Introduction to

Anthro-pology

Introduction to Anthropology

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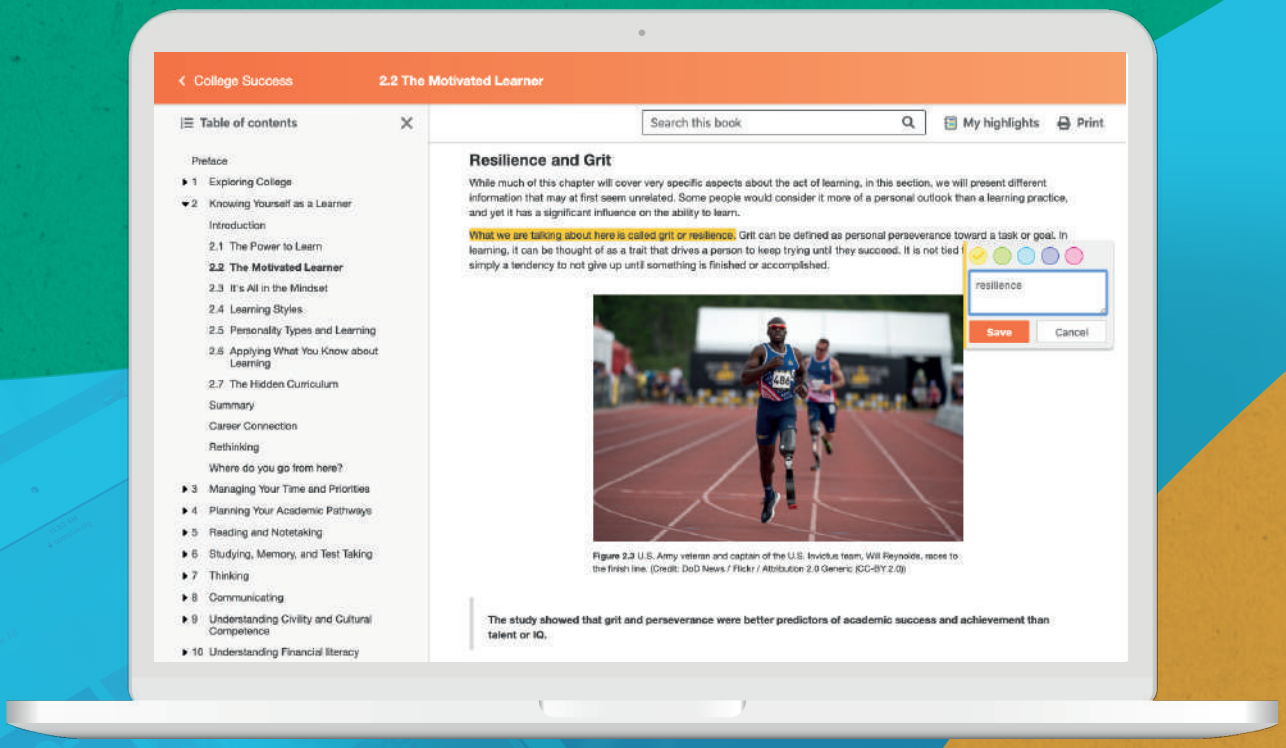

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PREFACE

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Format

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About *Introduction to Anthropology*

Introduction to Anthropology is a four-field text, grounded in foundational content in cultural anthropology, archaeology, biological anthropology, and linguistic anthropology. This approach makes the text useful for both general and cultural introductory courses as well as for introductory courses in some of the anthropology subfields. Upon this strong foundation, two contemporary themes are highlighted: social inequality and the natural world. Ethnographies and examples throughout the text address the impacts of these two themes on human societies throughout history and around the globe.

Coverage and Scope

Introduction to Anthropology contains all of the foundational material necessary for introductory courses in anthropology. Methods and theories from all four fields are introduced in the first two chapters and woven throughout later discussions. The central concept of culture likewise is both explored in detail in its own chapter and referenced repeatedly in examples throughout the text. The evolution and diversification of the human species is centrally featured in two chapters, "Biological Evolution and Early Human Evidence" and "Physical and Cultural Evolution in the Genus *Homo*." The breadth of the discipline is apparent in the variety of examples and ethnographies as well as specific chapters dedicated to developing areas of anthropology, such as

"Medical Anthropology" and "Human-Animal Relationships." An engaging and inviting narrative will hold students' interest.

Addressing Societal Issues

The central themes of *Introduction to Anthropology*—social inequality and the natural world—connect the text's foundational material to two of the most pressing contemporary issues facing societies around the world.

- In addressing social inequality, the text drives readers to consider the rise and impact of social inequalities based on forms of identity and difference (such as gender, ethnicity, race, and class) as well as oppression and discrimination. The contributors to and dangers of socioeconomic inequality are fully addressed, and the role of inequality in social dysfunction, disruption, and change is noted. *Introduction to Anthropology* centers on the lived experiences of a wide range of people and provides ample opportunities for instructors and students to discuss and address preconceived notions, misconceptions, and potential solutions and outcomes.
- To illustrate the fundamental relationship between humans and their environments, the natural world is treated as both a setting for human existence and a key influence on human culture, economics, and politics. This focus makes the text uniquely suited to the contemporary era as climate change and environmental degradation play an increasing role in humanity's governance, intercultural relationships, and daily lives.

Illuminating an Evolving and Relevant Field

The text showcases the historical context of the discipline, with a strong focus on anthropology as a living and evolving field. A deep and reflective exploration of the origins of anthropology's methods and goals is featured in several chapters, including "Methods: Cultural and Archaeological Research Methods" and "Indigenous Anthropology." There is significant discussion of recent efforts to make the field more diverse—in its practitioners, in the questions it asks, and in the applications of anthropological research to address contemporary challenges. The authors who contributed to this text come from diverse backgrounds and geographic regions, providing balance and richness to the narrative, examples, and theoretical foundations of the text. The researchers highlighted in the Profiles in Anthropology sections, many still living and working, are likewise representative of the growing diversity of the field.

Unique chapters: Five of the text's 20 chapters introduce students to current and developing specializations within the discipline. These chapters offer an engaging and in-depth look at research fields rarely covered in introductory texts, fields that are particularly interdisciplinary in their aims and practices. They further stress that anthropology is an evolving and relevant field, offering insights into humanity's deepest questions and directions forward in addressing the toughest challenges. These chapters are:

- "Anthropology of Food," including material on food artifacts, ancient foodways and food reconstructions, food as cultural heritage, food prescriptions and proscriptions, and the globalization of food.
- "Anthropology of Media," addressing topics such as visual anthropology and ethnographic film, photography and representation, news media and the public sphere, the role of media in the development of national identity, and digital media.
- "Medical Anthropology," with material on the history of medical anthropology, the social construction of health, common medical anthropology methods and theoretical approaches, and applied medical anthropology.
- "Human-Animal Relationships," including discussions of multispecies ethnography, human-animal empathy, human-animal relationships among people practicing varying subsistence strategies, animal symbolism in oral tradition and religion, and pet keeping.
- "Indigenous Anthropology," which, through the lens of the experiences of the Indigenous peoples of North America, addresses the historical and contemporary challenges facing Indigenous people, including issues of agency, rights, and identity, as well as exploring Indigenous material cultures, perspectives, and worldviews.

Enriching and Engaging Features

Several feature boxes highlight the vibrant and applied nature of anthropology and give students practice using the methods discussed throughout the text.

- **Profiles in Anthropology.** Each chapter contains a profile of one or more anthropologists, many contemporary and some

historical, who have made significant contributions to the discipline. These featured anthropologists represent a diversity of racial and ethnic backgrounds as well as a broad sampling of research interests and perspectives.
- **Ethnographic Sketches.** Ethnographic sketches taken from the authors' own fieldwork are spaced throughout the book. These engaging vignettes provide a window into the actual work of doing anthropology, providing readers with a sense of the pleasures and challenges of doing research in the field.
- **Mini-Fieldwork/Applied Activities.** Each chapter concludes with a simple fieldwork activity to give students practice thinking and researching like an anthropologist. These exercises provide them with hands-on experience applying the methods and theories discussed in the chapter to actual research conducted in their own communities.

Pedagogical Framework

An effective pedagogical framework helps students structure their learning and retain information.

- **Chapter Outlines.** Each chapter opens with an outline and introduction, familiarizing students with the material that will follow. Throughout the chapter, material is chunked into manageable sections of content within each of the larger main heads.
- **Learning Objectives.** Every main section begins with a set of clear and concise learning objectives. These objectives are designed to help the instructor decide what content to include or assign and to guide student expectations. After completing the section and relevant end-of-chapter exercises, students should be able to demonstrate mastery of the learning objectives.
- **Chapter Summaries.** Chapter summaries distill the information presented in each chapter to key, concise points.
- **Key Terms.** Key terms are bolded and followed by a definition within the text. Definitions of key terms are also listed in a glossary at the end of each chapter.
- **Critical Thinking Questions.** Each chapter ends with 8 to 10 critical thinking questions designed to help students assess their learning and apply it to their daily lives.
- **Suggested Readings.** This feature helps students further explore the chapter content by providing curated links to other information sources.

About the Authors

Senior Contributing Authors

Jennifer Hasty is an adjunct professor of African studies at the University of Pennsylvania. She studies media and politics in West Africa and the United States. Her book *The Press and Political Culture in Ghana* explores the cultural and historical forces shaping the practice of journalism in the recent period of democratization. In addition to working as a journalist for several Ghanaian media organizations, she has worked as a wedding videographer in the Philadelphia metro area and a community radio DJ in northern New Mexico. She is currently writing a book on corruption in Ghana. Chapters authored or coauthored in this text include the following:

Chapter 1: What Is Anthropology?

Chapter 2: Methods: Cultural and Archaeological

Chapter 3: Culture Concept Theory: Theories of Cultural Change

Chapter 6: Anthropological Thought

Chapter 7: Work, Life, and Value: Economic Anthropology

Chapter 8: Authority, Decisions, and Power: Political Anthropology

Chapter 12: Gender and Sexuality

David G. Lewis is a member of the Confederated Tribes of Grand Ronde of Oregon. He has a PhD from the University of Oregon (2009) and is an assistant professor of anthropology and ethnic studies at Oregon State University. David has conducted research on Oregon tribal history for some 25 years and has published numerous journal articles and book chapters. Additionally, he has researched and written over 470 essays for his blog, the *Quartux Journal* (https://openstax.org/r/QuartuxJournal), documenting tribal adjustments to colonization in the West. David conducts numerous presentations annually with community groups, at conferences, and at universities, educating about tribes in the region; consults with local governments and organizations on diversity, place naming, and land acknowledgments; and curates museum exhibits at local historical societies and museums. Chapters authored or coauthored in this text include the following:

Chapter 2: Methods: Cultural and Archaeological

Chapter 3: Culture Concept Theory: Theories of

Cultural Change

Chapter 19: Indigenous Anthropology

Dr. **Marjorie M. Snipes** earned a PhD in cultural anthropology from the University of Wisconsin–Madison (1996) and is currently a professor of anthropology at the University of West Georgia, where she teaches anthropological theory, ethnographic field methods, anthropology of religion, and animals and culture. Her doctoral fieldwork in the northwestern Andes of Argentina focused on religion and identity in an agropastoral society, in particular on understanding the relationships that herders forge with their animals and with each other. Among her recent publications are *Inside Anthropology* (2021, Kendall Hunt) and *The Intellectual Legacy of Victor and Edith Turner* (2018, Lexington). Chapters authored or coauthored in this text include the following:

Chapter 10: The Global Impact of Human Migration

Chapter 11: Forming Family through Kinship

Chapter 13: Religion and Culture

Chapter 14: Anthropology of Food

Chapter 18: Human-Animal Relationships

Chapter 20: Anthropology on the Ground

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Comprehensive Instructor's Manual. Each component of the instructor's manual is designed to provide maximum guidance for delivering the content in an interesting and dynamic manner. The instructor's manual includes a chapter outline containing the learning outcomes for each section, section outlines, and section summaries. Chapter key terms are listed as well. Also included for each chapter are strategies for using the Mini-Fieldwork/ Applied Activity and the Profiles in Anthropology. There are sample answers and strategies for using select critical thinking questions in the chapter. Each chapter also includes links to websites and

organizations relevant to the content in the chapter as well as to content that extends examples in the chapter.

Test Bank. With nearly 1,100 multiple-choice, fill-in-the-blank, and short-answer questions in the test bank, instructors can customize tests to support a variety of course objectives. The test bank is available in Word format.

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CHAPTER 1
What Is Anthropology?

Figure 1.1 Artist's depiction of a woman hunting, created in 1565. Contrary to some long held beliefs, women have always played a role in hunting game. (credit: "Illustration of activities of Lapps and Finns: Men and women hunting with bows and arrows on snowshoes; "women hunt...as nimbly...or more than men" by Illustration of activities of Lapps and Finns/Library of Congress Prints and Photographs Division)

CHAPTER OUTLINE

INTRODUCTION Imagine a research project that contains these three members:

Randy Haas discovered the 9,000-year-old grave of a teenager buried with a hunting tool kit in the Andes mountains of Peru. Haas found that this hunter from long ago was a young woman. This discovery has upset the notion that hunting was the exclusive activity of men throughout human evolutionary history.

Daniel Miller is part of a global team researching how people use smartphones in various parts of the world, including Brazil, Cameroon, Chile, China, Ireland, Italy, Japan, East Jerusalem, and Uganda. The team is exploring how smartphones take on different functions in different cultural contexts. Focusing on Ireland,

Miller theorizes that smartphones become a kind of personal avatar, expressing and enacting the specific social identity of the user.

FIGURE 1.2 Red-tailed monkeys, the subject of anthropologist Michelle Brown's study, are primates that are found in Central and East Africa. This red-tailed monkey lives in Uganda. They are social animals and live in groups of 8-30 individuals. (credit: "Schmidt's Red-tailed Monkey" by Mehgan Murphy/Smithsonian's National Zoo, CC0 1.0)

Michelle Brown spends long days observing blue monkeys, red-tailed monkeys, and baboons in a conservation park in Uganda. She records the behavior of these primates as they find food, communicate, and fight with one another. She collects urine and feces to analyze hormone levels, intestinal parasites, and DNA. She wants to understand how primates compete as individuals and groups for access to various foods in their environment.

What kind of research project could encompass such a diversity of topics and methods? Since this is the first chapter of an anthropology textbook, you can probably guess. Though they conduct research on vastly different topics, all three are anthropologists. How could the work of these researchers be united in one academic discipline? The reason, as we will see, is that anthropology is vast.

Anthropology, the study of humanity, is guided by a central narrative and set of research commitments. Anthropology aims to overcome bias by examining cultures as complex, integrated products of specific environmental and historical conditions. Anthropologists use many different research strategies in their efforts to represent people from cultures very different from their own.

Anthropology explores controversial topics that may challenge individual assumptions and values. The goal is to understand the full experience of humanity, including elements that may seem unfamiliar or uncomfortable. Anthropology teaches a set of skills for setting aside personal perspectives and keeping an open mind while learning about the diversity of human practices and ideas. As discussed further at the end of this chapter, this does not mean abandoning individual personal values, but rather suspending judgment temporarily while learning to understand the perspectives of others.

1.1 The Study of Humanity, or "Anthropology Is Vast"

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define the study of anthropology in the broadest sense.
- Summarize the guiding narrative of anthropology.
- Restate and explain the central commitments of anthropology.

Anthropology is a vast field of study—so vast, in fact, that anthropology is interested in everything. Anthropology is unique in its enormous breadth and its distinctive focus. Consider other disciplines. In the arts and sciences, each discipline focuses on a discrete field of social life or physical phenomena. Economists study economics. Religious scholars study religion. Environmental scientists study the environment.

Biologists study living organisms. And so on.

Anthropologists study all of these things. Put simply, anthropology is the study of humanity across time and space. Anthropologists study every possible realm of human experience, thought, activity, and organization. Human as we are, we can only engage in social and natural worlds through our human minds and human bodies. Even engagement with nonhuman realms such as astronomy and botany is conditioned by our human senses and human cognition and thus varies across different societies and different time periods.

You may be thinking, If anthropology is the human aspect of absolutely everything, then does anthropology encompass the other social disciplines, such as political science, religious studies, and economics? This is not the case. Certainly, anthropologists are frequently multidisciplinary, meaning that while their research and teaching are focused within the discipline of anthropology, they also engage with other disciplines and work with researchers and teachers in other fields. But the way that scholars in the other social disciplines approach their subject matter is different from the way anthropologists approach those same subjects.

The distinctive approach of anthropology relies on a central narrative, or story, about humanity as well as a set of scholarly commitments. This central story and these common commitments hold the discipline together, enabling anthropologists to combine insights from diverse fields into one complex portrait of what it means to be human.

Anthropology is everything, but it's not just *anything*. Anthropology is the study of humanity guided by a distinctive narrative and set of commitments.

The Heart of Anthropology: Central Narrative and Commitments

Anthropologists are great storytellers. They tell many, many stories about all aspects of human life. At the heart of all of these stories is one fundamental story: the "story of humanity," a rich and complex narrative. A narrative is a story that describes a connected set of features and events. Narratives can be fictional or nonfictional. The narrative of anthropology is a true story, a factual narrative about the origins and development of humanity as well as our contemporary ways of life. The central narrative of anthropology can be summarized this way.

Human beings have developed flexible biological and social features that have worked together in a wide variety of environmental and historical conditions to produce a diversity of cultures.

Three features of this narrative are especially important to anthropologists. These features form three central commitments of anthropology. In academic study, a commitment is a common goal recognized by the scholars in a discipline.

Central Commitment #1: Exploring Sociocultural Diversity

As the narrative suggests, humans in a diversity of conditions create a diversity of cultures. Rather than trying to find out which way of life is better, morally superior, more efficient, or happier or to make any other sort of judgment call, anthropologists are committed to describing and understanding the diversity of human ways of life. Setting aside judgments, we can see that humans everywhere create culture to meet their needs. Anthropologists discover how different cultures devise different solutions to the challenges of human survival, social integration, and the search for meaning.

What are you wearing today? Perhaps a T-shirt and jeans with sneakers, or a tunic and leggings with flip-flops. What about your professor? Are they wearing a bathrobe and slippers, or perhaps a cocktail dress with stilettos? You can be (almost) certain that will never happen. But why not? You might assume that what Americans wear for class is completely normal, but this assumption ignores the question of what makes something "normal."

FIGURE 1.3 Ghanaian professionals wearing local fashions to promote the national textile industry. (credit: "Ghanaian Ladies" by Erik (HASH) Hersman/flickr, CC BY 2.0)

In many countries, for instance, university students typically wear dress shirts with slacks or skirts to class. Many Ghanaian students would not dream of wearing ripped jeans or tight leggings to class, considering such casual dress disrespectful. American students put much more emphasis on comfort than on presentation, an overall trend in American dress. Even in office settings, it is now acceptable for Americans to wear casual clothing on Fridays. In the West African country of Ghana, "casual Friday" never caught on, but office workers have developed their own distinctive Friday dress code. As the local textile industry became threatened by Chinese imports, Ghanaian office workers began wearing outfits sewn from locally manufactured cloth on Fridays, creating a practice of "National Friday Wear."

So which way is better, the American way or the Ghanaian way? Anthropologists understand that neither way is better and that each addresses a need within a particular culture. Casual Friday is great for Americans who crave comfy leisurewear, while National Friday Wear is great for Ghanaians who want to boost their local economy and show their cultural pride.

Anthropologists recognize not only diversity across different cultures but also the diverse experiences and perspectives within a culture. Do you ever buy used clothing at thrift shops, or do you know people who do? An old green men's trench coat bought at a vintage clothing store may be a favorite of a college student. The mother of that student may not feel the same way and offer to buy their child a new coat much to the distress of the owner of the coat! To people who have grown up in the 1930's and 1940's, used clothing was associated with the hard times of the Great Depression. For the newer generations, used clothing is a way to find unique, affordable clothing that can stretch the boundaries of mainstream style. Although people in a culture share a general set of rules, they interpret them differently according to their social roles and experiences, sometimes stretching the rules in ways that ultimately change them over time.

FIGURE 1.4 Ghanaian trader in her secondhand clothing shop (credit: "Market Woman - Kejetia Market - Kumasi - Ghana - 03" by Adam Jones/flickr, CC BY 2.0)

In Ghana, most used clothing is imported from the United States and Europe in large bales that local vendors purchase and sell in market stalls. A person from the United States or Europe is locally referred to as an *obruni*. Used clothing is called *obruni wawu*, or "a foreign person has died," reflecting the assumption that no living person would give away such wearable clothing. Many Ghanaians love to pick through the piles of *obruni wawu* in the market, thrilled to find recognizable brands and unusual styles. Some, however, associate *obruni wawu* with poverty. The stalls that sell *obruni wawu* are often called "bend-over boutiques," referring to the subservient posture adopted by customers rifling through the piles of clothing on the ground. *Obruni wawu* is suitable in some situations but certainly not in others. A particular Ghanaian movie included a scene where a man trying to woo a much younger woman. When the man gave his would be girlfriend a bag full of *obruni wawu* as a gift, it caused the audience to burst our laughing. The gift was humorous and inappropriate to the audience.

As with clothing, different cultures come up with different solutions to common challenges such as housing, food, family structure, the organization of work, and finding meaning in life. And people in every society discuss and argue about their own cultural norms. Anthropology seeks to document and understand the diverse range of solutions to common human challenges as well as the diversity of conflicting perspectives within each culture.

Central Commitment #2: Understanding How Societies Hold Together

Just as the various parts of our bodies all work together (the brain, the heart, the liver, the skeleton, and so forth), the various parts of a society all work together as well (the economy, the political system, religion, families, etc.). Frequently, anthropologists discover that changes in one realm of society are related to changes in another realm in unexpected ways. When farmers in Ghana began growing cocoa for export during the colonial period, the agricultural shift dramatically altered gender relations as men monopolized cash crops and women were relegated to vegetable farming for their families' consumption and local trade. As men benefited from the profits of the cocoa trade, relations between men and women became more unequal.

Anthropologists have a favorite word for the way that all elements of human life interrelate to form distinctive

cultures: **holism**. Sometimes those parts reinforce one another, encouraging stability; sometimes they contradict one another, promoting change. Consider the caste system in India. Cultural anthropologist Susan Bayly describes how the beliefs and practices associated with caste in India have provided cultural integration and stability while also demonstrating a great deal of local variability and working as a force of social change (1999). Most Indians are familiar with two forms of belonging assigned by birth, the *jati* (birth group) and the *varna* (order, class, or kind). There are thousands of birth groups in the various regions of India, many specific to a single region. By contrast, there are four varnas known across India: Brahmins (associated with priests), Kshatriyas (associated with rulers and warriors), Vaishyas (associated with traders), and Shudras (associated with servile laborers). Another group, called "untouchables" or *dalits*, are outside the scheme of varnas.

As described in the Vedas, the four varnas are ordered in an interdependent hierarchy reminiscent of human anatomy. The *Rig Veda* describes how the gods sacrificed the first man, Purusa, dividing his body to create four groups of humanity:

> When they divided the Purusa, into how many parts did they arrange him? What was his mouth? What his two arms? What are his thighs [loins] and feet called? The *brahmin* was his mouth, his two arms were made the *rajanya* [*kshatriya*, king and warrior], his two thighs [loins] the *vaisya*, from his feet the *sudra* [servile class] was born. (Bayle, 1999)

Ancient texts envision caste as a means of social order as people in each caste perform different functions and occupations, all working together in harmony. Note, however, that such texts were written down by members of upper-caste groups, often Brahmin scholars. Anthropologists and historians who study the practices of caste argue that the caste system was never such a unitary and dominant force across the country but rather a flexible, regional, and constantly changing set of identities. In the colonial period, the British made the caste system more rigid and antagonistic, offering education and jobs to select caste groups. In the 20th century, many lower-caste groups have resisted their oppression by converting to Christianity or Islam and forming political parties to pressure the government for more opportunities for social advancement.

Anthropologists are curious about how different cultures create different categories of people and use those categories to organize the activities of social life. In many farming societies, for instance, men do certain kinds of agricultural work and women do others. In societies where land must be cleared in order to sow crops, men often chop down trees and clear the brush while women do the planting. In societies that utilize large-scale industrial farming, migrants or people of a specific ethnicity or assigned racial category are often recruited (or forced) to perform the manual labor required to grow and harvest crops. In industrial capitalist societies, one group of people owns the factories and another group works the machines that produce the industrial products. Relations between groups can be cooperative, competitive, or combative. Some cultures promote the equality of social groups, while many others reinforce inequality among groups. Holism is not the same as harmony. Anthropologists are interested in how society holds together but also in the conditions that can cause conflict, change, and disintegration.

You may have heard the word *polarized* used to describe the sense that two different groups in American society are moving farther and farther apart in their values, opinions, and desires. Some suggest that the contradictory perspectives of these two groups threaten to tear American society apart. Others suggest that Americans are united by deeper values such as freedom, equal opportunity, and democracy. Using holism to understand this issue, an anthropologist might consider how the perspectives of each group relate to that group's economic experiences, political convictions, and/or religious or moral values. A comprehensive use of holism would explore all of these aspects of society, looking at how they interact to produce the polarization we see today and suggesting what might be done to bring the two groups into productive dialogue.

Central Commitment #3: Examining the Interdependence of Humans and Nature

As our narrative suggests, anthropologists are interested in the natural environment, the way humans have related to the natural world over time, and how this relationship shapes various cultures. Anthropologists consider how people in different cultures understand and use the various elements of nature, including land, water, plants, animals, climate, and space. They show how people interact with these elements of nature in complex ways.

Archaeologists working in prehistoric sites all over the world have documented how prehistoric people understood celestial objects and used them to navigate their waterways, create calendars and clocks, regulate farming activities, schedule religious ceremonies, and inform political leaders. This area of study is called **archaeoastronomy**. In Chaco Canyon in the American Southwest, archaeologists have discovered that buildings in the major settlement areas were aligned so that certain windows would provide perfect vantage points to view the sun and moon at pivotal times of the year, such as solstice and equinox. The Sun Dagger, consisting of two whorl-shaped petroglyphs (stone etchings) on Fajada Butte, is precisely positioned under a rock crevice so as to indicate the solstices and equinoxes when the sun shines through the crevice. Unfortunately, tourist foot traffic at the site has altered the width and direction of the crevice so that the Sun Dagger no longer marks these celestial events accurately.

FIGURE 1.5 The Sun Dagger at Fajada Butte (credit: National Park Service/Wikimedia Commons, Public Domain)

The people of Chaco Canyon may have been particularly attuned to the features of their environment as they constructed their complex civilization in the challenging environment of the high desert. With scarce rainfall and brief growing seasons, their survival depended on accurate identification of opportune planting and harvesting times. With the onset of a 50-year drought, farming became more and more precarious. Eventually, the ancient peoples of Chaco were forced to abandon the area.

Some anthropologists study how people interact with the plants in their area. The field of **ethnobotany** examines how people in different cultures categorize and use plants for food, shelter, tools, transportation, art, and religion. Ethnobotanists also conduct research on plants used in healing to discover the relationship between cultural practices and the pharmaceutical properties of these plants. Some examine the cultural use of psychoactive plants such as mushrooms and peyote in religious ritual. For instance, anthropologist Jamon Halvaksz studied the controversial use of marijuana among youth in New Guinea (2006). Young people told Halvaksz that marijuana helped them work harder, overcome shame, and understand ancestral stories. Critics of the practice told Halvaksz that marijuana dried the blood of people who used it, making their offspring weak and feeble. Marijuana use has generated similar controversies in other countries, including the United States, with some arguing that the drug provides relaxation and pain relief while others claim it interferes with cognitive abilities and motivation.

Our relationship with nature is reciprocal. Nature shapes humanity, and humanity shapes nature. Exploring

how nature shapes humanity, anthropologists speculate about how aspects of the environment have shaped the emergence and development of human biology, such as our ability to walk, the shape of our teeth, and the size of our brains. Dramatic climactic shifts over the past several million years have forced periods of rapid biological and cultural adaptation, resulting in new hominin species and new skill sets such as language and toolmaking. In more recent archaeological time periods, environmental characteristics have shaped religious beliefs, gender relations, food-getting strategies, and political systems. Environmental forces can trigger the beginning or the end of a society. Some archaeologists study how natural events such as volcanic eruptions and droughts have led to mass migrations and the collapse of empires.

Our reciprocal relationship with nature also works the other way around; that is, humans shape nature. Our environments are shaped by the food-getting methods of our societies as well as the way we acquire and trade resources such as oil, natural gas, diamonds, and gold. Many anthropologists explore how contemporary ways of life change the natural world at local, regional, and global levels. Farming dramatically impacts ecosystems with the clearing of prairies, wetlands, and forests. Fishing can deplete certain species, changing the whole ecosystem of rivers and coastal waters. Responding to population pressures, people construct dams to channel water to emergent cities. The redirection of water transforms regional ecosystems, turning wetlands into deserts and deserts into resource-hungry cities.

Scholars use the term **Anthropocene** to describe the contemporary period of increasing human impact on the ecosystems of our planet. Large-scale pollution, mining, deforestation, ranching, and agriculture are causing dramatic environmental disruptions such as climate change and mass extinction of plant and animal species. Many anthropologists are studying these problems, focusing on how people are working locally, regionally, and globally to promote more sustainable ways of living in our natural world.

1.2 The Four-Field Approach: Four Approaches within the Guiding Narrative

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Identify and define the four fields of anthropology.
- Describe the work of professional anthropologists in each field.
- Provide an example of how the four fields work together to explore common issues.

Let's recall the central narrative of anthropology:

Human beings have developed flexible biological and social features that have worked together in a wide variety of environmental and historical conditions to produce a diversity of cultures.

Researching this argument is a vast endeavor requiring many complementary approaches and techniques. Anthropology comprises four main approaches, the four subfields of our discipline. Each subfield specializes in exploring a different aspect of the common narrative. Combining insights from the four fields gives us a rich and complex understanding of specific issues such as gender, inequality, race, and the environment. Let's take a look at each subfield and then examine how the subfields combine in the study of racial categories and relations.

Biological Anthropology

Biological anthropology focuses on the earliest processes in the biological and sociocultural development of human beings as well as the biological diversity of contemporary humans. In other words, biological anthropologists study the origins, evolution, and diversity of our species. Some biological anthropologists use genetic data to explore the global distribution of human traits such as blood type or the ability to digest dairy products. Some study fossils to learn how humans have evolved and migrated. Some study our closest animal relatives, the primates, in order to understand what biological and social traits humans share with primates and explore what makes humans unique in the animal world.

The Dutch primatologist Carel van Schaik spent six years observing orangutans in Sumatra, discovering that these reclusive animals are actually much more social than previously thought (2004). Moreover, van Schaik observed that orangutans use a wide variety of tools and pass down skills to their young. By studying these

primates, van Schaik and other biological anthropologists gain insight into the origins of human intelligence, technology, and culture. These researchers also warn that habitat loss, illegal hunting, and the exotic pet trade threaten the survival of our fascinating primate cousins.

Biological anthropologists frequently combine research among primates with evidence from the human fossil record, genetics, neuroscience, and geography to answer questions about human evolution. Sometimes their insights are startling and unexpected. Anthropologist Lynne Isbell argues that snakes have played a key role in the evolution of human biology, particularly our keen sense of sight and our ability to communicate through language (Isabell, 2009). Isbell's "snake detection theory" posits that primates developed specialized visual perception as well as the ability to communicate what they were seeing in order to alert others to the threat of venomous snakes in their environment. She points to the near-universal fear of snakes shared by both humans and primates and has documented the prevalence of snake phobia in human myth and folklore. Isbell's research highlights how human-animal relations are central to humanity, shaping both biology and culture.

Not all biological anthropologists study primates. Many biological anthropologists study fossilized remains in order to chart the evolution of early **hominins**, the evolutionary ancestors of modern humans. In this field of study, anthropologists consider the emergence and migration of the various species in the hominin family tree as well as the conditions that promoted certain biological and cultural traits. Some biological anthropologists examine the genetic makeup of contemporary humans in order to learn how certain genes and traits are distributed in human populations across different environments. Others examine human genetics looking for clues about the relationships between early modern humans and other hominins, such as Neanderthals.

Forensic anthropology uses the techniques of biological anthropology to solve crimes. By analyzing human remains such as decomposed bodies or skeletons, or tissue samples such as skin or hair, forensic anthropologists discern what they can about the nature of a crime and the people involved. Key questions are who died, how they died, and how long ago they died. Often, forensic anthropologists can discover the age, sex, and other distinctive features of perpetrators and victims. Looking closely at forms of bodily trauma and patterns of blood or bullets, they piece together the story of the crime. They work on investigative teams with law enforcement officers and medical experts in ballistics, toxicology, and other specialties. Forensic anthropologists often present their findings as witnesses in murder trials.

Not all of these crimes are contemporary. Sometimes, forensic anthropology is used to understand historical events. Excavating the historic Jamestown colony of early English settlers in North America, archaeologist William Kelso found a human skull in the midst of food remains. Noticing strange cut marks on the skull, he called upon Douglas Owsley, a forensic anthropologist working for the Smithsonian Institution, to help him figure out what the markings meant. Owsley determined that the markings were evidence of intentional chopping to the skull with a sharp blade. He concluded that the skeleton belonged to a 14-year-old girl who had been cannibalized by other settlers after she died. This interpretation corroborates historical evidence of severe starvation in the colony during the harsh winter of 1609–1610.

Archaeology

Archaeologists use artifacts and fossils to explore how environmental and historical conditions have produced a diversity of human cultures – the study of **archaeology**. **Artifacts** are objects made by human beings, such as tools or pottery. **Fossils** are the remains of organisms preserved in the environment. Archaeologists have developed careful methods of **excavation**, or removing fossils and artifacts from the ground, in order to learn as much as possible about how people lived in times before and after the development of writing. They are interested in how people met basic needs such as clothing and shelter, as well how they organized their societies in family groups, trade networks, and systems of leadership. Many archaeologists seek to understand how humans lived in relation to the natural world around them, altering the environment at the same time that the environment was shaping their evolution and social development.

A group of archaeologists led by Tom Dillehay spent seven years excavating a set of sites in northern Peru, charting the development of human society in this area over a period of 14,000 years (2017). They traced the society from the early ways of life to the emergence of cities and early states, discovering how people there developed fishing, farming, and herding strategies that led to increased sociocultural complexity. The team

collected data on the plants and animals of the area as well as the buildings, tools, cloth, and baskets made by the people. They concluded that the people who lived in this area placed a high value on cooperation and living in harmony with nature.

Some archaeologists focus on more specific topics in more recent time periods. Archaeologist Eric Tourigny examined the graves at pet cemeteries in the United Kingdom from 1881 to 1981(2020). Looking at the epitaphs on the gravestones of the pets, Tourigny noted a change from earlier Victorian ways of thinking of pets as friends to later, more modern ways of conceptualizing pets as members of the family. He noted, too, that epitaphs expressed an increasingly common belief that pet owners would be reunited with their pets in the afterlife.

Cultural Anthropology

Cultural anthropology is devoted to describing and understanding the wide variety of cultures referred to in anthropology's central narrative. Cultural anthropologists explore the everyday thoughts, feelings, and actions of people in different cultures as well as the cultural and historical events that they consider important. Examining social discourse and action, cultural anthropologists seek to understand unspoken norms and values as well as larger forces such as economic change and political domination. Cultural anthropologists also study how different societies are structured, including the roles and institutions that organize social life.

Cultural anthropologists often live for many months or years in the societies they study, adopting local ways of living, eating, dressing, and speaking as accurately as possible. This practice is called **fieldwork**. Anthropologists who undertake fieldwork might write an **ethnography**, an in-depth study of the culture they have been studying. Classic ethnographies of the early 20th century often portrayed the cultures of non-Western peoples as harmonious and unchanging over time. Bronislaw Malinowski, a pioneer of the long-term fieldwork method, spent nearly two years studying trade and magic among the Trobriand peoples living in what is now the Kiriwina island chain northeast of New Guinea. His ethnography, *Argonauts of the Western Pacific* (1922), describes how Trobrianders undertook canoe voyages from island to island for the ceremonial exchange of white shell bracelets and red shell necklaces among different island groups, an exchange system known as the kula ring. Curiously, these highly valued objects had no use whatsoever, as no one ever wore them. Rather, the exchange of bracelets and necklaces functioned as a means of enhancing social status (for the givers) and reinforcing trade relationships. Malinowski argues that this form of exchange took the place of warfare. Exploring the kula ring in great detail, Malinowski also learned about many other aspects of Trobriand culture, such as the making of tools and canoes, farming practices, gender roles, sexuality, and magical beliefs and practices.

Nowadays, cultural anthropologists tend to focus more on issues involving conflict and change, such as suicide bombing in Afghanistan (Edwards 2017), a creationist theme park in Kentucky (Bielo 2018), sperm donation in Denmark (Mohr 2018), and garbage pickers in Rio de Janeiro (Millar 2018). Often, anthropologists explore overlooked and marginalized perspectives on controversial issues, shedding light on the cultural complexities and power dynamics involved. Anthropologist Tracey Heatherington was interested in why some people were resisting the creation of a conservation park on the Italian island of Sardinia (2010). The central highlands of Sardinia are home to many endangered species and old growth forests, as well as local herding peoples who fiercely resisted the appropriation of their homeland. Heatherington's research identified three competing perspectives: those of global environmentalists, the national government of Italy, and the local people of Sardinia. The global environmentalists view the Sardinian highlands as a delicate ecosystem that should be protected and controlled by environmental experts. The Italian government sees in the same land an opportunity to develop ecotourism and demonstrate the Italian commitment to environmentalism. The local peoples of Sardinia treasure their homeland as the foundation of their way of life, an intimate landscape imbued with history and cultural value. As the controversy drew these three perspectives together, Western-led global environmentalism combined with national government to undermine the legitimacy of local knowledge and authority. Heatherington describes how stereotypes of Sardinians as ignorant and culturally backward were used to delegitimize their resistance to the conservation park, drawing our attention to forms of ecological racism that lurk in the global environmental movement.

Linguistic Anthropology

As you might guess, **linguistic anthropology** focuses on language. Linguistic anthropologists view language as a primary means by which humans create their diverse cultures. Language combines biological and social elements. Some linguistic anthropologists study the origins of language, asking how language emerged in our biological evolution and sociocultural development and what aspects of language might have given early hominins an evolutionary advantage. Other linguistic anthropologists are interested in how language shapes our thinking processes and our views of the world. In addition to its cognitive aspects, language is a powerful tool for getting things done. Linguistic anthropologists also study how people use language to form communities and identities, assert power, and resist authority.

Linguistic anthropologists frequently conduct the same kinds of long-term, immersive research that cultural anthropologists do. Christopher Ball spent a year living and traveling with the Wauja, an indigenous group in Brazil (2018). He describes the many routine and ritualized ways of speaking in this community and how each kind of talk generates specific types of social action. "Chief speech" is used by leaders, while "bringing the spirits" is used for healing the sick. Ceremonial language is used for giving people names and for conducting exchanges between different indigenous groups. Ball, like many linguistic anthropologists, also examined public speeches, such as the ones delivered by Wauja leaders to protest a dam on a nearby river. Ball also analyzed the forms of language used by state officials and development workers to marginalize and subordinate indigenous groups such as the Wauja.

Language is central to the way we conceptualize ourselves and our lives. Have you ever been asked to write an essay about yourself, perhaps as part of a school assignment or college application? If so, you might have used different phrases and concepts than if you'd been chatting with a new acquaintance. The purpose and intended audience of our language use shapes the way we represent ourselves and our actions.

Anthropologist Summerson Carr examined an addiction treatment program for homeless women in the midwestern United States, looking at the role of language in the therapeutic process (2011). After observing therapy sessions and self-help meetings, she describes how addiction counselors promote a certain kind of "healthy talk" that conveys deep cultural notions about personhood and responsibility. As patients master this "healthy talk," they learn to demonstrate progress by performing very scripted ways of speaking about themselves and their addiction.

How the Four Fields Work Together: The Example of Race

With their unique methods and emphases, the four fields of anthropology may seem like completely different disciplines. It's true that anthropologists from the four fields don't always agree on the best approach to sociocultural enquiry. Biological anthropologists often see themselves as "hard" scientists committed to studying humanity through the scientific method. Cultural anthropologists rely on the "softer" methods of observation, participation, and interviews. Someone who studies the genetic distribution of blood types and someone who studies an addiction treatment program may have a difficult time finding common ground.

Increasingly, however, urgent concerns such as inequality and climate change have highlighted the importance of an integrated approach to the study of humanity. The issue of racial inequality is an excellent example. Beginning with an approach from the cultural side of our discipline, many anthropologists explore what we think we know about the concept of race. How many racial categories do you think there are in the world? How can you tell a person's racial identity? What do you know about your own racial category?

Biological anthropologist Jada Benn Torres and cultural anthropologist Gabriel Torres Colón teamed up to explore how people use genetic ancestry testing to construct notions of collective history and racial belonging (2020). For instance, if you learn through genetic testing that your ancestors most likely came from Nigeria, you might begin to feel a certain identification with that country and with the continent of Africa as a whole. You might begin to feel that you have less in common with the people of your country of citizenship and more in common with the people of your country of ancestry, a racial connection perhaps felt as more fundamental than the sociocultural connection to your home culture. While concerned about the potential for spreading misconceptions about racial categories, Torres and Colon also note that racialized solidarity across national boundaries can foster transnational movements for social justice. Such research shows how we *actively*

construct our concepts about race using biological information about ourselves, all the time believing that those concepts are embedded in nature.

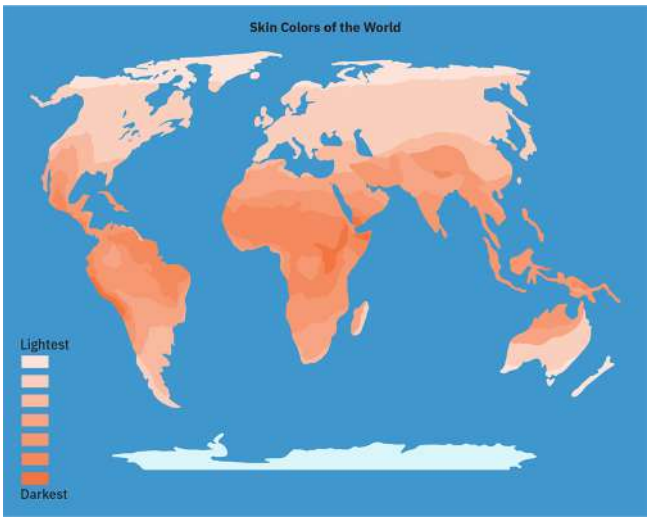

FIGURE 1.6 This map shows the predicted skin colors of people based on the levels of ultraviolet radiation in the areas where they live. (attribution: Copyright Rice University, OpenStax, under CC BY 4.0 license)

Importantly, biological anthropology demonstrates that our common notions of race are inaccurate. Biological anthropologists such as Agustín Fuentes (2012) and Nina Jablonski (2006) have looked carefully at the global distribution of human traits such as skin color, facial features, hair texture, and blood type, among other markers, in order to determine if humans are indeed grouped into discrete categories based on race. Short answer: biologically speaking, there are no real racial categories. Each human trait varies along a spectrum, and the various traits are mixed and matched among people in ways that make racial distinctions impossibly inaccurate. As an example, take the issue of skin color, which is the most common way people assign race. Jablonski demonstrates that skin color varies along a spectrum, from pinkish beige to dark brown, with people throughout the world having skin of every possible shade between those two. Originally, humans evolving on the African continent had dark skin to protect them from the direct ultraviolet light of the sun. As some early humans migrated north into environments with less direct sunlight, their skin lightened to allow the absorption of vitamin D from the much weaker sunlight.

Today, if we look at people with deep historical connections to particular geographical areas, we find that skin color shifts gradually with location. Imagine setting out on a road trip from Kinshasa, the capital of the Democratic Republic of the Congo, just a few degrees south of the equator in central Africa, and traveling all the way up to the city of Tromsø in Norway, north of the Arctic Circle. This 157-hour trip would take you through Nigeria, Niger, Algeria, Spain, France, Germany, Denmark, and Sweden. If you were paying attention to the skin color of the indigenous peoples in each location, you would notice a gradual shift from deep brown in Kinshasa to lighter brown in Algeria to dark beige in southern Spain to lighter beige in Sweden. You might also notice other changes, such as more green and blue eyes and more red and blond hair, as you head into northern Europe. At no point in your trip could you identify a boundary between groups. Rather, you would see a gradual spectrum of change.

Whether looking at visible characteristics such as skin color or invisible genetic markers such as blood type, biological anthropologists have demonstrated time and time again that there is no scientifically justifiable way to divide the human population into racial categories. Any way you draw the lines, there will be more variation within categories than between categories.

Does this mean that race does not exist? In terms of biology, that is exactly what it means. But in terms of social reality, unfortunately not. Race does not exist in nature, but race does exist in our minds, our practices, and our institutions. Archaeological excavations of the material lives of various groups in the United States, including people from China and Ireland as well as enslaved peoples from Africa, show how notions of race shaped their whole ways of life: the buildings in which they lived, the clothing they wore, the property they

owned, and the structure of their families (Orser 2007; Singleton [1985] 2016). In contemporary societies, cultural anthropologists studying forms of racial inequality in societies all over the world—including the United States, the Dominican Republic, Brazil, Japan, Kenya, and Zimbabwe—have uncovered the different ways that each of these societies constructs racial categories and uses various criteria to assign (and often reassign) race to a particular person.

Moreover, in-depth ethnographies illuminate the severity of racism in the everyday lives of people of color in the United States and elsewhere. After three years of fieldwork on the West Side of Chicago, anthropologist Laurence Ralph documented the suffering of people in this Black neighborhood as they contend with discrimination, economic deprivation, gang violence, and political marginalization (2014). Ralph emphasizes that the people he observed dream of a better life for themselves and their children, in spite of these struggles, and describes how many turn to social and political activism in an attempt to make their neighborhood a better place for everyone who lives there.

Linguistic anthropologists are interested in how race is constructed and expressed through language. Marcyliena Morgan studied the underground hip-hop scene in Los Angeles, exploring how Black emcees and musicians craft linguistic codes that reference their experiences of police violence, urban unrest, gang activity, and gentrification (2009). Like Ralph, Morgan highlights the creativity and resilience of Black American communities in the face of enduring racism in American society.

Taken together, these various anthropological approaches to race provide more insight and understanding than any one approach ever could. Overturning the biological myth of race is essential to understanding the complex reality of human diversity, but it is not enough. It would be a mistake to pretend that racial categories do not matter just because the concept of race has no basis in biology. The combined work of archaeologists, cultural anthropologists, and linguistic anthropologists demonstrates how the mythic notion of race has been used to exploit and marginalize certain people throughout history and into the present. We also see how people respond to racial subjugation with creativity and resilience, inventing cultural forms of resistance and mobilizing their communities through social activism.

1.3 Overcoming Ethnocentrism

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define the concept of ethnocentrism and explain the ubiquity of ethnocentrism as a consequence of enculturation.
- Distinguish certain forms of ethnocentrism in terms of their historical relationship to forms of empire and domination.
- Identify primitivism in European and American representations of African peoples.
- Identify orientalism in European and American representations of Asian and Middle Eastern peoples.

Have you ever known somebody who seems to think the world revolves around them? The kind of friend who is always talking about themselves and never asks any questions about you and your life? The kind of person who thinks their own ideas are cool and special and their own way of doing things is absolutely the best? You may know the word used to describe that kind of person: egocentric. An egocentric person is entirely caught up in their own perspective and does not seem to care much about the perspectives of others. It is good to feel proud of your personal qualities and accomplishments, of course, but it is equally important to appreciate the personal qualities and accomplishments of others as well.

The same sort of “centric” complex operates at the level of culture. Some people in some cultures are convinced that their own ways of understanding the world and of doing things are absolutely the best and no other ways are worth consideration. They imagine that the world would be a much better place if the superior beliefs, values, and practices of their own culture were spread or imposed on everyone else in the world. This is what we call **ethnocentrism**.

Enculturation and Ethnocentrism

We are all brought up in a particular culture with particular norms and values and ways of doing things. Our

parents or guardians teach us how to behave in social situations, how to take care of our bodies, how to lead a good life, and what we should value and think about. Our teachers, religious leaders, and bosses give us instruction about our roles, responsibilities, and relationships in life. By the time we are in our late teens or early twenties, we know a great deal about how our society works and our role in that society.

Anthropologists call this process of acquiring our particular culture **enculturation**. All humans go through this process. It is natural to value the particular knowledge gained through our own process of enculturation because we could not survive without it. It is natural to respect the instruction of our parents and teachers who want us to do well in life. It is good to be proud of who we are and where we came from. However, just as egocentrism is tiresome, it can be harmful for people to consider their own culture so superior that they cannot appreciate the unique qualities and accomplishments of other cultures. When people are so convinced that their own culture is more advanced, morally superior, efficient, or just plain better than any other culture, we call that ethnocentrism. When people are ethnocentric, they do not value the perspectives of people from other cultures, and they do not bother to learn about or consider other ways of doing things.

Beyond the sheer rudeness of ethnocentrism, the real problem emerges when the ethnocentrism of one group causes them to harm, exploit, and dominate other groups. Historically, the ethnocentrism of Europeans and Euro-Americans has been used to justify subjugation and violence against peoples from Africa, the Middle East, Asia, and the Americas. In the quest to colonize territories in these geographical areas, Europeans developed two main styles of ethnocentrism, styles that have dominated popular imagination over the past two centuries. These styles each identify a cultural "self" as European and a **cultural other** as a stereotypical member of a culture from a specific region of the world. Using both of these styles of ethnocentrism, Europeans strategically crafted their own coherent self-identity in contrast to these distorted images of other cultures.

Primitivism and Orientalism

Since the 18th century, views of Africans and Native Americans have been shaped by the obscuring lens of **primitivism**. Identifying themselves as enlightened and civilized, Europeans came to define Africans as ignorant savages, intellectually inferior and culturally backward. Nineteenth-century explorers such as Henry M. Stanley described Africa as "the dark continent," a place of wildness and depravity (Stanley 1878). Similarly, European missionaries viewed Africans as simple heathens, steeped in sin and needing Christian redemption. Elaborated in the writings of travelers and traders, primitivism depicts Africans and Native Americans as exotic, simple, highly sexual, potentially violent, and closer to nature. Though both African and Native American societies of the time were highly organized and well-structured, Europeans often viewed them as chaotic and violent. An alternative version of primitivism depicts Africans and Native Americans as "noble savages," innocent and simple, living in peaceful communities in harmony with nature. While less overtly insulting, the "noble savage" version of primitivism is still a racist stereotype, reinforcing the notion that non-Western peoples are ignorant, backward, and isolated.

Europeans developed a somewhat different style of ethnocentrism toward people from the Middle East and Asia, a style known as **orientalism**. As detailed by literary critic Edward Said (1979), orientalism portrays peoples of Asia and the Middle East as irrational, fanatical, and out of control. The "oriental" cultures of East Asia and Middle East are depicted as mystical and alluring. The emphasis here is less on biology and nature and more on sensual and emotional excess. Middle Eastern societies are viewed not as lawless but as tyrannical. Relations between men and women are deemed not just sexual but patriarchal and exploitative. Said argues that this view of Asian and Middle Eastern societies was strategically crafted to demonstrate the rationality, morality, and democracy of European societies by contrast.

In his critique of orientalism, Said points to the very common representation of Muslim and Middle Eastern peoples in mainstream American movies as irrational and violent. In the very first minute of the 1992 Disney film *Aladdin*, the theme song declares that Aladdin comes from "a faraway place / where the caravan camels roam / where they cut off your ear if they don't like your face / it's barbaric, but hey, it's home." Facing criticism by antidiscrimination groups, Disney was forced to change the lyrics for the home video release of the film (Nittle 2021). Many thrillers such as the 1994 film *True Lies*, starring Arnold Schwarzenegger, cast Arabs as America-hating villains scheming to plant bombs and take hostages. Arab women are frequently portrayed as

sexualized belly dancers or silent, oppressed victims shrouded in veils. These forms of representation draw from and reproduce orientalist stereotypes.

Both primitivism and orientalism were developed when Europeans were colonizing these parts of the world. Primitivist views of Native Americans justified their subjugation and forced migration. In the next section, we'll explore how current versions of primitivism and orientalism persist in American culture, tracing the harmful effects of these misrepresentations and the efforts of anthropologists to dismantle them.

1.4 Western Bias in Our Assumptions about Humanity

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define and recognize cultural bias.
- Analyze forms of cultural bias in our own interactions and institutions.
- Describe how the four fields of anthropology can work together to expose and overturn the misconceptions of cultural bias.

Euro-American ethnocentrism is everywhere in American culture—in our movies, advertising, museums, amusement parks, and news media. Though the styles have shifted somewhat in the past century, both primitivism and orientalism still persist as two discernible styles of bias.

Primitivism and Orientalism in Popular Culture

Think for a minute about the last time you saw an image of an African person. Was it, perhaps, an image of wide-eyed girl in tattered clothing in an advertisement from a development agency requesting a charitable donation? Or maybe it was a news media photograph of a child soldier wielding an AK-47 in a conflict zone in the Democratic Republic of the Congo or another African country. Africa is still popularly represented as a dark place full of deprivation and crisis. Africans are frequently infantilized as simple children who need the support and tutelage of White Western helpers. But isn't it true, you may say, that poverty and violent conflicts are widespread in Africa? Isn't the representation accurate to some degree?

The most troubled places on the African continent are the places where European colonialism was most brutal and violent. In what is now the Democratic Republic of the Congo, the Belgian king Leopold II oversaw a reign of terror against the local peoples, encouraging their enslavement for the lucrative rubber trade. Elsewhere in Africa, European colonial governments stole land from local peoples and confined them to reservations, forcing them to work on European plantations in order to pay taxes to the colonial government. Colonial officials fomented conflict by privileging some ethnic groups and repressing others. Where you see violence and conflict in Africa today, the roots can often be traced to the colonial period. Is this painful history included in American representations of Africa?

Moreover, there are many bright spots in Africa, places such as Ghana and Botswana, with growing economies and stable democracies. Would it surprise you to learn that Ghana has a space program? That there are more mobile phones than people in Kenya? That several electric cars are manufactured in Africa?

Similar distortions are applied to Native Americans, frequently represented as victims of history, poor and helpless, in need of outside help. The primitivist gaze shapes the representation of Native Americans in museums, which often feature dioramas of humble people with stone tools, buckskin clothes, and tepees, either living a simple life close to nature or engaged in tribal warfare, their bodies painted with vibrant colors. Of course, Native Americans do not live this way now, but these are the images that come to mind in the popular imagination. It is of course important for non-Native Americans to learn about the cultures of Native peoples before and during their contact with European settlers, but it is equally important to understand the legacies of history in the contemporary living conditions and activities of Native communities. Rather than seeing Native peoples as passive victims, popular culture should also depict the dynamic and creative responses of Native Americans to the forms of cultural violence enacted against them.

FIGURE 1.7 One example of a healthy Native American dish is Navajo mutton stew with blue corn and dry bread. (credit: "Mutton Stew with Blue Corn and Dry Bread" by Neeta Lind/flickr, CC BY 2.0)

For instance, did you know that a Native food movement is surging across the United States, both on Native reservations and in American cities? Native food activists such as Karlos Baca and Sean Sherman are reviving and reinventing the balanced, healthy cuisines of their ancestors, featuring dishes such as braised elk leg and maple red corn pudding. Sherman and his partner, Dana Thompson, have founded the nonprofit group North American Traditional Indigenous Food Systems (NATIFS), devoted to preserving Native foodways. The group offers opportunities for tribes to set up Native cuisine restaurants, providing jobs and profits to communities with high unemployment. Watch this video (https://openstax.org/r/sheansherman) to learn more about Sean Sherman and the Native Food movement.

Like primitivism, orientalism has endured in American and European cultures. In the two decades following the al-Qaeda attacks on American targets on September 11, 2001, the most prominent example of orientalism in American culture has been the stereotype that *all* Islamic peoples are fanatical and violent. The indiscriminate application of this stereotype to Islamic peoples across the Middle East was a major contributor to the 2003 American invasion of Iraq, a country that had nothing at all to do with the September 11 attacks. To promote the invasion, politicians used the orientalist notion that Iraq was a violent and irrational country stockpiling weapons of mass destruction (which turned out to be false). As the war raged on, the Iraqi people came to be categorized as either "unlawful combatants" or helpless victims of a cruel dictator. American officials argued that Iraqis needed the help of American troops to save them from their subjugation and teach them democracy.

For many Europeans and Americans, these forms of ethnocentric bias distort views of peoples living in large geographical regions of the globe. Misunderstanding other cultures this way can result in policies and military actions that do not achieve desired results. Moreover, ethnocentric bias promotes and reinforces inequality among social groups within multicultural societies. When people with certain ethnic or racial identities are seen as helpless or violent, they face discrimination in their pursuit of education, employment, and justice.

The Bias of Backwardness

Common to both primitivism and orientalism is the notion that European and Euro-American cultures are more advanced and civilized than other cultures. Since at least the 19th century, Euro-American thinking has been dominated by the idea that the various cultures of the world can be evaluated on a scale of sociocultural sophistication from least advanced to most advanced. Typically, Native American and African cultures were considered the most primitive, while those of Asia and the Middle East were thought of as slightly more developed but certainly not as civilized as the societies of Europe, which were ranked at the top as the epitome of human progress.

Early anthropology played a role in promoting this ethnocentric way of thinking. Nineteenth-century anthropologists detailed various hypothetical schemes charting the developmental stages that each culture would go through in its pursuit of the European ideal of civilization. One very prominent scheme was proposed by the British anthropologist Edward Tylor. Tylor suggested that each culture progressed from "savagery" to "barbarism" to "civilization." Since the change from one stage to another could not be witnessed by the researcher, such "evolutionary" schemes were largely based on hypothetical conjecture, sometimes called "theorizing from the armchair."

While some anthropologists played a role in popularizing this way of thinking, others worked to expose it as misguided and inaccurate. The writings of American anthropologist Franz Boas highlighted the fact that no culture is isolated in its process of developmental change. Instead, each culture develops through interactions with other cultures, as new ideas and inventions diffuse from one culture to the next. Moreover, cultural change is not structured by an overall trajectory of progress as defined by the European example; rather, cultures change in many ways, sometimes adopting new ways of doing things and other times reviving and reclaiming older ways. Through these varied patterns of change, each culture forges its own unique history.

While the evolutionary schemes of 19th-century anthropology have been disproven, the underlying notion of sociocultural progress toward a Euro-American ideal is still a widespread form of ethnocentric bias outside of anthropology. Many people still refer to some countries as "developed" and "modern" and others as "undeveloped" and "backward." Think for a minute: Which countries are generally thought of as modern? Which ones are frequently referred to as undeveloped? What is really meant by these labels?

These labels are rooted in Euro-American values. Championing capitalism and technology, many Europeans and Americans view the generation of material wealth as the primary measure of the success of any society. The divide between the more and less "advanced" countries of the world is largely a distinction between the richer and poorer countries. European and American societies, which have become wealthy through the development of global trade and industrial capitalism, are considered the most successful. Societies that have not achieved the levels of wealth and technology associated with Euro-American industrial capitalism are sometimes labeled "undeveloped." Societies that have not industrialized at all are sometimes called "premodern" or simply "traditional."

As with older evolutionary schemes, this way of thinking relies on the notion that each society pursues economic development in isolation. The poorer countries of the world are told: if you work hard and apply the correct economic policies, then you too can become rich like the United States, the United Kingdom, and Germany. But how did those countries become rich in the first place? Certainly not in isolation. The Boasian emphasis on cultural interaction also applies to economic change. To a large degree, European and American societies became wealthy by dominating other societies and keeping them poor. European countries constructed a system of global capitalism designed to make them very rich by extracting raw materials and human labor from their colonies. In fact, that was the whole impetus for colonialism.

The cultural anthropologist Sidney Mintz is one of many who have studied how this happened. Mintz explored how European merchants designed a very lucrative system of production and consumption based on sugar (1985). As European consumers began developing a taste for sugar in the 17th century, European merchants developed sugar plantations in the New World using the labor of enslaved people transported from West Africa. Sugar produced on these plantations was exported to Europe and the rest of the world, earning a hefty profit for the European merchants who designed the system. Local people living in the places where sugar was produced did not benefit much from this trade, and enslaved people suffered and died for it. Similar systems were developed for the production of other global commodities such as cocoa, coffee, tea, and cotton. Some commodities required enslaved labor and others involved small farmers, but the basic structure of the trade was the same. The economies of many South Asian and African countries were designed entirely around the export of primary commodities, the production of which was controlled by European merchants who reaped the profits from this global trade. Many postcolonial countries still rely on the export of these primary commodities.

What do these historical processes mean for understanding the world today? European merchants and governments crafted strategic ways of thinking about the parts of the world they wanted to invade and

colonize. To justify the development of the slave trade, the plantation system, and colonial rule, Europeans labeled many non-Europeans as backward peoples needing the civilizing influence of European domination. This form of bias persists in contemporary notions of backwardness applied to the poorer peoples and parts of the world.

In reality, the colonial system was a global mechanism for European merchants and governments to extract wealth from other parts of the world. European merchants took great care to maintain control over these forms of highly profitable trade, edging out local merchants and forbidding local competition. Even today, we see the remnants of this system in Euro-American domination of global trade. If the world seems divided between rich and poor, it is not because some countries work hard and others are "backward." It is because the global system was founded on forms of inequality that endure into the present.

PROFILES IN ANTHROPOLOGY

Franz Boas
1858–1942

FIGURE 1.8 Franz Boas (credit: "FranzBoas" by Canadian Museum of History/Wikimedia Commons, Public Domain)

Personal History: Franz Uri Boas was born in Germany to a middle-class Jewish family (Peregrine 2018). After completing a PhD in physics and mathematics, he worked as a geographer on an expedition to the Canadian Arctic, living and working with the Native Inuit peoples on Baffin Island. With his newfound passion for Native American culture, Boas returned to Germany to work at a museum and began conducting ethnographic and linguistic research among Native groups. In 1887, he came to the United States and established the first anthropology department at Clark University in Massachusetts. He spent most of his career as an anthropology professor at Columbia University and curator at the American Museum of Natural History in New York City.

Areas of Anthropology: Though he promoted a holistic approach integrating the four fields of anthropology, Boas was primarily a cultural anthropologist specializing in the Native peoples of the Northwest coast of North America. Between 1886 and 1900, he conducted 29 months of fieldwork in the region, focusing on the

Kwakiutl peoples of Vancouver Island. He recorded myths, songs, and folklore in Native languages and described cultural activities such as food collection and artistic styles. Focusing on the linguistic and psychological aspects of this rich ethnographic data, Boas sought to understand Native perspectives and values. As the leading anthropologist of his time, he established an American tradition of recording ethnographic observations in meticulous detail and promoted the goal of reaching for an insider's point of view.

Accomplishments in the Field: Boas profoundly disagreed with ethnocentric and racist theories circulating in the social sciences in the late 19th and early 20th centuries. Some anthropologists of the day identified some cultures as "primitive" or "savage," arguing that each culture developed in isolation along a common trajectory toward "civilization." Rejecting this model, Boas used his ethnographic data to show that cultures do not develop in isolation toward a common goal. Rather, each culture has its own unique historical trajectory, and cultures are constantly changing by sharing new ideas and practices.

Importance of His Work: Boas was horrified by the use of anthropological methods to support the theories and practices of White supremacy. In the 19th century, some American researchers measured the skulls of various ethnic groups, arguing that people who had immigrated to the United States from northern Europe had larger skulls and were therefore intellectually superior. In 1907, Boas conducted a survey for the U.S. Immigration Commission measuring the skulls of 17,821 American immigrants and their children. Comparing the head shapes of parents and children, Boas discovered that the children had larger skulls due to environmental factors in their new homeland, such as diet and medical care. His findings dealt a strong blow to race theory. Throughout his career, Boas spoke out against racism, arguing that biological differences have nothing to do with culture, language, or achievement.

1.5 Holism, Anthropology's Distinctive Approach

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define and give examples of holism.
- Analyze how different elements of society cohere with and reinforce one another.
- Identify how different elements of society can contradict one another, motivating social change.

In 2020, the COVID-19 pandemic swept across the globe. Nearly 210 million people had fallen sick with the coronavirus and more than 4 million had died as of August 2021. Medical researchers are still studying the long-term effects of this illness on the lungs and brains of people who have recovered. Some have discovered psychological effects as well, such as increased risks for depression, anxiety, and schizophrenia.

Beyond the medical realm, the effects of the pandemic reached into every aspect of our societies and our everyday lives. In societies all over the world, people were forced to remain at home, "sheltering in place" from the dangers of the disease. Businesses closed their doors to the public, and many shut down permanently, unable to pay their bills. By May 2020, nearly 50 million Americans had reported losing their jobs due to the pandemic. The epidemic of disease ballooned into an epidemic of grief as people mourned the loss of the those who had died and worried about those who had fallen sick. Stressed out by so many disruptions, some adults turned to alcohol and drugs, and addiction rates soared. Incidents of domestic violence escalated. Racial violence against Asian Americans increased as some Americans blamed China for the emergence and global spread of the disease. People everywhere reported feeling lonelier and more cut off from their friends and family members.

And yet there were also some positive consequences. Because people were not driving as much, air quality improved in many urban areas, giving relief to many people who suffer from asthma. Looking up into the night sky, some people were able to see stars for the very first time. Some people reported valuing their friends and family members even more now that they could not spend time with them in person. New social media technologies spread, such as Zoom, and many people learned to use existing technologies such as FaceTime and Skype. People also became aware of the valuable contributions made by "essential workers" in drugstores, hardware stores, and grocery stores as well as hospitals and nursing homes.

How did a virus cause so many changes? The various elements of society are entwined in a complex whole. Dramatic changes in one area, such as epidemic disease in the realm of public health, can trigger a chain of effects throughout other social realms, such as the family, the economy, religion, and the political system.

You'll recall the word *holism* from our earlier discussion about anthropology's commitment to understanding how the many parts of society work together. **Holism** is a distinctive method of analysis that foregrounds the ever-changing relationships among different realms of culture.

Society as an Integrated Whole

Throughout the 2010s, infant death rates in certain rural areas in Africa decreased dramatically. While thrilled with this positive trend, researchers did not initially know how to explain it. Were mothers and fathers doing something different to promote the health of their babies? Were African governments providing better health services for infants? Were aid agencies providing more resources? None of these things seemed to be true in any significant way.

The one thing that had changed in the areas with lower infant mortality was the spread of mobile phones. Could that have something to do with lower infant mortality? And if so, how? Researchers hypothesize that it wasn't just the possession or use of mobile phones that was making the difference—it was the capability to use mobile money transfers and other fintech. If a baby had a fever in the middle of the night, the mother could now immediately text members of her extended family to organize the necessary funds to take the baby to a hospital for treatment. Quicker treatment meant a better chance for recovery. Something that does not appear to be directly related to infant health may in fact have a great impact on it.

Recall from the beginning of this chapter our discussion of the very broad scope of anthropology. While other disciplines focus on one realm of society, such as medicine or technology, anthropology ranges across all realms of human thought and activity. Using the technique of holism, anthropologists ask how seemingly disparate elements of social life might be related in unexpected ways.

In American and European cultures, the most common form of marriage is a union of two people. In the United States, many marriages end in divorce and most people then remarry, resulting in a cycle of marriage-divorce-remarriage called *serial monogamy*. In other cultures, however, a man may have more than one wife. It might be tempting to think that the dominant form of marriage in a culture is related to morality or gender relations. It turns out, however, that one very significant influence on marriage patterns is the food-getting strategy of a particular culture. In small-scale farming cultures, the marriage of one man to two or more women provides an abundance of children to help out with the work of weeding, watering, fertilizing, and guarding the crops (Boserup [1970] 2007; Goody 1976). In cultures where children contribute to food production, the marriage of one man to multiple women is more prevalent. This isn't always the case, of course, as there are other factors that influence the form of marriage practiced in a culture, but the useful work of children does contribute to the popularity of this form of marriage.

In the contemporary United States, by contrast, most people work not on farms but in offices, shops, and factories. Children are not valued as sources of household labor, and they are not legally permitted to work for wages. In fact, children can be viewed as a drain on the household, each one requiring a massive investment of resources in the form of health care, childcare, special equipment, educational opportunities, and expensive toys. In this context, the increased fertility of multiple wives might impoverish the household. Moreover, our fast-paced, capitalist economy requires a flexible and highly mobile work force. American workers can lose their jobs, and they must be prepared to move and retrain in order to find further work. Many Americans experience periods of uncertainty and precarity in their work lives, conditions that affect the livelihood of their households as well as their relationships with their marriage partners and children. Such a context contributes to smaller family size and fragile marriage bonds. The cycles of stability and disruption in American work life are mirrored in the cycles of marriage and divorce involved in serial monogamy.

These are just two examples of why anthropologists are committed to taking such a broad view of the cultures they study. Often, the various realms of society are related in ways that are not at first apparent to the researcher. By specializing too narrowly on only one realm, the researcher might miss the wider forces that shape the object of study.

Sources of Contradiction, Conflict, and Change

Holistic analysis considers not only how the various features of culture hold together but also how change in one feature can generate cascading changes among others. Often, anthropologists begin their analysis by focusing on one significant change in the lives of a particular cultural group and then chart the ramifications of that change through various other realms of culture.

Attiya Ahmad conducted research among South Asian women who migrate to the Middle East for jobs as housekeepers (2017). She writes about how these women adapt to a new culture and living situation in Kuwait and the disruptions they face when they return to their families and home cultures. On the job in Kuwait, these domestic workers must learn to speak Arabic, operate household gadgets, prepare an entirely different cuisine, respect Islamic norms and practices, and perform their appropriate gender role as female members of a Kuwaiti household. They face the cultural requirement that women should be *naram*, or soft and malleable, as they develop emotionally charged relationships with the various members of the household. These requirements bring about profound personal transformations for these women as they deal with the contradictions of being both successful wage earners and subordinated cultural others.

The motivation to migrate is primarily financial: the need to pay for schooling, marriages, medical care, and other family expenses. While the women are working in Kuwait, their families become economically dependent on the money they send back home even as their emotional relationships with their family members become weaker and more difficult. When they return home, profoundly changed by their experiences in Kuwait, their natal families nonetheless expect them to behave exactly as they did before they left, observing the same gender and age-related norms that govern the household. This creates a sense of internal conflict for these women. Unable to truly reintegrate with their natal families, many either seek out new connections in their home communities or migrate back to Kuwait. Some begin learning more about Islam by attending special *da'wa* classes, where they meet other women in the same situation. Finding ethical inspiration in Islamic teachings, many do convert, against the objections of their natal families and their Kuwaiti employers.

All cultures are constantly changing, with small changes in one realm snowballing into larger and larger changes within and beyond that culture. The Me Too movement is another good example. What began in 2006 as a call by American activist Tarana Burke for solidarity and empathy with victims of sexual harassment has now spread into many sectors of American society and across the globe. Initially focused on high-profile celebrities and the movie industry, the Me Too movement has raised awareness of widespread sexual harassment and assault in the fashion industry, churches, the finance industry, sports, medicine, politics, and the military. Activists press for legal changes to protect workers, especially whistleblowers who come forward with allegations of inappropriate sexual behavior. Evaluations of patriarchal and chauvinistic behavior in these institutional realms have sparked scrutiny of the more informal cultural norms of American romance and dating. The Me Too movement challenges the way Americans think about the gender roles of men and women, appropriate speech and gestures, and the distinction between public life and private life.

The movement has prompted processes of dialogue and change in at least 28 other countries, including Afghanistan, China, Nigeria, and the Philippines. The global campaign has been interpreted differently in each of these cultural contexts as the transcultural intentions of American activists intersect with local norms of gender and sexuality. Indeed, some critique the Me Too movement as ethnocentric. Though the calls for reform resonated with French feminists, Me Too activism sparked a backlash among many other French people, with some men and even women arguing that French men should have the right to make sexually provocative comments and rub against women in public places.

While many anthropologists actively support the Me Too movement, our methods of cross-cultural comparison call on us to set aside our personal values (at least temporarily) in order to understand how people in various cultural contexts interpret and act on the cross-cultural campaign against gender-based harassment and assault. This method of suspending personal values is key to understanding how all the elements of a particular culture interact with one another, including pressures from the outside.

1.6 Cross-Cultural Comparison and Cultural Relativism

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define the concept of relativism and explain why this term is so important to the study of anthropology.
- Distinguish relativism from the "anything goes" approach to culture.
- Describe how relativism can enlighten our approach to social problems.

Recall our earlier discussion of cultural styles of clothing. American clothing style is *related to* American values. Ghanaian clothing style is *related to* Ghanaian values. We have seen how different realms of culture are interrelated, fitting together to form distinctive wholes. Anthropologists use the term **cultural relativism** to describe how every element of culture must be understood within the broader whole of that culture. Relativism highlights how each belief or practice is *related to* all of the other beliefs and practices in a culture. The anthropological commitment to relativism means that anthropologists do not judge the merits of particular beliefs and practices but rather seek to understand the wider contexts that produce and reinforce those elements of culture. Even when studying controversial topics such as piracy and guerilla warfare, anthropologists set aside their personal convictions in order to explore the complex web of cultural forces that determine why we do the things we do.

Relativism Is *Not* "Anything Goes"

Critics of the notion of relativism, believing so strongly in their own cultural norms that they cannot set them aside, even temporarily. They argue that relativism is amoral, a refusal to condemn aspects of culture considered to be wrong and harmful. For them, relativism means "anything goes."

For anthropologists, cultural relativism is a rigorous mode of holistic analysis requiring the temporary suspension of judgment for the purposes of exploration and analysis. Anthropologists do not think that violent or exploitative cultural practices are just fine, but they do think that the reasons for those practices are a lot more complex than we might imagine. And frequently, we find that the judgmental interventions of ethnocentric outsiders can do more harm than good.

Morality, Activism, and Cultural Relativism

A striking example of the application of cultural relativism in anthropology is the controversy surrounding female genital cutting (FGC), sometimes called female genital mutilation. FGC is a cultural practice in which an elder cuts a younger woman's genitalia, removing all or part of the clitoris and labia. The practice is common in parts of Africa and the Middle East. FGC is not only extremely painful; it can also lead to infection, urination problems, infertility, and complications in childbirth.

The World Health Organization and the United Nations condemn the practice as a form of violence against children, a danger to women's health, and a violation of basic human rights. These organizations view FGC as a form of discrimination against women, enforcing extreme inequality among the sexes. Efforts to ban FGC have focused on educating parents and children about the medical harms associated with the practice. Local governments are encouraged to enact laws banning FGC and impose criminal penalties against the elders who perform it.

FIGURE 1.9 Rendille Kenyan women attending a church dedication ceremony. (credit: "180818_TSCOKenya_EstherHavens_0997" by Ann/flickr, CC BY 2.0)

Despite decades of campaigning against FGC, however, the practice remains widespread. If condemning FGC has not been effective in reducing it, then what can be done? Anthropologist Bettina Shell-Duncan has taken a more relativist approach, attempting to understand the larger cultural norms and values that make FGC such an enduring practice. Setting aside her personal opinions, Shell-Duncan spent long periods in African communities where FGC is practiced, talking to people about why FGC is important to them. She learned that FGC has different functions in different sociocultural contexts. Among the Rendille people of northern Kenya, many people believe that men's and women's bodies are naturally androgynous, a mix of masculine and feminine parts. In order for a girl to become a woman, it is necessary to remove the parts of female genitalia that resemble a man's penis. Likewise, in order for a boy to become a man, the foreskin must be removed because it resembles the folds of female genitalia.

Other societies value FGC for different reasons. Some Muslim societies consider FGC a form of hygiene, making a girl clean so that she can pray to Allah. Some communities see FGC as a way of limiting premarital sex and discouraging extramarital affairs. In the colonial period, when FGC was banned by the colonial government, some Kenyan girls practiced FGC on themselves as a form of resistance to colonial authority. As FGC is promoted and carried out by senior women in most contexts, the practice becomes a way for senior women to solidify power and exert influence in the community.

People in communities practicing FGC are often aware of the efforts of outside groups to ban the practice. They know about medical complications such as the risk of infection. But the denunciations of outsiders often seem unconvincing to them, as those denunciations tend to ignore the cultural reasons for the endurance of FGC. People who practice FGC do not do it because they despise women or want to harm children. Shell-Duncan argues that parents weigh the risks and benefits of FGC, often deciding that the procedure is in the best interest of their child's future.

Personally, Shell-Duncan remains critical of FGC and works on a project with the Population Council designed to dramatically reduce the practice. Cultural relativism does not mean permanently abandoning our own value systems. Instead, it asks us to set aside the norms and values of our own culture for a while in order to fully understand controversial practices in other cultures. By suspending judgment, Shell-Duncan was able to learn two important things. First, while campaigns to eradicate FGC frequently target mothers, providing them with educational material about the medical risks involved, Shell-Duncan learned that the decision to go ahead with the procedure is not made by parents alone. A large network of relatives and friends may pressure a girl's parents to arrange for the cutting in order to ensure the girl's chastity, marriageability, and fertility. Secondly, Shell-Duncan learned that people who practice FGC do it because they want the best for their girls. They want their girls to be respected and admired, considered clean and beautiful, fit for marriage and childbearing.

Shell-Duncan argues that outside organizations should reconsider their efforts, focusing more on

communities than on individual parents. Awareness campaigns will be more effective if they resonate with local norms and values rather than dismissively condemning them as part of the whole culture of FGC. Some researchers urge anti-FGC activists to connect with local feminists and women's groups in an effort to empower local women and localize the movement against FCG. Some alternative approaches press for more incremental forms of change, such as moving the practice to more sanitary conditions in clinics and hospitals and reducing the severity of the procedure to smaller cuts or more symbolic nicks.

As this example illustrates, cultural relativism is not an amoral "anything goes" approach but rather a strategy for forming cross-cultural relationships and gaining deeper understanding. Once this foundation has been established, anthropologists are often able to revise their activist goals and more effectively work together with people from another culture in pursuit of common interests.

1.7 Reaching for an Insider's Point of View

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define the notion of *insider's point of view*.
- Critique the notion of *insider's point of view*, explaining how it is never perfectly achievable.
- List and describe the distinctive methods anthropologists deploy in their attempts to represent an insider's point of view

Bettina Shell-Duncan's work on FGC demonstrates the importance of setting aside your own values and opinions in order to see an issue from the point of view of those directly involved. This often means working across contexts, whether studying another group or another culture. Anthropologists across the four fields apply this technique. Cultural anthropologists talk to people and participate in social activities in order to understand cultural life. Archaeologists rely on artifacts and fossils to reconstruct the sociocultural life of peoples in earlier times and different places. Through these different methods, anthropologists all aim for the same thing: they want to understand the perspectives of the people who practice a particular culture, sometimes called an **insider's point of view**.

The Challenge of Representing Others

The anthropological goal of representing an insider's point of view is controversial. Is it truly possible to step outside your own identity to really understand a different perspective? How can a researcher from a particular culture possibly understand exactly how it feels to be a member of another culture? Even anthropologists who study their own cultures may find themselves researching people from different classes, ethnicities, or gender categories. Is it possible to accurately represent the perspectives of people whose lives are so different from your own? Is it ethical? Is it valuable?

For decades, White European and American anthropologists conducted research and wrote ethnographies as if the challenge of representing cultures very different from their own was really no problem at all. Empowered by White privilege and ethnocentrism, many earlier anthropologists believed that long-term intensive fieldwork was enough to give them cross-cultural insight into the perspectives of the people they studied.

Too frequently, those anthropologists reduced the complexity of the non-Western cultures they studied to just one point of view, as if the people in that society all interpreted their cultural rules the same way and never disagreed or changed the rules over time. In her book about Japanese culture, *The Chrysanthemum and the Sword* (1946), anthropologist Ruth Benedict describes Japanese people in terms of common personality traits, such as reverence for the emperor and a moral sense guided by shame. Critics have argued that her conclusions are skewed by her overreliance on very few informants, all of them Japanese people confined to internment camps during World War II. As we have explored in this chapter, every culture comprises multiple perspectives that often contradict one another, generating sociocultural conflict and change. Recognizing this situation, contemporary anthropologists often conduct research among several different subgroups and geographical locations, integrating insights from these various arenas into a comprehensive and dynamic view of cultural complexity.

Then there is the question of deep-seated bias, often operating unconsciously among researchers and the

people they study. Consider the situation above in which a White American anthropologist conducts research in an African country previously colonized by Europeans. European colonialism left behind a legacy of White privilege in postcolonial African countries. Earlier anthropologists did not often recognize how racialized power dynamics might shape their research and writing, distorting their representations of the peoples they studied. In the 1960s, anthropologists began to think more carefully about these issues, realizing that an insider's point of view is never perfectly achievable. As human beings, our own perspectives are conditioned by our own enculturation, our own ways of seeing and thinking about the world around us.

If an insider's point of view is never really possible, should we give up on this aspirational goal of the discipline? In such a scenario, researchers would only study and write about people from the same sociocultural categories as themselves. So, for example, Americans would only research and write about other Americans. But are all Americans really members of the same sociocultural category? Could an upper-class Asian American from Manhattan research and write about a poor Black community in the Deep South? Could a Latino man write about a group of Latinx/Latina/Latino people consisting of all genders? American culture is not unique in its complex array of identities. In all cultures, people have multiple identities as members of multiple sociocultural categories. While you may be an insider within your culture in some respect, you may be an outsider by some other measure. The ethical question of who can represent who is riddled with difficulties.

Moreover, resigning ourselves to studying "our own people," whoever they might be, is tantamount to giving up on cross-cultural research and the insight, empathy, dialogue, and transformation that frequently result from it. Anthropological insights have been key to rethinking American notions of sexuality, family, and race, among so many other pressing issues. We need the skills of cross-cultural research now more than ever. While perfect representations of different communities and cultures may be impossible, many anthropologists now deploy innovative methods designed to address the problems of history and power at the heart of the discipline. The aim is not to achieve perfect ethnography but to work ethically and collaboratively to produce what contemporary cultural anthropologist Nancy Scheper-Hughes has termed "good enough ethnography."

Collaborative Methods of Representation

Faced with the challenges of representation, many anthropologists practice methods of collaboration with the individuals and groups that they study. Collaborative ethnography has a very long history in cultural anthropology, traceable all the way back to early Euro-American ethnographies of Native Americans. Often, anthropologists began their research by employing a local person as a translator or field assistant, a role that usually evolved into something much more cooperative.

FIGURE 1.10 Francis La Flesche (credit: "Francis laflesche" by National Anthropological Archives, Smithsonian Institution/Wikimedia Commons, Public Domain)

Researching the Omaha peoples in the early 20th century, anthropologist Alice Cunningham Fletcher began working with a young Omaha man, Francis La Flesche. Through their collaboration, La Flesche became an ethnographer himself. While most anthropologists of the day merely acknowledged their local collaborators (if they did even that), La Flesche became a full coauthor of their joint ethnography, *The Omaha Tribe* (1911).

Today, anthropologists collaborate with the people they study in a number of ways. Some involve local people as readers and editors of their work, sometimes including community responses in the published ethnography. Some conduct focus groups to generate local feedback on particular chapters. Some anthropologists hold community meetings or forums to talk about the major themes and implications of their work. And some, like Fletcher, collaborate with members of the local community as equal coauthors on books and articles. Such methods strengthen ethnography by ensuring accuracy, promoting multiple perspectives, and striving to make anthropological work more relevant to the communities being studied.

Collaboration also draws attention to the personal side of ethnography. Instead of extracting ethnographic "facts" from the process of fieldwork, many contemporary anthropologists focus on describing particular people, insightful conversations, and cooperative practices encountered in their research. Through this kind of representation, culture is represented as a constellation of personal perspectives, each one shaped by the position of each person in that community. Anthropologists also now acknowledge that ethnography is shaped by the personal background and identity of the researcher as well as the motivations and intended audience of the research. Collaborative anthropologists frequently describe their research in the first person, openly acknowledging how their personal and cultural biases influence their research.

Anthropologist Luke E. Lassiter takes a collaborative approach in his study of the song and dance of contemporary Kiowa communities of southern Oklahoma (1998). Lassiter describes how he became interested in Kiowa song as a boy through his involvement in the Order of the Arrow, an affiliate of the Boy Scouts. Moving beyond the superficial representations of Native American culture in Boy Scout teachings, Lassiter went on to attend powwows, where he met singers and learned more about Kiowa culture. He developed a close friendship with renowned Kiowa singer Billy Evans Horse, who taught Lassiter how to sing Kiowa songs and encouraged him to pursue his interest in Kiowa culture in graduate school. Instead of foregrounding his own

description of Kiowa song and dance, Lassiter highlights the individual experiences and opinions of his local collaborators as *they* describe how songs are created, passed down, and interpreted in the community.

Collaborative anthropology is not only more ethical and accurate; it is also more socially conscious and political. When anthropologists collaborate as equals, they often become socially involved and politically committed to the welfare of the communities they study. There are various terms for this, among them *engaged anthropology*, *public anthropology*, *anthropological advocacy*, and *applied anthropology*. When those communities face struggles over land, food security, medical care, or human rights abuses, many anthropologists support their interests in a number of ways. Anthropologists often speak out publicly, write sympathetic ethnographies, testify in court, participate in protests, and coordinate with organizations that can provide material aid. Anthropologist Stuart Kirsch was researching magic and sorcery in a Yonggom village in Papua New Guinea when he became concerned about pollution from local copper and gold mines nearby (2018). As the community he was studying mobilized to protect their environment, Kirsch became involved in their lawsuit against the Australian owners of the mine. He contributed to a social and environmental impact study and advised lawyers representing the affected communities. He spoke out to local media and scholarly publications, explaining the environmental problems caused by pollution from the mine.

Working across Cultures toward Common Goals

Stepping back for a moment, consider the problems facing us as humans on our shared planet. Climate change threatens the survival of humanity and the biodiversity of plants and animals. Forms of deeply entrenched inequality fuel racial, ethnic, and class conflicts within and between nations. These are global problems, transnational problems, cross-cultural problems. Human beings need to find a way to communicate and cooperate across the sociocultural boundaries that divide us, always recognizing the power dynamics involved in that process.

How can we do this? Anthropology teaches us that we may never understand exactly how it feels to be a member of a different culture or group within our own culture. But if we want to work together with people of different sociocultural backgrounds to solve these pressing global issues, we have to try. Long-term fieldwork and cross-cultural collaboration are not perfect solutions to the challenges of cross-cultural understanding, but these methods give us a place to begin. And anthropological methods and insights can be transformative, making possible the kinds of empathy and dialogue necessary to solve our global problems.

The goal of this anthropology textbook is to guide you in this process of transformation as you learn about the cultural lives of the various peoples with whom you share this planet.

MINI-FIELDWORK ACTIVITY

Representation and Otherness

List three characters from fictional movies or television shows who represent people from cultures different from your own. What adjectives would you use to describe these characters? How are they made to appear? How do they act? Are they central or marginal characters? What role does each play in the plot or theme? What might be the consequences of representing cultural groups in this way? Do you see evidence of ethnocentrism, primitivism, and/or orientalism as described in this chapter?

Suggested Readings

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Key Terms

Anthropocene the contemporary period of increasing human impact on the ecosystems of our planet.

anthropology the study of humanity across time and space.

archaeoastronomy the study of how people in the past understood and used celestial objects for navigation, calendars, politics, and the timing of ritual events.

archaeology the field of anthropology that relies on the excavation of artifacts and fossils to explore how environmental and historical conditions have produced a diversity of human cultures.

artifacts objects made by humans, such as pottery or tools.

biological anthropology the field of anthropology that focuses on the earliest processes in the biological and sociocultural development of human beings as well as the biological diversity of contemporary humans. Biological anthropologists study the origins, evolution, and diversity of our species.

cultural anthropology the field of anthropology devoted to describing and understanding the wide variety of human cultures. Cultural anthropologists focus on such things as social thought, action, ritual, values, and institutions.

cultural other a stereotype of a person from a different culture, used to create a cultural distinction between "us" and "them."

cultural relativism understanding every element of culture within the broader whole of that culture. Cultural relativism highlights how each belief or practice is related to all of the other beliefs and practices in a culture.

enculturation the process of learning and acquiring a particular culture, often intensified in childhood.

ethnobotany the study of how people in different cultures categorize and use plants for food, shelter, tools, transportation, art, and religion.

ethnocentrism the notion that one's own culture is so superior that no other culture is worth consideration. Ethnocentric people often imagine that the world would be a much better place if the beliefs, values, and practices of their own culture were spread to or imposed on everyone else in the world.

ethnography a written book or article about a particular culture.

excavation the removal of fossils and artifacts from the ground in order to learn as much as possible about how people lived in times before and after the development of writing.

fieldwork a research method that requires cultural anthropologists to live for many months or years in the societies they study, adopting local ways of living, eating, dressing, and speaking as closely as possible.

forensic anthropology the application of the techniques of biological anthropology to solve crimes.

fossils the remains of organism preserved in the environment.

holism how the elements of human life are bound together to form distinctive cultures.

hominins the evolutionary ancestors of modern humans.

insider's point of view a goal of anthropological research, representing the perspectives of people who practice a particular culture.

linguistic anthropology the field of anthropology that explores the central role of language in human cultural life. Linguistic anthropologists study the origins of language, how language shapes thought, and how language operates as a tool of power.

orientalism the depiction of some cultural groups, particularly people from the Middle East and Asia, as exotic, irrational, fanatical, and sensuous.

primitivism the depiction of some cultural groups, particularly Africans and Native Americans, as exotic, simple, highly sexual, potentially violent, and closer to nature.

Summary

Anthropology is an incredibly broad discipline, covering the entire scope of human experience, but its enormity is controlled by a common narrative and set of three central commitments. The common narrative states that human beings have developed flexible biological and social features that have worked together in a wide variety of environmental and historical conditions to produce a diversity of cultures. The three central commitments are exploring sociocultural diversity, examining how societies hold together, and studying the interdependence of humans and nature.

Anthropologists have developed four main approaches to pursuing anthropology's common narrative, comprising the discipline's four fields: biological anthropology, archaeology, cultural anthropology, and linguistic anthropology. Each of these fields generates a particular type of knowledge about the human experience that can be integrated with knowledge from the other three fields into a deeper, richer understanding of humanity's central challenges, such as racial injustice and climate change.

Getting at that deeper understanding, anthropologists learn to recognize their own biases as forms of ethnocentrism such as primitivism and orientalism. Rather than categorizing societies according to levels of sophistication (as European scholars did in the 19th century), contemporary anthropologists use holistic techniques of examination and analysis, seeking to understand how the various elements within a culture fit together and how these elements can contradict one another, provoking change. Effective holistic analysis requires a commitment to the method of cultural relativism, which requires a researcher to set aside their own personal values in order to appreciate another culture on its own terms. An important contribution to a rich appreciation of another culture is the input and participation of cultural insiders. The ethical challenges of understanding and representing another culture have led anthropologists to develop collaborative ways of working with cultural insiders, aimed at addressing the power asymmetries of fieldwork and ethnography.

Critical Thinking Questions

1. Have you ever taken a course in one of the other social disciplines, such as economics, political science, history, or religion? How would anthropology study the same subject matter in a different way?
2. Which other social issues might benefit from a four-field approach? Propose one issue, and consider how each of the four fields might contribute to our understanding of that issue.
3. Have you ever thought or said something ethnocentric? What is an appropriate response if someone else says something ethnocentric in a conversation? How can people learn to recognize and rethink ethnocentric notions?
4. As mentioned in this chapter, one very dominant way of evaluating the sophistication of different societies is by measuring the amount of wealth generated by each one. Can you think of an alternative way of evaluating progress or development? Would that way reorder the global hierarchy? How might it change your way of thinking about your own society?
5. Identify a contemporary problem in your own society. How would you pursue a holistic analysis of that problem? What are the various realms of culture that directly or indirectly relate to that problem?
6. Is it really possible to set aside your own personal values when studying something you consider morally troubling or simply wrong? Identify a controversial topic in your own or another culture, ideally one that is personally meaningful to you. How would you practice cultural relativism when studying this topic? How would relativism change the way you interact with people in the course of your research? How would it change the kinds of questions you would ask in interviews?
7. Make a list of possible ways you could collaborate with someone from another social or cultural group in an effort to represent the perspectives of cultural insiders.

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CHAPTER 2
Methods: Cultural and Archaeological

Figure 2.1 These archaeologists are working to uncover a fresco on a building in Pompeii, Italy. Pompeii was famously covered in ash when nearby Mount Vesuvius erupted in 79 CE. The ash has preserved many structures and artifacts from the time. (credit: "Pompeii Restoration Work" by Justin Ennis/flickr, CC BY 2.0)

CHAPTER OUTLINE

INTRODUCTION Fieldwork is one of the most important practices of anthropology. While all of the subfields of anthropology conduct fieldwork in some form to gather information, each subfield may use different methods of conducting research. The concept of working in "the field" was traditionally based on the practice of traveling to distant regions to study other cultures within their native environmental contexts. In recent decades, "the field" has broadened to include diverse settings such as one's hometown (as in urban anthropology), the Internet (visual or virtual anthropology), or collections in university archives and museums (ethnohistory or museum anthropology).

2.1 Archaeological Research Methods

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Describe archaeological techniques for uncovering artifacts.
- Explain the importance of context in making sense of artifacts and describe how researchers record content while working in the field.
- Describe the law of superposition as used in the field of archaeology.
- Describe the different types of relative dating methods used by archaeologists.
- Identify and briefly define four absolute or chronometric dating methods.

Many people have an inherent fascination with the human past. Perhaps this fascination stems from the fact that people recognize themselves in the objects left behind by those who have lived before. Relics of past civilizations, in the form of human-made cultural **artifacts**, temples, and burial remains, are the means by which we can begin to understand the thoughts and worldviews of ancient peoples. In the quest to understand these ancient societies, human curiosity has sometimes led to fantastical myths about races of giant humans, dragons, and even extraterrestrial beings. In the realm of archaeology, less speculative methods are used to study the human past. Scientific approaches and techniques are the foundation of archaeology today.

Archaeological Techniques

In archaeology, the first step in conducting field research is to do a survey of an area that has the potential to reveal surface artifacts or cultural debris. Surveys can be done by simply walking across a field, or they may involve using various technologies, such as drones or Google Earth, to search for unusual topography and potential structures that would be difficult to see from the ground. Cultural artifacts that are found may become the basis for an **archaeological excavation** of the site. A random sampling of excavation units or test pits can determine a site's potential based on the quantity of cultural materials found. GPS coordinates are often collected for each piece of cultural debris, along with notes on specific plants and animal found at the site, which can be indicators of potential natural resources. **Features** such as trails, roads, and house pits are documented and included in a full set of field notes. Government agencies have different protocols about what constitutes an archaeological site; the standard in many areas is six cultural objects found in close proximity to one another.

When preparing a site for excavation, archaeologists will divide the entire site into square sections using a grid system, which involves roping off measured squares over the surface of the site. This grid system enables archaeologists to document and map all artifacts and features as they are found in situ (in the original location). All objects and features uncovered are assigned catalog or accession numbers, which are written on labels and attached to the artifacts. These labels are especially important if artifacts are removed from the site.

Excavation is a slow process. Archaeologists work with trowels and even toothbrushes to carefully remove earth from around fragile bone and other artifacts. Soil samples may be collected to conduct pollen studies. **Ecofacts**—objects of natural origins, such as seeds, shells, or animal bones—found at a site may be examined by other specialists, such as **zooarchaeologists**, who study animal remains, or **archaeobotanists**, who specialize in the analysis of floral (plant) remains with an interest in the historical relationships between plants and people over time.

Every cultural and natural object and feature is fully documented in the field notes, with its exact placement and coordinates recorded on a map using the grid system as a guide. These coordinates represent an object's **primary context**. If uncovered objects are moved before documentation takes place, the archaeologist will lose the **archaeological context** of that object and its associated data. Archaeological context is the key foundation of archaeological principles and practice. In order to understand the significance and even age of artifacts, features, and ecofacts, one needs to know their context and association with other objects as they were found in situ. Objects that have been removed from their primary context are said to be in a **secondary context**.

Careful and proper documentation is vitally important. This information becomes part of the archaeological record and guides and contributes to future research and analysis.

FIGURE 2.2 This dig site in Vindolanda, England has yielded thousands of artifacts left behind by Roman occupiers in the years 85 – 370 CE. (credit: "Digging Archaeology 4" by Son of Groucho/flickr, CC BY 2.0)

Archaeological Dating Methods

Establishing the age of cultural objects is an important element of archaeological research. Determining the age of both a site and the artifacts found within is key to understanding how human cultures developed and changed over time. Other areas of science, such as paleontology and geology, also use dating techniques to understand animal and plant species in the ancient past and how the earth and animal species evolved over time.

Relative Dating

The earliest dating methods utilized the principles of **relative dating**, developed in geology. Observing exposed cliffsides in canyons, geologists noted layers of different types of stone that they called **strata** (**stratum** in the singular). They hypothesized that the strata at the bottom were older than the strata higher up; this became known as the **law of superposition**. According to the law of superposition, not just geological layers but also the objects found within them can be assigned relative ages based on the assumption that objects in deeper layers are older than objects in layers above. The application of the law of superposition to archaeological fieldwork is sometimes called **stratigraphic superposition**. This method assumes that any cultural or natural artifact that is found within a stratum, or that cuts across two or more strata in a **cross-cutting relationship**, is younger than the stratum itself, as each layer would have taken a long time to form and, unless disturbed, would have remained stable for a very long time. Examples of forces that might cause disturbances in strata include natural forces such as volcanos or floods and the intervention of humans, animals, or plants.

The law of superposition was first proposed in 1669 by the Danish scientist Nicolas Steno. Some of the first applications of this law by scholars provided ages for megafauna (large animals, most commonly mammals) and dinosaur bones based on their positions in the earth. It was determined that the mammalian megafauna and the dinosaur bones had been deposited tens of thousands of years apart, with the dinosaur remains being much older. These first indications of the true age of fossil remains suggested a revolutionary new understanding of the scale of geological time.

It was eventually determined that if a specific set and sequence of strata is noted in several sites and over a large enough area, it can be assumed that the ages will be the same for the same strata at different locations in the area. This insight enabled geologists and archaeologists to use the structures of soils and rocks to date phenomena noted throughout a region based on their relative positions. Archaeologists call this method *archaeological stratification*, and they look for stratified layers of artifacts to determine human cultural contexts. Stratigraphic layers found below cultural layers provide a basis for determining age, with layers above assumed to be more recent than those below.

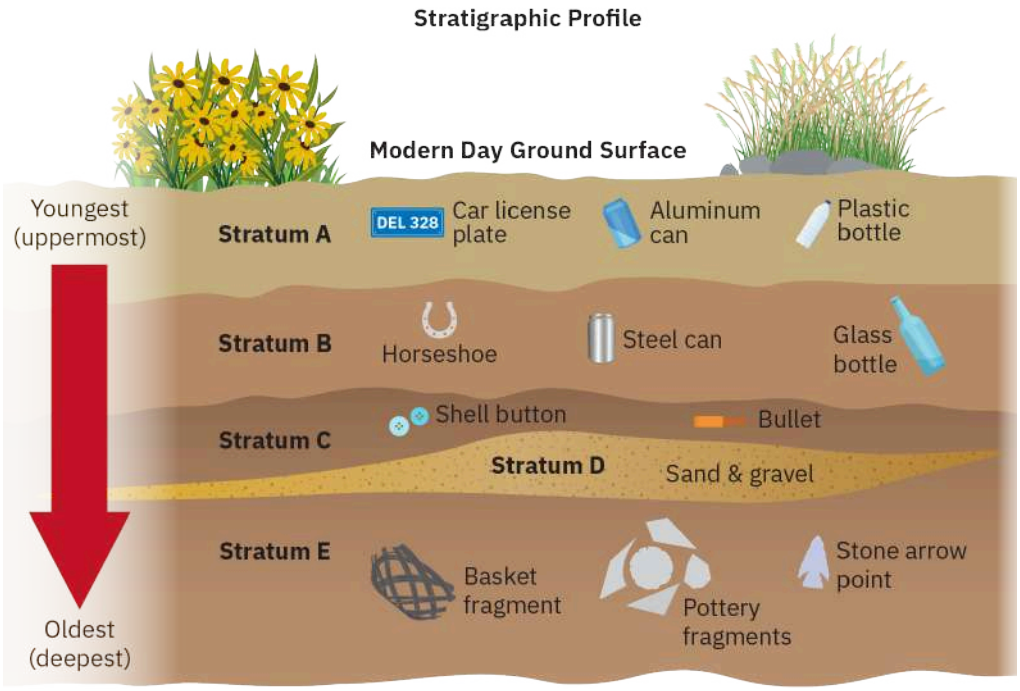

FIGURE 2.3 According to the principle of superposition objects found at deeper layers (called stratum) are older than those found above. In this illustration, the pottery fragments in Stratum E can be assumed to be older than the shell buttons found in Stratum C. The objects nearest the surface (aluminum can, plastic bottle) are obviously most recent. (attribution: Copyright Rice University, OpenStax, under CC BY 4.0 license)

Another method of dating utilized by archaeologists relies on **typological sequences**. This method compares created objects to other objects of similar appearance with the goal of determining how they are related. This method is employed by many subdisciplines of archaeology to understand the relationships between common objects. For example, typological sequencing is often conducted on spearpoints created by Indigenous peoples by comparing the types of points found at different locations and analyzing how they changed over time based on their relative positions in an archaeological site.

Another form of typological sequencing involves the process of **seriation**. Seriation is a relative dating method in which artifacts are placed in chronological order once they are determined to be of the same culture. English Egyptologist, Flinders Petrie introduced seriation in the 19th century. He developed the method to date burials he was uncovering that contained no evidence of their dates and could not be sequenced through **stratigraphy**. To address the problem, he developed a system of dating layers based on pottery (see Figure 2.4).

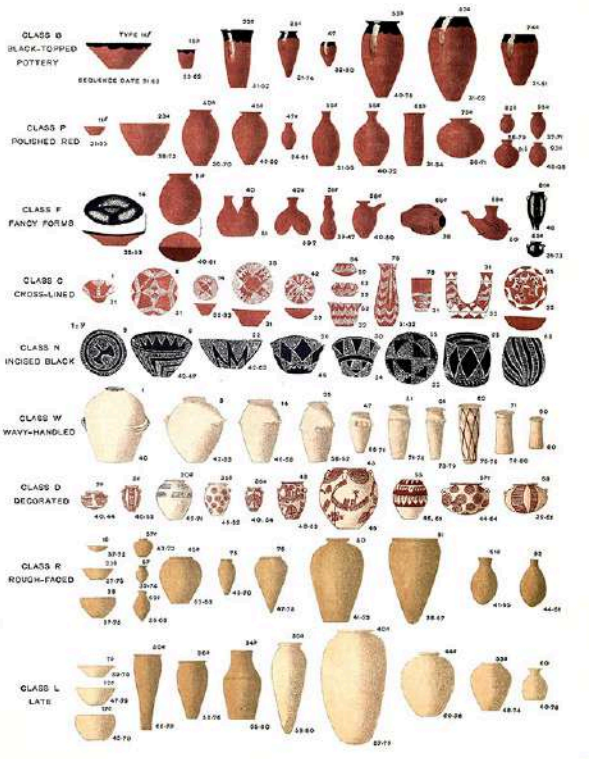

FIGURE 2.4 Petrie's Egyptian pottery seriation method is built upon the observation that styles change with time. Petrie arranged pottery artifacts into similar groups based on stylistic features and placed them along a relative timeline based on these features. (credit: "Evolution of Egyptian prehistoric pottery styles, from Naqada I to Naqada II and Naqada III" by W. M. Flinders Petrie and A. C. Mace/Wikimedia Commons, Public Domain)

Typological sequences of pottery, stone tools, and other objects that survive in archaeological sites are not only used to provide dating estimates. They can also reveal much about changes in culture, social structure, and worldviews over time. For example, there are significant changes in stratigraphy during the agricultural age, or Neolithic period, at around 12,000 BCE. These changes include the appearance of tended soils, pollens that indicate the cultivation of specific plants, evidence of more sedentary living patterns, and the increased use of pottery as the storage of food and grain became increasingly important. Archaeological evidence also shows a growing population and the development of a more complex cultural and economic system, which involved ownership of cattle and land and the beginning of trade. Trade activities can be determined when pottery types associated with one site appear in other nearby or distant locations. Recognizing the connections between objects used in trade can shed light on possible economic and political interrelationships between neighboring communities and settlements.

Chronometric Dating Methods

Chronometric dating methods, also known as **absolute dating methods**, are methods of dating that rely on chemical or physical analysis of the properties of archaeological objects. Using chronometric methods, archaeologists can date objects to a range that is more precise than can be achieved via relative dating methods. **Radiocarbon dating**, which uses the radioactive isotope carbon-14 (^{14}C), is the most common method used to date organic materials. Once a living organism dies, the carbon within it begins to decay at a known rate. The amount of the remaining residual carbon can be measured to determine, within a margin of error of 50 years, when the organism died. The method is only valid for samples of organic tissue between 300 and 50,000 years old. To ensure accuracy, objects collected for testing are promptly sealed in nonporous containers so that no atmospheric organic substances, such as dust, pollen, or bacteria, can impact the results.

Dating systems that measure the atomic decay of uranium or the decay of potassium into argon are used to date nonorganic materials such as rocks. The rates of decay of radioactive materials are known and can be measured. The radioactive decay clock begins when the elements are first created, and this decay can be

measured to determine when the objects were created and/or used in the past. Volcanic materials are particularly useful for dating sites because volcanoes deposit lava and ash over wide areas, and all the material from an eruption will have a similar chemical signature. Once the ash is dated, cultural materials can also be dated based on their position relative to the ash deposit.

The technique of **dendrochronology** relies on measuring tree rings to determine the age of ancient structures or dwellings that are made of wood. Tree rings develop annually and vary in width depending on the quantity of nutrients and water available in a specific year. Cross dating is accomplished by matching patterns of wide and narrow rings between core samples taken from similar trees in different locations. This information can then be applied to date archaeological remains that contain wood, such as posts and beams. Dendrochronology has been used at the Pueblo Bonita archaeological site in Chaco Canyon, New Mexico, to help date house structures that were occupied by the Pueblo people between 800 and 1150 CE. The Laboratory of Tree-Ring Research, based in Tucson, is the world's oldest dendrochronology lab. Go on a tree-ring expedition! (https://openstax.org/r/tree-ring)

The most effective approach for dating archaeological objects is to apply a variety of dating techniques, which allows the archaeologist to triangulate or correlate data. Correlating multiple methods of dating provides strong evidence for the specific time period of an archaeological site.

Strategy	What It Is	How It Is Seen	How It Is Read	Assumptions
Dendrochronology	Tree ring width pattern	Growth in life, ring	Count rings and measure	1 ring = 1 year; no duplication or missed rings; regional comparability
^{14}C	Radioactive decay and atom counting	Decay after death	Count beta decay or ^{14}C per unit volume	Half-life of ^{14}C-^{12}C decay known; exchange with atmosphere and productions rates constant

TABLE 2.1 Chronometric Dating Techniques

2.2 Conservation and Naturalism

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Describe conservation efforts undertaken in the United States in the 19th century.
- Define salvage anthropology and describe its origins and methods.
- Provide an example of an anthropologist who used their research to help the people they were studying.
- Explain why museums can be said to have created exhibits reflecting limited interpretations and describe efforts to correct this limitation.

Early Efforts

The conservation movement began in the 19th century as people in Europe and America began to realize that human settlement and the exploitation of the world's natural resources had led to the destruction or endangerment of numerous animals, plants, and significant environments. Efforts began in the 1860s to understand and protect the remaining natural landscapes and habitats. These efforts were partly motivated by concern for wildlife and natural areas. However, also significant were the concerns of sporting organizations and recreationists. The primary aim of early conservation efforts was to preserve significant natural ecosystems for parks or wilderness areas so that sportspeople and outdoor enthusiasts would have places to hunt, fish, and explore. Many areas preserved by these early efforts are still protected today, such as Yellowstone and Yosemite National Parks in the United States.

An element of this early period of conservation was the effort to collect specimens for display in natural history museums. This collection effort was part of a movement known as **naturalism**, which seeks to understand the world and the laws that govern it by direct observation of nature. The late 19th and early 20th centuries saw a marked growth in naturalist collections worldwide as many cities and nations sought to establish and fill their own natural history museums. These collections have been particularly useful to zooarchaeologists and archaeobotanists, who use specimen collections of mammals, birds, fish, and plants to identify natural objects and animal remains found at human burial sites. Many archaeology labs have collections of animal skeletons for comparative anatomy, analysis, and identification (see Figure 2.5).

FIGURE 2.5 Collections of bones, such as this collection of specimens from various animal species housed at the Wildlife Forensics Lab in Ashland, Oregon, serve as a useful resource for zooarchaeologists. (credit: "Wildlife Forensics Lab" by US Fish and Wildlife Service Headquarters/flickr, Public Domain)

In addition to animal specimens, Native American baskets and other Indigenous art objects were collected and placed in natural history museums. When visiting the Auckland Museum in Auckland, New Zealand, visitors today encounter two large totem poles in the foyer. Northwest Coast totem poles are common in most older museums throughout the world. These totem poles were gathered from America's Northwest Coast in the late 19th and early 20th centuries as part of the worldwide conservation and naturalism movement. Most museums sought to purchase such artifacts, but in some cases, artifacts were stolen when Indigenous owners were unwilling to sell them. Many natural history museums also established dioramas depicting both Indigenous peoples and animals in their "natural" world. The practice of installing dioramas of Indigenous people is now heavily criticized because of the implication that Indigenous peoples are akin to animals and plants. Many museums have stopped this practice and have even dropped the phrase *natural history* from their names. However, the Smithsonian Institution's National Museum of Natural History in Washington, DC, and the American Museum of Natural History in New York both maintain the designation and still display dioramas of Indigenous peoples.

FIGURE 2.6 This diorama of Native Americans is on display in the Indiana State Museum in Indianapolis, Indiana. Such dioramas have come under criticism for the way that they depict Indigenous peoples and cultures. (credit: "Native Americans – Indiana State Museum – DSC00394" by Daderot/Wikimedia Commons, Public Domain)

Salvage Anthropology

Connected to the collecting of Indigenous artifacts is a practice known as **salvage anthropology**. Salvage anthropology was an effort to collect the material culture of Indigenous peoples in the United States and other parts of the world who were believed to be going extinct in the later 19th century. During this period, many anthropologists dedicated themselves to collecting material objects, stories, language lists, and ethnographies from tribal peoples worldwide. Many collections were made through legitimate means, such as purchasing objects or sitting down with collaborators (called *informants* in older anthropological vernacular) to record traditional stories, but some collecting involved the theft of tribal cultural items or purchases from intermediary traders.

Many of these anthropologists were hired by the Bureau of American Ethnology (BAE), a division of the Smithsonian Institution, and spent considerable time living with Native peoples on the reservations that were by then home to most Native Americans. Language was a special research focus for linguists and anthropologists, as many Native languages were rapidly going extinct. Through analysis of language, an anthropologist can understand the meaning of words and their context as well as gain a sense of a culture's philosophy and worldviews.

Anthropologists were not paid well to do this work for the BAE. Some began supplementing their income by buying cultural objects at a low cost from the people they studied and selling those objects at a much higher rate to museums. This practice is now acknowledged as unethical and exploitative. The anthropological research of this period has also been criticized for focusing solely on cultural knowledge while ignoring the hardships faced by the culture. For example, few anthropologists chose to help their subjects address the circumstances of living in poverty on the reservations.

Leonard J. Frachtenberg was an anthropologist working during the salvage anthropology period who did take action to help the people he was studying. Around the turn of the 20th century, Frachtenberg was conducting research to collect the languages of the people living on the Siletz Reservation, in Lincoln County, on Oregon's coast. He worked extensively with collaborators from the Coos, Coquille, Lower Umpqua, and Alsea tribes—some of whom were living at the Siletz Reservation and some who had returned to their native lands—and published a series of **oral histories** based on his research. He also helped the tribes locate lost unratified treaties from the 1850s and use those treaties to successfully sue the federal government. In the treaties, the government had promised to pay the Indigenous peoples of Oregon's coast for their ancestral land if they peacefully relocated to the Siletz Reservation. The people upheld their part of the bargain, but they

never received any payment. Frachtenberg helped a Coquille man named George Wasson travel to Washington, DC, and locate copies of the treaties in the National Archives. In 1908, the tribes began the process of successfully suing the federal government for payment for their lands. This process took some 40 years to complete for many tribes, and not all tribes have been fairly paid to this day.

Museum Collections

Most of the materials collected by anthropologists during the period of salvage anthropology ended up in museums and university archives. Many natural history museums now display large dioramas featuring the material objects of numerous tribes. Museum research libraries house extensive collections of manuscripts and ethnographies. Archaeologists have contributed to these collections as well; many museums contain large collections of human remains. Indigenous peoples have criticized these collections, especially the gathering of human remains, which is seen as sacrilegious. Today, there are millions of sets of human remains (some full skeletons, but most single bones) in museum repositories that have never been studied and perhaps never will be.

Anthropologists spent so much of their time in the early period collecting that they had little time to study or analyze what they found. Many collections were put in storage after the anthropologists who had gathered them moved on to a new project or passed away. There are currently millions of material artifacts and ethnographic manuscripts that have never been fully studied. These archived materials offer research opportunities for anthropologists as well as for Indigenous peoples, who are making use of these collections to help recover parts of their cultures that were lost due to the assimilation policies of the past 200 years.

One person who has taken advantage of these archives is linguistic anthropologist Henry Zenk. Zenk has spent years studying the languages and cultures of the tribes of western Oregon, specifically the Chinook, Kalapuya, and Molalla tribes. He conducted research with the Grand Ronde tribe in the 1970s and 1980s and became a proficient speaker of Chinuk Wawa, a trade language spoken by tribes from southern Alaska to northern California and as far east as Montana. He has taught the language at the Grand Ronde Reservation for nearly 30 years. He is also one of the experts on the Kalapuya languages, spoken by the Kalapuya tribes of the Willamette and Umpqua Valleys, and in 2013, he began a project to translate the Melville Jacobs Kalapuya notebooks.

Melville Jacobs was an anthropologist from the University of Washington who studied the languages of the Northwest Coast from 1928 until his death in 1971. He filled more than 100 field notebooks with information on the languages of the peoples of western Oregon, with a special focus on Kalapuya. Jacobs published a book of Kalapuya oral histories in 1945, *Kalapuya Texts*. He also worked with Kalapuya speaker John Hudson to translate numerous texts prepared by earlier anthropologists Leonard Frachtenberg and Albert Gatschet. Jacobs and Hudson were able to translate several of these previously gathered texts, but many remained untranslated when Hudson died in 1953. Zenk, along with colleague Jedd Schrock, spent many years first learning Kalapuya and then translating a set of the Jacobs notebooks that recorded the knowledge and history of a Kalapuya man named Louis Kenoyer. In 2017, Zenk and Schrock published *My Life, by Louis Kenoyer: Reminiscences of a Grand Ronde Reservation Childhood*. Zenk and Schrock's work is a fine example of the research possibilities offered by the existing work of previous anthropologists.

Zenk worked closely with the Grand Ronde tribe on this project and endeavored to make sure that the translation of Kenoyer's story would benefit the people of the tribe to help them to better understand their own history. His research and work with members of the Grand Ronde tribe spanned 50 years, beginning with his PhD project, which involved extensive work with Grand Ronde members, who at the time were not a federally recognized tribe. In the 1990s, Zenk began working with the tribe to teach Chinuk Wawa to tribal members. The tribe today has an extensive language immersion project to teach the language to young people. Zenk has been a consistent influence, serving as advisor, teacher, master-apprentice instructor, and researcher. Zenk's work has helped the tribe recover parts of its culture and history that had been lost for many decades.

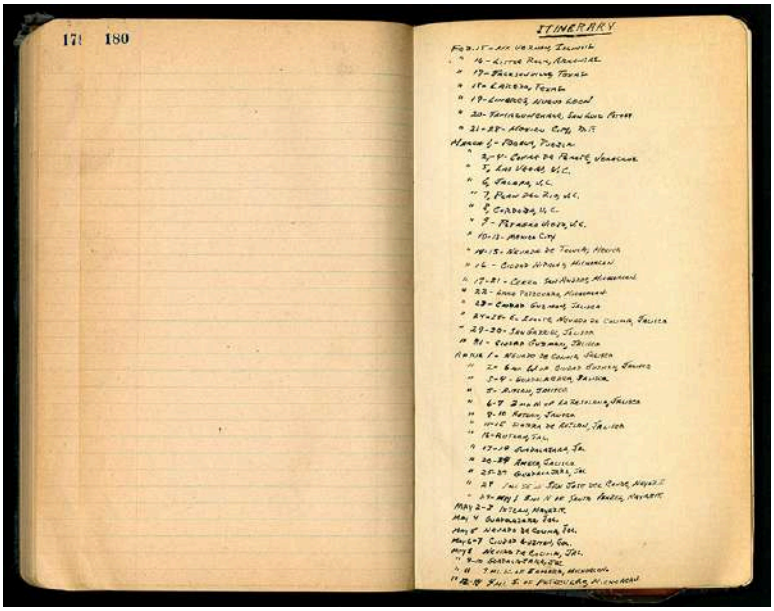

FIGURE 2.7 This page of an anthropologist's field notebook from 1949 contains a travel itinerary for several months. Contemporary anthropologists are likely to have such information in digital format. (credit: "Field Notes – Mexico, 1949 (Page 180) BHL46264382" by James Arthur Peters/Biodiversity Heritage Library/Wikimedia Commons)

PROFILES IN ANTHROPOLOGY

Albert Gatschet
1832–1907

FIGURE 2.8 Albert Gatschet was a Swiss-American ethnologist who pioneered the scientific study of Native

American languages. Here he is at age 61. (credit: "PSM V41 D306 Albert S Gatschet" by *Popular Science Monthly*/Wikimedia Commons, Public Domain)

Personal History: Albert Gatschet was a Swiss philologist and ethnologist who emigrated to the United States in 1868. He had a great interest in linguistics and Native American languages, and he gained attention in 1872 for his comparative analysis of 16 southeastern tribal vocabularies, which opened up new areas of research in linguistics. In 1877, he was hired to work on the Geographical and Geological Survey of the Rocky Mountain Region as an ethnologist. He also collected many notebooks of languages from Native peoples in California and Oregon. He is most noted for his studies of the languages of the southeastern tribes and his ethnography of the Klamath Tribes of Oregon.

Gatschet was fluent in numerous languages and published in English, French, and German in the United States and Europe during his career. He also became quite fluent in numerous Native languages. His first large work was *Orts-etymologische Forschungen aus der Schweiz* (Etymological research on place names from Switzerland, 1865–1867), a study of Swiss place names that is still the standard authority today.

Area of Anthropology: Philology, ethnology, linguistics

Accomplishments in the Field: One of Gatschet's most significant analyses was of the southeastern tribal languages, principally the Timucua language of northern Florida. Based on analysis of the notes of the Catholic priest Father Pareja, who had collected language texts from the Timucua people in 1612–1614, Gatschet determined that Timucua was a distinct language group that had gone extinct. Gatschet also examined the Catawba language of South Carolina, concluding that it was related to the Siouan languages of the western Great Plains. From 1881 to 1885, Gatschet worked in Louisiana, discovering two new languages and completing ethnographic descriptions of the southern tribes. In 1886, he found the last speakers of the Biloxi and Tunica languages and related them to the Siouan languages as well. He published his studies of the Gulf tribes in the two-volume work *A Migration Legend of the Creek Indians* (1884, 1888).

In 1877 and 1878, Gatschet spent time among the tribes of the Grand Ronde Reservation in Oregon. He collected some of the first professional field notes on the Kalapuya, Molala, and Shasta languages from some of the last speakers, and he published and made notes about the Kalapuya mounds. Upon leaving the reservation, he spent time researching the traditions of the Tualatin Kalapuya people in their traditional lands in the Tualatin Valley. He then went to the Klamath Reservation, where he collected field notes on the Klamath language. He worked his field notes into a two-part work, *The Klamath Indians of Southwestern Oregon* (1890), volume 2 of the US Department of the Interior's *Contributions to North American Ethnology*.

Gatschet was commissioned by the Bureau of American Ethnology (BAE) in 1891 to investigate the Algonquian people of the United States and Canada, a study he never fully completed. Illness forced him to retire, but near his death, he remained engaged in studies of Chinese languages.

After his death, his wife, Louise Horner Gatschet, sold his field notes to the BAE. She was also hired by the BAE to help translate much of his work. Gatschet's letters mention his wife being with him throughout his travels; she likely contributed in numerous ways to his field studies.

Importance of His Work : Gatschet was one of the first professional anthropologists to visit many tribes and was able to collect ethnographies and narratives from peoples who were gone within the next decade. He analyzed language families in the field and provided early frameworks of connected languages. Gatschet's work is fundamental to the study of the languages of western Oregon and the southeast Gulf area of the United States. His professional work, which applied rigorous methods to collect Native languages, predates much of the work of Franz Boas, who is credited with implementing scientific methods in the study of human societies.

Interpretation and Voice

There is increasing acknowledgement of the role of interpretation in the study of the human past. Although ideally grounded in well-conducted research and the best evidence available at the time, all conclusions about what might have been are based on the interpretations proposed by the authors of history. The backgrounds and viewpoints of those conducting research and publicizing findings play a significant role in the conclusions

they reach and share with other scholars. Interpretation and perspective are affected by many factors, including racial category, nationality, religious beliefs, social status, political affiliation, ambitions, and education. For many years, anthropological studies were almost always conducted by White, male scholars who grew up in the Northern Hemisphere and were educated in the same system. These common backgrounds represent a significant interpretive bias.

After being accessioned into museums, many collections of cultural artifacts have not been altered in more than 100 years. When these material objects were initially placed on display, choices about their arrangement and the written descriptions that accompanied them were made by museum curators. Most of these curators did not reach out to the originators of the artifacts or their descendants for input, and many exhibits do not accurately depict or describe the objects on display. Museum exhibits have been found to contain inaccurate information about objects' material composition, makers, tribal cultures, collection sites, and proper use. Many other display objects are lacking this information altogether.

Several museums are now seeking the help of Native people to better understand and more accurately tell the story of their collections. These Native perspectives are correcting misconceptions about the meaning and context of cultural artifacts and providing correct information about basic things such as the materials and processes used in the objects' production. Native input is also guiding museums in making choices about how objects are arranged and displayed. This input has been invaluable in helping museums more accurately tell the stories and display the context of the peoples who originally created the objects on display.

2.3 Ethnography and Ethnology

LEARNING OUTCOMES

By the end of this chapter, you will be able to:

- Identify early anthropological practices pertaining to ethnography.
- Define ethnology and provide examples of how it is used in anthropology.
- Describe efforts to achieve multiple perspectives in anthropological research.
- Define feminist anthropology and describe its aims.

The Development of Ethnography and Ethnology

As discussed in What is Anthropology? ethnography is a method used by cultural anthropologists to create a description of a culture or society. Ethnographers gather and utilize information from many sources, such as fieldwork, museum collections, government records, and archaeological data. In the 19th century, a form of ethnography developed that was called **armchair anthropology**, in which theories about human societies and human behaviors were proposed solely based on secondhand information. Lewis Henry Morgan is a well-known practitioner of this type of research. The content of his most famous publication, *League of the Ho-dé-no-sau-nee, or Iroquois* (1851), was gathered primarily from other books he read. Morgan did meet with Native peoples at various times in his career, but he did not conduct ethnographic research among the Iroquois before writing *League of the Ho-dé-no-sau-nee, or Iroquois*.

In the later 19th century, numerous anthropologists and other scholars undertook research projects with hundreds of tribes throughout the Americas, many of them by then living solely on federal reservations. Many of these researchers were influenced by Columbia University professor Franz Boas, a German scientist who was originally trained as a physicist but became most famous as an anthropologist. Boas insisted that scholars obtain ethnographical information directly from the peoples they aimed to write about, rather than collecting information from other published sources. Boas quickly established himself as a leader in the field of anthropology and eventually took an associate role at the federal Bureau of American Ethnology.

FIGURE 2.9 Franz Boas is credited with establishing the standards of field research that became the foundation of contemporary anthropological practices. Here he is in 1915, 57 years old. (credit: "Franz Boas" by Canadian Museum of History/Wikimedia Commons, Public Domain)

Boas advocated for and published in all four fields of anthropology and asked many key questions in his scholarship. In his 1907 essay "Anthropology," Boas identified two basic questions for anthropologists: "Why are the tribes and nations of the world different, and how have the present differences developed?" (Boas [1974] 1982, 269). Boas was responsible for hiring scholars and sending them out into the field to collect information about various Indigenous peoples. His standards of field research became the foundation of the contemporary science of anthropology.

One area of interest for early anthropologists was the similarities and differences between various Indigenous societies. This interest in comparison led to a branch of anthropology called **ethnology**, which is a cross-cultural comparison of different groups. In early anthropology, ethnology's aim was to understand how various Indigenous societies were related to one another. This included the relations among language dialects, dress, and appearance and to what degree and in what direction various tribes had migrated from one location to another. Early anthropologists explored these questions with the hope of tracking changes in tribal cultures. Another leading concern was how Native peoples initially got to the Americas. Anthropologists have used the practices of ethnology to establish relationships and shared cultural elements that help illuminate migration patterns of peoples from the "old" to the "new" world. Ethnology is still a common practice in linguistics, archaeology, and biological anthropology.

Some additional uses of ethnology are fused with archaeological methods and analysis. Ethnoarchaeology is a form of archaeology in which, following methods largely created by American archaeologist Lewis Binford, archaeologists access ethnographic information about recent or existing human cultures to draw conclusions about human cultures in the archaeological past. In Binford's 1978 study *Nunamiut Ethnoarchaeology*, he draws comparisons between the ways in which contemporary Indigenous peoples disposed of animal remains and the evidence observed in Nunamiut refuse sites. These comparisons inform a model that is used to understand more about how Indigenous peoples' ancestors may have disposed of remains in the past. Such models are not perfect, but many Indigenous cultures have maintained aspects of their culture to the present day.

Perspective and Interpretation in Ethnography

Ethnography is still commonly used by cultural anthropologists. Practitioners today consult multiple informants during their research in order to gather a variety of perspectives on a culture or society. No one person has a full or authoritative view of their own culture; multiple viewpoints are essential to a full description. Many early anthropological studies only invited male perspectives, introducing a male bias into the resulting ethnographies. Now, anthropologists deliberately seek varied perspectives, consulting people of different genders and ages and who occupy different roles.

Anthropologists can introduce significant bias into an ethnography. The most challenging aspect of fieldwork in cultural anthropology is to observe and study another culture without bias. Having an **ethnocentric** or **etic perspective** means someone is judging a culture according to the standards of their own culture and belief system. To observe a culture from the perspective of the people being researched is to have an **emic perspective**. For anthropologists to be effective researchers, they must be able to observe and gather data from unbiased and emic perspectives. In addition, an anthropologist's **interpretation** of the information gathered can significantly alter their research findings. Earlier anthropologists were primarily male and White, so their findings were based on interpretations made through these lenses. **Feminist anthropology** attempts to address this male bias. Feminist anthropology is recognized as having begun as early as the 1850s, with attempts made (by male anthropologist) to include more information on women in their ethnographic research. In the 1920s, female anthropologists such as Zora Neale Hurston and Ruth Benedict began publishing in the field, but not until the 1928 publication of Margaret Mead's *Coming of Age in Samoa* did a female anthropologist gain prominence.

FIGURE 2.10 This U.S. postage stamp honors anthropologist Margaret Mead. Mead was one of the first female anthropologists to be acknowledged for her work and insights. (credit: "Margaret Mead Stamp" by John Curran/flickr, CC BY 2.0)

Women's contributions and perspectives became much more pronounced in the later parts of the 20th century. Feminist anthropologists seek not only to claim a role for themselves in the field equal to that offered to men but also to expand the focal points of anthropological inquiry to include areas of life such as family, marriage, and child-rearing, as well as the economic and social roles played by women. The dominance of male anthropologists had biased analysis of human societies toward male-dominated roles and activities.

Many early archaeological research, for example, assigned no role to women in early societies or assumed that women's roles were limited to maintaining households and raising children. Evidence of women's subsistence and economic activities was either not looked for or ignored. It was also assumed that women in early societies had subservient roles to men, when in fact most early societies have now been found to be very egalitarian, with equal status accorded to women and men. Feminist anthropology has both expanded research to include women's roles and aimed to understand the gender roles in other societies on their own terms, rather than according to the gender roles of the researcher's own society.

Other perspectives emerged in anthropology in the 1970s as more members of minority groups began entering the field. One category of minority voices that has been a significant asset to anthropology is that of people with Indigenous ancestors. Practitioners with this type of background are part of a subfield called **Indigenous anthropology**. Indigenous anthropology is discussed in detail in Indigenous Anthropology.

2.4 Participant Observation and Interviewing

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define participant observation and identify best practices associated with it.
- Describe what makes a good informant for anthropological research.
- Describe best practices for conducting an interview from an unbiased and emic perspective.
- Explain the concept of ownership of cultural information.
- Identify the rights of study informants.
- List practices required by institutional review boards before research can begin.
- Describe the aim of long-term research projects in anthropology.

Participant Observation

Working in the field often places anthropologists in settings very different from what they are familiar with. Upon first arriving at an unfamiliar field location, it is common for anthropologists to feel out of place and uncomfortable as they adjust to a new culture and environment. Many anthropologists keep a daily log of their feeling and impressions in their new environment. Researchers studying other cultures practice a method called **participant observation**, which entails directly participating in the activities and events of a host culture and keeping records of observations about these activities.

Researchers may create various types of records of their interactions as participants and their observations about the host culture and environment. These might take the form of field notebooks, computer files, digital recordings, photographs, or film. Researchers working in the field may also collect objects that will remind them of the culture they are studying, often memorabilia such as maps, tourism brochures, books, or crafts made by the people they are observing.

Some researchers regularly record impressions of activities while they are occurring so that they do not forget to make note of important aspects of the culture. But many researchers will wait to take photos, draw images, or write in their notebooks until after an activity is over so that they do not disturb the culture through their efforts at documentation. In either case, it is important that researchers be respectful and responsible and always ask for permission from subjects before taking photos or recordings. Many researchers will have gathered signed permission from their subjects before beginning their research and will work with a documented plan that has been approved by their institution before going into the field.

Interviewing Informants

An important source of information about a culture is **interviews** with various people who grew up in that culture. Interviews can be uncomfortable for people, and it is important that researchers do all they can to help subjects feel at ease. Researchers will normally conduct an interview in a familiar space for the informant, such as the informant's home. They will help the subject ease into the interview by participating in introductory and hosting protocols followed in that culture when a visitor comes to someone's home. The researcher will start off the interview with the exchange of pleasant comments and will introduce themselves

by explaining who they are, where they come from, and why they are doing this research. Then the interview may commence.

Interviews can be short or long, and there may be follow-up meetings and further interviews based on how knowledgeable the informant is. Many informants are chosen because they are deeply conscious of multiple aspects of their culture. This type of insider information is vitally important to an anthropological research project. In addition to interview questions, survey questions may also be asked during these meetings. The use of recording equipment, for both audio and video recordings, is common during interviews. However, such equipment may be considered intrusive by some, and their use is always at the discretion of the informant. Express permissions must always be obtained both to create a recording and to use a recording in future projects.

FIGURE 2.11 Ethnographic researchers engage with the cultures they are studying by spending time with their people. Here Josphat Mako, a Maasai man, greets Stuart Butler. Butler spent two months with Mako, walking between Maasai villages and visiting with residents to learn about both traditional customs and contemporary practices and challenges. (credit: "2015 06 24 Walking with the Maasai JPEG RESIZED 0025" by Make It Kenya Photo/Stuart Price/flickr, Public Domain)

Ethical Considerations

Contemporary sociocultural researchers and anthropologists must follow protocols established by an **institutional review board** (IRB) as well as any research protocols specific to the culture being researched. For social science research, IRBs are committees housed within a university that must review and approve research plans before any research begins. There may also be a parallel review process within the host culture. The proposed research is normally fully planned out before the review process can begin, with specific information about the type of research that will be conducted, including examples of questions to be asked, potential risk factors to subjects, plans for emotional support for subjects, means of protecting the identity of subjects, language used to fully disclose the intent of the project to subjects, and the final plan for archiving the research data. Many Indigenous nations have their own research protocols, and foreign countries will have their own research protocols and processes for securing permission to conduct research as well.

Researchers conducting sociocultural, medical, or clinical studies must gain written consent for all interviews from their informants, and they must be transparent as to why they are conducting research and how it will be used in the future. There are normally various levels of protocols pertaining to research, based on the potential to cause stress or harm to the subjects. At the highest level, full disclosure and signed permission as well as complete anonymity of the subjects involved in the project are required. A research plan should also specify whether recordings, notes, and data will be archived for future use or destroyed at the end of the project. Content gathered from research may make its way into articles or books or become part of a vast body of anonymous data available to other researchers. These possibilities should be discussed with collaborators. Collaborators are usually anonymous unless they choose to allow their names to be used. Many researchers now assign to their subject culture significant rights to review reports and edit and correct erroneous

information and interpretations as well as ownership rights of the final product and the research data. Alternately, researchers may destroy research data once the project is over so that it cannot be used in ways other than what was originally intended.

Long-term research projects are becoming the norm for many professional researchers, who establish trusting relationships with collaborators over the length of their careers. During the early years of anthropology, it was almost unheard of for researchers to establish long-term relationships with the subjects of their research, but many scholars began to view short-term relationships as exploitative. Long-term relationships involve a regular return to the subject culture, on an annual or semiannual basis, to follow up on projects and programs. Researchers often include their subjects in the planning and administration of their projects and will at times seek a research objective based on the needs of their subjects. This type of research is more **open-ended** and often has an applied focus, seeking to solve problems and issues identified as significant by the collaborating culture. Those who engage in this type of research make it a primary aim to help the collaborating culture rather than to seek information pertinent to their personal projects.

This type of open-ended research has been developed in response to the criticisms of Indigenous scholars such as Vine Deloria Jr., who questioned whether early anthropologists did anything beneficial for the people they studied. A researcher working in this fashion will listen closely to the concerns expressed by those they are studying and aim to identify a project that will ultimately help the collaborating culture address issues identified as important, either by directly working toward a solution or by offering significant insights into the causes and subtleties of the issue. The researcher will include members of the culture in their team, and the results of the research will be given to the people for their use. Researchers working in this manner may still publish their findings, but the subject community will be part of the decision-making regarding what is important and what should and should not be published. The subject community will also have control over any projects that develop based on the findings. In some cases, the researcher is required to submit all manuscripts intended for publication to a committee formed by the collaborating culture for review, correction, and approval. Many Indigenous anthropologists who are tribal members are required to submit their publications to their tribal council for approval before they publish.

Contemporary anthropological researchers often assign ultimate ownership of the material they collect to the culture-bearers who provided the information. In fact, there are scholars today who, when publishing findings, assign authorship to the community they worked with and assign themselves the role of editor or compiler. An example is the text *Chinuk Wawa: Kakwa nsayka ulman-tilixam laska munk-kemteks nsayka / As Our Elders Teach Us to Speak It*, which is authored by the Chinuk Wawa Dictionary Project and published by the Confederated Tribes of the Grand Ronde Community of Oregon, with the scholar Henry Zenk acknowledged as the compiler of the information. Intellectual property protocols in many countries now assume that ownership of ethnographic content is assigned to the informants. Informants have rights, both legally and per IRB policies, to both participate and not participate in a study and to have their data removed from a study if they choose. Ethical researchers will listen to their informants, and if they are at all worried about the effect their findings will have on their informants or other people, they will either pull the data out of the study or find a way to make it completely anonymous. No researcher wants to have their informants adversely affected by their involvement in a research project. The IRB-informed consent paperwork, which must be signed by all informants, should address these concerns and allow the informants to freely choose their level of participation.

2.5 Quantitative and Qualitative Analysis

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Identify differences between quantitative and qualitative information.
- Provide an example of how an anthropologist might model research findings.
- Describe the steps of the scientific method.

Differences between Quantitative and Qualitative Information

Quantitative information is measurable or countable data that can provide insight into research questions.

Quantitative information is one of the most direct ways to understand limited, specific questions, such as how often people in a culture perform a certain action or how many times an art form or motif appears in a cultural artifact. **Statistics** created from quantitative data help researchers understand trends and changes over time. Counts of cultural remains, such as the number and distribution of animal remains found at a campsite, can show how much the campsite was used and what type of animal was being hunted. Statistical comparisons may be made of several different sites that Indigenous peoples used to process food in order to determine the primary purpose of each site.

In cultural research, **qualitative data** allows anthropologists to understand culture based on more subjective analyses of language, behavior, ritual, symbolism, and interrelationships of people. Qualitative data has the potential for more in-depth responses via open-ended questions, which can be coded and categorized in order to better identify common themes. Qualitative analysis is less about frequency and the number of things and more about a researcher's subjective insights and understandings. Anthropology and other fields in the social sciences frequently integrate both types of data by using mixed methods. Through the triangulation of data, anthropologists can use both objective and frequency data (for example, survey results) and subjective data (such as observations) to provide a more holistic understanding.

Modeling

Many anthropologists create models to help others visualize and understand their research findings. Models help people understand the relationships between various points of data and can include qualitative elements as well. One very familiar model is a map. Maps are constructed from many thousands of data points projected onto a flat surface to help people understand distances and relationships. Maps are typically two-dimensional, but we are of course all familiar with the three-dimensional version of a world map known as a globe. Maps and globes are built on data points, but they also include qualitative information, such as the colors used to represent various features and the human-assigned names of various geographical features. Other familiar types of models include graphs, calendars, timelines, and charts. GPS is also a significant modeling tool today.

GPS, or the Global Position System, is increasingly used in archaeology. A model of a research site can be created using computer programs and a series of GPS coordinates. Any artifacts found or important features identified within the site can mapped to their exact locations within this model. This type of mapping is incredibly helpful if further work is warranted, making it possible for the researcher to return to the exact site where the original artifacts were found. These types of models also provide construction companies with an understanding of where the most sensitive cultural sites are located so that they may avoid destroying them. Government agencies and tribal governments are now constructing GPS maps of important cultural sites that include a variety of layers. Layering types of data within a landscape allows researchers to easily sort the available data and focus on what is most relevant to a particular question or task.

Wild food plants, water sources, roads and trails, and even individual trees can be documented and mapped with precision. Archaeologists can create complex layered maps of traditional Native landscapes, with original habitations, trails, and resource locations marked. GPS has significant applications in the re-creation of historic periods. By comparing the placements of buildings at various points in the past, GPS models can be created showing how neighborhoods or even whole cities have changed over time. In addition, layers can be created that contain cultural and historic information. These types of models are an important part of efforts to preserve remaining cultural and historic sites and features.

The Science of Anthropology

Anthropology is a science, and as such, anthropologists follow the **scientific method**. First, an anthropologist forms a **research question** based on some phenomenon they have encountered. They then construct a testable **hypothesis** based on their question. To test their hypothesis, they gather data and information. Information can come from one or many sources and can be either quantitative or qualitative in nature. Part of the evaluation might include statistical analyses of the data. The anthropologist then draws a conclusion. Conclusions are rarely 100 percent positive or 100 percent negative; generally, the results are somewhere on a continuum. Most conclusions to the positive will be stated as "likely" to be true. Scholars may also develop methods of testing and **retesting** their conclusions to make sure that what they think is true is proven true through various means. When a hypothesis is rigorously tested and the results conform with empirical

observations of the world, then a **theory** is considered "likely to be accurate." Hypotheses are always subject to being disproven or modified as more information is collected.

2.6 Collections

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Identify and explain the issues and needs of archival collections.
- Identify and explain the issues and needs of three-dimensional collections.
- Describe current controversies regarding ownership of anthropological artifacts and human remains.
- Recall two pieces of legislature pertaining to questions of ownership.
- Define *provenance* and describe its importance in anthropology.

Not all anthropological research is done in the field. There is much to be learned from the collections of manuscripts and artifacts housed in universities and museums. These collections make it possible for anthropologists to study human cultures within the setting of special research laboratories that have been designed to preserve and organize materials collected and perhaps interpreted by scholars of the past.

Archives

Archival collections contain published, re-created, or original manuscripts that are deemed significant enough to be placed in conditions designed to preserve them against damage or loss. Such collections may contain correspondence, maps, drawings, original drafts of books, rare books, or other papers and media that need special care. Photographs are a major resource in many archives, and they need special handling. Preservation policies of archival collections include practices such as keeping resources out of direct sunlight and away from moisture.

While archives offer researchers a great range of valuable resources, they typically impose rather strict policies on those wishing to access these resources. Researchers typically must wear gloves when handling materials to prevent damage from the oils and acidity of human skin. Normally, archival collections do not circulate (i.e., cannot be removed from the host site), and researchers may have to apply for permission to enter the site or use any information. Archives may charge varying rates to make copies of material or to use images of the resources in their collection for publication. To access some archives, researchers must plan ahead by scheduling a time to visit and making previous arrangements to access specific collections. Some sites do not allow researchers to scan materials using flatbed scanners, instead stipulating the use of non-flash photography or overhead scanning. Some archives do not allow the patron to scan, photograph, or copy a manuscript in any way, with all arrangements for copies and reproductions having to go through the archive's staff.

The first step in archival research is typically to review a list or similar finding aid that indexes and describes the resources available in a collection. These descriptive aids can help researchers determine whether a collection contains resources that fit their needs and can make a visit to a selected archive more efficient and worthwhile. Finding aids have become so well constructed that they may provide researchers with enough information to enable the researcher to request copies of specific materials and avoid the effort and expense of traveling to the archive in person. Most archives offer downloadable finding aids of their most important collections on their websites, and there may be additional printed finding aids available on request. Most archives will make requested copies for a moderate fee and will mail or email researchers a packet of the reproduced materials. The cost of procuring such copies is almost always much less than the cost of traveling to an archive site and paying for housing and meals. However, if a collection is potentially full of material important to a research project, it may be better to visit in person.

Three-Dimensional Collections

Three-dimensional collections of objects such as basketry and pottery are normally housed separately from manuscript collections. Such collections may host tens of thousands of individual cultural objects. These collections typically require much more care and management than manuscript materials. Extensive planning goes into determining the best way to contain and store each type of object in order to slow deterioration over

time, with special attention paid to both the temperature and the moisture levels in storage areas. Handwoven baskets will be supported so that their fibers are not under stress, and all organic objects will have been previously frozen, perhaps several times, to destroy any insects that may live in the fibers. Collections of animal and human remains utilized by biological anthropologists or archaeologists must be properly stored and controlled against further degradation by reducing temperatures and maintaining moisture controls. Some very ancient organic collections may need to be chemically stabilized so they do not degrade. Objects made from organic materials—such as wooden canoes, basketry, reed sandals, or human remains—are particularly prone to degradation. Organic artifacts that have been sealed away from contact with the air for centuries, such as boats found on the bottom of a river or lake, will degrade fast once exposed to the air, so they may be kept permanently frozen or preserved with an ammonium glycol solution to stabilize decay.

FIGURE 2.12 This pair of yucca sandals, collected in 1875, is an example of an organic artifact of the Southern Paiute people. Yucca is a perennial plant with large tough leaves that can be used for various purposes. (credit: "Sandals, Southern Paiute, yucca, collected in 1875 – Native American collection –Peabody Museum, Harvard University – DSC05570" by Daderot/Wikimedia Commons, CC0)

All objects in collections storage must be well organized to make them accessible for further research opportunities. Collection materials that have been used to make claims about human experience or evolution must remain accessible to future researchers in case there are challenges or additional questions about their findings. In addition, if an anthropologist who donated and is responsible for overseeing a collection at one institution should die or move to another research institute, there needs to be a plan for the period of retention for the collection, or the time that the collection will remain in the archive. Many biological and cultural collections have been preserved in repositories since the day they were collected, with no plans to ever remove them from an archive. There are collections in the Smithsonian Institution that have been there since the institution was built in the 1850s. These collections continue to grow at museums and universities around the world.

In the early 20th century, many museums adopted the practices of painting objects with lacquer and spraying organic collections with pesticides such as DDT to prevent insect damage. These solutions were proven to ultimately be harmful. Lacquer tends to alter the color and chemical structure of objects and is thus not a good preservation material, and DDT and other pesticides pose health threats to humans. Both museum staff and tribal members who receive repatriated objects and human remains are very concerned about the hazards these chemicals pose to humans—and to the environment, if they should be reburied. Efforts to clean many collections are underway.

Ownership

A question being asked by both anthropologists and subjects of research today is who owns the objects housed in material collections. In the past, anthropologists or their host institutions assumed ownership of anything

they collected, along with the right to publish images of materials and sign over ownership of the objects to collections repositories. In recent decades, tribal peoples and other subjects of research have begun asking questions about whether such objects really should be considered the property of these repositories. Many of these artifacts were not even collected by scientists but rather donated or sold by collectors, some of whom removed the artifacts from burial sites. Artifact hunting is a common cultural practice in some countries, such as Peru, where many people dig in Inca sites to locate artifacts to sell.

Questions of ownership become particularly pressing when the objects in question are human remains. Until the 1960s, tribal peoples in the United States had little or no power to repatriate their ancestors. **Repatriation** is the process of restoring human remains and/or objects of religious or cultural importance to the peoples from whom they originated. In the United States, repatriation is executed under the Native American Graves Protection and Repatriation Act (**NAGPRA**), passed into law in 1990. Prior to 1990, Indigenous peoples in the United States had no legal means to claim return of any of the millions of human remains that had been collected and placed in museums and archaeological collections since the 19th century.

Another important piece of legislature is the National Historic Preservation Act (NHPA), passed in 1966. The act was passed to ensure that federal agencies would identify and take actions to protect and preserve the nation's historic sites and locations. It especially impacted Indigenous communities and their cultural and historical resources. Section 106 of the NHPA requires that federal agencies follow a formal review process before undertaking any type of development project (36 CFR 800). This process includes identifying what the actual undertaking is, such as the development of a road or other major capital project. Once this is established, the agency must make a good-faith effort to identify any historic resources (50+ years of age) in the area and determine if they are eligible for protection under the NHPA. After this identification measure is completed, the agency must initiate consultation with the state historic preservation officer (SHPO) or tribal historic preservation officer (THPO) and other interested groups and individuals. This step can include a variety of meetings or activities and a period of notification that a project is going to commence, during which feedback is requested by the lead federal agency. Public meetings might be held, with speakers selected to introduce and describe the project. During the consultation period, correspondence and feedback is welcomed from concerned tribes, institutions, or individuals. Tribes and other community groups with an interest in any cultural objects likely to be found on the site are required to be consulted. Successful consultation often takes place during the earliest planning stages of a project. Lack of early consultation can lead to a failure to identify historic resources of cultural and religious importance.

The process places the burden of determining the potential effects of the project on the federal agency, according to three established categories: no potential to effect, no adverse effect, and adverse effect. The agency must then seek concurrence from appropriate SHPOs and THPOs and potentially other consulting parties. If there is an adverse effect, the agency, the SHPO and/or THPO, and other consulting parties will negotiate mitigation terms and solidify them into a memorandum of agreement to ensure completion of the agreed-upon mitigation measures. In most cases, Native groups do not believe that archaeological excavations alone are an appropriate mitigation measure, but each community has its own interpretation of what is appropriate.

Generally, anytime a road is built or a building is constructed, there needs to be a section 106 review of the project because of the likelihood of encountering Native American cultural sites in almost all locations in the United States. Through the consultation process and cooperation between SHPOs and THPOs, decisions are made as to the status and disposition of any cultural objects recovered from cultural sites. Tribes typically advocate for the non-disturbance of human remains and the return of cultural objects to the concerned tribes. The NHPA is not perfect, as it does not completely halt construction that will destroy a cultural site and does not apply to collections placed in repositories before 1966.

In the early 20th century, the United States made it illegal for nonscientists to remove artifacts from archaeological sites on federal lands under a law called the American Antiquities Act (1906). More recently, NAGPRA made it possible for tribes to repatriate objects covered under the act, such as human remains and funerary objects. Under this law, more than 20,000 sets of remains had been repatriated as of 2010, but millions of artifacts and sets of additional remains are still in repositories. In addition, there are human remains and funerary objects of US origin in collections worldwide that are not subject to NAGPRA

repatriation.

One problem surrounding repatriation is that many artifacts and remains lack clear **provenance**, or detailed information about where they were found. Lack of clear provenance also limits an object's usefulness to researchers. In many cases, wide regions are provided as the origin of an artifact, making it unclear which specific tribal culture it relates to. Objects that, for example, are labeled as coming from "New York" may have been created by members of dozens of tribes or bands of tribes. In general, the more specific a provenance is, the better. Narrowing an object down to Buffalo, New York, reduces its possible tribal sources to just a few. Objects that have too broad of a context are nearly impossible to repatriate because repatriation is supposed to return an object or human remains to the original tribe. In 2010, NAGPRA was expanded to allow for groups of tribes to repatriate objects of wide regional association back to a previously agreed-upon reburial or repatriation location. Under this expanded version of the law, a greater number of objects and human remains will be able to be returned to their communities.

Concerns about ownership have also been raised regarding the ethnological and ethnographic research collected in millions of documents in hundreds of research collections around the world. Some tribal peoples have raised concerns that this material represents their ancestral intellectual knowledge and that it was taken from them without full disclosure of how it would be used. Many anthropologists published books and/or made tenure at their universities based on such research. Meanwhile, little was done with the information to help the tribal peoples it described, who were struggling under political and legal pressures to assimilate. In some cases, tribal peoples have implemented research projects utilizing these manuscript collections that have the explicit goal of helping their people with cultural recovery efforts.

One example of Indigenous peoples utilizing archive materials to their advantage is offered by Oregon's Coquille Indian Tribe, which made use of archival documents to successfully restore their tribe to federal recognition in 1989 after the tribe was declared "terminated" by the federal government in 1954. Their restoration bid was made difficult by the fact that the records of their tribal culture were collected in faraway archives. Essential to the tribe's success was George Wasson Jr., son of the aforementioned George Wasson who was aided by Leonard Frachtenberg. Wasson Jr. designed and implemented an effort to collect copies of anthropological manuscripts pertinent to the Coquille tribe from the Smithsonian Institution.

In 1995, 1997, and 2006, the Southwest Oregon Research Project—a project initiated by the Coquille Indian Tribe, University of Oregon anthropologists, and students from western Oregon tribes—collected 150,000 pages of documents about the tribes of western Oregon from the Smithsonian Institution and the National Archives. These materials have since become a major collection at the University of Oregon's Knight Library Archives, special collections division, and additional copies have been given to 17 regional tribes.

These projects are examples of the repatriation of intellectual knowledge to the tribes that the information was collected from. Many libraries now have policies that allow concerned tribes to repatriate their intellectual knowledge in the form of copies of collection materials for little or no cost. Recordings of songs represent a particularly sensitive and special type of cultural artifact to many tribal people. Archives have historically not been very attentive to the concerns of tribes regarding their collections. For more information, consult the Protocols for Native American Archival Materials.

ETHNOGRAPHIC SKETCHES

Summers Collection and the Grand Ronde Tribe

by author David Lewis

The Summers Collection is a collection of more than 600 Native objects from the West Coast of the United States, collected by the Reverend Robert Summers, an Episcopalian minister. A large portion of the collection, some 300 objects, was collected from the Grand Ronde Indian Reservation, which is close to where Summers lived in McMinnville, Oregon. In the 1870s, Summers would regularly visit the people of Grand Ronde and purchase objects they had in their homes or were using. Most of these objects are woven baskets and trays made in a traditional manner, many predating the formation of the reservation in 1856. Sometime in the

1890s, Summers passed his collection on to his associate Reverend Freer, who donated the collection to the British Museum in 1900.

The collection has remained part of the British Museum collections since then. The value of this collection lies not only in the objects and their unusually good preservation but also in the care Summers took to document the people he purchased them from, their use, and their cultural background. It was unusual in early anthropology for a collector to be so comprehensive in documenting material collections. Summers was likely aided by his wife, who was a professional botanist and would have been meticulous in her work documenting botanical collections.

In the 1990s, the Grand Ronde tribe became aware of the Summers Collection at the British Museum. In 1999, representatives of the tribe visited the museum, viewed the collection, took photos of all objects related to the tribes, and copied all the notes they could. Since then, the tribe has worked through a series of museum curators to see if it would be possible to repatriate the collection to the Grand Ronde. The British Museum is one of the largest repositories in the world, holding sacred and cultural objects from numerous nations, many once part of Britain's extensive colonial empire. The British Museum rarely allows repatriations, fearful that allowing one to occur would set a precedent resulting in multiple other cultures submitting claims. Still, curators of the North American collections have suggested that something could be worked out if there were a book deal to help publicize their collections and significant enough publicity. In 2018, the Grand Ronde tribe was able to negotiate the loan of some 16 objects from the collection. The objects were placed on display in the new Chachalu Museum and Cultural Center in Grand Ronde. While there, the objects were studied by cultural experts who focused on understanding how they were made and how they might be able to replicate the techniques.

There are no protocols for international repatriation. The Grand Ronde tribe had to work diplomatically to form negotiated agreements and establish a beneficial relationship with the British Museum. After more than 100 years of assimilation, many traditional skills had been lost to the Grand Ronde people. The opportunity to regain some of this lost ancestral knowledge by studying these cultural goods is a rare gift.

MINI-FIELDWORK ACTIVITY

Participant Observation

When practicing participant observation, researchers immerse themselves in a cultural context and make observations and notes about what occurs. This activity is structured to take place in a few hours and can be accomplished in your community.

- Spend about an hour in a public place, such as a mall or store, coffeeshop, park, bus, train, or library, and observe what people around you are doing. Take notes about their actions, interactions, clothing, foods, mannerisms, and anything else that might seem interesting. Note characteristics and mannerisms pertaining to culture, language, ethnicity, masculine and feminine roles, and age-related roles.
- Try not to be conspicuous, and do not record conversations unless they are spoken quite loudly so as not to be intrusive. If anyone asks what you are doing, just explain that you have an assignment in a college course to make an anonymous report on local culture.
- Return home and write a two-page reflective report on your research. In the report, give specifics of what you witnessed, and analyze how you personally responded to different cultures or mannerisms. About two-thirds of the report should be ethnographic reporting, and one-third should be analysis.
- Try to eliminate your personal bias or admit when you have one, and identify when you are basing your analysis on personal opinions.
- Pay attention to the need to maintain the anonymity of your subjects as if this were an actual anthropology fieldwork assignment. Do not identify people by name; instead, use pseudonyms.

As a final step, give a five-minute presentation about your experience that summarizes the high points of your

participant observation.

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Key Terms

absolute dating methods (see also chronometric dating methods) dating methods that use physical and chemical properties of artifacts and structures modified by humans to establish their age without reference to other artifacts. For example, radiocarbon dating is used to date organic materials generally up to 50,000 years old.

archaeobotanist a specialist who studies plants and seeds appearing in an archaeology site.

archaeological context the place where an object was originally found, along with other associations, such as the stratum it was found in, specific features, and other objects associated with it.

archaeological excavation the scientific process of uncovering artifacts and other biological and cultural remains in the historic and prehistoric past of human-inhabited sites.

armchair anthropology a method of conducting anthropological research without doing fieldwork, relying instead on materials and documents previously collected by others.

artifacts objects that are portable and show evidence of human cultural activity; for example, bones that show evidence of drawings sketched on them, stone tools, pottery, etc.

chronometric dating methods dating methods used to analyze various physical or chemical characteristics of an artifact in order to assign a date or range of dates for its production.

cross-cutting relationship a principle in geology and archaeology that suggests that a geologic or cultural feature that cuts across another feature is the more recently deposited of the two.

dendrochronology an absolute dating technique that uses patterns of growth of tree rings and cross-dating to determine the approximate age of wood.

ecofacts natural objects found at an archaeological site, such as seeds, bone, shells, etc., that show no sign of human craftsmanship.

emic perspective viewing and attempting to evaluate other peoples and cultures according to the standards of those cultures; an "insider's" point of view.

ethnology the study of differences and relationships between various peoples, societies, and cultures.

etic (or ethnocentric) perspective viewing a culture from the perspective of an outsider looking in.

features cultural structures found at an archaeological site that are not movable or portable, such as parts of a temple, altars, tombs, etc.

feminist anthropology an approach to anthropology that seeks to transform research methods and findings by engaging with more diverse perspectives and using insights from feminist theory.

hypothesis a supposition that is subjected to research in order to be proven or disproven through data collection.

Indigenous anthropology the study of one's own culture or society using anthropological methods. The term has come to mean any application of Indigenous knowledge, perspectives, and scholarship in anthropology.

institutional review board a university research committee that reviews biomedical or social science research proposals to determine if they appropriately protect human participants, informants, and subjects.

interpretation the act of explaining the meaning of something.

interview a method of research in which the researcher asks questions of an informant to gain information about a person, society, or culture.

law of superposition the geological principle of stratigraphy that assumes that materials, normally rock layers, found beneath other materials are older that the materials on top.

NAGPRA the Native American Graves Protection and Repatriation Act (1990), a US law that protects human remains and cultural and ceremonial objects and artifacts from collection and requires the return of such items already collected to the originating tribes. NAGPRA also allows for the repatriation of the same materials from museums and other repositories.

naturalism an approach that seeks to understand the world and the laws that govern it by direct observation of nature.

open-ended in the context of anthropological research, describes a research method whereby the researcher allows informants to answer questions without a limit in time or subject.

oral histories histories of previous events, moral or ethical lessons, or stories of creation that are passed down by memorization. Many oral histories are also called mythologies, legends, texts, or folklore.

participant observation an anthropological

research method in which the researcher enters a cultural community and collects information through observation of and participation in the culture.

primary context the context of an artifact, feature, or site that has not been disturbed since its original deposition.

provenance the location of an artifact when it is first found. The provenance is normally recorded when the artifact is in situ, or before it has been removed.

qualitative data nonnumerical data, such as language, feelings, or impressions, that is normally collected when the researcher is at the research site.

radiocarbon dating a dating technique for organic substances that measures the decay of radioactive carbon in the sample; also called carbon-14 (^{14}C or C^{14}) dating. This is the most widely used technique for dating organic artifacts between 50 and 60,000 years old.

relative dating describes methods of determining the relative order of past events through comparisons of two or more artifacts without determining their absolute age; e.g., sample 1 is older than sample 2 because sample 1 was found beneath sample 2.

repatriation the process of returning human remains, associated funerary objects, and ceremonial items to the originating culture.

research question a question that can be proved or disproved through research and observation.

retesting the scientific practice of conducting experiments or research more than once in order to determine if the findings are accurate. Retesting helps eliminate human and other errors in testing and create a range of accuracy.

salvage anthropology a particular period in early anthropological practices (1870s–1930s) during which tribal cultures were subject to extreme collecting from researchers. The practice occurred because of fears that Native cultures would go extinct and there would be nothing further to study.

scientific method a method of expanding knowledge by asking questions, creating a hypothesis, collecting data, and presenting well-reasoned findings based on evidence.

secondary context the context of a cultural or natural objects that has been moved or disturbed from its original location and is thus no longer associated with its place of origin; for example, a burial that has been moved from its original location due to geological shifts or natural disaster.

seriation a relative dating method that places similar artifacts from the same area in a chronological sequence.

statistics the science of collecting and analyzing numerical data in large quantities and inferring proportions in a whole from those in a representative sample, or the numerical data collected and analyzed in this manner.

strata plural of *stratum*; in geology and archaeology, distinct layers of deposited natural or archaeological material.

stratigraphic superposition a relative dating method that assumes that any cultural or natural artifact that is found within a stratum, or that cuts across two or more strata in a cross-cutting relationship, is younger than the stratum itself.

stratigraphy the process of identifying the order and relative positions of strata.

stratum singular of *strata*; one specific layer of deposited natural or archaeological material.

theory a supposition or a system of ideas intended to explain something.

three-dimensional collection a collection of objects or artifacts.

typological sequence a set or group of objects ordered according to their types.

zooarchaeologist an archaeologist who specializes in the identification of animal remains at an archaeological site.

Summary

Chapter 2 discusses how anthropologists gather information. All of the subfields of anthropology conduct fieldwork in some form to gather information, each subfield may use different methods of conducting research. The concept of working in "the field" was traditionally based on the practice of traveling to distant regions to study other cultures within their native environmental contexts. In recent decades, "the field" has broadened to include diverse settings such as one's hometown (as in urban anthropology), the Internet (visual or virtual anthropology), or collections in university archives and museums (ethnohistory or museum anthropology). Research methods for cultural anthropology and archaeology are covered in detail. the chapter explores the issues that need to be considered when analyzing information gathered during research. This includes the biases of the

anthropological researcher. Also covered is some of the history of the research methods used in anthropological study and how fieldwork and methods have changed over time.

Critical Thinking Questions

1. Explain how conservation, as practiced in the 19th and early 20th centuries, attempted to preserve animals, plants, and human cultures.
2. Describe salvage anthropology. Why was it practiced? What are some criticisms of this approach?
3. What is different about anthropology as practiced in the 19th century compared to the way it is practiced today?
4. Why is it important to have multiple perspectives when describing human culture? How do anthropologists gather these multiple perspectives?
5. What is a feminist anthropological approach to anthropological inquiry? What does this approach offer to the field?
6. What rights do tribal peoples have when research is conducted on them?
7. What are the ethical responsibilities of anthropologists when conducting research? What practices should anthropologists follow to be sure their research proceeds in a moral and ethical manner?
8. Name and describe the most important pieces of government legislation in the United States pertaining to the rights of Indigenous peoples to cultural artifacts and knowledge.

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CHAPTER 3
Culture Concept Theory: Theories of Cultural Change

Figure 3.1 Now and in the past, people have called many different types of dwelling home. Top left, tent on K Street in Washington DC; top right, Puye cliff dwellings near Espanola, New Mexico; bottom left, a water village, Brunei, Indonesia; bottom right the International Space Station (credit: top left "K Street" by Daniel Lobo/flickr, Public Domain; top right "Puye Cliff Dwellings" by BFS Man/flickr, CC BY 2.0; bottom left "The water village. Burnei" by Bernard Spragg. NZ/flickr, Public Domain; bottom right "The International Space Station after arrival of ISS Roll Out Solar Arrays" by NASA/NASA.gov, Public Domain)

CHAPTER OUTLINE

INTRODUCTION Though all humans have a set of basic needs, we meet those needs in very different ways in response to environmental conditions and social circumstances. For example, consider the basic human need for shelter. In places prone to flooding, people often build their houses on stilts, constructing patios and walkways to connect their houses together. In mountainous areas, people sometimes carve their houses into cliffsides. In societies with extreme inequality, some people live in luxury highrise apartments side-by-side

with people who pitch their tents on the sidewalk. Humans have even constructed a complex dwelling adapted to the conditions of space, the International Space Center.

Similarly, humans have a wide range of solutions to human needs for clothing, food, family life, health, and social order. In each society, the various solutions combine in a complex totality called culture. In this chapter, we explore the concept of culture, what it is and how to study it. Taking the need for shelter as a central example, we will see how culture is created and how it changes. We will learn about how different elements of culture interact with one another. As culture is a central concept in anthropology, our understanding of culture will guide our exploration of human lifeways throughout this textbook.

3.1 The Homeyness of Culture

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Explain the importance of culture to the concept of home.
- Identify the centrality of culture in the discipline of anthropology.
- Describe how each of the four fields deploys the concept of culture.
- Explain why culture feels familiar and "homey."

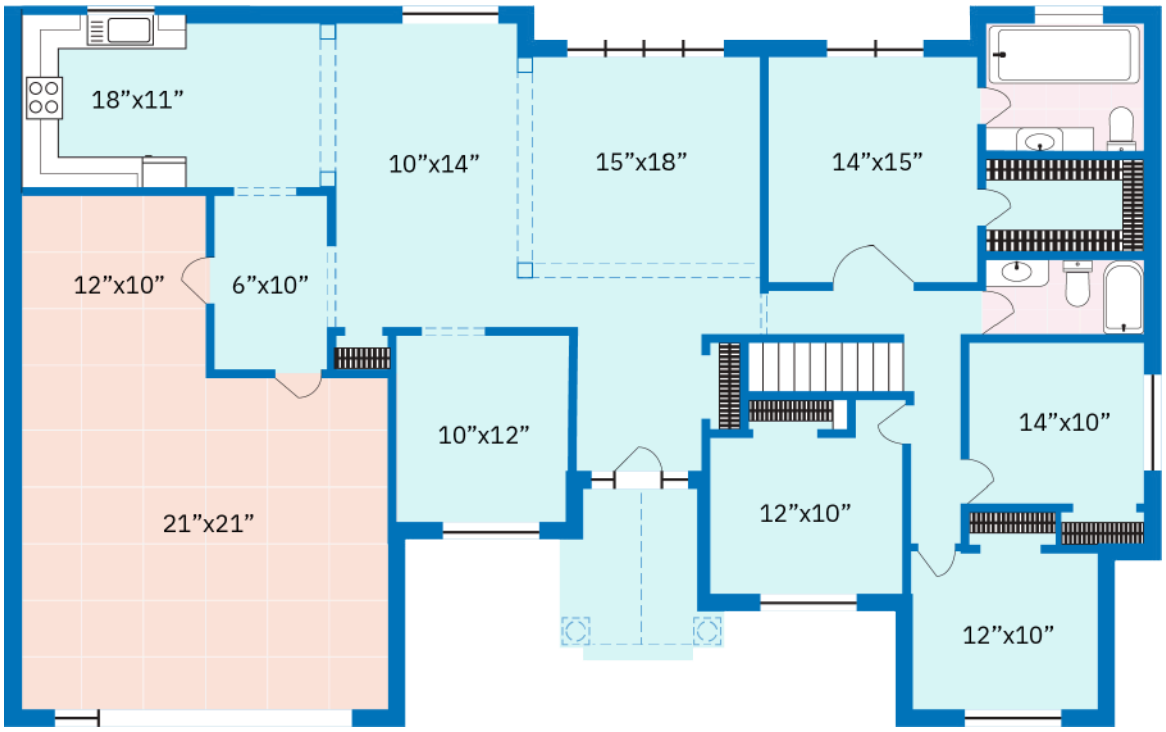

FIGURE 3.2 The floor plan of a typical 21st-century middle-class American house consists of many individual rooms, including three to four bedrooms, a large kitchen, a family room, and an attached garage. This floor plan depicts such a home. (attribution: Copyright Rice University, OpenStax, under CC BY 4.0 license)

What place do you call home? For some people, home is a large, angular structure made of wood or brick, fixed on a permanent foundation of concrete, and rigged with systems to provide running water, electricity, and temperature control. Such houses have separate rooms for distinct activities, such as sleeping, bathing, eating, and socializing. Often, one bedroom is larger than the others and connected to its own bathroom. This is the "primary bedroom," designed to accommodate a married couple while their children sleep in smaller bedrooms. The room for cooking (the kitchen) used to be separated from the room where people socialized (the living room or great room), as it was assumed that one person (the wife) would cook in the kitchen while another person (the husband) relaxed alone or with company in the living room. More recently, open-concept architecture has eliminated the wall separating the kitchen from the living room, as adults often cook together or socialize as one cooks and the other relaxes.

In the 1960s, French scholar Pierre Bourdieu (1970) analyzed a typical house of a Kabyle family in northern Algeria. Traditional Kabyle houses were rectangular buildings made of stone and clay with tiled roofs. Inside, a waist-high dividing wall marked off one-third of the house. This marked-off section, set lower than the rest of the house and paved with flagstones, was the stable, where animals were kept at night. A farming people, the Kabyle kept oxen, cows, donkeys, and mules. Above the stable was a loft where women and children often slept, though arrangements for sleeping and marital sex tended to vary.

FIGURE 3.3 These houses in Norther Algeria, built by the Kabyle people, are constructed of stone, and include open space for both animals and human inhabitants under a shared roof. (credit: PhR610/flickr, CC BY 2.0)

The floor of the larger section of the house was higher and paved with a layer of black clay and cow dung that women polished with a stone. This part was reserved for human use. In this larger, elevated section, a large weaving loom sat against the wall opposite the door. Facing east, this wall with the loom received the most light in the house. Guests and brides were seated here, as it was considered the nicest part of the house. Opposite the dividing wall in the larger section was the hearth, surrounded by cooking tools, lamps, and jars of edible grain. With the loom and the hearth, the main area of human activity in the house was associated with the work of women. Bourdieu explained that men were expected to remain outside the house from dawn to evening, working in the fields and associating with other men in public spaces. Women were supposed to remain in the home.

In Bourdieu's analysis, the Kabyle house was divided into two realms: a dark, low realm associated with animals and natural activities (sleeping, sex, childbirth, and death) and a lighter, higher realm associated with humans and cultural activities (weaving, cooking, brides, and guests).

Humans all over the world require a place to gather, work, socialize, and sleep. Some have Western-style houses, while others have compounds. Some live in tents made of wooden beams and covered with animal skins or cloth, in caves hollowed out of sandstone or volcanic rock, or in wooden structures built on stilts or in trees to avoid floods and predators. While these different forms of home are all designed to perform a common function as human living spaces, they are distinctively shaped by local environments and lifeways. Houses are most commonly built with locally available materials and designed to protect against local climatic conditions and predators. Over generations, people develop distinctive technologies to transform available materials into durable and functional homes. Different forms of family, different gender roles and relations, and different

everyday activities determine the organization of space in these different homes. Dominant ideas about work, gender, marriage, parenting, hospitality, and status all shape the places we call home.

Home, then, involves a combination of materials, technologies, social relationships, everyday practices, deeply held values, and shared ideas. In every culture, these features are uniquely combined to produce distinctive versions of home. Other combinations of features produce distinctive versions of clothing, food, work, and health. Growing up in a particular social group, a person learns these ways of living, eating, working, and so on and comes to consider them normal and natural. Anthropologists have a word for such integrated combinations of social and environmental features, and that word is **culture**. The ways of your culture are familiar to you, often so deeply ingrained that they come naturally. Culture itself feels like home.

All four fields of anthropology are devoted to understanding human culture. Biological anthropologists are often interested in the emergence of culture in the course of human biological evolution. Archaeologists use material artifacts as keys to understanding the technologies, social practices, and ideas of ancient peoples. Cultural anthropologists often use participant observation to understand how the various features of culture fit together in contemporary societies. Linguistic anthropologists are interested in how language shapes and is shaped by other features in the constellation of culture.

This chapter explores culture as a central concept in anthropology. We examine what distinguishes culture from other aspects of human experience and activity. In an effort to organize the vast array of things included in culture, we divide culture into three levels and consider how those levels fit together holistically—and what happens when they don't. Finally, we identify a set of contradictions built into the concept of culture and see how those contradictions illuminate the nature of human social life.

3.2 The Winkiness of Culture

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Provide E. B. Tylor's definition of culture.
- Distinguish natural behavior from cultural behavior.
- Describe deliberate and nondeliberate ways that people acquire culture.
- Explain how biological processes can be shaped by culture.

In the last section, we referred to culture as a combination of materials, technologies, social relationships, everyday practices, deeply held values, and shared ideas. Nineteenth-century British anthropologist Edward Burnett Tylor defined culture as "that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (1873, 1:1). That's a lot to include in one concept! If all of that is culture, then what about human experience and activity is *not* culture?

Consider this scenario. A student comes to class one day, and the instructor says, "I've decided that you're all a bunch of failures and I'm flunking the entire class." Imagine then that the instructor simply stands there after that announcement, blinking calmly as the class erupts in protest.

Now imagine that same scenario with one very slight difference. The instructor announces, "I've decided that you're all a bunch of failures and I'm flunking the entire class." Then, as the class erupts in protest, the instructor calmly blinks *one* eye, leaving the other eye open.

FIGURE 3.4 Would you take this woman seriously? In American culture, winking, related to the normal biological function of blinking, takes on special meaning in social interactions. (credit: Motion Picture News/Wikimedia Commons, Public Domain)

What just happened there? Blinking is a biological compulsion common to humans everywhere. Humans blink to keep eyes hydrated and clear of debris. Humans are born knowing how to blink; nobody has to teach us. On average, humans blink 15 to 20 times every minute. Without realizing it, people are necessarily blinking throughout every conversation, every social interaction, every activity during the day. The people we talk to and interact with are also blinking constantly, so often that everyone is accustomed to ignoring it. Blinking does not affect the perceived meaning of speech or actions.

But if someone deliberately blinks one eye, leaving the other one open, that's a completely different matter. In fact, leaving one eye open makes a blink a wink. Winking is not a biological necessity. Humans are not born knowing to how to wink, and it takes some practice to learn how to do it. Because it requires deliberate effort and people are not constantly doing it, winking can acquire special meaning in social interactions. In American culture (and many others), a wink often indicates that someone is joking around and that whatever they've just said or done should not be taken seriously. Of course, a wink can mean different things in different societies. Moreover, a wink can mean different things in the same society. If someone on a date takes their companion's hand and gives a cute little wink, the person may have reason to hope the winker is *not* just joking around.

American cultural anthropologist Clifford Geertz (1973) used the example of winking to illustrate two important aspects of culture. First, culture is learned. Innate human behaviors—that is, behaviors that people are born with—are biological, not cultural. Blinking is biological. Acquired human behaviors—that is, behaviors that people are taught—are cultural. Winking is cultural. This means that cultural behaviors are not genetically inherited from generation to generation but must be passed down from older members of a society to younger members. This process, as you'll recall from What is Anthropology? is called enculturation.

Some aspects of enculturation are deliberate and systematic, such as learning the rules of written punctuation in a language. At some point in an English speaker's childhood, someone explicitly told them the difference between a question mark and an exclamation point. Most likely, they learned this distinction in school, a fundamental institution of enculturation in many societies. Religious institutions are another common force of

enculturation, providing explicit instruction in cultural rules of morality and social interaction. Extracurricular activities such as sports, dance, and music lessons also teach children cultural rules and norms.

While a great deal of very important cultural content is deliberately conveyed in these systematic contexts, the greater part of culture is acquired unconsciously by happenstance—that is, nobody planned to teach it, and no one made an effort to consciously try to learn it. By virtue of growing up in a culture, children learn what certain actions and objects mean, how their society operates, and what the rules are for appropriate behavior.

Going back to the cultural notion of home, did anyone ever explain to you why your childhood home was structured in a certain way? Did anyone ever point out the cultural assumptions about gender and family built into your house? Probably not. Now, imagine that you were taken away from your parents as a baby and adopted by a family far away, with a very different way of life situated in a very different environment. With your adoptive family, you might have been raised in a very different kind of home. Growing up, your everyday habits, activities, and expectations would have been shaped by the setup of that home. Living in that house, you would have wordlessly absorbed a set of assumptions about family, gender, work, leisure, hospitality, and property. And all of it would seem quite natural to you.

Many forms of culture are passed down through a combination of deliberate and unconscious processes. Perhaps when you were a child, someone told you what a wink was and showed you how to accomplish one; or perhaps you just witnessed a few winks, figured out what they meant from their contexts, and then learned how to accomplish one through trial and error. Geertz pointed out that there are two important aspects to winking: the meaning and the action. As both are learned, both are cultural. But perhaps more importantly, both the standardized action of winking and the assumed meaning of this action are commonly known among members of a group. That is, culture is shared.

Consider another aspect of human biology: dreaming. People in all societies dream, and no one has to teach them how to do it. Dreaming is biologically innate and spontaneously performed. Biological researchers hypothesize that dreaming helps the human brain process daily stimuli and convert recent experiences into long-term memories. As a biological necessity for brain health, dreaming is natural, not cultural.

But why do people dream in stories? And why are those stories so often confusing, even troubling? In many cultures, people are perplexed by their dreams, never really knowing what the objects and situations they dream about are meant to indicate—or if they have any meaning at all. In other cultures, however, dreams are recognized as arenas of spiritual communication with supernatural beings. In Ojibwa culture, young people are encouraged to fast for up to a week in order to bring on special visionary dreams (Hallowell 1992; Peters-Golden 2002, 188–189). In such dreams, a young person may be approached by a guardian spirit who imparts knowledge for successful hunting, warfare, or medicine. People are discouraged from discussing the meaning of these dreams, but young people are taught to expect and anticipate this kind of dream, and they know how to interpret the content of such dreams without discussion. The widely shared ability to dream such dreams and the shared knowledge to understand their content makes dreaming profoundly cultural among the Ojibwa.

Summing up, when an element of human experience or behavior is learned and shared, we know it is an aspect of culture. That delineates the concept of culture to some degree. However, the variety of things that are learned and shared by humans in groups is still quite enormous, as indicated by Tylor's rambling list (knowledge, belief, art, morals, law, custom, etc.). Instead of thinking of culture as one vast hodgepodge of things, it's helpful to break that hodgepodge into three basic elements. These basic elements of culture are understood to come together in larger combinations, or aggregates.

3.3 The Elements of Culture

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Define the concept of material culture and provide examples of material culture.
- Provide a detailed example of cultural practices.
- Explain how cultural frames orient our experiences and actions.
- Describe how norms and values are threaded through culture.
- Explain how ideologies and worldviews shape our perception of the world around us.

The complex whole of culture can be broken down into three categories: what we make, what we do, and what we think. The boundaries separating these categories are somewhat artificial because so much of cultural life involves all of these things at once. However, it's useful to start with the basic building blocks of culture, then see how those blocks can be put together to produce more complex structures.

Culture Is What We Make

Museums are buildings where objects of historical, artistic, scientific, or cultural interest are displayed. The Smithsonian's National Museum of the American Indian has one of the world's largest collections of Native artifacts, including many two- and three-dimensional objects such as baskets, pottery, and preserved specimens representative of the lives of Native populations from all areas of the country.

FIGURE 3.5 This basket, woven by Kucadikadi (Mono Lake Paiute) artist Lucy Telles, is an excellent example of the art of basket weaving. Telles, whose work was done in the early part of the twentieth century, is widely admired for her use of color and innovative designs. (credit: "Mono Lake Paiute Basket" by Ernest Amoroso, National Museum of the American Indian/Wikimedia Commons, Public Domain)

People living in groups learn to craft the things they need in order to make a living in their environment. Early human ancestors learned how to make sharp blades useful for processing meat. They shared their knowledge of toolmaking in groups, passing those skills down to younger generations. Objects that are made and used by humans in group contexts are called **material culture**. All of the tools developed by early hominins (blades, arrows, axes, etc.) are examples of material culture. All of the artifacts discovered by archaeologists (buildings, pottery, beads, etc.) are examples of material culture. The specialized knowledge and skills used for making material culture are called **technology**. Today, the word *technology* is often used to refer to electronic devices such as smartphones and computers. For anthropologists, both smartphones and obsidian blades are forms of material culture produced through specialized technologies. That is, *technology* refers to the knowledge and skills required to make blades, phones, and other objects of material culture.

Material culture is not just found in museums, of course. Material culture is all around. All of the furniture, appliances, books, dishes, and pictures on the walls in a typical American home are elements of material culture, and they reveal a great deal about the whole way of life of a society.

Consider the toothbrush. It would be possible for people to clean their teeth with a found object such as a twig

or leaf, or even with a finger. Ancient peoples often used a special chew stick, a twig with a frayed end. The bristled toothbrush was invented in 15th-century China and spread across Europe and into the United States, where it began to be mass produced in the late 19th century. Drugstores now feature many styles of toothbrush with an array of special features. Specialized teams design, manufacture, and market this wide variety of toothbrushes to consumers. Parents buy toothbrushes for their children and teach them the conventional techniques for brushing their teeth (little circles, two minutes, etc.). As adults, people often isolate themselves in a special room to brush their teeth in privacy. Even so, toothbrushing is a profoundly social act, relying on shared knowledge and observance of social norms for hygiene and health.

Trees, rocks, microbes, and planets are all material objects, but they are not material culture unless they are made and used by humans in group contexts. For instance, a tree growing in a natural forest is not an object of material culture. However, an apple tree can be material culture if it is planted by a farmer in an orchard designed to produce fruit for human consumption. A microbe can be material culture if it is manufactured to improve human digestion or genetically engineered to fight cancer.

FIGURE 3.6 This rock is on display in the British Museum. While a rock is not in and of itself material culture, this rock, which carries special meaning for those who view it, is. (credit: Archaeomoonwalker/Wikimedia Commons, CC BY 3.0)

On display in the Cleveland Museum of Natural History is a gray rock. This rock was simply found by humans and never shaped for any particular use. Sitting there in the museum, it has no specific purpose other than to serve as an object of popular contemplation. Though it is a fairly unremarkable lump of basalt, thousands of people stop to gaze at this rock, reading the sign that describes how it was obtained, marveling at its presence there in the museum. Why? What's so interesting about a rock? This particular rock was collected by astronauts on the Apollo 12 mission to the moon. The rock serves as evidence of this magnificent feat of scientific engineering and a source of great pride to the culture that accomplished such a mission. We go to museums to view the items on display there, but clearly, the human activities surrounding those objects are what make them interesting to us. That is, culture is not just material objects—it's also what we do and what we think.

Culture Is What We Do

Ahmed is a carpet seller in the Istanbul Grand Bazaar. Every day, people from all over the world come into his stall to examine, and sometimes buy, the carpets in his inventory. Anthropologist Patricia Scalco (2019) met Ahmed while she was conducting research on market exchange in Istanbul. She carefully observed the set of sales strategies he had crafted to respond to customer desires and knowledge. When anyone pauses at the entrance, Ahmed greets the potential customer and ushers the person into his stall. Bringing out a silver platter, Ahmed offers the customer a cup of tea, a welcoming gesture. As the customer browses, Ahmed

initiates a carefully constructed conversation designed to determine what sort of person this customer is, what they are looking for, and what they really know (and do not know) about carpets. He pulls out various carpets from the stacks, unfurling them as he describes their distinctive qualities. Ahmed identifies this interaction as a sort of game he must play with his customers. European tourists in this Turkish marketplace are often inspired by the desire for handmade traditional crafts made by local rural ethnic groups such as the Kurds. These days, however, most carpets sold in the Istanbul market are industrially produced in Pakistan, India, and China. However, in his many years of selling carpets, Ahmed has learned that he must play to Western orientalist fantasies, weaving a distinctive story around the origins and manufacture of a carpet, in order to win a sale. Like other merchants in this market, Ahmed has a family to support, and he cannot afford to openly contradict the knowledge and desires of his customers.

Centered on the material culture of carpets, Ahmed's work illustrates the importance of what people do and what they think in the making of cultural life. What people do and what they think are nonmaterial elements of culture. In his everyday interactions with customers, Ahmed has developed a set of habitual practices involving gesture and speech. Anthropologists use the term **cultural practices** to refer to this form of culture. Routine speech communicates meanings and values (such as the "authenticity" of a carpet), while routine action organizes social events (such as, hopefully, a sale). People from all walks of life develop similar combinations of habitual action and speech that constitute the everyday culture of people in those circumstances.

What do you do in the morning to get ready for the day? That is cultural practice. What do you do when someone comes over to your house? That is cultural practice. What do you do when you're hungry? That is cultural practice. Some cultural anthropologists focus on these everyday practices as keys to understanding culture, while others are more interested in special events such as ceremonies and festivals.

For instance, Carnival in Brazil is an annual festival of music and dance held every year to mark the beginning of the Catholic season of Lent. Parades of costumed dancers throng the streets of many cities, interacting with the audience and attracting crowds of followers. Cultural anthropologist Kenneth Williamson (2012) studied Carnival in Salvador, Bahia, in the north of Brazil. While Brazilian Carnival is framed as a national celebration, Williamson found that Carnival in the poorer and largely Black city of Salvador is distinctively animated by the politics of race. Local Carnival dance groups incorporate Black forms of movement such as capoeira, a combination of dance and martial art techniques created by Brazilian enslaved peoples. Forms of music and religion originating in Africa also contribute to the distinctiveness of Salvadoran Carnival. Carnival has become increasingly commercialized as a tourist attraction in Salvador, bringing in Black and White tourists alike. Black Brazilian activists complain that forms of Black culture are being appropriated and exploited as forms of cultural leisure with little understanding of their deep cultural meanings as expressions of resistance and survival. Meanwhile, most Black Salvadorans enjoy little benefit from the burgeoning tourist economy.

The practices of Turkish carpet merchants and Brazilian Carnival participants are both ways of doing culture, every day and on special occasions. As we see in both examples, the materials and actions of culture are infused with patterns of thought, some shared and some controversial. These ways of thinking constitute a third element of culture.

Culture Is What We Think

Imagine that you are walking down the street and you see a building. You notice a mailbox next to a driveway. You follow a little walkway lined with flowers to a front door. Below your feet, you find a mat that says, "Welcome!" Peering through a window, you see a central room where two people are sitting on a couch, eating chips, and watching television. Off to the side, there's a hallway. You can barely see the stockinged feet of a small person resting on a bed. A dog barks.

What kind of place is this? Are you sure? How do you know?

Now imagine you are walking down the street and see another building. There are neon lights in the front window and a large paved area to the side. As you enter the front door, a little bell jingles and young woman in a white blouse greets you from behind a long table. To one side of that table is a large black machine with buttons and numbers on it. The young woman carries a small leather folder in her hand and gives you an

expectant smile. You look around to find a room full of people seated at tables of various sizes. Young people in white tops and black pants are scurrying here and there, some carrying giant platters. You hear music in the background. You smell something delicious.

What kind of place is this? How do you know?

In both scenarios, elements of material culture are combined with patterns of action and speech. In order to make sense of these two scenarios, we must use shared ways of thinking about them. What we know about the way of life in our society leads us to identify the first scenario as somebody's home. What we know about the circumstances of eating in public leads us to identify the second scenario as a restaurant.

These patterned, shared ways of making sense of situations are called **cultural frames**. Cultural frames tell people where they are, what role they they play in that context, and what forms of behavior and speech are expected and appropriate. There are cultural frames for places, times, events, and relationships. If a couple have been dating for over a year, they probably use a cultural frame for romantic relationships to structure their actions and expectations in that relationship. And if one of the romantic partners invites the other to spend a holiday with their family, the invited person will probably summon a cultural frame for that holiday to tell them what to expect and how to behave.

Cultural frames are complex cognitive models that incorporate various roles and actions patterned in space and time. A **cultural role** is a conventionalized position held by a person or persons in a particular context or situation. Sociocultural roles are associated with certain behaviors and actions. For example, "mother" is a sociocultural role in the cultural frame of "family." "Waiter" is a sociocultural role in the cultural frame of "restaurant." While these roles are found in many cultures, the actions and behaviors associated with them vary significantly across cultural contexts.

In cultures that celebrate Mother's Day, it is conventional to send one's mother a card along with flowers and/or a gift. Anyone who has ever been shopping for a Mother's Day card has been bombarded with images and text that convey the stereotypical behaviors and preferences associated with motherhood. Many Mother's Day cards feature pastel flower arrangements with birds, butterflies, and delicate calligraphy. The text lionizes the emotional and material work of motherhood, praising the constant care and sacrifice of the good mother. In return, the card promises eternal gratitude.

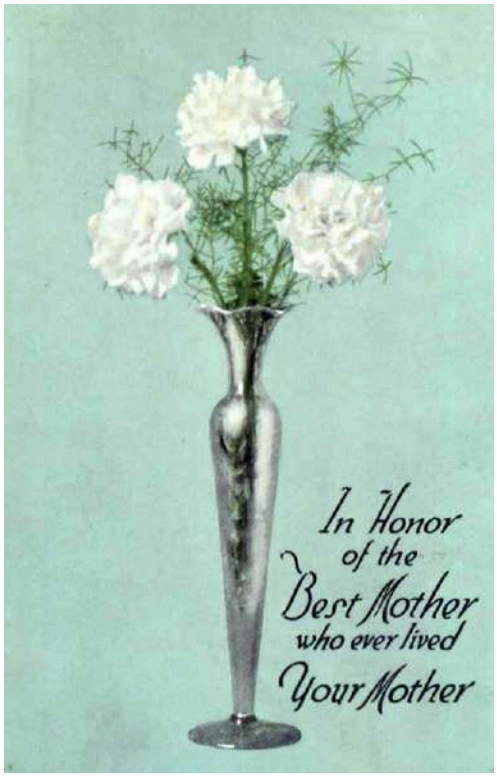

FIGURE 3.7 This American Mother's Day card from 1916 would still be considered appropriate today. The norm for a Mother's Day card in the United States has not changed much in over a century. (credit: Northern Pacific Railway/ Wikimedia Commons, Public Domain)

The behaviors and actions associated with a sociocultural role are collectively called a **norm**. Norms are not necessarily "normal" in the sense that they represent the most common features and behaviors exhibited by people in a certain role. Do all mothers prefer pastel flower motifs over, say, images of books or sports? Rather, norms tend to be idealized, a fantasy about how people in a role behave—or how they *should* behave. Why do we associate flowers, pastels, cursive, and self-sacrifice with motherhood?

The answer lies in another thinking element of culture: **values**. Cultural values are notions about what is good, true, correct, appropriate, or beautiful. A certain mainstream way of thinking about motherhood indicates that mothers should be delicate and feminine, concerned with beauty and decorum. Moreover, mothers should nurture and sustain growth. What better way of conveying these notions than through the imagery of pastel flower arrangements? Messages of gratitude describe the sort of behavior considered appropriate to mothers. A "good" mother is a mother who puts her children at the center of her life at all times, neglecting her own interests for the benefit of her family.

In any culture, norms indicate how people should behave, and values explain why they should behave that way. For example, the norm for women in the 1950s was to get married and work in the home rather than have a job in the public workforce. Not that all women did this, or even most. Many mothers, particularly women of color, were obliged to work outside the home just to make a living for their families. Nonetheless, normative depictions of women as housewives dominated media and public discourse in mid-20th-century America, establishing this idealistic norm. Why were mothers supposed to stay at home? A set of "family values" appointed fathers as the breadwinning heads of household, while mothers were relegated to serving men by keeping house and caring for children. Thus, the values that came to be associated with motherhood were subservience, self-sacrifice, gentleness, and nurture—the very values we see celebrated on Mother's Day cards.

Norms and values can combine in larger models that depict how various social realms operate, such as the family, the economy, the supernatural, and the political sphere. These models are known as **ideologies**. An ideology identifies the entities, roles, behaviors, relationships, and processes in a particular realm as well as the rationale behind the whole system. Take democracy, for instance. The political ideology of democracy

envisions a society of equal individual citizens who each cast a vote on proposals for government action. The majority vote wins. The essential roles in this ideology are citizen voters and government. The essential actions are voting and government action. The rationale is that government should obey the wishes of the citizenry.

Is this how democracy really works, though? What about the influence of powerful organizations such as the media and large corporations? Moreover, in most democracies, people do not vote directly on government policies but rather elect representatives, who craft laws and then vote on those laws themselves. Those representatives are accountable to citizens through the process of voting, but they are also strongly influenced by lobbyists representing business interests and the campaign donations of wealthy individuals and groups. Obviously, this ideology is a simplification of the way any democratic system really works. Ideologies are always partial, foregrounding the perspectives of some people in society while obscuring the perspectives of others.

A **worldview** is a very broad ideology that shapes how the members of a culture generally view the world and their place in it. Worldviews tend to span several realms, including religion, economics, and politics. A worldview provides an overarching model for the purpose and process of social life, depicting "how the world works." Many West African cultures, for instance, are shaped by a worldview that identifies the rationale of society in the accumulation and distribution of material goods in extended families, communities, and the nation as a whole. People rise to leadership through their ability to accumulate wealth, but they are strongly obligated to distribute that wealth through their extended families and communities by funding the education and business ventures of family members and helping those in need. Beyond the family, the actions of political and business leaders are shaped by this worldview as well. A political leader is expected to support the generation of wealth while also making sure that the benefits are spread through the community. Moreover, leaders are expected to maintain relationships with departed ancestors who watch over their descendants. Through periodic rituals and offerings, leaders petition ancestors to bless their families and communities with prosperity and good fortune.

3.4 The Aggregates of Culture

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Explain how elements of culture combine in aggregates.
- Give three detailed examples of cultural symbols.
- Explain how symbols are embedded in rituals.
- Describe how social structures organize important cultural processes.

An aggregate is a combination of elements. What we make, what we do, and what we think all combine in larger aggregates of culture. For instance, it's pretty clear that toothbrushes, moon rocks, restaurants, and Mother's Day cards must be understood as aggregates of material objects, practices, and ideas. In order to fully understand the toothbrush as a cultural object, we must examine not only its design and production but also *how* people use toothbrushes and *why* they use them. A set of routine practices surround our cultural objects (brushing), and those practices are supported by cultural ideas (hygiene).

Symbols

A **symbol** is an object, image, gesture, vocalization, or event conventionally associated with a particular meaning. anthropologist Jennifer Hasty was conducting fieldwork in Ghana during an election year, she noticed that the posters and pamphlets of one politician featured a broom. Confused, she asked a friend why a male politician would choose a humble domestic tool associated with women's work as his political motif. Making a sweeping motion with her hands, she explained, "Because he is promising to sweep away all the corruption." Turns out, he was the not the first to use this symbol. Over time, the broom has come to acquire political meaning as a symbolic anti-corruption tool in Ghana.

FIGURE 3.8 Featured in political posters and pamphlets, brooms like these have taken on special meaning in Ghanian politics, where they are understood as a symbol of a politician's intent to sweep away corruption. (credit: "Handmade Brooms at Granville Island Broom Co." by Ruth Hartnup/flickr, CC BY 2.0)

Colors, shapes, gestures, animals, plants—all of these commonly acquire specific cultural meaning. For a Hindu wedding, a bride typically wears a bright red sari, as red is an auspicious color associated with change, passion, and prosperity. White, on the other hand, is typically worn to Indian funerals.

Symbols are useful cultural aggregates because they provide a kind of shorthand for expressing complex ideas. Consider the American bumper sticker shown in Figure 3.9.

FIGURE 3.9 This popular American bumper sticker incorporates a variety of religious and social symbols. (credit: "Coexistence" by Rusty Clark/flickr, CC BY 2.0)

Combining symbols from Islam, Judaism, Taoism, Christianity, paganism, women, men, and the peace movement, this sticker aims to promote multicultural diversity. Rather than listing the various religions, identities, and ideologies and describing the conflicts among them, the message simply incorporates their symbols into a word urging mutual tolerance.

Although symbols have conventional meanings, they can mean different things in different contexts or to different people. Although the intended meaning of the above bumper sticker is diversity, some people

interpret it as an emblem of radical atheism. In the wake of the 2016 presidential election, some Americans started wearing safety pins to show their solidarity with LGBTQIA+ people, people of color, and others who had become targets of post-election harassment. For some, however, the safety pin symbolized pretentiousness and hypocrisy.

Ritual

Combining objects, actions, and meanings, **ritual** is a special kind of repeated, patterned action conventionally associated with a particular meaning. Rituals incorporate symbols and roles along with routinized activities such as gestures, music, and movement. Many rituals are performed by specialists in group settings to accomplish specific group or individual goals. Rituals bring together symbols, practices, and worldviews.

Consider this popular American ritual. On the first Sunday in February, many Americans gather in each other's homes to watch the annual championship game of the National Football League (NFL) on television. So widespread is this practice that stores are nearly empty and many Christian churches cancel afternoon and evening activities. As a whole, the ritual consists of many roles and relationships as well as patterned actions and conventional meanings. At the heart of the action are the two teams competing against one another in a chaotic game featuring an oddly shaped ball carried forward in campaigns of full-frontal assault across a carefully marked field. The players are surrounded by referees, coaches, camera people, and cheerleaders, each group having a strategic role in the action. Surrounding the field are commentators who interpret and contextualize, giving meaning to the actions of the game. At home, some people watch the game closely, exclaiming with joy or disappointment and commenting on the comments of the commentators. Other people socialize with one another, watching the game intermittently. Vast amounts of food and drink are consumed by Americans on Super Bowl Sunday. Typical foods include potato chips, dips, barbecued chicken wings, and pizza. Beer is the beverage of choice for this occasion. An event celebrating competition, spectatorship, and consumption, Super Bowl Sunday is an effective ritual for reinforcing dominant values in a society structured by corporate capitalism. Notions of gender, race, and class are threaded through the various levels of play and consumption as well.

In the Akan communities of central and southern Ghana, in West Africa, leaders perform a ritual called *Adae* that uses important cultural symbols and reinforces cultural commitments to authority, ancestors, and shared prosperity. In the Akan society, people are given special wooden stools to mark certain stages in life, such as puberty and marriage. A person's stool is said to contain the personal power of the owner, symbolizing the life essence of that person.

FIGURE 3.10 This stool is more than just a place to sit down. In the Akan society which created it, it is understood to represent the personal power and life essence of the person it was given to. (credit: "Stool (Dwa)" by Museum Expedition 1922, Robert B. Woodward Memorial Fund/Wikimedia Commons, CC BY 3.0)

When an eminent person dies, that person's stool is enshrined in a special shed called a stool house, or

nkonuafieso. Twice every 42 days (once on a Wednesday and once on a Sunday), a community leader makes a procession to the stool house of the ancestral leaders of the community. Entering the stool house, the leader must remove their sandals and lower the cloth worn draped around their shoulders, symbolizing their humility and respect for the ancestors. Then the leader greets the ancestral leaders one by one, making offerings of drink and food and asking for blessings and prosperity for the community.

Special rituals called **rites of passage** are used to mark the movement of a person from one social status to another. Naming ceremonies, puberty rites, weddings, and funerals are all common rites of passage. Anthropologist Arnold van Gennep (1960) identified three stages in rites of passage: separation, transition, and incorporation. In the first phase, separation, individuals, or groups are taken out of their everyday social context, leaving their original social status. In the second phase, transition, people exist in an in-between state outside of conventional norms of dress and action. In this phase, people are often dressed in special costume, made to engage in unusual behaviors, and taught special forms of secret knowledge. In the third phase, people are brought back into society in a formal ceremony and introduced as subjects in a new social category.

Initiation rituals are a common rite of passage in many societies. In many African societies that practice initiation, young people are gathered together in a group and taken to a special camp outside the town or village. This constitutes the separation phase. In the next phase, transition, members of the group are often dressed alike and made to follow a common set of rules and schedule of activities. They may be required to perform unusual feats, such as eating strange foods. Their bodies may be scarified or tattooed. Elders give them special knowledge essential to performing their future roles as women or men. For instance, girls may learn explicit lessons about conception and childbirth. Finally, when the transition is complete, initiates are returned to the town or village and presented as women or men. Often, the completion of initiation marks a young woman as formally eligible for courtship and marriage.

Social Structure

The way a society is formally organized is called **social structure**. Typically, a society organizes a set of routine activities and objects in space and time to accomplish a particular function, such as community decision-making, the production and circulation of goods, or religious observance. Social structure is the framework for those realms, designating when, where, how, and by whom these functions are accomplished. Social structures combine material culture (such as buildings) with practices (such as meetings) and ideas (such as the rules and procedures of those meetings).

Consider the social structure of community decision-making, or the political realm. In some societies, community decisions are routinely made under the authority of a person inhabiting an inherited political office, called a chief or king (such as the Akans, discussed in the last section). Chiefs often have a council of community elders, the heads of local extended families. A chief is expected to consult with this council in all community matters. Other groups in society may represent the interests of youth, women, farmers, or traders. Each group will have its own leader who communicates directly with the local chief. Regular procedures govern how issues are raised and discussed and how decisions are taken. Together, the groups, roles, relationships, and procedures all constitute the social structure of the political system.

Rather than seeing social structure as fixed and immobile, some anthropologists emphasize that people continually make and alter their social structures through everyday forms of interpretation, participation, and resistance. These processes mean that social structures are always subject to a variety of forces in a constant state of change.

3.5 Modes of Cultural Analysis

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Explain how evolutionary theories have been applied to the study of human culture.
- Identify two critiques of evolutionary approaches.
- Describe how anthropologists have studied the functionality of culture.
- Distinguish Malinowski's functionalism from Radcliffe-Brown's structural functionalism.
- Explain how ontological anthropology defines the study of reality.

Anthropologists have a number of ways of studying the elements and aggregates of culture. Some approaches emphasize the development of a particular aspect of culture over time, while other approaches examine how the different parts of culture fit together.

Evolution, Adaptation, and Historical Particularism

Some anthropologists are interested in the origins of human cultural forms and how these forms have changed over long periods of time. Just as Charles Darwin applied the notion of evolution to explain how biological species change over time, many 19th-century anthropologists used evolution to explain how cultures changed over time. This approach is called **cultural evolutionism**. Like Darwin, these anthropologists believed that simple forms evolved into more complex forms. Comparing different cultures of the world, they assigned the ones they considered more rudimentary to earlier evolutionary stages, while the ones they considered more complex were assigned to the more advanced stages. For example, British anthropologist Edward Tylor argued that human culture evolved from savagery through barbarism to civilization. He identified savagery with people who used gathering and hunting to meet their basic needs. The domestication of animals and plants was associated with barbarism. Civilization resulted from more advanced forms of farming, trade, and manufacturing as well as the development of the alphabet. Not surprisingly, British scholars identified their own culture as highly civilized.

Elaborating on Tylor's scheme, American anthropologist Lewis Henry Morgan subdivided each of these three stages into an even more elaborate model and proposed a mechanism for moving from stage to stage. Morgan focused on technology as the primary driver of cultural evolution. New and better ways of making things, according to Morgan, resulted in new patterns of social practice and thought. Advanced technology was associated with advanced civilization.

But is technology the only measure of cultural accomplishment, or even the best one? Members of societies in which people gather and hunt for a living have vast stores of knowledge about their environments. Typically, they can name hundreds of plant species and tell when and where to find each of them. Many hunters can examine animal tracks to discern the species, sex, age, and condition of the animal as well as how long ago the tracks were laid. People in these societies also actively sustain and nurture diversity in their environments, careful to avoid depleting important resources. Is it really accurate to think of such cultures as simple? All cultures are complex, though in different ways. Technology is highly valued in American culture, while environmental knowledge and sustainability have historically been less valued. Is it any wonder that early American anthropologists ranked other cultures according to one of their own most cherished values? Perhaps people in more environmentally sustainable cultures might consider the United States to be an example of environmental savagery.

Both Tylor and Morgan, like most anthropologists of their day, thought that all cultures passed through this single set of stages in the march toward civilization. This kind of theory is called **unilineal evolution**. Disagreeing with this way of thinking, anthropologists such as Franz Boas argued that there is no single line of cultural evolution but that each culture changes according to its own unique historical trajectory. Moreover, cultures evolve not in isolation but in constant interaction with one another. Rather than focusing on technological changes within a culture, Boas highlighted the **diffusion** of material objects, practices, and ideas among cultures in complex relations of trade, migration, and conquest.

Though theories of unilineal cultural evolution have been largely abandoned, some anthropologists are still

interested in discovering regular patterns that might govern how human cultures change over long periods of time. In the 1950s, American anthropologist Julian Steward developed an approach called **cultural ecology**, recognizing the importance of environmental factors by focusing on how humans adapt to various environments. Steward's approach showed how humans in each environmental zone develop a set of core cultural features that enable them to make a living. Central to each cultural core are ways of getting or making all the resources necessary for human survival—in particular, food, clothing, and shelter. Similarly, anthropologist Marvin Harris developed a theory called **cultural materialism**, arguing that technology and economic factors are fundamental to culture, molding other features such as family life, religion, and politics.

Though recognizing the importance of cultural change, many anthropologists reject the notion that all cultures change according to a general universal model, such as cultural materialism. Drawing from the Boasian notion that each culture follows its own historical path; many cultural anthropologists analyze change in terms of **historical particularism**. In this approach, contemporary processes are understood as products of the unique combination of internal and external forces unfolding over time in a particular culture.

Functionalism

Rejecting the comparative unilineal models that assigned each culture to an evolutionary stage, a number of cultural anthropologists developed a radically different approach that attempts to understand each contemporary culture in its own terms. **Functionalism** seeks to understand the purpose of the elements and aggregates of culture in the here and now.

Bronislaw Malinowski, an early proponent of this approach, argued that the function of culture is to meet human needs. All humans need to satisfy the need for food, clothing, and shelter. The fundamental purpose of culture is to provide a means of satisfying those needs. In the course of meeting those basic needs, humans in all cultures develop a set of derived needs—that is, needs derived from the basic ones. Derived needs include the need to organize work and distribute resources. Family structures and gender roles are examples of cultural elements addressing these derived needs. Finally, cultures also address a set of integrative needs, providing people with guiding values and purpose in life. Religion, law, and ideologies fulfill these integrative needs. Malinowski sought to understand both the biological and psychological functions of culture.

At first glance, this approach may not seem all that different from evolutionary approaches that identify the core set of cultural features devoted to human survival. What was so different in Malinowski's approach was his attempt to show that even so-called primitive societies had functionally complex cultural systems for meeting the full array of human needs. Malinowski's three-volume ethnography of the economics, religion, and kinship of the Trobriand people of Papua New Guinea demonstrated this fact in striking and elaborate detail.

A second version of functionalism, advocated by British anthropologist Alfred R. Radcliffe-Brown, identified the functions of various elements of culture in a slightly different way. Rather than looking for the way culture satisfies biological or psychological needs, **structural functionalism** focused more on how the various structures in society reinforce one another. Culture is not a random assortment of structural features but a set of structures that fit together into a coherent whole. Common norms and values are threaded through the family structure, the economy, the political system, and the religion of a culture. Structural functionalists conceptualized culture as a kind of machine with many small parts all working in tandem to keep the machine operating properly. While recognizing the value of this approach, contemporary anthropologists have complicated the mechanistic model of culture by pointing out that the various elements of culture come into conflict just as often as they reinforce one another. Although few anthropologists would now identify themselves as structural functionalists, the holistic approach to culture as an integrated system is derived from this important theoretical foundation.

Structuralism

In the previous paragraph, you learned about structural functionalism, an approach that marries functionalism with social structure. In a different sense, the term *structure* can refer to patterns of thought embedded in the culture of a people—that is, conceptual structure. French anthropologist Claude Lévi-Strauss pioneered this approach, sometimes called French **structuralism**. Lévi-Strauss considered culture to be a system of symbols that could be analyzed in the various realms of culture, including myths, religion, and

kinship. In these realms of culture, objects and people are organized into symbolic systems of classification, often structured around binary oppositions. Binary oppositions are pairs of terms that are opposite in meaning, such as light/dark, female/male, and good/evil. For example, kinship systems are varied and complex, but they are fundamentally structured by oppositions such as male versus female, older versus younger, and relation by blood versus relation by marriage. Lévi-Strauss examined myths as well, showing how the characters and plots emphasize binary oppositions. Consider the many European folktales featuring an evil stepmother (Cinderella, Sleeping Beauty), a character that combines the opposition of good versus evil with the opposition of blood relation versus relation by marriage. Lévi-Strauss argued that myths operate as public arenas for conceptually pondering and processing the fundamental categories and relations of a culture.

Ontology

In recent decades, some cultural anthropologists have come to focus on the nature of reality, including but not limited to human perspectives and experiences. **Ontology** is the study of the true nature of existence. In some cultures, for instance, the social world consists not only of embodied persons but also of spirit beings, such as ancestors and witches, who interact with people in mysterious ways. And in some cultures, people are not just bodies but assemblages that include souls, spirits, characters, or fates. **Ontological anthropology** explores how culture constructs our social and natural realities, what we consider real, and how we act on those assumptions. Reaching beyond human realities, ontological anthropology also attempts to include nonhuman perspectives, relationships, and forms of communication.

For instance, in his provocative ethnography *How Forests Think* (2013), anthropologist Eduardo Kohn describes how the web of life in the Amazon rainforest consists of continual communication among plants, animals, and humans. He examines how Amazonian peoples engage with dogs, spirits, the dead, pumas, rivers, and even sounds. Humans and these nonhuman beings are both antagonistic and interdependent in this interactive web. Predators and prey read one another's behavior, interpreting intentions and motivations. Kohn's effort is to get beyond conventional modes of human thought and language to understand how humans are embedded in nonhuman ecological realities.

PROFILES IN ANTHROPOLOGY

Dame Mary Douglas
1921–2007

Dame Mary Douglas (https://www.openstax.org/r/wiki_Mary_Douglas).

Personal History: Mary Douglas was born in San Remo, Italy; her British parents had stopped off on their way home from Burma, where her father had been working as a colonial civil servant. As children, Mary and her younger sister lived with their mother's parents in England until they were old enough to be sent to Catholic boarding school—a fairly common practice for the children of colonial officers. After the death of her mother and her dearly loved maternal grandfather, young Mary found security in the order and routine of the convent school (Lyons 2011). This respect for rules and order combined with a reverence for the Catholic Church to shape her lifelong commitment to studying the sacred aspects of the social order.

Area of Anthropology: At Oxford, Douglas studied with the prominent structural functionalist E. E. Evans-Pritchard. From him, she learned that African belief systems such as witchcraft were structured by an underlying logic. In this approach, the goal of fieldwork is to examine oral forms of culture as well as ritual and social practice in order to discern the underlying logic that governs culture as a whole. Douglass went to the Kasai region of what was then the Belgian Congo, where she studied how the Lele people used animals in practical and symbolic ways. She was particularly interested in a strange animal called the pangolin. Though a mammal, the pangolin has scales and no teeth.

FIGURE 3.11 This pangolin is classified as a mammal but has scales like a reptile or fish. Pangolin were considered sacred to the Lele people, who did not classify them as a food animal. (credit: Official photographer of the U.S. Embassy in Ghana/Wikimedia Commons, Public Domain)

Douglas described how the Lele observed a fundamental distinction between edible and inedible animals. Animals who lived among humans, such as rats and domesticated chickens, were considered part of society and therefore inedible (most of the time). Only wild animals were considered food. Pangolins are wild animals, but the Lele did not eat them (usually). Why? Douglas argued that the weirdness of the pangolin made people single it out for special consideration. Pangolins have scales like fish, but they live on land and climb trees. They look vaguely reptilian, but they do not lay eggs, instead giving birth to live young. Rather than teeth, they have long snouts that they use to vacuum up small insects. Thus, the pangolin defied the conventional categories the Lele used for dividing up the animal world. This breach of categories made the pangolin both repellent and sacred to the Lele. Members of a special fertility cult engaged in rituals in which they ate pangolins to ingest the power of this anomalous animal.

As this examination of cultural categories and anomalies suggests, Douglas was also influenced by Claude Lévi-Strauss and the approach of French structuralism. Like Lévi-Strauss, Douglas viewed culture as a coherent system of categories that were expressed in oral culture and social practice.

Accomplishments in the Field: Following her work on the Lele people, Douglas went on to conduct a broadly comparative study of objects, practices, and people that were considered ritually dangerous, subject to rules of prohibition called taboos. She showed how the subjects of taboos are often "matter out of place" (Douglas 1966, 44), things that defy conventional categories for dividing up the social and natural world. In her most famous work, *Purity and Danger* (1966), Douglas examines a wide range of taboos, such as rules against eating certain foods or engaging in sex at certain times or with certain persons. She examines the set of social and dietary rules established by ancient Hebrews, detailed in the book of Leviticus in the Old Testament. According to these rules, the Jewish people were forbidden from eating pigs, shellfish, and certain wild animals. They were not allowed to wear garments made of cloth that combined different fibers—such as, for example, a linen-cotton blend. Men were prohibited from having sex with menstruating women. In fact, women were considered so unclean during menstruation that anyone or anything that touched a menstruating woman became contaminated for the rest of that day.

What do all of these prohibitions have in common? Douglas shows how each forbidden object or condition produced discomfort because it transgressed conventional categories. Shellfish, for instance, are sea animals, but they don't have fins or scales, and many of them do not swim. Menstruation is blood loss, but it does not indicate injury. Moreover, menstruation is hidden and connected to the dangerous states of pregnancy and childbirth. In Hebrew law, menstruation itself was considered a dangerous and contaminating exception to the purity of persons and objects.

In her later work, Douglas applied this style of analysis to a variety of other social phenomena, including humor and trickster figures. She argued that humor functions as a release for thoughts and actions that might threaten the social order. Whereas taboos regulate and prohibit interaction with dangerous objects, animals, and people, humor seeks to sap them of their dangerous power by making light of them.

Importance of Her Work: After more than 25 years of teaching at the University of London, Douglas moved to the United States, where she held positions at the Russell Sage Foundation and Northwestern University. She continued to publish widely on such topics as consumerism, environmental risk, and decision-making in bureaucracies. When she retired, she moved back to England. In 2006, she was made Dame Commander of the Order of the British Empire. She died in 2007 at the age of 86.

3.6 The Paradoxes of Culture

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Identify four paradoxes in the concept of culture.
- Define four mechanisms of cultural change.
- Provide a detailed example of the mobility of culture.
- Describe culture as an arena of argument and contest.
- Explain how members of a culture can have different versions of their shared culture.

As European immigrants settled in the western frontier of the United States, they faced the challenge of reinventing the elements of culture familiar to them in very different environmental and social conditions. Used to living in houses made of wooden planks or logs, they found themselves on vast plains with very few trees. A common adaptation to this environmental limitation was to dig into a slope of earth to create a dugout home with turf walls and roof.

FIGURE 3.12 This Nebraska home, photographed with cow on its roof in 1870, was constructed in the side of the hill directly behind it. While such dugout homes were practical and functional, those who lived in them typically strove to replace them with wood-frame houses, as symbols of wealth and achievement. (credit: Solomon D. Butcher/Library of Congress, Public Domain)

While these homes were perfectly functional, many Euro-American settlers considered them dirty and backward. When their farming ventures became prosperous, they often undertook the great expense of importing wood from forested areas to build the kind of house familiar to them from life back east, either on the East Coast of the United States or in the European countries they originally came from.

While conducting fieldwork in Lesotho in the 1980s, cultural anthropologist Jim Ferguson observed that

people who became prosperous often replaced their round homes made of mud and stone and thatched roofs with rectangular ones featuring cement floors and galvanized steel roofs. While the round buildings were functionally adapted to local conditions, made of local materials, cool on hot days, and warm in cool nights, the rectangular ones heated up like ovens under the hot sun and were noisy in the rain. The materials were imported and expensive. Talking to one man who was planning to replace his round house with a rectangular one made of cement and steel, Ferguson suggested that local building methods and materials might be superior to foreign ones.

> Looking me carefully in the eye, he asked, "What kind of house does your father have, there in America? … Is it round?" No, I confessed; it was rectangular. "Does it have a grass roof?" No, it did not. "Does it have cattle dung for a floor?" No. And then: "How many rooms does your father's house have?" … I mumbled, "About ten, I think." After pausing to let this sink in, he said only: "That is the direction we would like to move in." (Ferguson 2006, 18)

In both cases, for Euro-American settlers and Lesotho villagers, the idea of home is not a settled matter but subject to the forces of environmental adaptation, functionality, social status, and ideological debate. Both examples illustrate a set of tensions at the heart of the concept of culture. Originally, anthropologists studied culture as a fairly stable and consensual set of features commonly embraced by the people of a certain geographical area. In the course of the 20th century, however, anthropologists began to realize that this notion of culture was misleading and incomplete. In the early 20th century, American anthropologist Franz Boas argued that the elements of culture are highly mobile, diffusing through the cultural contacts of trade and migration. Since the 1960s, cultural anthropologists have come to emphasize the controversial aspects of culture: how people disagree and argue over the dominant values and practices of their societies. Much of this controversy stems from the unevenness of culture within a society—how people in different social categories and subgroups participate differently in their common culture, with different versions or perspectives on the same cultural norms and practices.

Despite these forces of change and controversy, there is something durable and shared about culture, some set of common elements that distinguishes the whole way of life of each society. Even as cultures change through innovation and contact, they often hold on to some of their distinctive features. In the 1980s, some scholars thought that increases in global trade, migration, and technology were transforming all the diverse societies of the world into one uniform global monoculture. In the 2020s, we see that the opposite has happened. In many parts of the world, we have seen a resurgence of cultural identities and explicit efforts to maintain, rehabilitate, and reinvent forms of cultural heritage.

So riddled with contradictions is the concept of culture that some anthropologists have suggested ditching the whole notion altogether and finding some other concept to bind together the four fields in their pursuit of knowledge about humanity. Perhaps such an integrated understanding of humanity isn't even possible.

Or maybe the contradictions of culture are the most illuminating aspects of the culture concept. Maybe those contradictions are anthropology's most important contribution to our understanding of humanity. This textbook takes the latter approach. Culture is the whole way of life of a people subject to a set of contradictory forces. These forces constitute four central paradoxes of culture.

Paradox 1: Culture Is Continuous, but It Changes

Cultural materials, practices, and ideas are handed down from older to younger members of a culture, giving some degree of continuity to culture over time. However, many factors can intervene in this process of cultural reproduction to subtly alter or dramatically change the elements and aggregates of culture. In some contexts, younger people either fail to precisely learn the culture of their elders or deliberately reject those cultural lessons. Through travel and trade, people learn about other ways of doing things, and they take these ideas back to their own cultures, trying them out to see how they might improve their own ways of life. Accidents and deliberate experimentation introduce new possibilities. People may simply get tired of doing things one way over and over and thrill at some refreshing style or craze.

We can identify four main mechanisms of cultural change. These four mechanisms overlap and interact as the history of a culture unfolds over time. Diffusion is the movement of an element of culture from one society to

another, often through migration or trade. **Friction** occurs when two or more elements of culture come into conflict, resulting in alteration or replacement of those elements. **Innovation** is the slight alteration of an existing element of culture, such as a new style of dress or dance. **Invention** is the independent creation of a new element of culture, such as a new technology, religion, or political form.

In the examples at the beginning of this section, building techniques and ideals move along with human migration to new settings, where they must be altered to fit the materials and challenges of the new environment. In colonial and neocolonial contexts, dominant groups may introduce the techniques and ideals of their own homelands as "superior" even if they don't work very well in the environments of colonial conquest.

Some cultural inventions are so successful that they transform the whole way of life of a people. Consider the information technologies that have reshaped American life since the 1970s, such as computers, the Internet, and cell phones. These tools have changed the ways Americans communicate, work, learn, shop, navigate, and entertain themselves. Diffusing through trade, these inventions have transformed cultures all over the world in diverse ways. In many societies, modes of interacting through communication technologies come into conflict with norms for interacting face-to-face, creating friction between the two realms. Where the movements, behavior, and social relationships of young women are tightly controlled, for instance, mobile phones allow women to secretly make new friends, explore new topics of conversation, and engage in behavior their elders might not sanction.

Sometimes the forces of innovation and invention catch on, and sometimes they don't. In the 1970s, Ralph Hasty, a disc jockey from southwest Missouri, moved to Northern California, where he lived and worked for many years. There, he learned about a new technology for building houses in the form of geodesic domes, structures comprising intersecting polygons assembled from prefabricated kits. In late 1980s, he returned to live in southwest Missouri, bringing with him this enthusiasm for geodesic construction. He ordered a kit and built a geodesic dome house on a piece of rural land, intending to sell the house and use the profits to build more of these geodesic wonders. Well, things did not exactly go to plan. The locals apparently found the house far too weird to suit their notion of home. From the outside, the dome looked like some sort of futuristic greenhouse or zoo habitat. On the inside, conventional furniture did not fit in the oddly shaped rooms of the dome. Once finished, the geodesic home sat on the market for a number of months, and eventually, he had to sell it at a loss. It must be mentioned that Ralph Hasty, geodesic innovator, continued to live in a conventional rectangular house for the rest of his life.

FIGURE 3.13 Ralph Hasty stands in front of the geodesic dome he built. Although providing all of the needs of a secure and warm dwelling space, it was hard to find a buyer for this unconventional home. (credit: Jennifer Hasty, Public Domain)

Paradox 2: Culture Is Bounded but Mobile

Because many elements of culture are shaped by environmental forces, trading opportunities, and local histories of settlement, culture becomes associated with territory. But because of the mobility of people, objects, and ideas, culture rarely stays within the boundaries of any society; rather, it wanders restlessly along lines of travel, communication, conquest, and trade.

People move around a lot, and this is nothing new. On the popular British television series *Time Team*, archaeological excavations all over the United Kingdom uncover artifacts from ancient times that were produced in far-flung places such as Rome, Scandinavia, and the Middle East. In episode 4 of season 16 (2015), the team excavated a town in Wales that was constructed by Romans during the time of Roman conquest. There, archaeologists unearthed the foundations of Roman buildings along with a variety of Roman objects, including a third-century Roman coin, a Roman tool for removing earwax, a twisted-wire bracelet, and a knife handle decorated with gladiators. Other *Time Team* investigations have uncovered artifacts from travelers and pilgrims to sacred religious sites. These objects have diffused to British cultures through conquest, trade, and migration. As people move around, so do objects, technologies, practices, and ideas.

FIGURE 3.14 This fabric shop displays a number of colorful wax print patterns. Although wax print fabrics are now associated with Africa, the wax print technique actually originated in Indonesia. (credit: "National Colors" by Miranda Harple for Yenkassa.com/flickr, CC BY 2.0)

However, certain integrated sets of things, practices, and ideas do cluster in certain places. Take a look at the cloth in Figure 3.15. This kind of cloth is quintessentially African. It's called wax print, and indeed, clothing made of wax-print cloth is very popular in many parts of Africa. Wax-print cloth is industrially produced cotton cloth with intricate designs and bold colors. In most African countries, a vast selection of designs and brands of wax prints can be found in any market. Rather than buying ready-made clothes in clothing shops, people more often purchase cloth in the market and take it to a seamstress or tailor to be made into the garment of their own choosing.

Many wax-print designs are symbolic, serving as a means of nonverbal communication for the people who wear them. Some cloths are associated with proverbs, occasions, monuments, and famous people. In the West African country of Ghana, many cloth designs are named using the vivid proverbs of the large Akan cultural group. One popular design features a bird in flight, associated with the Akan proverb *Sika wo antaban*, meaning "money takes flight." Another elaborate motif is called *Akyekyde? Akyi*, or "the back of the tortoise," worn by wise people who move through life with slow intention. One design with long, corrugated stripes is called sugarcane, which is said to mean "I love you like sugar."

FIGURE 3.15 The various designs on these fabrics are understood to each have a special meaning. In the upper left, is an example of the *Sika wo antiban* design, meaning "money takes flight." (credit: Ninara/flickr, CC BY 2.0)

Though iconically associated with African dress, wax print actually originated in Indonesia, derived from local techniques for making batik cloth. Batik is made using wax to draw designs on plain cotton cloth that is then immersed in a dye bath. When the wax is melted off, the design remains against the background of color. When the Dutch colonized Indonesia in the 1700s, Dutch merchants were impressed with the beauty of local batik and sought to use their own methods of mass-produced block printing to imitate the vibrant colors and elaborate designs of Indonesian cloth.

In the 1880s, Dutch and British merchants introduced their own mass-produced wax prints to people in their African colonies, particularly along the west coast of Africa. Dutch wax cloth was enthusiastically embraced by Africans, who began to infuse certain patterns with social meanings. With independence in the mid-20th century, many African countries developed their own wax-print textile industries using designs developed by local artists.

Exemplifying the cultural paradox of locality and mobility, wax-print cloth is culturally embedded in African culture while carrying a complex history of global trade, appropriation, and colonial domination.

In the context of global power relations, the mobility of culture poses questions about who has the right to claim or use elements of culture diffused from elsewhere. As part of the process of cultural immersion and participant observation, many cultural anthropologists adopt the dress, diet, gestures, and language of the peoples they study while they are conducting fieldwork. Often, anthropologists bring their love of these cultural elements back to their home societies and continue to use and practice them to show their appreciation for the cultures they have studied. However, some people may find it unsettling to see a white Euro-American anthropologist wearing an African wax-print dress—or a silk sari from India, or an ornately woven lliclla cape from Peru. In your travels, have you ever purchased an item of clothing or jewelry worn by local peoples? Is it appropriate to wear such items in your home society?

If someone is using cultural items as a way of honoring that culture, many people would think it's perfectly fine. If someone is wearing items from another culture as a form of humorous costume, such as a sports mascot or Halloween costume, most people would find that offensive. An even more serious problem emerges when a person uses or claims cultural elements from another society in order to make a profit. What if, for instance, someone from the American fashion industry copied a wax print motif such as *Sika wo antaban*, using the design for American clothing, housewares, or art? The elements of culture, both material and nonmaterial, constitute the **intellectual property** of the people of that culture. Claiming or using the elements of another culture inappropriately is called **cultural appropriation**.

Paradox 3: Culture Is Consensual but Contested

In any society, people interact using a set of assumptions about the sorts of behavior and speech considered

appropriate to certain people in certain situations. That is to say, culture is consensual; through their words and actions, people agree to a certain way of doing things. As discussed earlier in this chapter, culture includes conventionalized roles, behavioral norms, and shared ideas for framing situations.

For example, imagine that someone in the United States has just graduated from college and is looking for a job. What should that person do? In the United States, it is common to spend time crafting an impressive résumé, using a specific form of technical language that accentuates the quality of a person's skills and experiences while demonstrating their educational background. Instead of listing "worked as a camp counselor," someone might indicate that they "developed systems of cooperative leadership among youth in an environmental awareness program." A recent graduate would likely post this linguistic masterpiece to a job search website such as Indeed.com.

For many people in China, such a strategy would seem very rudimentary and even grossly inadequate. Seeking opportunities for education, employment, and business, people in China frequently rely on a cultural system known as *guanxi*. Informed by Confucianism, *guanxi* refers to gifts and favors exchanged among people in wide social networks based on mutual benefit. *Guanxi* is based on family ties but also includes relationships formed in schools, in workplaces, and even among strangers who meet at parties or through mutual friends (Yin 2017). While still in school, a student may be on the lookout for people who might be able provide access to employment opportunities in the future. Using the practices of *guanxi*, the student would seek to establish personalized links with such people in the hope that these links might prove advantageous in the future.

Say, for instance, a student hopes to get a job in solar technology after graduation. That student might seek out professors whose teaching and research suggest connections in that industry. To establish relations of *guanxi*, the student would not only take courses from that professor but also attempt to establish some sort of personal rapport. This is typically done through strategic gift giving. In a particularly brutal winter, a student might knit a sweater for the professor. An artistically inclined student might sketch a portrait of the professor and frame it as a gift. Importantly, the gift must go slightly beyond the bounds of their professional relationship as professor and student. Over time, the student might find ways to meet with the professor, further cementing the social bond. After carefully cultivating this personalized relationship over months or years, the student might then ask the professor to use industry connections to help them find a job.

What this means is that personal connections can be just as important as, if not more important than, the language or qualifications of a person's résumé. While Americans emphasize the importance of job-search techniques, personal connections also play a role in securing employment in the American context, particularly in highly paid, competitive industries such as software development and finance. In many societies, people prefer to work with people they trust. Rather than hiring a random stranger, many prefer to hire someone recommended by a trusted friend or business partner. In *guanxi* relationships, relations of trust are established through the exchange of gifts and favors over time.

But what if the people who are hired in competitive industries are the ones who deployed their strategic social connections and not necessarily the ones who are most skilled, talented, or otherwise best suited to the work? What if the companies who are hired to complete infrastructure projects such as roads and bridges are not necessarily the most competent or experienced ones but those who have given strategic gifts to government officials? What if people use their *guanxi* networks to obtain special privileges, such as government licenses or social services? Legal scholar Ling Li (2011) argues that some people use the cultural system of *guanxi* to facilitate and rationalize bribery and other acts of corruption.

In 2012, the Chinese government launched an ambitious campaign against corruption among government officials. More than 100,000 people have been investigated and charged with corruption, including many high-ranking government officials, military officers, and senior executives of state-owned companies. Investigations have revealed how powerful people use their extensive *guanxi* networks to secure deals, exert influence, and extract goods and services. The campaign against corruption in China raises questions about the morality and legality of *guanxi* practices.

Although *guanxi* is a widely accepted system for gaining access to goods, services, and opportunities, people who don't have elite connections may feel that this informal cultural system is unfair. For personal or ethical reasons, some people may challenge or resist the practices of *guanxi*. Chinese journalist Lijia Zhang (2013)

describes how she was denied a promotion in her first job because she refused to give the expected *guanxi* gifts to her boss. Zhang reports that most Chinese people complain about the widespread practices of corruption but are forced to use their *guanxi* networks to get ahead in life.

Guanxi illustrates how culture can be generally taken for granted but also highly controversial. Many other cultural norms are also widely accepted but challenged and resisted by certain groups who are disadvantaged or limited by those norms. Gender roles are a good example, as are norms of sexuality and marriage.

Paradox 4: Culture Is Shared, but It Varies

The examples of *guanxi* and the geodesic dome both illustrate another paradox: how culture is widely yet unevenly shared among members of a group. Different members of and groups in a society have different perspectives on their shared culture—and different versions of that culture. Among elites, the use of Chinese *guanxi* (or American "networking") might seem to be a more personal and trustworthy process for making things happen. But for people who lack access to elite networks, these cultural norms may seem to be an exclusive and unfair tool of class oppression.

Returning to the notion of home, consider the many, many versions of home in your society. People in different subgroups and regions live in structures of different shapes and sizes that are made of different materials. And yet, the members of a culture do share a common set of assumptions about home. Home is where we live, where we sleep, and most often where our family lives as well. Even with such diversity, people in a society have a common image or ideal of home. On the West Coast of the United States, geodesic innovators sought to expand the notion of home with a new shape and a new way of building. But in southwest Missouri, that variation of home did not take root. Alas.

The four paradoxes all illustrate how culture operates as a force of stability in a society while also generating forms of constant alteration, adaptation, and change. As culture is mobile, controversial, and variable, some elements are always in the process of transformation even as other elements are maintained and reinforced. Over time, people reinterpret their cultural norms and practices and sometimes even reject them altogether in favor of some other way of thinking or doing things.

This paradoxical view of culture points to the dynamic tensions of people living in groups. Societies are collectivities of individuals, families, regional groups, ethnic groups, socioeconomic classes, political groups, and so on. Culture provides a way for people to live and work together while also allowing for the expression and performance of distinctive differences. Rather than breaking down, culture responds to pressures for change with adaptation to new conditions. The paradoxes that make culture seem impossible also make culture flexible and durable. In an era that combines increasing polarization with an urgent need for cooperative change, perhaps we need culture now more than ever.

MINI-FIELDWORK ACTIVITY

Romance over Time

Write down the answers to the following questions. What does a person in your culture do when they want to become romantically involved with a particular someone? Are there common practices for this? What rules guide this behavior, explicit or implied? What are the different roles involved? Are there symbols and rituals? Is there some amount of disagreement in your culture about any of these activities?

Now, find a person in your culture who is much older than you, perhaps a person over 70 years old. Ask that person to describe how people did the same things when they were your age. Ask the same set of questions, and write down the answers.

How have romantic relations changed over time? What forces have shaped this change? What aspects have remained the same? What explains the durability of some practices? Based on this trajectory of change, can you predict how romantic relations will change in the future?

Suggested Readings

"Anthropological Theories: A Guide Prepared by Students for Students." 2012. Department of Anthropology, University of Alabama College of Arts & Sciences. https://anthropology.ua.edu/anthropological-theories/.

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Key Terms

cultural appropriation claiming or using elements of another culture in an inappropriate way.
cultural ecology how humans develop culture as an adaptation to various environments.
cultural evolutionism the study of the origins of human cultural forms and how those forms have changed over long periods of time.
cultural frames patterned, shared ways of interpreting situations.
cultural materialism an evolutionary approach that identifies technology and economic factors as fundamental aspects of culture, molding other features of culture such as family life, religion, and politics.
cultural practices routine or habitual forms of behavior.
cultural role a conventionalized position in a particular context or situation.
culture the whole way of life of a society, combining material objects, technologies, social relationships, everyday practices, deeply held values, and shared ideas.
diffusion in an anthropological context, the spread of material objects, practices, and ideas among cultures in complex relations of trade, migration, and conquest.
friction occurs when two or more elements of culture come into conflict, resulting in alteration or replacement of those elements.
functionalism a form of analysis that focuses on the contemporary purposes of culture.
historical particularism an approach to cultural change that describes the combination of internal and external factors that shapes the unique historical trajectory of each culture.
ideology a model that depicts how a social realm operates or should operate. An ideology identifies the entities, roles, behaviors, relationships, and processes in a particular realm as well as the rationality behind the whole system.
innovation the slight alteration of an existing element of culture, such as a new style of dress or dance.
intellectual property material and nonmaterial products of an individual or group that are protected by national and international laws and cannot be used for profit by others without attribution or compensation.
invention the independent creation of a new element of culture, such as a new technology, religion, or political form.
material culture objects made or used by humans, such as buildings, tools, clothing, household items, and art.
norm the cultural expectations, including behaviors and attributes, that are associated with a cultural role.
ontological anthropology an approach that explores how culture constructs our social and natural realities, what we consider real, and how we act on those assumptions. Reaching beyond human realities, ontological anthropology also attempts to include nonhuman perspectives, relationships, and forms of communication.
ontology the study of the nature of existence.
rite of passage a ritual that moves a person or group of people from one social category to another, often more highly valued one. Examples of rites of passage include naming ceremonies, initiations, weddings, and funerals.
ritual repeated, patterned action conventionally associated with a particular meaning, often incorporating symbolic objects and actions.
social structure the organizational framework for a particular realm of culture, such as the family, the economy, or the political system. Social structures combine material culture with practices and ideas.
structural functionalism a form of analysis that describes how various aspects of culture fit together and contribute to the integrated whole of culture.
structuralism the study of culture as a system of symbolic categories embedded in the myths, religion, kinship, and other realms of a culture.
symbol an object, image, or gesture conventionally associated with a particular meaning.
technology specialized knowledge or skills required to produce objects of material culture.
unilineal evolution the idea that all cultures pass through a single set of developmental stages.
values cultural notions about what is good, true, correct, appropriate, or beautiful.
worldview a very broad ideology that shapes how the members of a culture generally view the world and their place in it. Worldviews tend to span several realms, including religion, economics, and politics.

Summary

The discipline of anthropology is centered on the concept of culture. What we make, what we do, and what we think constitute the basic elements of culture. These elements combine in aggregates such as symbols, rituals, and social structures. Since the 19th century, anthropologists have developed various modes of analysis for understanding culture, some examining change over time and others considering the functions of culture at one particular point in time. While it is an incredibly useful tool for understanding human social life, the concept of culture is riddled with paradox. Though durable and integrated, culture is subject to constant change, mobility, contest, and variability.

Critical Thinking Questions

1. Draw a floor plan for your ideal home. What rooms would you have, and why? How would those rooms be organized? How is the imagined structure of this home shaped by an imagined lifestyle? What form of family or social relations are embedded in your house plan? What forms of work? What notions about gender and age are assumed?
2. Describe your routine for getting ready in the morning. What aspects of this routine are governed by biology, and what aspects are cultural? Ask a friend to describe their morning routine. Are there differences? Commonalities? What norms and values shape these practices?
3. List the colors of the rainbow. With a friend, describe the symbolic meanings associated with each color. Do you agree on these meanings? Do some colors have multiple meanings in your culture? How do people use and interpret colors with multiple meanings?
4. List the social roles you inhabit in your culture. What are the ideal behaviors associated with those roles? Do you observe all of these norms, or do you choose to ignore or resist some of them? What happens when you publicly resist the norms of your culture?
5. What rituals mark the passage of children into adulthood in your culture? Identify symbolic objects and actions in those rituals. What norms and values are expressed?
6. Which sports are popular in your culture or region? Choose one. How might an anthropologist use an evolutionary perspective to analyze this sport? How might another anthropologist use a functionalist approach?
7. Do you believe in ghosts? Is this belief widely shared among the people you know? How might the belief in ghosts shape cultural ideas about life and death? Would ghost beliefs influence what people do after a person dies?
8. Under what circumstances is it appropriate for a person in one culture to adopt elements from another culture, such as dress, food, or speech? Is that cultural appropriation? Why or why not?

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Zhang, Lijia. 2013. "Author: In China, 'Everyone Is Guilty of Corruption.'" CNN. October 24, 2013. http://edition.cnn.com/2013/10/23/opinion/china-corrution-lijia-zhang/.

CHAPTER 4
Biological Evolution and Early Human Evidence

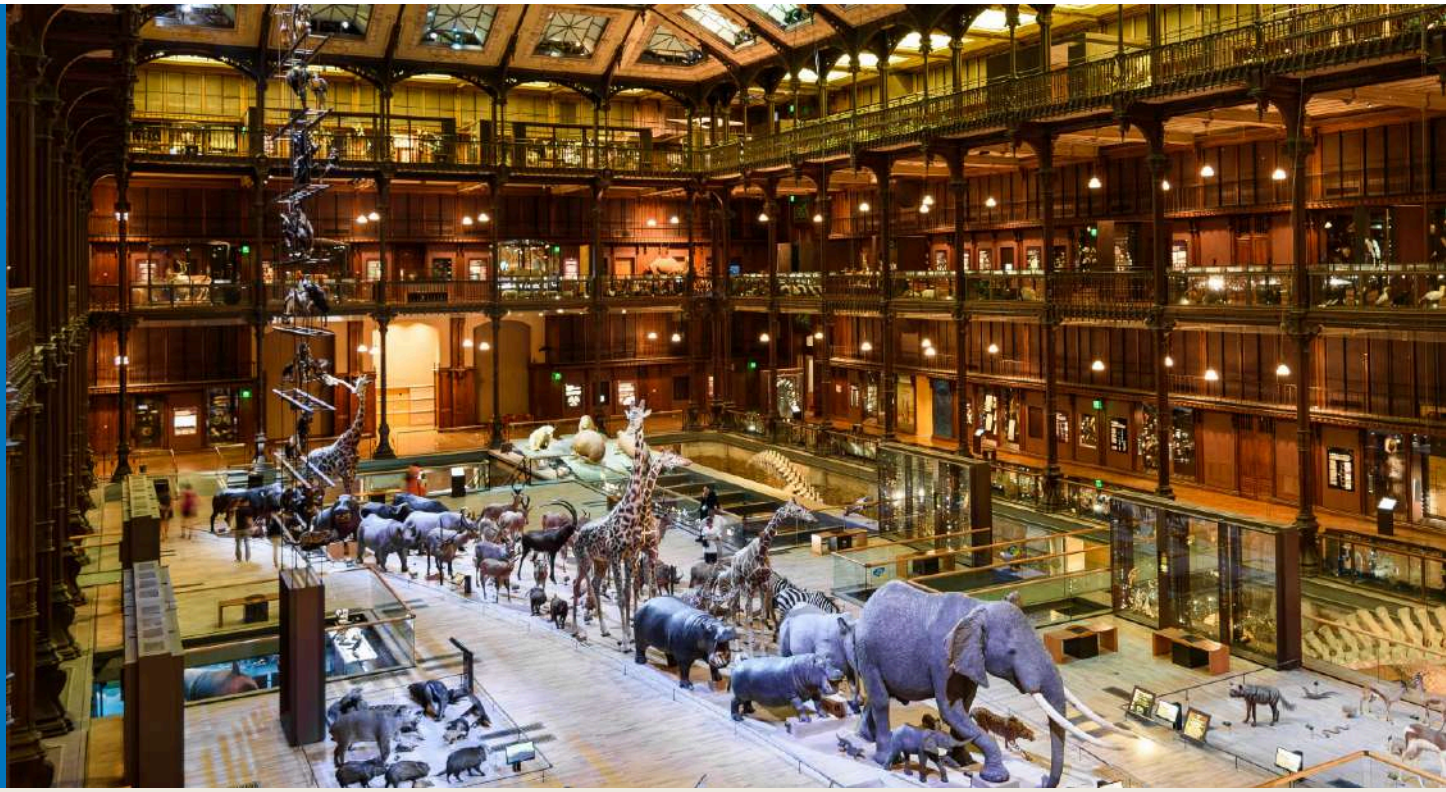

Figure 4.1 The Grand Gallery of Evolution in the National Museum of Natural History in Paris, France displays 9,500 specimens of the estimated millions of species that currently live or once lived on the Earth in its collections. In addition to educating the public about the mechanisms of evolution, the exhibitions in the museum honor the scientists who helped contribute to our current understanding of the history of life on Earth. (credit: "Great Gallery of Evolution" by Mustang Joe/flickr, Public Domain)

CHAPTER OUTLINE

INTRODUCTION This chapter applies evolutionary concepts to the understanding of human origins and explains the biological variation seen in our ancestors across time. Chapters 4, Biological Evolution and Early Human Evidence and Chapter 5, The Genus *Homo* and the Emergence of Us, represent a field of study that is probably the most dynamic, controversial and highly debated subfield of anthropology. Perspectives and opinions vary not only within the mindset of the general public but also amongst scientists and

anthropologists alike. As the human fossil puzzle begins to fill in with new discoveries, we find ourselves gaining valuable insights into what makes us human and the ways in which we are a part of, not separate from, the natural world. Despite our advances in the field, we also have to be prepared for the possibility we may end up with more questions than answers! It is these very reasons that explain why so many of us find this such a fascinating field and why so many of us take it so personally. It is after all a journey into the discovery of who we are and where we came from; and that should be of interest to all of us as members of the *Homo* genus.

4.1 What Is Biological Anthropology?

LEARNING OUTCOMES:

By the end of this section, you will be able to:

- Identify the five subfields of biological anthropology.
- Explain how each of the subfields contributes to our understanding of human origins and evolution.
- Understand the historical context of the field of biological anthropology.

Looking to the Deep Past

Biological anthropology, also referred to as physical anthropology or evolutionary anthropology, is one of the four major subfields of anthropology. While the other subfields focus on current and relatively recent human cultures, biological anthropology looks to the deeper past, asking questions about what it means to be human by exploring where humans came from as a species. Biological anthropology comprises numerous areas of study: human biological variation, paleoanthropology (human and primate evolution), primatology (the study of nonhuman primates), bioarchaeology (the study of bones found at archaeological sites), and genetic anthropology (the application of molecular science to archaeological, historical, and linguistic evidence to reveal the history of ancient human origins and migration). Each of these areas of study contributes something to anthropologists' understanding of current human physical characteristics and behaviors.

Exploring What It Means to Be Human

Studies of human biological variation evaluate the physical similarities and differences between human populations across both time and space. Differences in **morphology** include features such as height, jawline, eye sockets, and ear and nose shape and size. Biochemical differences account for variations in the sense of smell, mutations in the *CCR5* gene that offer resistance to HIV, and variations in skin pigmentation in response to levels of exposure to ultraviolet rays from the sun.

FIGURE 4.2 These variations in modern human skin pigmentation are the result of evolutionary adaptations to different levels of exposure to ultraviolet rays from the sun. (credit: "School Diversity Many Hands Held Together" by Wonder woman0731/flickr, CC BY 2.0)

The study of human biological variation is closely linked to the original conception of biological anthropology,

which was formalized in 1930 with the establishment of the American Association of Physical Anthropologists, recently renamed the American Association of Biological Anthropologists. The change in name is an effort to move away from the term *physical anthropology*, which has come to be associated with views promoting scientific racism that no longer represent or align with views held by anthropologists today. In 1951, American anthropologist Sherwood Washburn introduced a "new physical anthropology," changing the focus from racial typology and classification to the study of human evolution and the evolutionary process. This new focus expanded anthropology as a field to include paleoanthropology and primatology

Paleoanthropology looks at the fossil evidence of humanity's ancestors along with ancient material culture such as tools and other human artifacts. The physical morphology (shape and size) of skulls and other postcranial material (skeletal remains other than the skull) allow paleoanthropologists to form hypotheses about important milestones in human evolution over time.

Primatology examines the behavioral and physical attributes of both living and fossil primates as well as their relationships with their environments. Humans are primates who share a common ancestry with nonhuman primates. By studying nonhuman primates, anthropologists can gain a better understanding of what it means to be a primate and what it means to be human.

Genetic anthropology is used within several areas of biological anthropology. In this specialized area, DNA testing is combined with archaeological, historical, and linguistic evidence to reveal the history of ancient human migration or to track human disease.

Forensic anthropology is a subfield of biological anthropology that applies scientific methods to the analysis of human remains for the purposes of identifying a victim and determining the possible cause of death. A major difference between forensic anthropology and other types of biological anthropology is that forensic anthropology is usually focused on crime scenes involving the death of an individual, whereas other types primarily focus on understanding patterns and features that may appear in a group or an entire population. Beginning in World War II, forensic anthropologists have been instrumental in helping identify victims of war and disasters. They have played critical roles in identifying victims of the Thailand tsunami in 2004 and the destruction of the World Trade Center on September 11, 2001. Today, most forensic anthropologists work in a medical examiner's office, assisting with autopsies and examinations of skeletal remains.

Bioarchaeology studies human remains in archaeological settings with a focus on what skeletal material can reveal about the culture, diet, and presence of disease in a population. Bioarchaeologists are also interested in the **socioecological system** of a population, which helps anthropologists better understand the roles of environmental and ecological pressures and influences in shaping cultural identity, social inequity, sustainability, and access to and use of resources. Based on the biological remains found at archaeological sites, bioarchaeologists explore questions pertaining to social and funerary behavior, diet and nutrition, health, and disease. Bioarchaeology offers a window into the connections among biology, society, and culture. An example of what a bioarchaeologist might study is skeletal evidence of infant cranial boarding, which was practiced by many cultures, including the ancient Maya, the Inca, and some Native North American groups. The process involved binding a child's head to a flat board in order to artificially deform the skull, possibly to meet an aesthetic ideal or to signify social status. Bioarcheologists have found that variations in how the board was attached to the skull provide important information about an individual's social identity.

FIGURE 4.3 This elongated skull is from a member of the Nazca culture, which flourished in what is now Peru in the years 100 BCE to 800 CE. It's long, oval shape is the result of infant cranial bonding, the practice of deliberately shaping the development of an infant's skull by bonding it to stiff boards. (credit: "Nasca Peru Deformed Skull" by VasenkaPhotography/flickr, CC BY 2.0)

PROFILES IN ANTHROPOLOGY

Ann Rosalie David
1946-

FIGURE 4.4 Professor Ann Rosalie David, Egyptologist and forensic and biological anthropologist at the University of Manchester, UK. (credit: Professor David, Public Domain)

Personal History: Professor Ann Rosalie David was born in Cardiff, UK and earned a bachelor of arts degree in ancient history from University College London in 1967 and a doctorate from the University of Liverpool in 1971. Her thesis was on ancient Egyptian temple rituals.

Area of Anthropology: The focus of Professor's David's work has been biological anthropology and Egyptology.

Accomplishments In the Field: Professor David is a Director of the KNH Centre for Biological and Forensic Studies in Egyptology at the University of Manchester. In this role, she established the Ancient Egyptian Mummy Tissue Bank, one of the only such tissue banks in the world. She served as the keeper of Egyptology at the Manchester Museum and has often worked in collaboration with Egypt's Ministry of Health and Population on public health projects. One such project involved the identification of antibodies against schistosomiasis, a parasite spread by freshwater snails, in Egyptian mummies.

David was made an Officer of the Order of the British Empire (OBE) in 2003 for her work in Egyptology. David has appeared in or consulted on several documentaries, including the television miniseries *Private Lives of the Pharaohs* (2000) and *Secrets of the Pharaohs* (2001) and the documentary short *Mummies: Secrets of the Pharaohs* (2007).

Importance of Her Work: Ann Rosalie David was the first woman in Britain to hold a professorship in Egyptology. She was a pioneer in biomedical research, conducting research on disease, diet, and lifestyles in ancient Egypt. In 2010, her work on ancient Egyptian mummies found evidence to suggest that cancer may be a human-created disease, attributable in part to modern pollution and changes in lifestyle and diet (David and Zimmerman 2010).

PODCAST

In this podcast (https://openstax.org/r/interview-mummies-withprof.annrosaliedavid), Professor Rosalie discusses her work with ancient Egyptian mummies.

4.2 What's in a Name? The Science of Taxonomy

LEARNING OUTCOMES:

By the end of this section, you will be able to:

- Describe the historical context of binomial nomenclature and scientific classification.
- Distinguish between the different categories of groups found in Linnaean classification.
- Explain the different definitions of species and how they are applied to different populations.

Defining the Science of Taxonomy

Taxonomy is defined as the classification and naming of things. Taxonomy organizes things into groups based on predefined criteria. The criteria can be as simple as color or height or as complex as the presence or absence of a trait, gene, or behavior. Taxonomy is a critical component of biological anthropology because it helps anthropologists organize humans and their evolutionary ancestors both spatially (by location) and temporally (through time).

Taxon refers to a specific subgroup, such as the genus. **Taxa** is the plural form of taxon, used to refer to all groups. The classification system used for organizing living organisms was originally developed in the 18th century by Swedish botanist Carolus Linnaeus. His system, which he called the *Systema Naturae*, uses a structure known as **binomial nomenclature**. Binomial nomenclature assigns two Latin names to each organism. The first is termed the genus name. The second is the specific or the trivial name, commonly called the species name. In print, genus and species names are italicized. The first letter of the genus is capitalized, while the species or trivial name is lowercase. For example, the scientific name for the house cat is *Felis catus*, and the name for modern human beings is *Homo sapiens*. Linnaeus's binomial nomenclature established a shared scientific language that would become universal across countries and cultures, avoiding the confusion caused by regional and colloquial names.

In addition to establishing a shared language, Linnaeus's naming system groups organisms that share common traits. For example, he grouped together animals with mammary glands into the category mammals. Mammals were further broken down according to other traits. For example, mammals that have opposable

thumbs were grouped together as primates, and those without opposable thumbs were grouped as non-primates. This is a hierarchical classification scheme, meaning that organisms are grouped into successive levels from the broadest category of domain to the more specific level of species.

When Linnaeus first created his *Systema Naturae*, he built five hierarchical levels into his taxonomy: kingdom, class, order, genus, and species. Humans are in the kingdom Animalia, the class Mammalia, the order Primates, the genus *Homo*, and the species *sapiens*. Over time, many levels have been added to the Linnaean system of classification, including domain, phylum, subclass, superorder, family, and tribe. The addition of these taxon groups has enabled biological anthropologists to better understand the variations present in various groups of organisms. However, biological anthropologists spend the majority of their time trying to understand the species level.

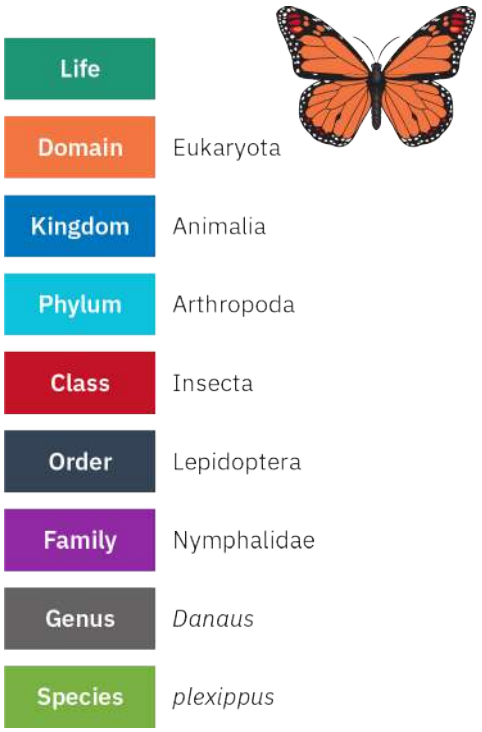

FIGURE 4.5 This chart details the Linnaean hierarchical classification for the monarch butterfly. The broadest category, "Life", appears at the top of the chart, with classifications of increasing specificity at each level that follows. "Species" is the most granular level. (attribution: Copyright Rice University/OpenStax, under CC By 4.0 license)

Defining a Species

While **species** is a word that most people are familiar with and comfortable using, just what determines a species is incredibly difficult to define. At the most basic level, a species comprises a group of organisms with shared characteristics that distinguish them from other groups. Most scientists distinguish a species based on behavior, genetics, and/or morphology. Species definitions are the basis for scientific names. The *common* name of a species, on the other hand, is usually based on general physical characteristics noted by a culture or local population. Common names are also referred to as folk taxonomy or **ethnotaxonomy** (classifications influenced by culture, etc.). There is a growing interest among anthropologists and the scientific community in preserving Indigenous classifications of the natural world and connecting them with scientific classifications.

Decisions related to classification often involve tremendous taxonomical controversy, especially within the field of biological anthropology. There are more than 20 distinct species definitions, or ways of categorizing or distinguishing one type of organism from another. Below are the four most common definitions of a species.

Biological Species

The **biological species definition** states that a species is a group of interbreeding organisms that are

reproductively isolated from other groups of organisms. **Reproductive isolation** means that members of a species are not able to mate successfully with members outside their species. Gorillas, for example, cannot successfully breed with *Pan paniscus*, the bonobo. The biological species definition uses the ability to interbreed as its foundation because successful mating leads to gene flow, or the movement of genetic material from one population to another.

Ecological Species

The **ecological species definition** emphasizes the role of natural selection in maintaining species boundaries. This concept is based on the idea that gene flow is neither necessary nor sufficient to maintain species boundaries. Instead, natural selection plays an important role in maintaining the boundaries between species. In nature, species boundaries are often maintained even though there is a substantial amount of gene flow between species. Gene flow between species generally occurs at places called **hybrid zones**, areas of overlap where two species are known to successfully breed. A classic example of a hybrid zone occurs on the island of Sulawesi in Southeast Asia, where *Macaca maura* (the moor macaque) and *Macaca tonkeana* (the Tonkean macaque) are known to have successfully interbred for more than 150 years. Despite this, the integrity of the two distinct species has been maintained.

Phylogenetic Species

The biological species definition is based on breeding behavior, specifically whether species are capable of mating with one another. This foundation is problematic when trying to identify species over time. It is hard to know whether two fossil specimens were capable of interbreeding. It is also difficult in the fossil record to distinguish between **interspecific variation** (differences between members of two different species) and **intraspecific variation** (variation within a species). Imagine finding the bones of two individuals, one five feet tall and the other six feet four inches. Identifying whether these individuals were members of two different species (interspecific variation) or representative of the normal variation within a given species would be extremely challenging.

These problems are addressed by the **phylogenetic species definition**. The phylogenetic species definition states that a species can be determined by shared possession of one unique characteristic. For example, imagine you found a group of fossil leg bones. In order to decide if they were from the same species, you would need to determine if they had a trait in common that only these fossil leg bones possessed. If the bones all possessed trait A and this trait was not found in any other species already identified, then you would have a new species, and all of the fossil leg bones could be placed in that species.

Mate Recognition Species

The mate recognition species definition states that a species is a set of organisms that recognize one another as potential mates. A classic example of a group of species that can be distinguished using this definition is American crickets. Within a single habitat in the United States, there might be over 30 different species of crickets. Each species of cricket is known to produce a distinct song. Despite all these different species living side by side, the female cricket of each species will only mate with a male after hearing the male sing her species-specific song. The song, and the female recognition of it, constitutes a mate recognition system. This is analogous to the biological species definition in that the song acts as a reproductive isolating mechanism.

4.3 It's All in the Genes! The Foundation of Evolution

LEARNING OUTCOMES:

By the end of this section, you will be able to:

- Define alleles, genes, phenotypes, and genotypes.
- Distinguish the process of mitosis from the process of meiosis.
- Explain how Mendel's laws of heredity affect human variation.
- Explain how the multitude of evolutionary forces contribute to variation in the human condition.

The Units of Life

Cells are the basic units of life in all organisms. They are the smallest entities that are capable of self-reproduction. There are two main types of cells: prokaryotic and eukaryotic cells, named for the types of

organisms in which they occur. Prokaryotes are single-celled organisms, such as bacteria and archaea. Eukaryotes are more complex, multicellular organisms, such as plants and animals (including humans). One of the most important components of eukaryotic cells is the enclosed nucleus at the center of the cell; prokaryotic cells do not have this nucleus. The nucleus of a eukaryotic cell houses all of the genetic material, or DNA (deoxyribonucleic acid), that controls cellular function. Normally, the DNA forms a long string within the nucleus.

There are two main types of eukaryotic cells: somatic cells and sex cells (also known as gametes). The somatic cells make up the structural components of a body, such as the tissues, muscles, and organs. The sex cells are specifically involved in reproduction. The function of the sex cells is to unite with a sex cell from another individual to form a fertilized egg, also known as a zygote. In animals, there are two types of sex cells: ova, or eggs, and sperm.

Cell division is the process that results in the production of new cells. However, sex and somatic cells divide differently. The cellular division of somatic cells is known as mitosis, while the cellular division of sex cells is known as meiosis. Mitosis of somatic cells is sometimes referred to as simple cell division because the parent cell divides once to produce two daughter cells that are genetically identical to each other and identical to the original parent cell. During mitosis, the DNA genetic material forms structures known as chromosomes. Each daughter cell inherits an exact copy of all 46 chromosomes found within the parent cell.

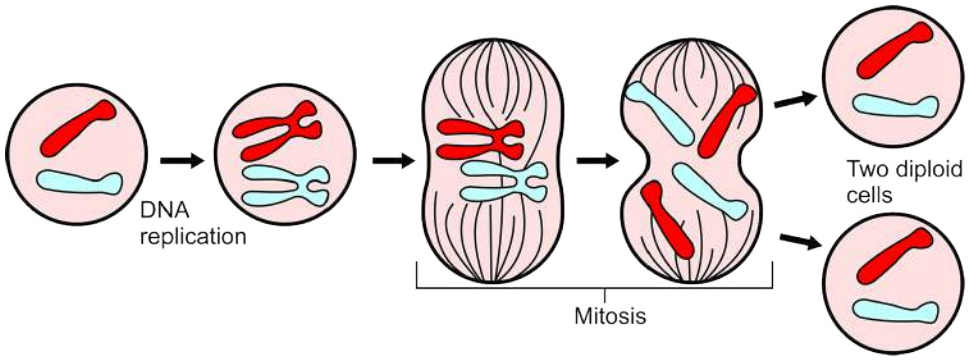

FIGURE 4.6 In somatic cell division, also known as mitosis, the parent cell divides to produce two daughter cells that are genetically identical to each other and to the parent cell. (credit: "Major events in mitosis"by Mysid/ Wikimedia Commons, Public Domain)

Meiosis, or sex cell division, is more complicated. This type of cellular division only occurs in the testes of males and the ovaries of females. Instead of just one division, meiosis results from two cellular divisions that produce four daughter cells. In meiosis, the four daughter cells each receive half of the original genetic material from the parental cell. Thus, each daughter cell only has 23 chromosomes.

It is on the chromosomes that genes are housed. Genes are the fundamental unit of heredity. They are best understood as the sequence or ordering of the DNA material that is housed in the nucleus. The **genotype** is the genetic material found within an organism's cells and it is the expression of these genes that will produce the **phenotype** or observable trait. Sometimes, the sequencing of the DNA material produces a variation of a gene, known as an **allele**. An allele is defined as a similar but slightly different form of the same gene that can activate the expression of a specific trait.

Gregor Mendel and the Laws of Heredity

The true nature of inheritance was not really understood until the beginning of the 20th century, when the 19th-century work of Gregor Mendel, a Catholic priest from Slovakia, was rediscovered. While in college, Gregor Mendel was introduced to cell theory, which states that all organisms are composed of cells and that cells are the fundamental unit of all living things. Cell theory raised many questions in Mendel's mind, including whether both parents contribute equally to the cells in their offspring. In 1854, Mendel began a series of experiments with pea plants to help resolve this question and better understand how traits are inherited from generation to generation.

FIGURE 4.7 Gregor Mendel was a Catholic priest whose experiments with selective breeding of pea plants established many of the rules of heredity. (credit: "Gregor Mendel Monk" by William Bateson, *Mendel's Principles of Heredity: A Defence*/Wikimedia Commons, Public Domain)

The first stage of Mendel's experiments was identifying plants that breed true, meaning that each parent only produces one kind of offspring when self-crossed. A self-cross is essentially a self-mating; some plants, such as peas, have both male and female parts and can self-fertilize. Not all self-crosses are the same as the parent plant, however. For example, self-crossed pea plants that have yellow pods sometimes produce offspring with yellow pods and sometimes produce offspring with green pods. Mendel continued to selectively breed only those pea plants that produced offspring that were the same as the parents. He called them purebreds and referred to them as the P1 generation. It took him more than two years to establish plants that always bred true.

Then Mendel selected seven traits of his pea plants that each had two distinct phenotypes, or observable expressions of the trait. For example, seed shape can be either round or wrinkled, while pod color can be either yellow or green. Over the next eight years, Mendel studied the mating and resulting traits of more than 28,000 plants. Mendel's first round of experiments used his purebred pea plants to create what is known as a monohybrid cross. A monohybrid cross is a mating between two purebred individuals who differ in a single characteristic. In Mendel's monohybrid crosses, the parent pea plants differed from one another in terms of whether the pods of the parental pea plants were yellow or green or whether the seeds of the parental pea plant were wrinkled or round.

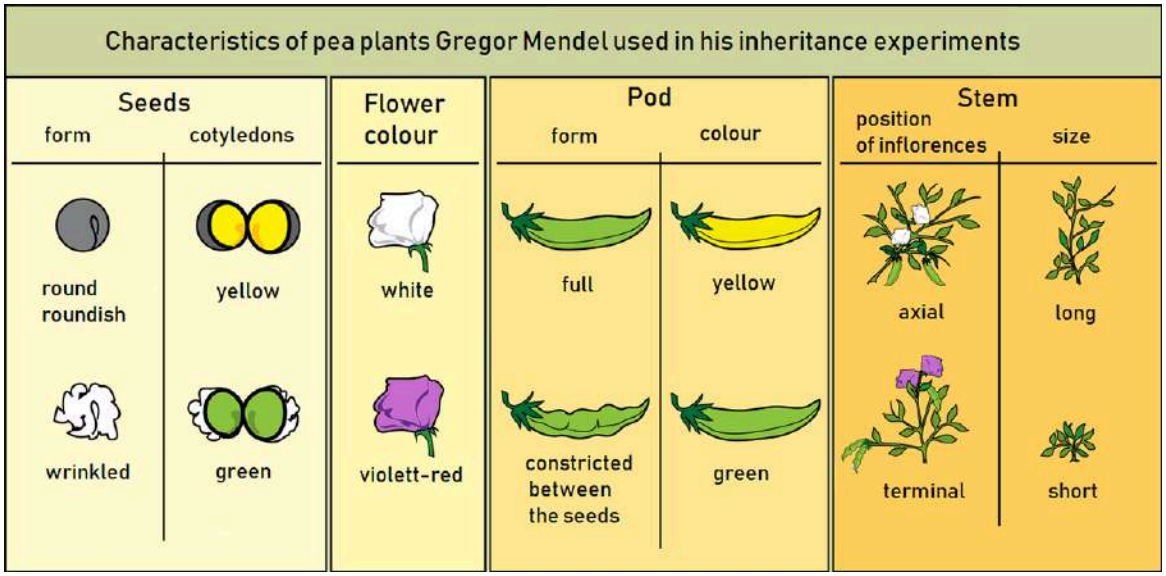

FIGURE 4.8 Mendel identified a number of distinct characteristics observable in the seeds, flowers, pods, and stems of pea plants. He used these observable traits as the basis for his breeding experiments, taking note of which traits were dominant and which unexpressed (or recessive) in offspring. (credit: "Mendel Genetics" by LadyofHats/ Wikimedia Commons, Public Domain)

In his first monohybrid crosses, Mendel mated a purebred yellow pea plant with a purebred green pea plant. He found that all the offspring resulting from this monohybrid cross were yellow, even though when the green peas self-crossed, all their offspring were green. In other words, all the *hybrid* offspring were yellow in color. A hybrid plant is one in whose parents differ in a term of a specific characteristic, such as pod color or seed shape. The trait that was expressed (yellow) Mendel referred to as dominant, and the trait that disappeared (green) he referred to as recessive. Mendel's next set of experiments involved mating two hybrid plants—in other words, those that resulted from the monohybrid cross. In these experiments, he found that the recessive traits reappeared in a ratio of three dominant to one recessive.

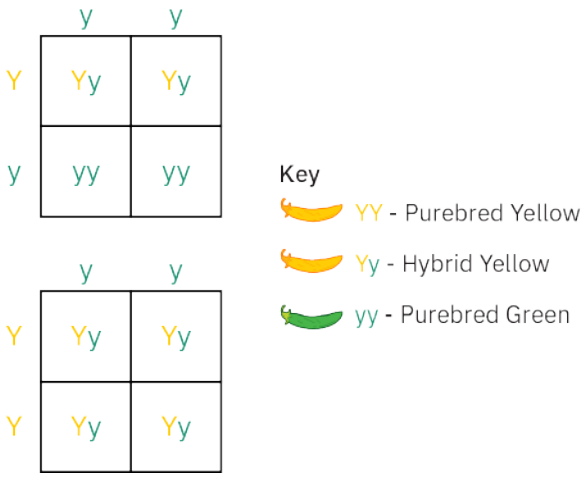

FIGURE 4.9 These diagrams are examples of Punnett squares, a simple method for predicting the observable results of breeding experiments. In the top square, a purebred green plant (yy) is crossed with a hybrid yellow plant (Yy). The four possibilities for offspring appear in the four interior squares of the diagram. In this case, half of the offspring will be hybrid yellow and half will be purebred green. The bottom diagram shows the results of a cross between a purebred green and a purebred yellow plant – in this case, all offspring are hybrid yellow. (credit: Copyright Rice University/OpenStax, under CC BY 4.0 license)

Mendel's experiments suggested two very important facts. First, Mendel noted that various expressions of a trait (such as pea color) were controlled by discrete units that occur in pairs and that offspring inherited one

unit of each pair from each parent. This observation became Mendel's first law of inheritance, the **law of segregation**, which states that the two alleles for each trait segregate, or separate, during the formation of gametes (eggs and sperm) and that during the reproductive process, the alleles combine at random with other alleles. Today, we know that the process of meiosis—division of sex cells—explains Mendel's law of segregation. Each of the seven traits identified by Mendel is controlled by a pair of genes in the plant, one on each chromosome. During the reproductive cycle, the chromosomes separate from one another so that each gamete has only one allele for each trait. During fertilization, the alleles combine, and the two-gene state is restored.

After Mendel established his first law of inheritance, he extended his studies to more complex situations. He began performing experiments with two set of traits, using dihybrid crosses. A dihybrid cross is a cross between individuals who differ with respect to two gene pairs—for example, a cross between a plant with a round yellow pea and a plant with a wrinkled green pea. Because yellow and round are both dominant traits and wrinkled and green are both recessive, all the offspring resulting from the first-generation mating were 100% yellow and round. The green color and the wrinkled pea shape had disappeared. However, these recessive traits reappeared in a ratio of three dominant to one recessive when two round yellow individuals from the first-generation dihybrid cross were mated. The green color and the wrinkled pea shape had not truly disappeared. In the second generation of the dihybrid cross, Mendel found that 9/16 of the offspring were round and yellow, 3/16 were wrinkled and yellow, 3/16 were round and green, and 1/16 were wrinkled and green. The results of these dihybrid crosses indicate that the two characteristics—pea color and pea shape—segregate independently. The expression of one trait is not influenced by the expression of the other trait. This is known as the **law of independent assortment**, which is Mendel's second law of inheritance. There is nothing to dictate that round peas will be yellow or that wrinkled peas will be green. The alleles that code for different traits sort independently of one another during sex cell division (meiosis).

Mendelian Inheritance in Humans

Mendel's laws of inheritance also apply to humans. Indeed, the principles of segregation and independent assortment account for the transmission of certain human traits. Human blood type is one of the most familiar Mendelian traits. Blood type has three phenotypes—A, B, and O—based on three alleles of a single gene. If only the A allele or both the A and O alleles are present, the phenotype is A. If only the B allele or both the B and O alleles are present, the phenotype is B. If both A and B are present, the phenotype is AB. If neither A nor B is present, the phenotype is O. Note that O is recessive to both A and B, while A and B are codominant. Codominance means that instead of one allele masking the other, the products of both alleles are observed. Additional examples of Mendelian traits, or those controlled by a single gene, include Huntington's disease, widow's peak, cystic fibrosis, sickle cell anemia, Tay-Sachs disease, hemophilia, and red-green color blindness. OMIM, or Online Mendelian Inheritance in Man (https://openstax.org/r/onlinemendelian), hosts an online database of almost 5,000 Mendelian human traits.

It is important to note that the majority of human traits are not controlled by a single pair of genes. More often, a single gene can have multiple effects. Even more commonly, multiple genes are needed to produce a single effect. These are referred to as **polygenic traits**. Most human traits are polygenic, not Mendelian. A good way of determining if a trait is polygenic is to assess whether the trait can be measured. Traits that can be measured, such as height or weight, are polygenic. Also, traits that have a wide range or lots of variability and can be affected by environmental factors are probably polygenic. The survival of a species depends on genetic diversity and variation. If there is a reduction of a gene pool due to geographic isolation or other environmental factors than a species is at risk of extinction.

4.4 Evolution in Action: Past and Present

LEARNING OUTCOMES:

By the end of this section, you will be able to:

- Identify the major contributors to evolutionary theory and their specific theoretical contributions and historical context.
- Explain the theory of evolution and how it applies to the understanding of human origins.
- Identify the key differences between Linnaean classification and phylogenetics.
- Define key evolutionary processes such as genetic drift, allopatric speciation, etc.

Contemporary biological anthropologists utilize an evolutionary perspective. This means that the principles of evolution are used to understand how and why living organisms, including people, thrive in almost every environment on Earth. More specifically, natural selection is accepted as the guiding force that shapes why living things are the way they are. Out of all the possible variations of beings competing for the same resources on Earth, those that prospered were the ones better suited to their environments than all other competitors. The principles of evolution and natural selection will be discussed in some detail in the next few sections, but it is important to establish at this early point that this chapter relies on the foundational assumption that natural forces are the only forces directing the development of life on Earth.

Early Evolutionists and the Fixity of Species

Evolution is defined as change in the allele frequency within a gene pool that can lead to changes in an organism's morphology (form and structure) over time. Evolution involves the processes of mutation, natural selection, and speciation, which will be introduced in upcoming sections. Prior to the 19th century, the prevailing idea in Western thought was that nature was fixed and static; it was made by a supreme being in the form it currently appeared, and it did not change. Within this fixed natural system, living creatures were arranged within a set order that was considered to have been decreed by God, known as the **great chain of being**. This order featured God at the top, angels beneath God, and then humans. Below humans were various types of animals, followed by plants and minerals. This hierarchy was significant both because it placed some creatures above others and because it distinctly separated humans from the rest of the animal world.

During a period stretching from the 14th through the 18th centuries, some people began to question whether the natural world was as static as it was traditionally perceived to be. The British scientist and architect Robert Hooke is remembered as the first person in the Western world to claim not only that nature has changed over time but also that evidence of these changes remain. He hypothesized that fossils are the remains of actual plants and animals that were once alive. This conclusion was contrary to the previously accepted conclusion that fossils were nothing more than stone images. Hooke also noted that many marine fossils were located far away from any existing ocean, and he came to the then radical conclusion that Earth's geography and physical features had experienced dramatic changes.

The first person to propose a mechanism by which species could change was French naturalist Jean-Baptiste Lamarck, best known for having developed the first theory of macroevolution, a hypothesis about how the actual transformation from one species into another species could occur. Lamarck's theory relied on the now defunct idea of the **inheritance of acquired characteristics**.

Lamarck argued that the usefulness of a trait or organ could be ascertained based on its complexity or size. In particular, he believed that the usefulness of an organ could be judged by its size and the usefulness of a trait by its complexity. He speculated that organs and traits that help a creature to survive will become bigger and more complex over time, while those that are of little use will become smaller and simpler and eventually disappear. His classic example of this theory in action is the long neck of a giraffe. Lamarck speculated that as giraffes stretched their necks to reach the leaves at the tops of trees, their necks would grow longer, and furthermore, these longer necks would be inherited by the subsequent generations. This theory of the inheritance of acquired characteristics is also known as Lamarckian inheritance. One of the interesting things about Lamarck's theory is that he believed that wishes, desires, wills, and needs were all sufficient to motivate change. That is, wishing for or desiring a change in one's physical characteristics could make that change happen.

There are two primary problems with Lamarckian inheritance. First, desires, wishes, and needs do not change physical characteristics without a deliberate change in behavior. Someone may wish for blue hair, but their hair color will not change without dye. The second problem is that the inheritance of acquired traits is not possible. If someone dyed their hair blue, their children would not inherit blue hair. Traits that are acquired during a lifespan are not passed on to subsequent generations.

Just because Lamarck's theory of macroevolution is not correct does not mean that it is insignificant. Lamarck recognized the importance of interactions between organisms and their environments in the evolutionary process and was the first to propose a mechanism by which evolutionary change from one species into another could actually occur.

Georges Cuvier, another Frenchman and a leading scientist in the early 19th century, made numerous contributions to evolutionary thinking. He is best known for his theory of **catastrophism**, which he developed to explain the increasing number of fossils that were being found, some displaying impressions of creatures no longer found anywhere on Earth. Catastrophism proposes that floods, earthquakes, and other natural disasters—understood within the theory as acts of God—have been responsible for killing all the animals alive in certain places at certain times. According to Cuvier, either new animals have been created or the areas had been repopulated by animals from neighboring areas. To be consistent with emerging fossil evidence indicating that organisms had become more complex over time, Cuvier proposed that new organisms with a more modern appearance were the result of a more recent creation event. While scientists no longer adhere to catastrophism as a viable theory, Cuvier's idea of extinction continues to be an important component of evolutionary thinking today.

Another major contributor to evolutionary thinking was Scottish geologist Charles Lyell, known as the father of modern geology. He wrote a three-volume treatise, *Principles of Geology* (1830–1833), in which he argued that contemporary geological processes were the same as those that occurred in the past. These processes, such as wind and rain, produced the contemporary geological landscape. Mountains, lakes, and rivers were all created by these geological processes, many of them slow moving. This theory has come to be known as the principle of **uniformitarianism**. Lyell suggested that in order for such slow-acting forces to produce momentous change, Earth must be much older than previously suspected. Prior to Lyell's publication, the majority of natural historians believed that the earth was less than 6,000 years old, a number arrived at through calculations made based on the Old Testament. By altering the suspected age of the earth from several thousand years to millions of years, Lyell changed the framework within which scientists viewed the geological past.

Charles Darwin's Role in Changing Views of the Natural World

Charles Darwin introduced a new way of seeing the world that was both highly criticized and acclaimed in the scientific community of his time. In spite of resistance by various segments of society, his theories of natural selection became the foundation of biological science. New knowledge pertaining to genetics and molecular science has strengthened Darwin's theories rather than weakened them.

Darwin the Apprentice

When he was 17 years old, well before he gained a reputation as a naturalist, scholar, and scientist, Darwin was studying to be a medical doctor at the University of Edinburgh. Like many young people, he began to question his original choice of studies, and he decided to instead learn taxidermy under John Edmonstone. John Edmonstone was born enslaved and grew up on a plantation owned by a Scottish politician in what is now Guyana in South America. Charles Waterton, the son-in-law of the plantation owner and a renowned naturalist, would visit the plantation often. He started inviting Edmonstone to accompany him on his frequent travels into the rainforest. On his travels, Edmonstone gained considerable knowledge about the flora and fauna of South America along with impressive taxidermy skills.

After gaining his freedom in 1817, John Edmonstone taught taxidermy at the University of Edinburgh, where he served as a mentor to Darwin over a period of several months. It is believed that Darwin's relationship with Edmonstone may have influenced his abolitionist views, which were later strengthened by firsthand accounts of slavery while Darwin was on his infamous voyage to the Galápagos Islands off the coast of Ecuador.

FIGURE 4.10 At the University of Edenborough, John Edmonstone taught Darwin how to preserve birds. This is an example of *Embernagra platensis*, the great Pampa-finch, collected by Charles Darwin in Uruguay in May of 1833. (credit: "*Embernagra platensis platensis*, Great Pampa-finch, skin. Syntype. [B 19600]" by Michelle McFarlane/ Museums Victoria, CC BY 4.0)

Darwin the Explorer and Scholar

Charles Darwin left the University of Edinburgh and decided to pursue theology at Christ's College, Cambridge. His studies there led to his appointment in 1831 as a naturalist on the HMS *Beagle* for a five-year scientific expedition around the world. During this voyage, Darwin collected, dissected, and organized various specimens, especially in the Galápagos Islands, a chain of islands off the western coast of South America. His observations in the Galápagos marked a crucial point in his thinking on evolution. He noted that the fauna and flora of the western coast of South America were similar to those he observed in the Galápagos, but still distinct enough to be considered different species. More surprisingly, the animals of each of the various islands in the Galápagos chain differed slightly from one another. Darwin observed 13 different types of finches throughout 13 different small islands. The birds on each island differed in the structure of their beaks, their body form, and the color of their feathers. Each species was specifically adapted to the specific habitats on each of the islands. Darwin used the techniques that Edmonstone taught him to preserve the Galápagos finches, which became key pieces of evidence supporting Darwin's theory of natural selection.

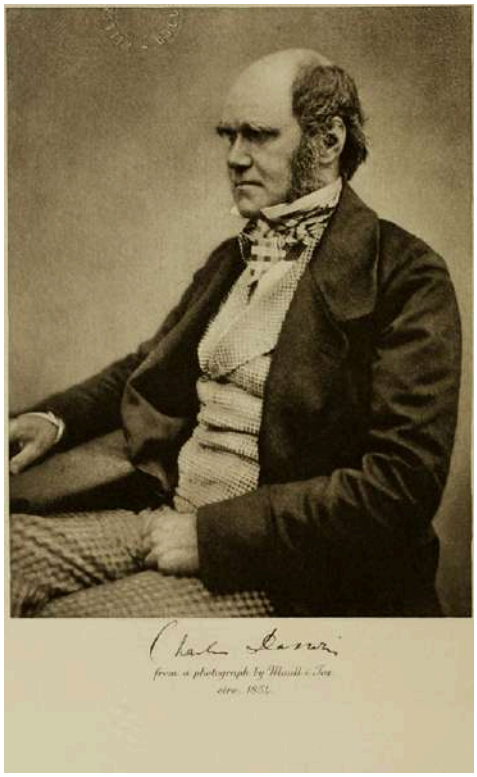

FIGURE 4.11 Charles Darwin is acknowledged as the father of the theory of natural selection. His work built upon the ideas of many other thinkers. His great contribution was in synthesizing these ideas into a coherent theory explaining the diversity of life on earth and the great changes in life over geological time. (credit: A. C. Seward, Cambridge Philosophical Society, Cambridge University Press/Wikimedia Commons, Public Domain)

During his travels on the *Beagle*, Darwin had been thinking about **artificial selection**—the selective breeding of animals to produce traits that humans find useful, commonly associated with the process of domestication. Darwin understood that artificial selection provided important clues about the natural evolution of species.

While on board the HMS *Beagle*, Darwin read a book by English economist Thomas Robert Malthus titled *An Essay on the Principle of Population* (1798). Darwin obtained two important points from this book. The first was that human populations, if unrestrained, will grow exponentially. This means that they will double each generation. The second point was that food resources increase much more slowly than population does. Malthus noted that the growth of human populations is kept in check by a limit of food resources, which creates a struggle for existence. The struggle for existence is not just about getting enough food but also about survival. In other words, it is about an individual's ability to both find enough food and not become another organism's food. This simple concept, the struggle for existence, provided Darwin with a mechanism for how evolution could occur. Darwin realized that individuals with favorable characteristics for living in an environment are the ones that will survive to the age at which they reproduce, while those with less favorable variations will not. This mechanism for "selecting for" certain traits and features is known as the theory of **natural selection**.

Darwin concluded from his observations that when a group of animals of the same species are geologically separated, they develop into separate species. This evolutionary process is commonly referred to as **allopatric speciation** (or geographic speciation) and is based on the principles that related species share a common ancestor and that species change over time.

Darwin did not originate the idea of evolution. Many of the ideas used by Darwin in his theory of natural selection were developed by other thinkers. Darwin was also not the only person thinking about natural selection. Another British natural historian, Alfred Russel Wallace, developed the same idea at roughly the same time, entirely independently of Darwin. Whereas Darwin developed his ideas based on his travels to the Galápagos, Wallace's thinking was influenced by his own travels through the Malay Archipelago between

Indochina and Australia. Wallace outlined his theory of evolution by natural selection in a letter written to Darwin while he was in Malaysia. As Darwin had not yet published his own work, Wallace and Darwin jointly presented papers introducing the theory of natural selection. In 1859, Darwin finally published his book *On the Origin of Species*, some 20 years after his voyage on the HMS *Beagle*.

Understanding Darwin's Theory of Natural Selection

The theory of natural selection has five main components:

1. All organisms are capable of producing offspring faster than the food supply increases.
2. All organisms show variation.
3. There is a fierce struggle for existence, and those with the most suitable variations are most likely to survive and reproduce.
4. Variations, or traits, are passed on to offspring (inherited).
5. Small changes in every generation lead to major changes over long periods of time.

A popular but often-misunderstood concept related to natural selection is the term **survival of the fittest**. Survival of the fittest does not necessarily mean that the biggest and fastest survive; instead, it refers to those who are most *evolutionarily* fit. This means that an organism has traits that are sufficient for survival and will be passed on to future generations. The term *survival of the fittest* was not even introduced by Darwin; rather, it was first used by English philosopher, anthropologist, and sociologist Herbert Spencer, who promoted the now discredited ideology of social Darwinism. Social Darwinism applied the concept of Darwin's biological evolution to human societies, proposing that human culture was progressing toward the "perfect human." Spencer's writings became integrally related to the 19th-century rise of scientific racism and European colonialism.

FIGURE 4.12 This peppered moth is well camouflaged on the trunk of this tree. A darker colored moth would more easily be seen and eaten and would thus be less likely to pass on its genes to offspring. Natural selection relies upon the ability of natural variations to increase an individual's chances of reproduction. (credit: Ben Sale/Wikimedia Commons, CC BY 2.0)

Examples of Darwin's theory of natural selection can be found throughout the natural world. Perhaps one of the best known is the color change observed in peppered moths in England during the 19th century. Before the Industrial Revolution, peppered moths in England were a light grey color, well camouflaged on tree branches and less likely to be eaten by birds. Occasionally, through the process of mutation, black moths would appear in the population, but these were usually quickly eaten because they were more visible against light-colored bark. When soot from coal factories began to cover the bark of the trees, the black moths became better camouflaged and the white moths were now more visible. Consequently, the black moths were the ones to survive to reproduce, while the white ones were eaten. In a few decades, all the peppered moths in the cities

were black. The process was termed **industrial melanism**. As coal usage decreased and the bark of the trees once again became lighter in color, white moths again dominated the urban areas.

Examples of natural selection in modern times are numerous. Pesticide resistance in insects is a classic example. Pesticide resistance refers to the decreasing susceptibility of a pest population to a pesticide that previously was effective at controlling it. Pest species evolve pesticide resistance via natural selection, with the most resistant individuals surviving to pass on their ability to resist the pesticide to their offspring. Another good example is the rise of "superbugs," bacteria that have become increasingly resistant to antibiotics.

The Processes of Evolution

Mutation is the creative force of evolution and represents the first stage of the evolutionary process. **Mutation** is defined as an alteration in a genetic sequence that results in a variant form. For a mutation to have evolutionary significance, it must occur in the sex cells (sperm and ova). This is because only genetic information that is in the sex cells is passed on from generation to generation. Mutations in non-sex chromosomes will not be passed on from one generation to the next. Whereas other evolutionary forces can modify existing genetic material, only mutation can produce new genetic material. One of the most interesting things about mutations is the fact that they are random. There is no way of predicting when a specific mutation will occur; all scientists can do is estimate the probability of a mutation occurring. Mutations do not necessarily appear when they are needed.

The conventional view is that mutations are harmful, but this is not always true. Some mutations are harmful, some are advantageous, and some are neutral. Advantageous mutations lead to changes that improve an individual's survival and/or chances of reproduction. The mutation that confers resistance to insecticide in mosquitos led to changes that improved their survival. Likewise, the mutation for black coloration in peppered moths led to increased survival during the Industrial Revolution. Neutral mutations have no effect on survival or reproduction. And some mutations are in fact quite harmful and do negatively affect certain individuals' survival and reproduction.

Mutations generally occur spontaneously in response to conditions in the body or in the environment. The exact cause of a mutation cannot usually be determined, and the rate of mutation is very difficult to determine. This is because mutations that are neutral or do not lead to obvious changes often go unnoticed. The probability of a mutation at any given gene is between 1 in 10,000 and 1 in 100,000. While the probability that a specific point in an individual's genetic material will have a mutation is clearly very low, the probability that the totality of an individual's genetic material will have at least one mutation is much higher. The point is that while rare, mutation is also common. For example, although many mosquitoes have adapted to insecticides through a mutation that confers some resistance to the chemicals, if the mutation had not already been present in the population, the mosquitoes would have died out. The need for a specific mutation had no effect on whether the mutation appeared or not.

There is currently a controversial pilot program in Florida aimed at dealing with mosquitoes against which insecticide sprays have increasingly become ineffective. The first genetically modified mosquitoes were released in the Florida Keys in May of 2021. The genetically altered mosquitoes produce female offspring that die in the larval stage, preventing them from growing to adulthood, in which they can then bite and spread disease. Genetic science currently has the power to use mutations to control or even wipe out an entire species. Genetic engineering has the potential to benefit humanity, but it will undoubtedly also raise ethical questions and controversy.

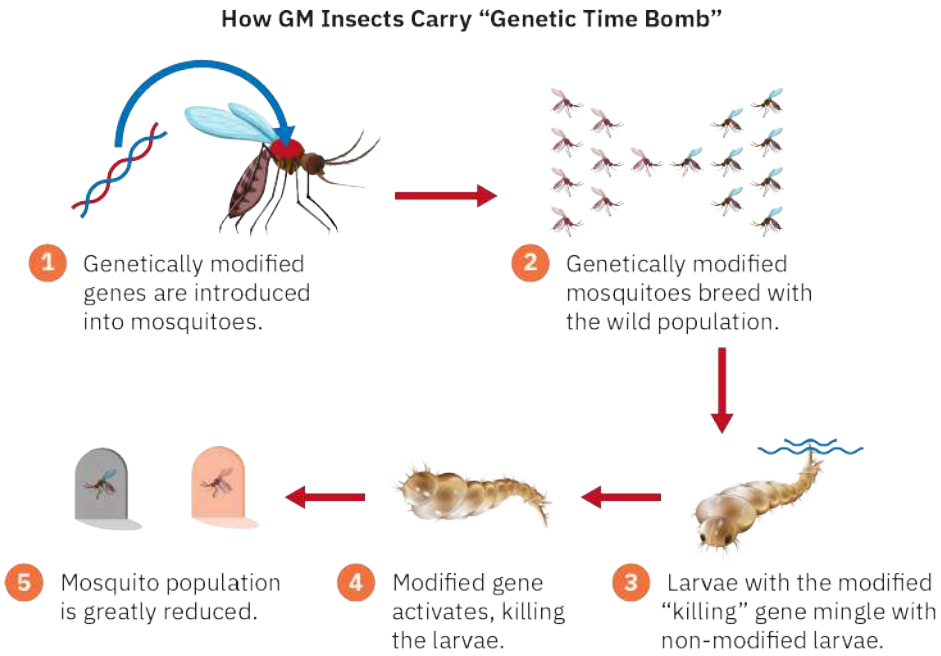

FIGURE 4.13 Genetically modified mosquitoes are currently being bred that will die in the larval stage, thus greatly reducing the mosquito population. (attribution: Rice University, OpenStax, under CC BY 4.0 license)

Genetic Drift

Genetic drift is defined as the effect of random chance on a population, notably the way in which it determines whether an individual survives and reproduces or dies. Imagine that you stick your hand into a bucket filled with Halloween candy. What is the probability you will withdraw a Snickers bar? The composition of Halloween candy in your bucket will be affected by the proportion of people handing out Snickers bars compared to other candy. If each bucket of Halloween candy were a population, then one could say that genetic drift—random chance—was affecting the composition of the candy in your Halloween bucket. An important point about genetic drift is that it is directly and inversely related to population size. The smaller the population, the larger the influence of genetic drift; the larger the population, the smaller the influence of genetic drift. In a large population, say 100,000, removing a couple of individuals will have a truly miniscule effect on the population. Note that in early human evolution, however, population sizes were small, so the effect of genetic drift may have been substantial.

Gene Flow

Gene flow is another important evolutionary force, involving the exchange of genetic material between populations and geographic regions. Without gene flow, there would be no diversity—and without diversity, a species is at higher risk of extinction. Gene flow can be seen in the process of pollination, in which bees or butterflies carry and transfer pollen from one area to another. Anytime a gene is introduced to a new population where it did not exist before, that is gene flow.

FIGURE 4.14 The process of pollination is a good example of gene flow. In this case, bees and butterflies transfer genetic material, in the form of pollen, from one flower to another. (credit: "Honey Bee on a Dandelion, Sandy, Bedfordshire" by Orangeaurochs/flickr, CC BY 2.0)

Speciation

Speciation is the rise of a new species in response to an environmental change or pressure. Allopatric speciation, mentioned previously, is the most common form of speciation event. During allopatric speciation, a species diverges when two populations become isolated from one another and continue to evolve. This isolation is created by geographic barriers such as mountains, rivers, or oceans. A good example of allopatric speciation is the different species of squirrel found on the two sides of the Grand Canyon. Descended from a common ancestor, the squirrels became reproductively isolated from one another by the Grand Canyon, eventually resulting in different species.

FIGURE 4.15 An example of allopatric speciation is the different species of squirrels that inhabit the Grand Canyon. The squirrel on the left is a Harris antelope squirrel and the one on the right is a white-tailed antelope squirrel. They look similar but are different species. (credit: left, "Harris Antelope Squirrel" by Saguaro National Park/flickr, CC BY 2.0; right, "White-Tailed Antelope Squirrel" by Renee Grayson/flickr, CC BY 2.0)

Sympatric speciation involves species that are descended from a common ancestor and remain in one location without a geographic barrier. A good example is the East African cichlid fish, which experience reproduction isolation due not to a physical barrier but to females' selection of mates with certain coloration. The amount of light that reaches different levels and depths of the lake impacts how colors in the males appear to the females. The East African cichlid fish are also a good example of adaptive radiation. Adaptive radiation is seen when one or more species give rise to many new species in a relatively short time. Research shows that an explosion of about 250 very diverse species of cichlids in Lake Tanganyika occurred in less than 10 million

years (Takahashi and Koblmüller 2011). Other research suggests that the common ancestor was the result of a hybrid swarm from two different locations, as seen in Figure 4.16. (Meier et al. 2017).

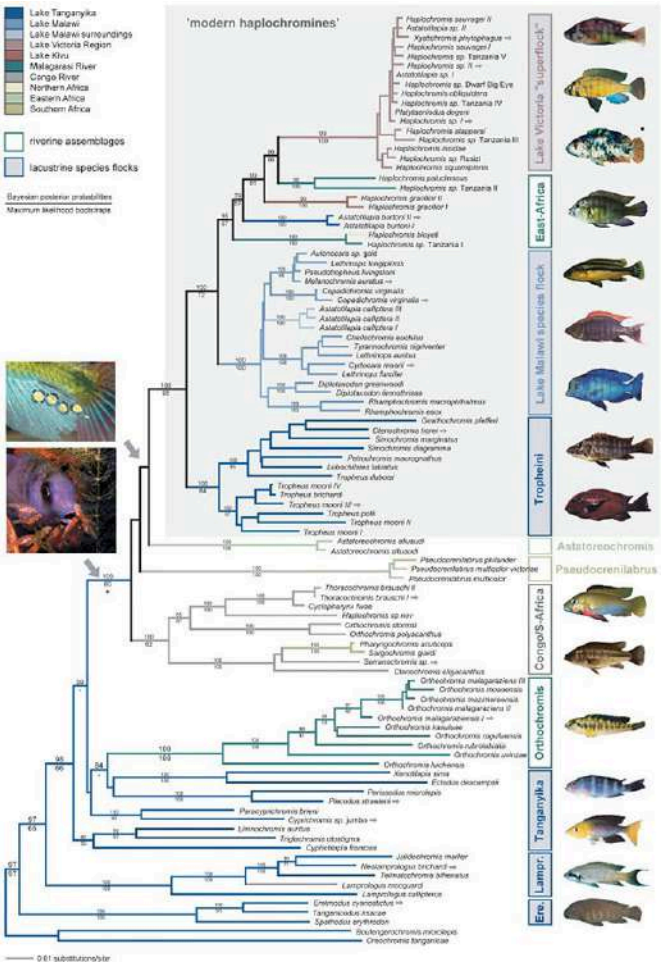

FIGURE 4.16 There are more than 250 different species of East African cichlid fish, all traceable to two common ancestors. The process through which a great number of species arises from a common ancestor within a relatively short period of time is known as adaptive radiation. (credit: "1471-2148-5-17-3" by Phylogeny Figures/flickr, CC BY 2.0)

In peripatric speciation, members of the same population are separated and over time evolve as separate species. Ring speciation is considered by some to be a type of peripatric speciation. Ring speciation occurs when several species coexist for a time in a region near one end of a geographic barrier. When part of the population migrates away from the original population (or gene pool) to the other side of the barrier, reproductive isolation results. Reproductive isolation is strongest for that part of the population that is farthest away from the original population. When too much variation has occurred between two groups, they will no longer interbreed, and as a result, speciation—the development of two separate species—can occur. While fairly rare, ring speciation is believed to explain the different species of the California salamander genus *Ensatina*.

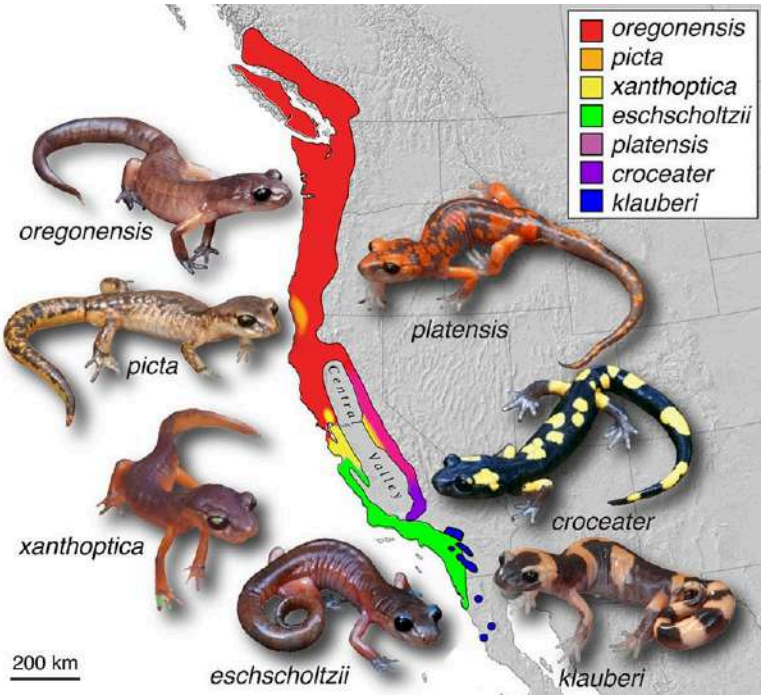

FIGURE 4.17 This map shows the range of different species of the California salamander genus *Ensatina*, believed to have developed through the process of ring speciation. In ring speciation, reproductive isolation leads to the development of new species from a common ancestor, due to separation caused by distance and/or a physical barrier. (credit: Thomas J. Devitt, Stuart J. E. Baird, and Craig Moritz/Wikimedia Commons, CC BY 2.0)

Gradualism vs. Punctuated Evolution

Biological anthropologists are interested not only in how a species is best defined but also in how often and by what means new species are developed. The traditional view of evolution assumes that morphological, behavioral, and genetic changes occur gradually and accumulate in a single unbroken and unbranching line; this view of evolution is known as **gradualism**. If this perspective is correct, scientists would expect to find numerous fossils exhibiting evidence that they are slowly and gradually transitioning into new and distinct species. However, while fossils are rare, fossils showing evidence of transitional forms are even rarer. While the dearth of transitional fossils is often attributed to the incompleteness of the fossil record, it has caused some biological anthropologists to question if evolution is truly gradual.

What can be observed in the fossil record are static populations that are interrupted by sudden bursts of change. This phenomenon of long periods of stasis, or no change, followed by quick periods of change is known as **punctuated equilibrium**. Instead of a gradual accumulation of small changes, punctuated equilibrium suggests that rapid changes due to a variety of environmental factors, including climate change, are characteristic of the formation of new species. The fossil data for a large number of organisms show just this—long periods of stasis followed by rapid and massive change. The scarcity of intermediary forms in the fossil record has led some to conclude that punctuated equilibrium is the dominant theory. However, the fact that intermediary forms do exist suggests that gradualism is also an important factor in the evolution process. One research study found that 30 to 35 percent of speciation events occurred as the result of a sudden event or change, while the remainder showed evidence of gradualism (Phillips 2006). In both the gradual and punctuated models, speciation takes the form of branches through time rather than a linear progression. Evolution is neither linear nor progressive, but rather a branching process—a tree of life containing both areas of divergence and points of a shared common ancestry.

The Tree of Life: Showing Evolutionary Relationships

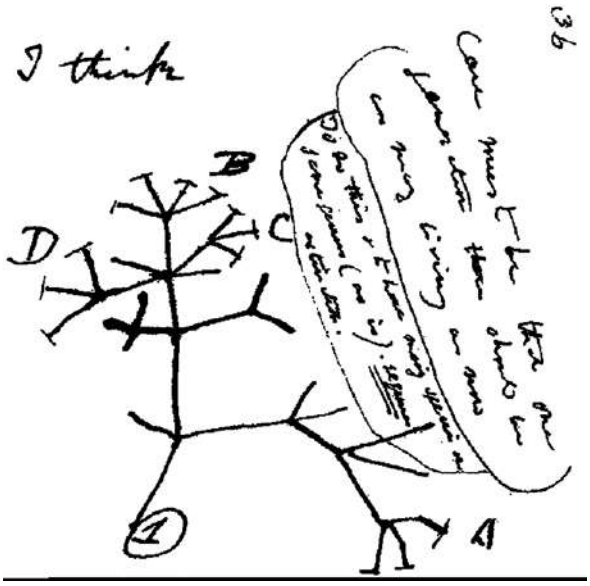

FIGURE 4.18 This sketch made by Charles Darwin illustrates his attempts to think through the branches of evolutionary relationships. (credit: Charles Darwin/Wikimedia Commons, Public Domain)

During Darwin's time, evolutionary relationships had to be determined largely by structural morphologies and physical characteristics. Molecular science had not yet been developed. The binomial nomenclature discussed earlier not only allowed distinction between species but also provided clues to evolutionary relationships. For example, which of the below species of butterfly would be the most distantly related?

- *Danaus gilippus*
- *Danaus genutia*
- *Limenitis archippus*
- *Danaus plexippus*
- *Danaus petilia*

The answer, of course, would be *Limenitis archippus*, the viceroy butterfly, which is a mimic of the monarch butterfly (*Danaus plexippus*). The first part of the viceroy's name, *Limenitis*, is the genus. The fact that it is different from the others shows that it is more distantly related.

FIGURE 4.19 Species can sometimes be difficult to identify by physical characteristics alone. The two butterflies in this image are examples of two different species, one a monarch and the other a viceroy butterfly. What differences can you see? (credit: left, "**Today's Mass Extinction and Holocene-Anthropocene Thermal Maximum"** by khteWisconsin/flickr, Public Domain; right, "A Viceroy Butterfly" by Benny Mazur/flickr, CC BY 2.0)

It is important to note that the Linnaean classification system has limits. Sometimes, species can be difficult to identify by physical characteristics alone. Species that exhibit mimicry and larval forms in different stages of

development can take on the appearance of other organisms, resulting in errors in classification. Can you tell which of the butterflies in Figure 4.19 is the monarch? Close examination reveals that the markings on the wings are a bit different. The monarch is on the left, and the monarch mimic, the viceroy, is on the right. Likewise, in Figure 4.20, you can see how it might be difficult to correctly classify barnacles, crabs, and limpets based on physical appearances. One may be tempted to classify the barnacle and the limpet as being closely related due to the conical shells that they share, when in actuality, the barnacle is more closely related to the crab, as they are both crustaceans. The conical shells of the barnacle and the limpet are similar adaptations in response to similar environmental pressures, not evidence that they are closely related or share a common ancestor.

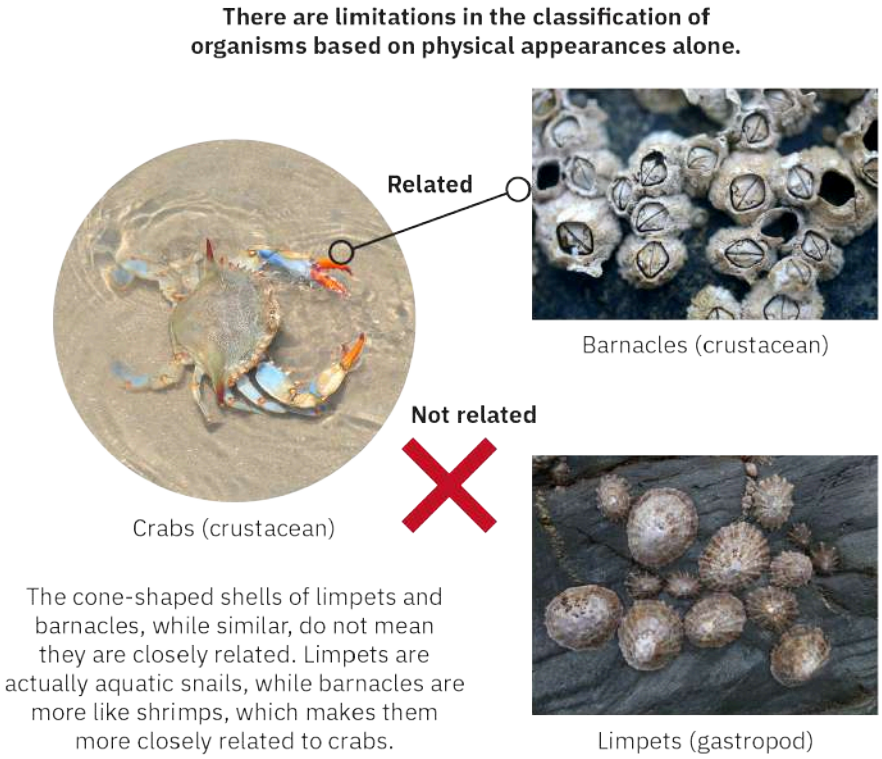

FIGURE 4.20 Classifying species based on physical similarities alone can lead to false conclusions. Although barnacles and limpets look much more like one another than they do the crab on the left, barnacles are actually more closely related to the crab. (credit: left, "DSC_5206" by Sally Wyatt/flickr, CC BY 2.0; top right, "Barnacles" by Mo Riza/flickr, CC BY 2.0; bottom right, "Limpet Family at Sunny Cove" by Tim Green/flickr, CC BY 2.0)

Structural Morphologies as Evidence of Relationship

Structural similarities may be derived traits (**homologous structures**), inherited from a common ancestor, or they may have developed independently (**analogous structures**). An example of a homologous structure is the grasping hand found in both humans and chimpanzees, which suggests that humans and chimpanzees share a common ancestor that also had a grasping hand. Analogous structures are seen in the wing of a butterfly and the wing of a bat. While both wings serve a similar function, these two organisms likely developed their wings independently and do not necessarily share a common ancestor. Identifying homologies is essential for creating hierarchies of phylogenetic relationships because homology indicates that shared features are due to common descent. However, homologies can be difficult to identify in nature, and they are easy to confuse with analogous traits.

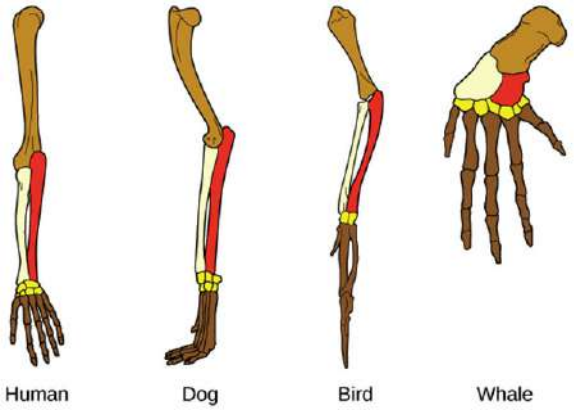

FIGURE 4.21 The structural similarities visible in these various species are homologous, meaning that the similarities are the result of these animals sharing a common ancestor. (attribution: Rice University, OpenStax, under CC BY 4.0 license)

Cladistics, or the use of cladograms, is a method of visually distinguishing between homologous *ancestral* and *derived* characteristics. **Ancestral characteristics** are found in the common ancestor of the species being classified, whereas **derived characteristics** are only found in the groups in question. An ancestral characteristic that humans share with common ancestors is opposable thumbs. In contrast, a derived trait that is only found in modern humans is the chin. By exclusively looking at derived characteristics, biological anthropologists can develop a clearer understanding of the relationships between the groups being studied.

The Molecular Tree of Life and Phylogenetics

The emergence of genetic and molecular science has provided additional tools and lines of evidence to verify evolutionary relationships. The phylogenetic tree is a model used by modern taxonomists to reveal the complexity and diversity of life and its many branches. Phylogenetic trees show how species and other taxon groups evolved from a series of common ancestors. They are based on both physical and genetic evidence.

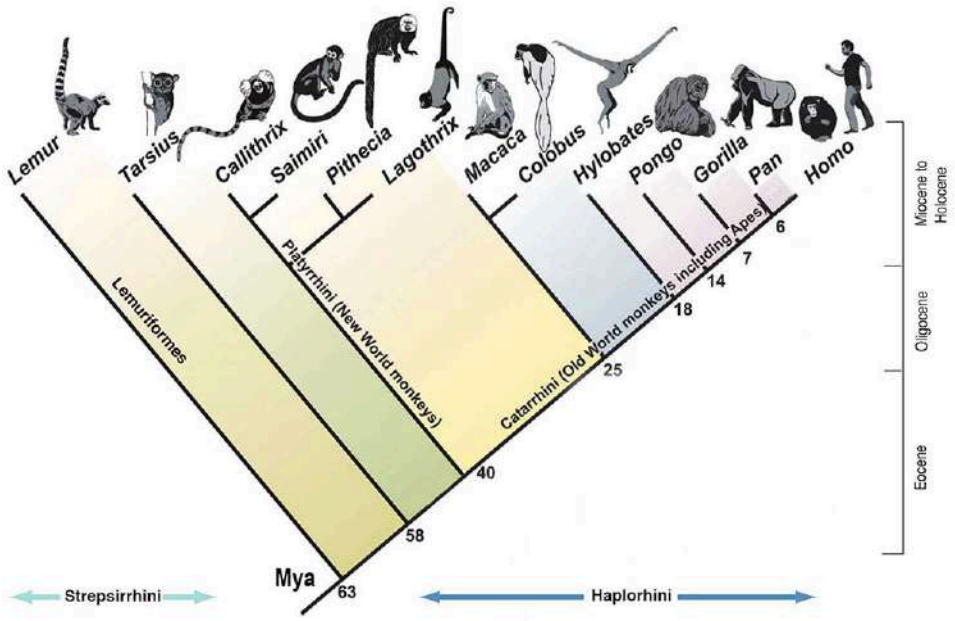

FIGURE 4.22 Phylogenetic trees illustrate how old species are believed to be and their degree of relatedness to one another. This particular tree pertains to primate species. (credit: Kosigrim/Wikimedia Commons, Public Domain)

4.5 What Is a Primate?

LEARNING OUTCOMES:

By the end of this section, you will be able to:

- Define primate.
- Describe the relationship between primate behavior and environment.
- Identify and classify the key taxonomic groups of primates.

What Is a Primate?

FIGURE 4.23 Orangutans, the only great ape from Asia, are one of many living primate species. Others include lemurs, monkeys, gibbons, and human beings. (credit: Dawn Armfield/Wikimedia Commons, Public Domain)

Primates—including human beings—are characterized by a number of distinct physical features that distinguish them from other mammals. These include

- opposable thumbs and (in nonhuman primates) opposable big toes;
- the presence of five digits (fingers or toes) on the appendages;
- flat nails instead of curved claws;
- pads at the tips of the fingers made up of deposits of fat and nerves;
- reduced reliance on sense of smell and a relatively small snout;
- depth perception;
- binocular vision (being able to see one image with both eyes);
- a relatively slow reproductive rate;
- relatively large brain size; and
- postorbital bars (bony rings that completely surround the eyes).

FIGURE 4.24 The hands of this bonobo, including its opposable thumbs, look very similar to human hands. Opposable thumbs or toes are a primate trait shared by no other group of mammals. (credit: "Bonobo Plankendaal" by Marie van Dieren/flickr, CC BY 2.0)

The first four traits enhance dexterity and enable primates to use their hands and feet differently from other mammals. Other traits on this list represent a shift in emphasis among the sense organs between primates and other mammals. Primates are characterized by a greater emphasis on vision and a reduced reliance on smell relative to other mammals.

Primate Behavioral Variation

Anthropologists regularly ask, "What makes us human?" Comparative studies of humans with nonhuman primates help answer this question. Comparing the behavior of nonhuman primates and the behavior of human beings helps anthropologists identify what culture is and develop operational definitions for it. Without the comparative perspective provided by primatology, anthropologists would be missing an important piece of the puzzle of what makes humans human. Without primatology, anthropologists would not be able to fully understand humankind.

Studying nonhuman primates in their environment is key to understanding variations in behavior and can shed light on humanity's ancient past. Primatologists are studying the chimpanzees at Gombe National Park in Tanzania, where they live in the rainforest. The behavior of chimpanzees that live in the tropical regions of Africa is quite different from the behavior of chimpanzees that live in the savanna at Fongoli in Senegal, in West Africa. Gombe chimps hunt red colobus monkeys without the use of tools, just catching them with their hands, while the Fongoli chimpanzees hunt galagos (also known as bush babies) using sticks that they adapt and used as spears (Pruetz, J.D, et al, 2015). The two environments also show differences in gender roles with both males and females in the Fongoli savannah group involved in hunting while only male chimpanzees hunt in the rainforests. Studying how these nonhuman primates both make and use tools is critical for understanding how humans' fossil ancestors may have used and constructed tools.

An important question that primatologists and biological anthropologists seek to answer is the question, do nonhuman primates have culture? Whenever we see an exchange of ideas where one individual is involved in teaching another and when that knowledge is passed on to others in a group is according to anthropologists, a

form of culture. We see this happen in chimpanzee groups where older chimpanzees teach the young how to use sticks to termite-fish, the process of extracting termites from a termite mound using a stick.

FIGURE 4.25 This chimpanzee lives in the Gombe National Park in Tanzania. Chimps living in Gombe's rainforest environment have developed a very different set of hunting techniques and tool use from their relatives living in the grassy savannah. (credit: "Chimp Eden Sanctuary – Mimi" by Afrika Force/flickr, CC BY 2.0)

Explaining Primate Success

Why primates evolved as they did and how they filled and exploited the range of ecological niches they now fill are questions that have not yet been adequately addressed. Over the last century, various hypotheses have been raised to account for the evolution of primates and their unusual anatomical characteristics. These theories include the arboreal theory, the visual predation hypothesis, and the angiosperm theory.

The **arboreal theory** proposes that primates evolved the traits they did as an adaptation to life in the trees. Specifically, primates evolved thumbs and big toes that are perpendicular to the other digits to help them grasp onto branches.

Matt Cartmill, a professor of anthropology at Boston University who spent his career trying to understand why primates evolved the way they did, has complicated this theory. Cartmill recognized that forward-facing eyes are characteristic not only of primates but also of predators such as cats and owls that prey on small animals. Thus, forward-facing eyes, grasping hands and feet, and the presence of nails instead of claws may not have arisen as adaptations to an arboreal environment. Rather, they may be adaptations that helped early primates succeed as predators. According to the **visual predation hypothesis**, primate features are adaptations for hunting insects and other small prey in the shrubby forest undergrowth and the lowest tiers of the forest canopy.

The **angiosperm theory** states that the basic primate traits developed in coevolution with the rise of flowering plants, also known as angiosperms. Flowering plants provide numerous resources, including nectar, seeds, and fruits, and their appearance and diversification were accompanied by the appearance of ancestral forms of major groups of modern birds and mammals. Some argue that visual predation is not common among modern primates and that forward-facing eyes and grasping extremities may have arisen in response to the need for fine visual and tactile discrimination in order to feed on small food items, such as fruits, berries, and seeds, found among the branches and stems of flowering plants.

Primate Classification and Taxonomy

Scientists generally classify the order Primates into two suborders: **Strepsirrhini** (prosimians) and **Haplorrhini** (tarsiers and anthropoids).

The Strepsirrhini or Prosimians

The Strepsirrhini are considered to be primitive primates that evolved much earlier than other primates. This

suborder includes lemurs and lorises. All the Strepsirrhini primates, or strepsirrhines, possess numerous anatomical traits that distinguish them from the Haplorrhini primates, or haplorrhines. These include a clawlike nail on the second toe, referred to as a grooming claw, and incisors in the lower jaw that are tightly packed together and protrude from the mouth, forming what is called a toothcomb. There are seven families of living strepsirrhines, and all of them are found in what anthropologists refer to as the Old World, which consists of the continents of Africa, Asia, and Europe. Five groups of living strepsirrhines are found only on the island of Madagascar off the coast of Africa. Two additional families are found in Africa and Asia.

FIGURE 4.26 The pygmy slow loris (*Nycticebus pygmaeus*) is an example of a Strepsirrhini primate. Pygmy slow lorises be found in Vietnam, Laos, and a province of China. (credit: Lionel Mauritson/Wikimedia Commons, Public Domain)

The Haplorrhini or Anthropoids

The Haplorrhini are broken down into two further infraorders, Simiiformes and Tarsiiformes, and the Simiiformes are further divided into Platyrrhini and Catarrhini. The **Platyrrhini**, or platyrrhines, are exclusively found in the New World (specifically Central and South America) and are colloquially referred to as New World monkeys. Their name is derived from the rounded shape of their external nostrils, which open off to the sides. New World monkeys are also distinguishable by their prehensile tails that serves as an extra limb for extra support when moving in the trees. The **Catarrhini**, or catarrhines, are found throughout Africa and Asia. They differ from the New World primates in that they possess narrow nostrils that face downward. The Catarrhini contain two superfamilies, **Cercopithecoidea** and **Hominoidea**, and are exclusively Old World. The Cercopithecoidea contain two main groups: cheek pouch monkeys (Cercopithecinae) and leaf-eating monkeys (Colobinae). The most distinctive feature of the cercopithecoid primates is their molars, which exhibit two parallel ridges. The most distinguishing feature of the hominoids is that they do not have tails and are largely terrestrial, or ground-dwelling. Examples of Hominoidea include gibbons, chimpanzees, gorillas, orangutans, and humans.

The Tarsier Puzzle

The tarsier, which belongs to the family Tarsiidae, has both prosimian and anthropoid characteristics, which has made it difficult for scientists to classify. Tarsiers are currently classified within their own classification under the haplorrhines. One of the characteristics that tarsiers share with other haplorrhines, (including humans) is the inability to manufacture their own Vitamin C. They are the smallest known primate and are nocturnal, with extremely large eyes that take up much of the space in their skull. Due to their size of the eyes, the tarsier cannot rotate them; instead, it can rotate its head 360 degrees like an owl. Tarsiers are also the only primate carnivore, eating largely flying insects and sometimes small animals like bats and lizards. Tarsiers do not do well in captivity. They are extremely sensitive to noise and can become easily stressed. In fact, they can

become so stressed that they die by suicide by banging their heads against tree trunks.

FIGURE 4.27 The Philippine tarsier (*Carlito syrichta*) is found only in the southern portion of the Philippine islands. The tarsier has been challenging for scientists to classify, exhibiting both prosimian and anthropoid characteristics. (credit: "8thApril2007 – 'Tarsier' Monkey" by Jacky W./flickr, CC BY 2.0)

4.6 Origin of and Classification of Primates

LEARNING OUTCOMES:

By the end of this section, you will be able to:

- Explain the concept of deep time.
- Define fossils and explain some dating methods used on fossils.
- Identify some of the key characteristics of early primate fossils, including their respective time periods.

Understanding Concepts of Time

Geologists divide deep history into time periods known as eras. Eras are generally based on the fossil life forms observed. The oldest of the geological eras is the Eoarchean, which began approximately four billion years ago. The majority of the fossil evidence that we have for primate evolution comes from the Cenozoic era—the current geological era, dating from 65 million year ago (MYA) to the present. The Cenozoic era is divided into a series of epochs. Each epoch is associated with specific forms of primates that evolved during that time period.

Fossils and Dating Methods

Biological anthropologists primarily, although not exclusively, study fossil artifacts. A **fossil** is any remainder of a plant or animal that has been preserved in the earth. Upon the death of an organism, its body slowly decomposes until all that remains are the teeth and the bones or a mere impression of the organism's original form. Under most conditions, teeth and bones and impressions eventually deteriorate, too. However, occasionally conditions are favorable for preservation. Examples of favorable materials for fossil formation include volcanic ash, limestone, and mineralized groundwater. Scientists do not have fossils of everything that lived in the past, and in some cases, remains from only a few individuals of a species have been found. The fossil record is very incomplete. Robert Martin, a curator at the Field Museum of Natural History in Chicago,

estimates that there have been more than 6,000 primate species, while the remains of only 3 percent have been found. Fossils are very rare, but they are extremely informative about human biological evolution.

Making Sense of Fossils

An important part of understanding fossils is determining how old they might be and putting them in chronological order. In order to use a primate fossil to reconstruct the evolutionary history of primates, anthropologists must first be able to estimate approximately how old that specific fossil is. For some time, relative dating methods were the only methods available for dating fossils. Relative dating calculates the approximate age of a fossil in comparison to other fossil specimens. The last half century has seen important advances in absolute dating, including techniques that have made possible the dating of the earliest phases of primate evolution. Absolute dating calculates the actual biological age of a fossil in years within a range of years.

Relative Dating Techniques

Stratigraphy is the best-known and most commonly used method of relative dating. Stratigraphy is based on the observation that soil is deposited in successive layers, or strata. The oldest layers of soil (and any artifacts or fossils within them) will appear beneath more recent layers of soil (and any artifacts or fossils within them). In addition to using the location of layers of soil to date fossils deposited within these layers, biological anthropologists also sometimes make use of other items consistently found in a specific layer of the soil. These items are referred to as indicator artifacts because they help indicate the relative age of fossils and other artifacts. The best indicator artifacts are those that have a wide geographic distribution, are presence for a short period of geological time, and/or are from a species that underwent rapid evolutionary change. Different indicator artifacts have been used to ascertain relative age in different areas of the world. In Africa, elephants, pigs, and horses have been used to establish relative dates of different geological strata. The stratigraphy at Olduvai Gorge in East Africa, for example, was established based on fossil pigs. The various species of pig in successive strata are different and distinct, allowing paleoanthropologists to distinguish the strata based on the pig species found within them. Once the stratigraphy of an area is established, the relative ages of two different fossils in different sites can be determined by the associated indicator artifacts.

If a site has been disturbed, stratigraphy will not be a satisfactory way to determine relative age. In such a situation, it may be possible to use absolute dating methods to estimate the age of fossils found together in a disturbed site.

Absolute Dating Techniques

Many absolute dating methods are based on the rate of decay of a radioactive isotope. A radioactive isotope is a chemical element that dissipates excess energy by spontaneously emitting radiation. These emissions happen at known and stable rates. Once the rate of decay of a radioactive isotope is established, the age of a specimen containing that isotope can be estimated within a range of possible error.

C-14

The best-known method for determining the absolute age of fossils is carbon-14 or ^{14}C (pronounced “C-14”) dating. All plants and animals contain the isotope carbon-14 (^{14}C). Plants absorb ^{14}C from the air, and animals ingest plants containing the isotope. Because plants only absorb ^{14}C when they are alive and animals only consume plants when they are alive, scientists can determine how long ago an animal or plant died based on the amount of ^{14}C that remains in their cells. Carbon-14 has a known half-life of 5,730 years. This means that approximately half of the original ^{14}C in an organism will be eliminated in 5,730 years after its death. For example, if an organism had an original ^{14}C value of 100, then after 5,730 years, only 50 units of ^{14}C would be present.

Thermoluminescence

Another absolute dating technique that is frequently used by paleoanthropologists is thermoluminescence dating. Thermoluminescence dating requires that either the fossils to be dated or the sediments that the fossils are within have been exposed to a high-temperature event, such as a volcanic explosion. During such a high-temperature event, all the radioactive elements within the material are released. Consequently, the amount of

radioactive elements that have accumulated in the artifact since the time of the high-temperature event can be used to calculate the artifact's age.

Primates of the Paleocene Epoch

The Paleocene epoch began approximately 65 MYA and ended about 54 MYA. It is the most poorly understood epoch of the Cenozoic era, as it is the time period with the fewest fossils to represent it. However, this epoch is considered important to primate evolution because it offers the first unequivocal record of the earliest primates. Evidence of the most primitive primate yet identified was found in the U.S. state of Montana, in a geological deposit that was dated to the earliest part of the Paleocene. This creature is known as ***Purgatorius***. *Purgatorius* is similar to extinct and living primates – and distinct from other mammals – in the presence of an elongated last lower molar and an enlarged upper central incisor (resulting in what one could think of as "Bugs Bunny teeth"). These two characteristics, which are shared by all living primates today, suggest that *Purgatorius* may be the common ancestor of later primates.

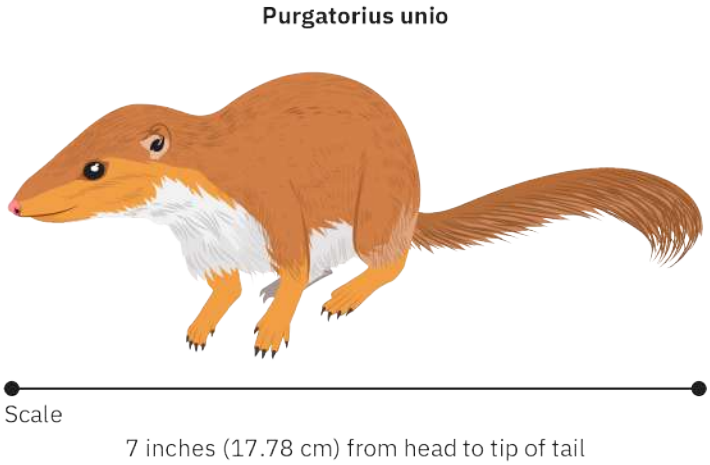

FIGURE 4.28 *Purgatorius unio* may be the common ancestor of all later primate. Remains of *Purgatorius unio* have been found in deposits dated to be about 63 million years old. (attribution: Rice University, OpenStax, under CC BY 4.0 license)

Primates of the Eocene Epoch

The Eocene epoch, which began approximately 54 MYA and ended about 34 MYA, is marked by the disappearance of *Purgatorius* and the first appearance of primates that more closely resemble modern-day primates, especially in the fact that they possess postorbital bars composed entirely of bone. A postorbital bar is a bony ring surrounding the entirety of the eye orbit. This contrasts with other mammals whose postorbital bars are part bone and part cartilage. Some fossil specimens also possess a toothcomb and/or a grooming claw, characteristics that are exclusively found in strepsirrhine primates today. Other anatomical characteristics that are significant would be the ankle bones which researchers believe played a key role in the evolutionary success of primates. The evolution of primates during the Eocene was tremendous. It has been hypothesized that there were four times as many strepsirrhine primates during the Eocene than there are living primates today. Fossil primates in Eocene deposits are common in North America and Europe and are becoming known in Asia and Africa. However, there are currently no known fossil primates from the Eocene in South America or Antarctica.

Primates of the Oligocene Epoch

The Oligocene epoch, which began approximately 34 MYA and ended about 22 MYA, marks the appearance of the first fossil monkeys. The earliest unambiguous haplorrhine fossils were found at the Fayum, an archaeological site about 60 miles from Cairo, Egypt, that today represents part of the Sahara. The Fayum primates are divided into two main groups: **Parapithecoidea** and **Propliopithecoidea**. Based on their teeth, these primates are believed to be the earliest New World and Old World monkeys, respectively. Teeth are generally described according to a dental formula that indicates the number of each type of teeth in each quadrant of the jaw. An organism with a 2.1.2.3 dental formula has two incisors, one canine, two premolars, and three molars in each quadrant of their upper and lower jaws. Based on the presence of a third premolar, a

trait found in all New World monkeys, it is probable that Propliopithecus represents the earliest New World monkeys, even though they first evolved in Africa. Likewise, it is probable the propliopithecoids represent the earliest catarrhine primate, as they are the first fossil monkeys that possess a dental formula of 2.1.2.3 found in catarrhine primates.

Miocene Apes

The Miocene epoch contains fossil evidence of some of the earliest apes such as *Proconsul africanus* africanus which lived in Africa from 23 to 14 mya. The earliest Miocene ape, found in Africa, is ***Proconsul***. Unlike modern-day apes, the *Proconsul* lacked long, curved digits, suggesting that they were able to hang from branches but more often moved about on all four of their limbs. *Proconsul* also lacked a tail, which is why they are considered apes and not monkeys. Like all Old World monkeys and apes, including humans, their teeth show a pattern of 2.1.2.3. Another well-known ape from the Miocene is *Sivapithecus*. *Sivapithecus* fossils are very common throughout Asia, with a particularly large number having been found in Turkey. Like modern-day humans, they exhibit very thick dental enamel, suggesting that these apes regularly ate very hard foods. The most intriguing aspect of *Sivapithecus* morphology is that the skulls show a tremendous resemblance to the living orangutan in features such as its tall nasal openings and high eye sockets.

FIGURE 4.29 *Sivapithecus* is one the earliest known ape species. Fossil remains exhibit the tall nasal openings and high eye sockets currently visible in orangutans. (credit: "*Sivapithecus indicus* (Fossil Ape) (Dhok Pathan Formation, Upper Miocene; Potwar Plateau, Pakistan)" by James St. John/flickr, CC BY 2.0)

While it is known that orangutans probably evolved from a *Sivapithecus*-type ape, there are no clear candidates for the ancestors of modern African great apes. There have only been two fossils found that clearly and unequivocally belong to the ancestors of modern African apes. *Samburupithecus* is a large late Miocene ape found in northern Kenya. It is known to resemble modern African apes. It differs from other Miocene fossils in having molar teeth that are elongated in a direction from the front of the mouth toward the back, instead of from cheek to tongue. Another fossil from the late Miocene (9–10 MYA) that is sometimes identified as an ancestor of modern African apes is *Ouranopithecus*, found in Greece, which has facial morphology that links it to both African apes and humans.

4.7 Our Ancient Past: The Earliest Hominins

LEARNING OUTCOMES:

By the end of this section, you will be able to:

- Compare and contrast some early hominin species.
- Identify some key adaptations and characteristics found in early hominins.
- Identify key adaptations and derived traits that emerged in changing environments.

Walking on Two Feet

The term **hominin** refers to all species considered to be in direct lineage to humans, which include the genera *Homo, Australopithecus*, *Paranthropus*, and *Ardipithecus*. **Hominids** refers to all modern and extinct great apes, which include humans, gorillas, chimpanzees, and orangutans and their ancestors. These terms have been understood to represent different things over the years, but the definitions provided here are the most current. While all hominins may differ in varying ways from one another, they all share one anatomical behavioral complex: bipedal locomotion.

Scientists can hypothesize about how a creature moved by analyzing several aspects of its morphology. Brachiators, animals that move by swinging from branch to branch, generally have long arms, while leapers, animals that propel their bodies through the force of their lower limbs, have relatively long legs. Arboreal primates have arms and legs of equal length. In bipedal locomotion, one leg is called the stance leg, and the other is called the step leg. While the stance leg is on the ground, the step leg is off the ground and striding forward. During normal walking, both feet are on the ground only about 25 percent of the time. As speed of locomotion increases, the percentage of time that both feet are on the ground decreases. As a result, for most of the time that bipedal organisms are moving, their body is balanced on only one of their legs (the stance leg). To ensure that bipedal organisms do not fall over while balanced on their stance leg, they have undergone many anatomical changes since the earliest hominin ancestors.

One of the most important anatomical changes that facilitate successful bipedalism is the angling of the femur (upper leg bone) inward at what is referred to as a valgus angle, which positions the knees and feet under the center of the pelvis. Bipedal hominins have also evolved spinal curves that make it possible for the hips to balance the weight of the upper body. The evolution of the arch in the foot as well as the realignment of the big toe so that it is parallel to the other toes is also instrumental in transmitting weight during the step phase of bipedal locomotion.

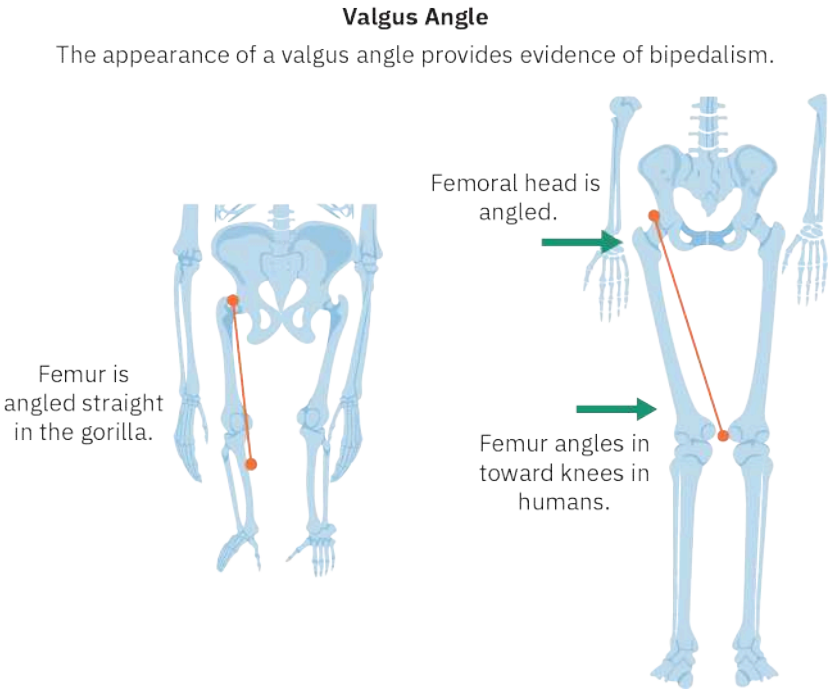

FIGURE 4.30 In humans, the femur bones angle inward. This adaptation, known as the valgus angle, makes bipedal locomotion (walking upright) more comfortable and more efficient. (attribution: Rice University, OpenStax, under CC BY 4.0 license)

The most important evidence of early hominin bipedalism is provided by the work of English paleoanthropologist Mary Leakey. In the 1980s, Mary Leakey discovered a 75-foot trail of footprints made by three bipedal individuals who had crossed a thick bed of wet volcanic ash about 3.5 MYA. These footprints were found in East Africa at the site of Laetoli. Based on the date and the location, it is probable that these footprints were made by *Australopithecus afarensis*. Analysis of the Laetoli footprints indicates a modern striding gait.

FIGURE 4.31 These replicas of the 3.6-million-year-old hominin footprints found in Tanzania by Mary Leakey are on display at the National Museum of Nature and Science in Tokyo, Japan. (credit: "*Australopithecus afarensis* Fossil Hominid Footprints (Pliocene, 3.6–3.7 Ma; Laetoli Area, Northern Tanzania, Eastern Africa)" by James St. John/flickr, CC BY 2.0)

The evolution of hominin bipedalism required complex anatomical reorganization. For natural selection to produce such a tremendous amount of change, the benefits of these changes must have been great. There have been dozens of hypotheses for these changes, ranging from freeing hands to carry tools, food, or offspring to increasing energy efficiency or thermoregulation (the ability to maintain the body's temperature) by exposing

more of the body's surface. None of the hypotheses are testable, making it truly challenging to understand why humanity's ancestors made such a huge behavioral shift. The next sections explore some of the key discoveries of early hominin fossils in which anthropologists see some of the earliest indications of the adaptation of bipedalism in the human story.

Miocene Hominids

The first hominid fossils appear in the late Miocene, 10 to 5 MYA. Sometime between 7 MYA and 4 MYA, hominids moved out of the trees and began to adapt more fully to a ground-based living niche. Unfortunately, the fossil evidence from this time period is extremely sparse, but new finds continue to be discovered.

A complete cranium of *Sahelanthropus tchadensis* was found in 2002 by French paleoanthropologist Michel Brunet and his team in Chad in West Africa. *Sahelanthropus* is a fossil ape that lived approximately 7 MYA and is claimed by some researchers to be the last common ancestor of humans and chimpanzees. Genetic studies indicate that humans and chimpanzees diverged from one another sometime between 5 MYA and 7 MYA, so this species lived right at the time of the divergence. The cranial capacity is a mere 350 cubic centimeters (cc), which is equivalent to a chimpanzee; the modern human cranial capacity is approximately 1,400 cc. *Sahelanthropus* also has a very large brow ridge (the large bone above the eyes), and the location of the **foramen magnum**, the opening at the base of the skull where the spinal column enters the skull, suggests that its head was not held over its spine and thus it was not bipedal.

Orrorin tugenensis was found in Kenya in 2001 by geologist Martin Pickford of the Collège de France and paleontologist Brigitte Senut of France's National Museum of Natural History. *Orrorin tugenensis* was dated to approximately 6 MYA. *Orrorin* was proposed to be a hominin due to anatomical traits that suggest bipedalism. For example, the femoral head (the big, rounded ball at the top of the leg bone that connects the leg to the hip) is much larger than in quadrupedal apes, suggesting the femur was being used to support the weight of the upper body. The muscles attached to the femur also suggest bipedal movement. Another feature that suggests that *Orrorin* is truly a hominin is the teeth, which exhibit thick dental enamel and small, square molars, much like modern humans.

Pliocene Hominins

The Pliocene epoch extended from 5 MYA to 1.8 MYA. Fossils from the Pliocene show evidence of the evolution of hominins that are clearly bipedal. They also show evidence of clear, albeit primitive, cultural behavior. Climatically, the Pliocene was colder than the preceding Miocene, which resulted in changing sea levels and an increase in ice at the poles, opening up some previously inaccessible areas. During this period, North and South America became connected through the Isthmus of Panama, and a land bridge across the Bering Strait appeared between Alaska and Siberia.

Ardipithecus ramidus

Ardipithecus ramidus was found in Ethiopia in 1992 by American paleoanthropologist Tim White and was dated to about 4.4 MYA. This is the first discovered hominin species to be dated to the Pliocene era. Based on the forward position of the foramen magnum, it can be concluded that *Ardipithecus* was bipedal. Also, the upper arm bones are very small, suggesting that the arms were not used to support weight during locomotion. *Ardipithecus* possesses numerous traits, such as thin dental enamel, evidence of a reduced canine, and an opposable big toe. As a result of the latter trait, many believe that *Ardipithecus* was bipedal on the ground and quadrupedal in the trees. This hypothesis is supported by the fact that the fossil bones were found in relatively heavily forested environments. The reduced canine is a derived trait appearing even earlier than *A. ramidus* and is not what we would typically see in African ape males who have large intimidating canines. Current hypotheses suggest that over time smaller canines became dominant when there became less need to show aggression along with a female preference for males with milder temperaments (Suwa, G., et al. 2021).

FIGURE 4.32 These skeletal remains have been identified as *Ardipithecus*, the first hominin species discovered that has been dated to the Pliocene Era. (credit: Sailko/Wikimedia Commons, CC BY 3.0)

The Robust and Gracile Australopithecines

The next few sections will examine various australopithecine species that had diverse physical characteristics related to morphology of the teeth and skull. Based on these characteristics, paleoanthropologists classified these species into *gracile* and *robust* forms, as illustrated in Figure 4.33. Gracile species had a more pronounced projection of the jaw (**prognathism**), less flared cheeks with no sagittal crest, and smaller teeth and jaws. The sagittal crest in the robust australopithecines accommodated large temporalis jaw muscles for chewing tough plant materials.

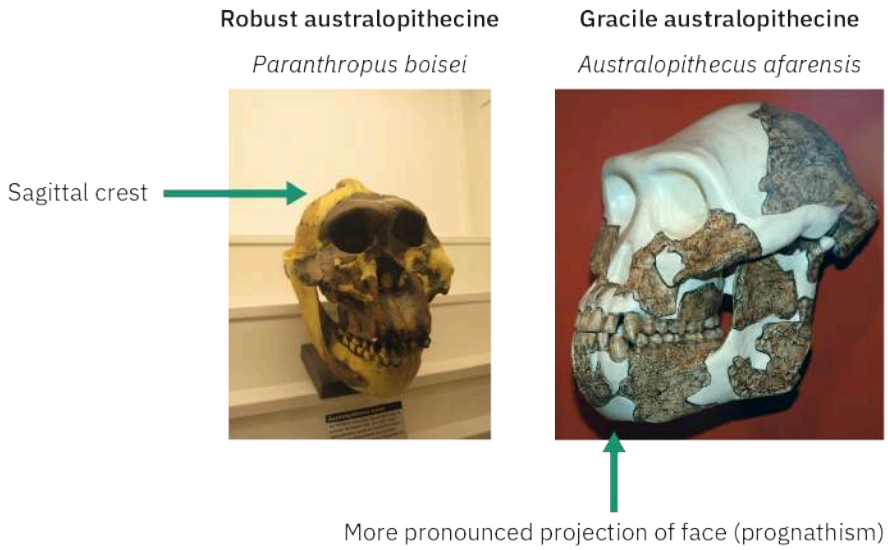

FIGURE 4.33 Australopithecine species are classified as either robust or gracile. A defining feature of the robust species is the sagittal crest visible on the *Paranthropus boisei* skull on the left. Gracile species, such as *A. afarensis*, on the right, display more pronounced projection of the face (prognathism). (credit: left, Rama/Wikimedia Commons, Public Domain; right, "*Australopithecus afarensis* Fossil Hominid (Pliocene, Eastern Africa) 1" by James St. John/flickr, CC BY 2.0)

Species considered to be the gracile include *Australopithecus anamensis*, *A. afarensis*, *A. africanus*, *A. garhi*,

and *A. sediba*. The robust australopithecines (classified under the genus *Paranthropus*) include *Paranthropus robustus*, *P. boisei*, and *P. aethiopicus*. The gracile species emerged around 4 MYA and disappeared 2 MYA, while robust species continued to exist for another million years. The next sections will first take a look at some of the gracile forms of australopithecine, followed by the robust forms.

Australopithecus africanus

Australopithecus africanus was the first australopithecine discovered, in 1924, and was described by Australian anatomist and anthropologist Raymond Dart, who found the fossil in a box of fossils sent to him by lime quarry workers at a site called Taung in South Africa. The most notable specimen in the box was a skull from a child, which Dart had to chip away from the stone it was embedded in. It took Dart four years to separate the teeth. The skull is now known as the Taung skull or Taung child. Dart argued that the Taung child represents "an extinct race of apes intermediate between living anthropoids and man" (Wayman 2011). He noted that the skull was long and narrow, not rounded as in modern humans, and its brain averaged a mere 422 cc, equivalent to a chimpanzee. However, the Taung child did not possess brow ridges, had circular orbits, and had minimal prognathism as well as small canines and no **diastema** (space in the jaw for large canines to be positioned when the mouth closes). These latter traits are all analogous to modern humans. Most importantly, Dart noted that the forward position of the foramen magnum indicated that the skull was poised on top of the vertebral column, suggesting bipedalism and an upright posture.

FIGURE 4.34 This partial skull is from a specimen known as the Taung child. The species, *Australopithecus africanus*, displays traits that resemble modern humans in some ways but not others. (credit: Daderot/Wikimedia Commons, Public Domain)

Australopithecus afarensis

In 1973, a good portion of a skeleton (about 40 percent) was found in the Afar region of Ethiopia by American paleoanthropologist Donald Johanson. He called the skeleton Lucy, after a Beatles song. It was dated to around 3.75–2.8 MYA and was determined to be a member of the species *Australopithecus afarensis*. Like all fossils recently discovered, Lucy was given an identification or accession number, KNM-AL-288. The KNM acronym stands for the Kenya National Museum, where the fossil is housed, and AL stands for the Afar locality where the fossil was found. Since then, more specimens of this species have been found in Kenya, Tanzania, and Ethiopia, all in East Africa.

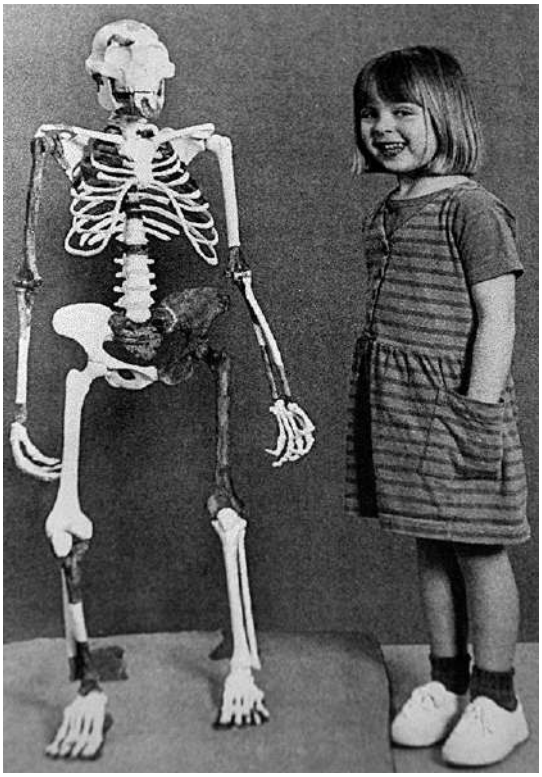

FIGURE 4.35 This child stands next to a recreated skeleton of *A. afarensis*. The long arms and long, curved fingers and toes of *A. afarensis* are apparent. (credit: "*Australopithecus afarensis* Fossil Hominid (Lucy Skeleton) (Hadar Formation, Pliocene, 3.2 Ma; Hadar Area, Afar Triangle, Northern Ethiopia, Eastern Africa) 2" by James St. John/ flickr, CC BY 2.0)

Australopithecus afarensis is dated from 3.9 to 2.9 MYA with an endocranial capacity of around 400 cc, which is approximately the same as a common chimpanzee. There are two morphological features that provide evidence that *A. afarenis* moved more like a great ape than a human. First, it had arms that were substantially longer than modern humans'. Long arms are generally found in animals that hang from branches, suggesting that *A. afarensis* also exhibited this behavior. Also, *A. afarensis* possesses finger and toe bones that are long and curved, another characteristic of animals that hang from branches. However, there is one important morphological feature of *A. afarensis* that suggests that this species may have moved somewhat like modern humans. The shape of *A. afarensis*'s pelvis (hip bones) looks substantially more like a modern human's than it does an ape's. Instead of the hip bones being long and narrow, they are short and wide. Most paleoanthropologists believe that this change in pelvic shape indicates that *A. afarensis* moved like modern humans do, on two legs. While *A. afarensis* may have locomoted bipedally, the morphological differences between *A. afarensis* and modern humans suggest they did not move in exactly the same way. Current consensus is that *A. afarensis* was both tree dwelling and bipedal. Other anatomical evidence of bipedalism includes a more anterior position of the foramen magnum and the angle of the femoral head and neck.

Australopithecus garhi

Also found in Ethiopia, *Australopithecus garhi* is dated to approximately 2.5 MYA. Its cranial capacity is slightly greater than *A. afarensis*, at 450 cc. *Australopithecus garhi* has incisors that are larger than those of any of the known australopithecines or *Homo*. The function of the large incisors is not yet known. The most exciting aspect of *A. garhi* is that it provides evidence of the earliest use of stone tools by a hominin. Specifically, *A. garhi* fossils were found with fossil bones of ruminants, such as antelopes, that displayed numerous cut marks. Cut marks are made on bones by the process of removing meat from the bones with stone or metal tools. Based on this finding, biological anthropologists have hypothesized that *A. garhi* used some type of stone tool for butchering.

Australopithecus sediba

In 2008, the clavicle bone of *Australopithecus sediba* was discovered by Matthew Berger, the nine-year-old son of American paleontologist Lee Berger, in Malapa, South Africa. Further excavation in a cave feature uncovered two partial skeletons, one of an adult female and the other a younger juvenile. *A. sediba* is considered an important species because it appears in the fossil record around the time of the first emergence of the genus *Homo* around 2 mya. The classification of *A. sediba* was initially difficult to determine, due to its complex overlapping features, which include humanlike spine, pelvis, hands, and teeth and a chimpanzee-like foot. This combination of traits suggests both tree climbing and bipedal adaptations. After studying the characteristics collectively, anthropologists classified *A. sediba* as a species of *Australopithecus*. It is considered a direct ancestor of *Homo erectus and Homo ergaster*, which are discussed in Chapter 5, The Genus *Homo* and the Emergence of Us . It is believed that *A. sediba* could be a descendent of *A. africanus*, which suggests the species may be a dead end within the lineage to humans. Its classification and relationship with the genus *Homo* will likely remain highly debated.

FIGURE 4.36 These bones are from *Australopithecus sediba*, which displays a humanlike spine and pelvis but a chimpanzee-like foot. (credit: Phiston/Wikimedia Commons, CC BY 3.0)

Paranthropus robustus

Thirteen years after Raymond Dart's discovery, South African paleontologist and medical doctor Robert Broom discovered *Paranthropus robustus* at a site called Kromdraai in South Africa**.** The most obvious difference between Dart's and Broom's respective fossils, *A. africanus* and *P. robustus*, is that the morphology of Broom's fossil is much larger. Its features include a sagittal crest and a flared zygomatic arch for the attachment of a large temporalis muscle for chewing a diet reliant on hard nuts and seeds. This interpretation was further supported by scanning electron microscopy (SEM), which was used to evaluate the markings etched into the teeth. As the teeth increased in size the incisors and canines shrank, giving *Paranthropus* a flatter face with less projection of the jaw. There are some who argue that depending on the environment and locale, some *Paranthropus* may have been omnivores, with varied diets similar to those of *H. ergaster*. (Lee-Thorp, Thackeray, and van der Merwe 2000).

Paranthropus boisei

Following in Broom's footsteps, other scientists began searching for fossils in East Africa. Beginning in 1931, Kenyan and British paleoanthropologist Louis Leakey and his wife, Mary Leakey, worked in what is known as the Eastern Rift Valley, which is a 1,200-mile trough extending through Ethiopia, Kenya, and Tanzania. They searched for almost 30 years before they found their first hominin fossil, *Paranthropus boisei* (OH-5)—originally classified as *Zinjanthropus boisei*—in 1959. It is often referred to as the hyper-robust hominin because of its mohawk of bone on the top of the skull. Other features include a low or absent forehead, a flat face, large jaws, and large attachment sites over the entire skull for chewing muscles.

Paranthropus aethiopicus

We have little knowledge about *Paranthropus aethiopicus* (shown in Figure 4.37), which has been dated to about 2.5 MYA and is referred to as the "black skull." It is believed that this species falls somewhere between the robust and gracile australopithecines, having characteristics of both. The species was discovered in Ethiopia in 1967 by a French expedition team headed by Camille Arambourg and Yves Coppens.

FIGURE 4.37 Much remains to be learned about *Paranthropus aethiopicus*, which has characteristics of both the robust and gracile australopithecines. (credit: "*Paranthropus aethiopicus* (Fossil Hominid) (Nachukui Formation, Upper Pliocene, 2.5 Ma; Lomekwi, Lake Turkana Area, Kenya) 3" by James St. John/flickr, CC BY 2.0)

Landmarks and Questions

While the fossils discovered up to this point have provided a small window into the story of humanity's past, they have also simultaneously raised numerous questions. Questions related to phylogenetic relationships and points of divergence are challenges for paleoanthropologists, who have only fragmentary fossil evidence to build hypotheses around. Nevertheless, the discoveries that have been made represent important landmarks in anthropologists' understanding, providing clues that will lead to the next steps in the human journey.

MINI-FIELDWORK ACTIVITY

Pedestrian Survey

Conduct a pedestrian survey to try to locate fossils near where you live (trilobites in New York, ammonites in Texas, shark teeth near riverbeds, arrowheads). Think about where you would most likely find a fossil and why. Try to extract one without destroying the environment around it, which provides important context. Try to figure out what kind of fossil it is by doing some Internet research. Why do you think that this fossil was preserved? What information would make the search for fossils easier?

Key Terms

allele an alternative form of a gene that arises by mutation and is found in the same place on a chromosome, directly impacting the expression of a genetic trait or phenotype.

allopatric speciation speciation that occurs when two populations of the same species become isolated from each other due to a change in the environment, such as geographic isolation.

analogous structures anatomical similarities between two species that suggest not a common ancestor but rather similar environmental adaptations.

ancestral characteristics homologous structures or traits that may also be found in the common ancestor of the species being classified.

angiosperm theory a hypothesis that suggests that primate origins and typical primate characteristics developed in response to the emergence of flowering plants.

arboreal theory a hypothesis that proposes that primates evolved the traits they did as an adaptation to life in the trees.

artificial selection the process of deliberately breeding certain specimens of plants or animals to encourage desired traits.

binomial nomenclature the scientific naming system developed by Carolus Linnaeus that represents two parts of a taxonomic name. The name is italicized, the genus is always capitalized, and the species is always lowercased. For example: *Homo sapiens*.

bioarchaeology the study of bones and other biological materials found in archaeological remains.

biological species definition a definition of species as members of populations that actually or potentially interbreed in nature.

Catarrhini a subcategory of the primate infraorder Simiiformes that includes any primate considered an Old World monkey, an ape, or in the lineage of humans. This classification features downward-facing nostrils and a 2.1.2.3 dental formula.

catastrophism the theory that changes in Earth's fauna and flora were caused by supernatural catastrophic forces rather than evolution.

Cercopithecoidea a superfamily of the primate infraorder Simiiformes, subcategory Catarrhini, that consists of Old World monkeys.

cladistics the classification of organisms based on branchings of descendent lineages from a common ancestor

derived characteristics physical traits that are present in related organisms but absent from their last common ancestor. They are often associated with a speciation event.

diastema a space or gap between the canines and the other teeth that allows for the upper and lower teeth to bite together.

ecological species definition a definition of species that explains differences in form and behavior as the result of adaptations to the environment and natural selection.

ethnotaxonomy the study of organism classifications and taxonomies developed and used largely by Indigenous peoples and other cultural groups.

evolution changes that appear in a species over time. Evolution is dependent on genetic variation and natural selection to pass on beneficial traits that will increase survival of the species.

foramen magnum the opening at the base of the skull where the spinal column and nerves enter to reach the brain. The position of the foramen magnum can be used to determine if a species was bipedal.

forensic anthropology a branch of biological anthropology in which scientific techniques are used to determine the sex, age, genetic population, or other relevant characteristics of skeletal or biological materials related to matters of civil or criminal law.

fossils any remains, impression, or traces of living things from a former geologic age.

gene flow alteration of the frequencies of alleles in a population that results from interbreeding with organisms from another population.

genetic anthropology a branch of biological anthropology that uses molecular science to explore questions concerning human origins, early human migrations, and the appearance of disease across time.

genetic drift random changes in the frequencies of alleles in a gene pool.

genotype a complete set of genetic material found in an organism.

gradualism the idea that species evolve slowly and continuously over long periods of time.

great chain of being a concept detailing a hierarchical structure of all matter and life.

Haplorrhini a suborder of primates that contains tarsiers, New World monkeys, Old World monkeys, apes, and humans.

hominid the group representing all modern and

extinct great apes, including humans, chimpanzees, gorillas, orangutans, and all their immediate ancestors.

hominin the group representing modern humans, extinct human species, and all of humanity's immediate ancestors, including the genera *Homo*, *Australopithecus*, *Paranthropus*, and *Ardipithecus*.

Hominoidea a superfamily of the primate infraorder Simiiformes, subcategory Catarrhini, that consists of gibbons, great apes, and humanlike primates, including *Homo* and related fossil forms.

homologous structures similar anatomical structures that appear in different species and suggest a common ancestor.

hybrid zones areas where two distinct species mate and produce offspring

industrial melanism the prevalence of dark-colored varieties of animals (for example, peppered moths) in industrial areas where they are better camouflaged against predators than paler forms.

inheritance of acquired characteristics the disproved idea that an organism can pass on to its offspring physical characteristics that it has acquired during its lifetime.

interspecific variation the genetic variation seen between two species.

intraspecific variation the genetic variation seen within a species.

law of independent assortment a law of inheritance stating that different genes and their alleles are inherited independently.

law of segregation a law of inheritance stating that when two alleles for a trait separate during the formation of new zygotes, these alleles will combine at random with other alleles.

morphology the physical shape and structural form of an organism or species.

mutation a change in the structure of a gene that results in a variant form that may be transmitted to subsequent generations.

natural selection the process by which a species that is able to adapt and to pass on beneficial traits to its offspring ensures survival of the species; first formally introduced by Charles Darwin.

paleoanthropology the study of the origins and predecessors of the present human species based fossils and other remains.

Parapithecoidea a superfamily of primates from the early Oligocene that is believed to represent the earliest New World monkeys, though they first evolved in Africa.

phenotype the set of observable characteristics or traits of an organism, such as color and structural morphology.

phylogenetic species definition a definition of species based on individuals all possessing specific derived traits.

Platyrrhini a subcategory of the primate infraorder Simiiformes that comprises New World monkeys

polygenic traits traits that are controlled by multiple genes instead of just one.

primatology the branch of biological anthropology dealing with the primates.

Proconsul a genus of ape from the early Miocene.

prognathism projection of the face, as seen in many nonhuman primates and early hominins.

Propliopithecoidea a superfamily of primates from the early Oligocene that is related to Old World monkeys and is believed to represent the earliest catarrhine primate.

punctuated equilibrium a hypothesis holding that the evolution of species proceeds in a characteristic pattern of relative stability for long periods of time interspersed with much shorter periods during which many species become extinct and new species emerge.

Purgatorius genus of the earliest primate or proto-primate.

reproductive isolation conditions that prevent potentially interbreeding populations from breeding.

socioecological system the interrelationship between the diversity of plants and animals, humans' environments, and the diversity of human culture and language.

species a class of individuals that have some common characteristics or qualities.

stratigraphy a branch of geology dealing with the classification, nomenclature, correlation, and interpretation of stratified rocks.

Strepsirrhini a suborder of primates that includes lemurs, lorises, and galagos (bush babies).

survival of the fittest the theory that the most evolutionarily fit members of a species will pass on their traits to later generations.

sympatric speciation speciation without a geographic barrier.

taxa the plural form of taxon, used to signify all taxonomic groups.

taxon a specific group or subgroup of organisms.

taxonomy the science or technique of naming and

classifying life.

uniformitarianism the concept that Earth's surface was shaped in the past by slow-moving geological processes.

visual predation hypothesis a hypothesis that explains the origins of unique primate traits as adaptations for preying on insects and small animals.

Summary

Biological anthropology strives to understand how humans interact and behave in the present, how humans evolved biologically, and how humanity's ancient ancestors lived in diverse climates and environments. The anthropological approach to exploring these questions is grounded in evolutionary theory. Charles Darwin was one of the first to propose a mechanism by which evolution occurred, which he called natural selection. Natural selection is based on the premise that those with more favorable characteristics survive and reproduce at greater rates than those without them. Natural selection depends on the evolutionary processes of mutation, speciation, gene flow, and genetic drift.

Darwin's theory did not address how these favorable characteristics could be inherited. Gregor Mendel's experiments on peas addressed this very question. Mendel's work resulted in two very important observations. He observed that the two alleles for each trait separate during the formation of the sex cells and that the probability of having one trait does not affect the probability that an individual will have another trait.

Carolus Linnaeus is best known for creating the classification system that taxonomists use today, which is based on physical similarities and differences. Phylogenetics is a hypothesis about how species are related to one another and to a common ancestor. Today, biological anthropologists apply taxonomies and phylogenies to the current nonhuman primate and hominin fossil record. It is in the Miocene that the first fossil apes, such as *Proconsul*, are seen. The first evidence of hominin-like fossils appears by the end of the Miocene. A large number of morphological changes observed in early hominins suggest considerable environmental and climatic change. During the Pliocene epoch, extending from 5 to 1.8 MYA, the evolution of hominins that were clearly bipedal is evident in the fossil record, as is evidence of cultures that used stone tools. The path is now ready for the next group in humanity's evolutionary history to enter the scene.

Critical Thinking Questions

1. How do anthropologists define being human?
2. What are some of the key differences between Linnaean classification and phylogenetics?
3. In what ways does the COVID-19 virus exhibit natural selection?
4. How do anthropologists define a primate?
5. What is the difference between absolute and relative dating methods? What methods are commonly used when working with hominin fossils?
6. What is the difference between a prosimian and an anthropoid?
7. What are some of the main differences between Old World and New World monkeys?
8. What are some of the key characteristics seen in early hominins, and what environmental forces may have contributed to those changes?

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CHAPTER 5
The Genus Homo and the Emergence of Us

Figure 5.1 Liang Bua Cave on the island of Flores in Indonesia. A potentially new species of the genus *Homo, Homo floresiensis* was discovered in this cave in 2003. (credit: "Flores: Ruteng to Bajawa" by Bryn Pinzgauer/flickr, CC BY 2.0) (credit: "Flores" by Ryan Somma/flickr, CC BY 2.0)

CHAPTER OUTLINE

INTRODUCTION Our human story continues with the rise of the genus *Homo* which at one time represented at least 8 different species in our human lineage – with only *H. sapiens* surviving. The genus *Homo* displays some of the most diverse and complex examples of both australopithecine and *Homo* characteristics, which has made the classification of species in this genus challenging. In this chapter we take a look at how paleoanthropologists have defined *Homo* and at attempts to answer the question, "What does a species of the genus *Homo* look like?"

5.1 Defining the Genus Homo

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Describe the time periods and geological context of the genus *Homo*.
- Identify some key differences between the genus *Homo* and *Australopithecus*.
- Define some of the limitations of and challenges in the classification of hominin species in the genus *Homo*.
- Explain the concept of encephalization as it relates to early hominin evolutionary development and as a tool for hominin classification.

Putting *Homo* into Context

Before learning about the hominin species that make up the category genus *Homo*, it will be helpful to become familiar with the key archaeological time periods with which *Homo* is associated. The species and cultural developments mentioned below will be explored in greater detail in the sections that follow.

- **Lower Paleolithic** (from roughly 3 million years ago to approximately 300,000 BCE): This period includes *H. habilis* and the Oldowan tool industry, followed by *H. ergaster* and the Acheulean tool industry.
- **Middle Paleolithic** (approximately 300,000–40,000 BCE): This period includes continued use of Acheulean tools by *H. heidelbergensis,* followed by *H. neanderthalensis* and the Mousterian tool industry.
- **Upper Paleolithic** (approximately 43,000–26,000 BCE): The Upper Paleolithic saw the emergence of cave art like that found in the famous Chauvet Cave in France (Figure 5.29), Venus figurines (Figure 5.28), and an increased use of bone and antler in tools and jewelry. The most recent ice age occurred during this time, with glaciers covering huge parts of the planet. The emergence of Paleoindians and the use of Clovis points, which were used to kill large game such as mastodons and mammoths, occurred near the end of this time period.
- **Neolithic (Agricultural Age)** (8,000–3,000 BCE): New innovations appear during the agricultural age, or "Neolithic revolution," as *H. sapiens* set up permanent settlements. Humans begin to transition from being hunters and gatherers to growing grow crops, owning land, and domesticating animals.

The Challenge of Defining the Genus *Homo*

The previous chapter introduced the australopithecines, who were diverse in their physical characteristics (gracile and robust), with large jaws and teeth and small brain size. A key characteristic shared by both the australopithecines and the genus *Homo* is bipedalism. The transition to bipedalism is linked with various anatomical changes, including longer legs, changes in spinal curvature, and the development of arches in the feet to conserve energy and increase balance when walking.

What criteria other than bipedalism might be used to classify a species under the genus *Homo*? Many anthropologists have attempted to establish specific criteria to use in determining a classification of *Homo.* Paleoanthropologists Mary Leakey, Louis Leakey, and John Napier, as well as primatologist Phillip Tobias, were among the first to extensively study the fossils of *Homo habilis*, considered to be one of the earliest species in the genus *Homo*. *H. habilis* had a brain size of around 661–700 cc, which was larger than the australopithecines', with hands that were capable of the dexterity needed for making tools, due to bone structure changes and a repositioning of the thumb, which allowed for better grip.

The type specimen OH 7 of *H. habilis* dated between 2 and 1.7 MYA and was found in 1960 at Olduvai Gorge by Jonathan and Mary Leakey. It was described by Louis Leakey in 1964. Type specimen refers to a specimen that serves as the standard for the taxon or classification group for that species. OH 7 is the identification or accession number of this specific specimen and stands for "Olduvai Hominid #7." The specimen consisted of a partial juvenile skull, hand, and foot bones. It possessed teeth that were much smaller than those of any australopithecine and was possibly in coexistence with the robust australopithecines (*Paranthropus*). Based on an **endocranial cast** (an imprint of the interior of the brain case), it was determined that *H. habilis* may have possessed what is called a Broca's area in the brain. **Broca's area**, which includes two Brodmann areas (referred to as 44 and 45), is located in the middle of the left cerebral cortex of the brain and is especially important for speech development (Figure 5.2). Some scientists have suggested that *H. habilis* started to

develop the neural networks necessary for human speech, while others argue that *H. habilis* probably already had speech.

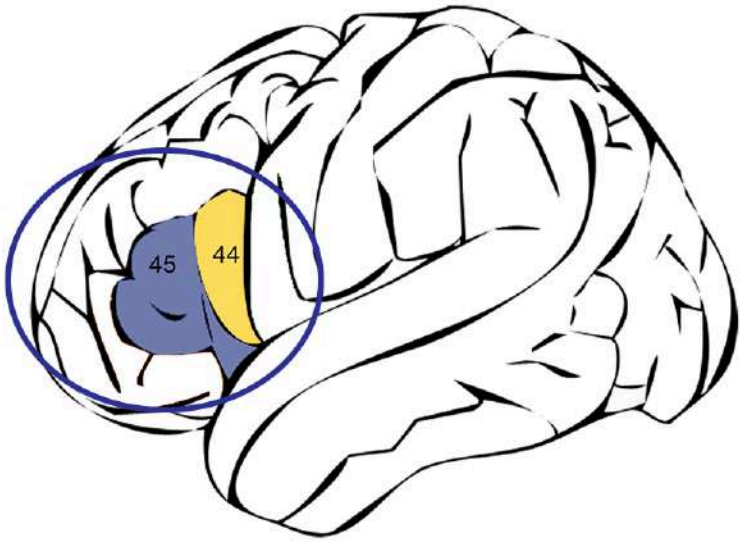

FIGURE 5.2 Position of the Broca's area in the brain, consisting of Brodmann areas 44 (yellow) and 45 (blue). Broca's area is associated with speech development and may have been present in the brain of *H. habilis*. (credit: Fatemeh Geranmayeh, Sonia L. E. Brownsett, Richard J. S. Wise/Wikimedia Commons, CC BY 3.0)

The **postcranial features** (skeletal structures in the body other than the skull) of *Homo habilis* are not as well established, as is the case for many other early hominin fossils. This can be problematic, as many hominin species coexisted with overlapping traits. Likewise, it can be problematic to have postcranial material and not the cranium or skull. The skull often serves as a diagnostic tool when postcranial materials do not provide enough evidence or provide confusing evidence.

Based on their research on *H. habilis*, Mary Leakey, Louis Leakey, and John Napier proposed the following criteria for classifying *Homo*: a brain size over 600 cc; a round, globular skull; tool use; reduced prognathism (protrusion of the jaw) and smaller jaws and mandibles; humanlike postcranial features; and feet that are fully adapted for walking (Leakey, Tobias, and Napier 1964). While this list established specific and fairly comprehensive guidance, the diversity of traits and the ways in which they overlapped didn't always line up with the criteria.

H. habilis has been at the center of several debates regarding their taxonomic position and relationship with other early archaic *Homo* species. For example, *H. habilis* was initially believed to have been a direct human ancestor through the lineage of *Homo erectus* and then modern humans. This viewpoint is now debated and has resulted in a scientific divide between those supporting *H. habilis* and those suggesting another *Homo* species, *H. rudolfensis*, as being the ancestor of *H. erectus*. *H. rudolfensis* is an archaic *Homo* dated to about 2 MYA, which coexisted with other *Homo* species during that time period. A cranium was discovered in 1972 along Lake Turkana in Kenya by Bernard Ngeneo, a local Kenyan. The specimen was later described by paleoanthropologist Richard Leakey. There is a lot that is not known about this species; scientists are missing postcranial materials, and as of yet no tools have been found. There are hypotheses that propose that *H. rudolfensis* might be a *H. habilis* male, exhibiting a larger cranium than that seen in a female *H. habilis*. Others suggest it is a completely different species. Another controversy centers on tool use. While *Homo habilis* was long regarded as the earliest hominin to use stone tools, it has been determined, based on evidence of cutmarks, that at least one australopithecine (*A. garhi*) used stone tools before *H. habilis*, at around 2.6 MYA (Semaw et al. 1997).

FIGURE 5.3 The specimen of *H. rudolfensis* on the left is noticeably different from that of *H. habilis* on the right. (credit: Conty/Wikimedia Commons, CC BY 3.0)

While there are still questions as to the phylogenetic relationship of *H. habilis* and *H. rudolfensis*, there is general agreement that *Homo* did evolve from *Australopithecus*. The timing and placement of the split between *Australopithecus* and *Homo*, however, is still debated. *H. habilis* was determined to not be an *Australopithecus* due to its smaller teeth, a humanlike foot, and hand bones that suggested an ability to manipulate objects with precision.

One of the main considerations in classifying *H. habilis* as a *Homo* and not an *Australopithecus* was its **cranial capacity**, which is a measurement that indicates brain size. With some exceptions, cranial capacity can serve as an indicator of where a hominin fossil might belong in the hominin phylogenetic tree. **Encephalization** refers to a progressive increase in brain size over time. In human evolution, we can observe encephalization beginning with *Homo habilis* and progressing more rapidly through *H. erectus*. Encephalization correlates with an increase in behavioral, cognitive, and cultural complexity. Cognitive developments correspond with our ability to construct and form ideas, including the ability think in and communicate via symbolic and abstract language, such as that used in storytelling, ritual, and art. There are always exceptions, however, such as the island-dwelling, small-brained *H. floresiensis*, who will be introduced later in this chapter. In spite of having a very small brain, *H. floresiensis* made and used tools and built fires. This discovery has challenged what we thought we knew about the correlation of brain size and cognitive development in human evolution.

The **encephalization quotient (EQ)** can serve as a good indicator (with some exceptions) of classification within the genus *Homo*. The encephalization quotient is a calculation arrived at by comparing the ratio between actual brain size (determined with either a mass or volume calculation) and expected brain size. Body size is a factor in these measurements as expected brain size reflects the relationship between brain and body size for a given taxonomic group (Jerison 1973). The larger the brain weight relative to the overall body weight, the more likely that the brain was used for more complex cognitive tasks. Harry J. Jerison (1973) was the first to develop EQ measurements. The formula he used for calculating EQ in birds and mammals is brain mass/ $0.12 \times (\text{body mass})^{0.66}$. Other formulas have also been proposed, such as EQ = brain mass ($11.22 \times$ body mass 0.76) (Martin 1981). While EQ is a strong tool for studying brain size in early hominins, there are always potential margins of error when dealing with fragmentary fossils, and increasingly alternative forms of measurements are being proposed. One study proposes that EQ should no longer be used as a tool in calculating brain size in primates and other vertebrate species, based on the premise that cognitive performance does not depend on body size and so body size should not be included in the formula (Schaik et al. 2021). Other theories consider the number of cortical neurons and neural connections as most important when considering cognitive ability (Roth and Dicke 2012). According to this approach, the density of the cortex

is more associated with intelligence than is brain size. These alternate approaches would perhaps better explain those exceptions in the fossil records, such as *H. floresiensis*. Other interesting research is looking at potential levels of cognition and memory as it relates to levels of tool complexity (Read and van der Leeuw 2008).

In spite of these criticisms, many see EQ measurements as providing fairly consistent results. Modern humans (*Homo sapiens*) have an EQ of roughly 6.0–7.0 (meaning that their brain mass is six to seven times greater than what one would expect to find in a comparable mammal of the same body size). *H. erectus* has an EQ of 4.0, while for an australopithecine EQ is around 2.5 to 3.0 (Fuente 2012, 227). Figure 5.4 shows increases in average brain sizes for various species over time.

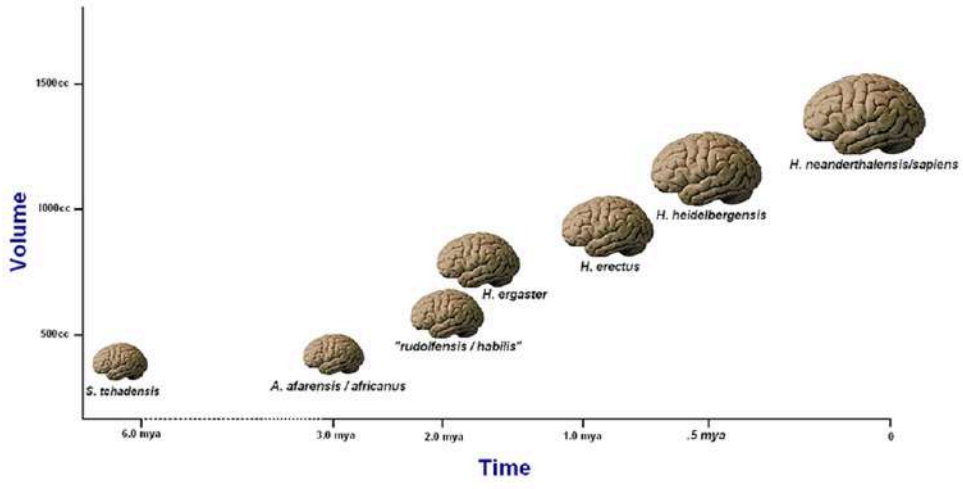

FIGURE 5.4 After remaining steady for millennia, average brain size increases noticeably in the last two million years. (Xiujie, Wu, and Norton 2007). (credit: Gisselle Garcia, artist (brain images), CC BY 4.0)

5.2 Tools and Brains: Homo habilis, Homo ergaster, and Homo erectus

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Compare and contrast the anatomy and material culture of *H. habilis, H. erectus*, and *H. ergaster.*
- Define the term "tool industry" and describe the tools typified by the Oldowan and Acheulean industries.
- Identify possible correlations between the environment, diet, new behaviors, and brain growth.

The Toolmakers

Archeologists use the word *industry* to describe a classification or assemblage of stone tools. The **Oldowan tool industry** is the oldest known stone tool industry. It dates from around 2.5 to 1.5 MYA. Because there were several hominins in Africa during this time, it is unclear whether these tools were created and used by *H. habilis* or by *Paranthropus boisei*, or by both (Susman 1991). Oldowan tools are fairly crude and primitive in appearance, which can make it difficult to find and identify them in the field.

FIGURE 5.5 An Oldowan tool. This chopper is made of quartzite and dated to the lower Paleolithic period. (credit: Locutus Borg/Wikimedia Commons, Public Domain)

Mary Leakey was the first to create a system to classify Oldowan assemblages, basing her classification on utility, or how the tools were used. Later efforts were made to classify tools based on how the tools were made. All Oldowan tools were created by using hard hammer percussion, in which flakes are chipped away from a stone, resulting in a "core". These cores served as basic tool that could have been used for killing game, cutting meat and plants, and possibly woodworking. Oldowan toolmaking is the earliest evidence of "flint knapping," a technique that became more complex over time, resulting in more sophisticated tools (Figure 5.6).

FIGURE 5.6 Demonstration of flint knapping, an ancient technique for shaping stones into useful tools. (credit: "Flint-knapping Demonstration" Tonto National Monument/NPS photo/flickr, CC BY 2.0)

Handedness, or brain lateralization (i.e., whether one is right-handed or left-handed), is a cognitive development that can be inferred through evidence of the use of a dominant hand in creating and using tools. The use of a dominant hand suggests a possible reorganization of the brain. It is believed that about 90 percent of humans are right-handed, which differs from apes, which are closer to 50 percent. David Frayer (2016), an anthropologist from the University of Kansas, has concluded that the brain lateralization of *Homo habilis* was more like that of modern human than that of apes. Frayer found striations on the teeth of a 1.8-million-year-old *Homo habilis* fossil that indicate right-handedness. He concluded that meat was pinched between the teeth and held in place with the left hand, while the right hand cut the meat with a tool. Brain lateralization, increasing brain size, and tool use are just some of the key developments we see in the genus *Homo.*

Homo ergaster

Homo ergaster is the first *Homo* that looks much like *H. sapiens*. A key difference between *H. ergaster* and earlier hominins is that *H. ergaster* exhibits substantially less **sexual dimorphism** in body size. *H. ergaster* males were only 20 percent larger than females. Likewise, modern human males are only 15 percent larger than females. This contrasts sharply with all other previous hominins, such as the australopithecines, in which males were 50 percent larger than females. It is well established that in mammals, significant dimorphism is associated with polygyny, and a lack of dimorphism is associated with a monogamous mating system. It has been suggested that the reduction in dimorphism seen in *H. ergaster* may indicate less male-male competition for access to females and perhaps a shift toward a monogamous mating system, with substantial parental investment in offspring.

Other similarities between *H. ergaster* and modern humans are seen in the teeth and postcranial features. The average cranial capacity of *H. ergaster* is 1,100 cc, which is just a bit smaller than that of modern humans, who average 1,400 cc. There is a very important specimen of *H. ergaster* that bears mentioning, the Nariokotome Boy. This specimen was discovered in 1984 by Kenyan paleontologist Kamoya Kimeu near Lake Turkana in Kenya. It is dated to approximately 1.6 MYA. The specimen is believed to represent a boy of about 12 years old, determined by various dental and cranial features. He was about 5 feet 4 inches tall, roughly the same height as a modern boy of the same age (Figure 5.7). It has been estimated that his adult height would be around 5 feet 10 inches, with an estimated cranial capacity of 900 cc. The Nariokotome Boy looks tremendously modern in appearance despite being 1.6 million years old.

FIGURE 5.7 This specimen of *Homo ergaster* is known as the Nariokotome Boy. It is believed to be the remains of a boy who was about 12 years old at the time of death. (credit: "Homo ergaster (fossil hominid) (Lower Pleistocene, 1.5 to 1.6 Ma; Nariokotome, Lake Turkana area, Kenya) 4" by James St. John/flickr, CC BY 2.0)

Homo ergaster Technology

Homo ergaster continued to use Oldowan stone tools, but they also began to construct much more complex tools, referred to as the Acheulean industry (Figure 5.8). These tools have been found throughout Africa, Europe, and the Middle East and are first noted as appearing approximately 1.6 MYA to 200,000 years ago. These types of tools are rarely found in Asia. It is currently unclear whether this is because the Acheulean industry had not yet been developed when *H. erectus* migrated to Asia or because bamboo (a plant found in

abundance in Asia) was found to be a more versatile resource than stone. As wood and bamboo are biodegradable, no remains of tools constructed from these materials would exist today.

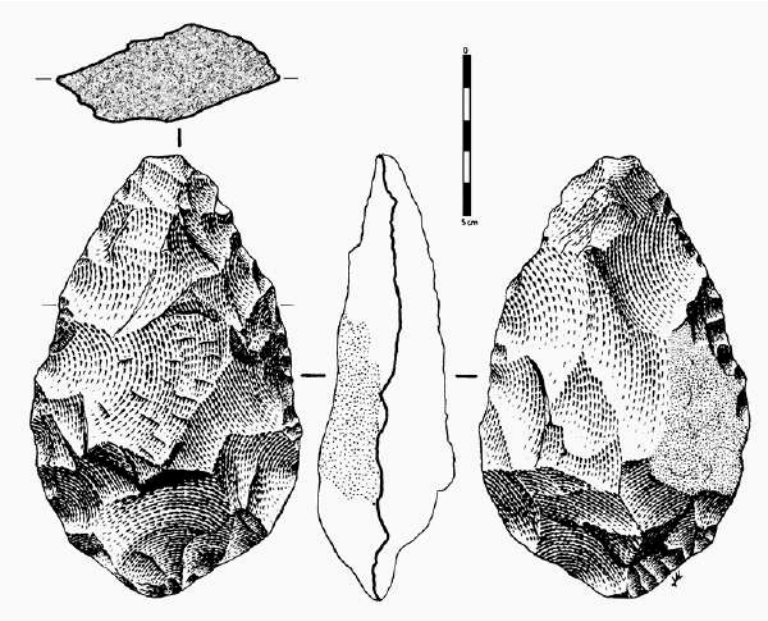

FIGURE 5.8 This hand axe, found in the Zamora province, Spain, displays the form and construction techniques typical of the Acheulean industry. (credit: Jose-Manuel Benito/Locutus Borg/Wikimedia Commons, Public Domain)

Unlike Oldowan tools, Acheulean tools actually look like tools. Acheulean tools are distinct from Oldowan tools in that they were modified on both sides, resulting in a symmetrical tool with two faces, also known as **biface**. One end of the tool was tapered, while the other end was rounded. The creation of symmetrical objects from stone materials is believed to represent an increase in cognitive ability as well as motor skills in the tool maker. These bifaces were struck from large flakes, which had themselves been struck from boulder cores. This required a more delicate technique than banging one rock into another. Acheulean tools were typically created used the soft hammer technique. In this technique, hard rock such as flint is chipped by striking it with a softer material such as bone or wood. The gentler blows detach small flakes that leave smooth, shallow scars, creating a straighter and more uniform cutting edge.

The main advantage of Acheulean technology is that it allowed hominins to get a better grip on their tools, as they were shaped to fit the hand. This tool type was used primarily as a hunter's knife but also for chopping, scraping, and even piercing. The most common type of biface tool is a hand axe. Note that even though these tools are called axes, they are held in the palm of the hand. Another type of Acheulean biface used by *Homo ergaster* is called a cleaver (Figure 5.9). The cleaver had a wide cutting edge across the end instead of a point and was best suited for hunting or hacking wood. Another Acheulean tool is the side scraper, used to scrape hides that could then be turned into simple clothing.

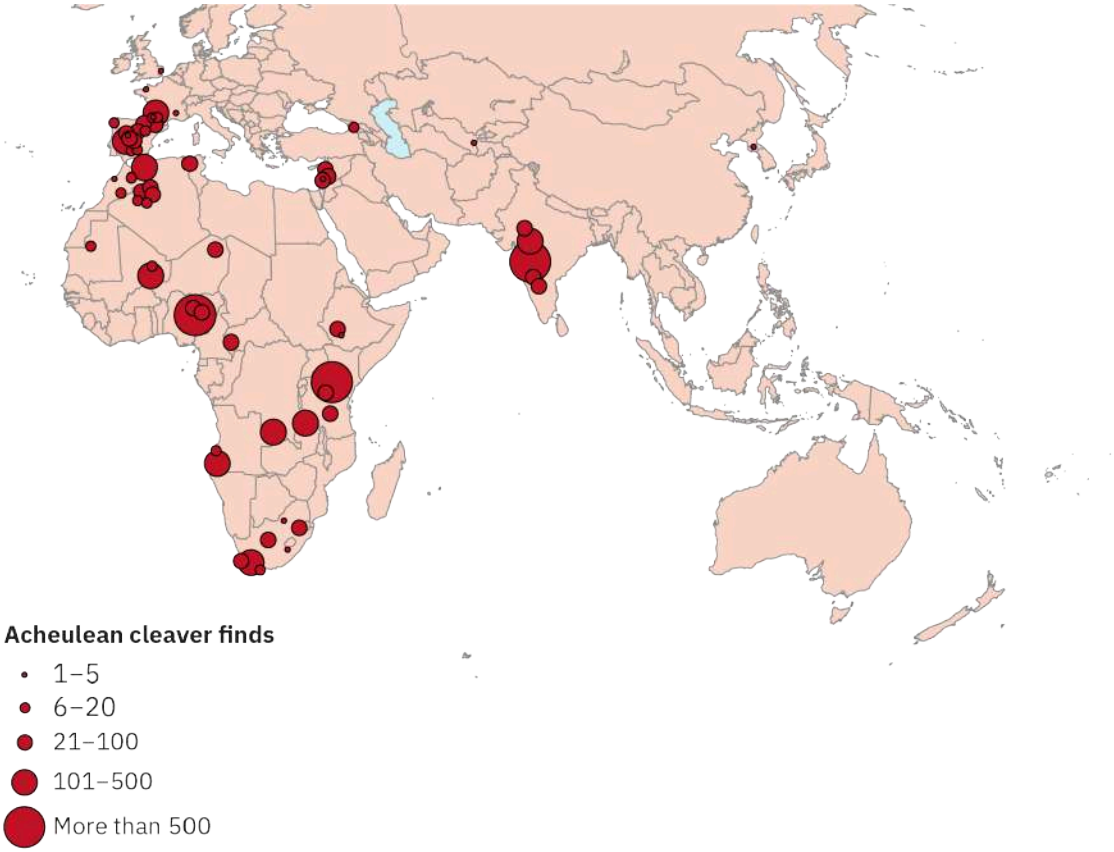

FIGURE 5.9 Map of Acheulean cleaver finds dated to the Lower Paleolithic (1.76–0.13 MYA). Note the concentration of artifacts found in certain areas of Africa and in Spain. (attribution: Copyright Rice University, OpenStax,under CC BY 4.0 license)

Evidence of an Increase in Meat Eating

In 1973, a specimen of *H. ergaster* known as KNM ER 1808 was found in Koobi Fora, Kenya. Dated to about 1.7 MYA, this is the most complete *H. ergaster* specimen ever found. Analysis of KNM ER 1808 suggests that *H. ergaster* may have been eating carnivore liver, which is high in Vitamin A. This may indicate a dietary shift toward increased meat eating by *H. ergaster*.

Homo erectus: A Success Story

Homo erectus is the longest-surviving species in the genus *Homo*. For almost two million years, *H. erectus* existed and evolved. Also known as the "Upright Man" or Java Man, *H. erectus* was first found in Indonesia in 1891 by Eugene Dubois, a professor of anatomy at the University of Amsterdam. At a site called Trinil, he found a skull cap and a femur. He named the specimen *Pithecanthropus erectus*. The most current dates for *Homo erectus* are 1.2–1.6 million years ago. *H. erectus* exhibits a cranial capacity averaging 900 cc and several distinguishing characteristics. These characteristics include a slightly projecting nasal spine, shovel-shaped incisors, a nuchal crest (a ridge in the back of the skull that supported strong neck muscles), very thick skull bones, and pronounced brow ridges. They also had longer legs, evidence that they were utilizing energy much more efficiently when walking and becoming effective hunters. We also see a diminishing of the protruding jaw (or prognathism) that was so prominent in the australopithecines.

FIGURE 5.10 This *Homo erectus* cranium exhibits a number of defining features, including a projecting nasal spine, thick skull bones, and pronounced brow ridges. (credit: Daderot/Wikimedia Commons, Public Domain)

There is evidence that *H. erectus* was using fire around 1.7–2.0 MYA, which would make it the first or one of the first hominins to do so. Ancient hearths, charcoal, and charred animal bones have been found in Zhoukoudian, China. This evidence suggests that *H. erectus* was hunting, cooking, and eating meat. Also found at Zhoukoudian are a number of fossil skulls that were once thought to display evidence of cannibalism. However, recent research evidence suggests that the remains of these *H. erectus* were prey to animal scavengers such as hyenas (Boaz et al. 2004).

The Smithsonian Institution has created an interactive tool (https://openstax.org/r/human-evolution-interactive-timeline) that visually illustrates the interrelationships between an increasingly variable and colder climate, encephalization, bipedalism, and new technologies and tool use. These correlations align with fossil evidence indicating changes in diet and caloric requirements in response to a colder and changing climate, which ultimately fueled a growing brain. The "expensive tissue hypothesis" proposes that maintaining a brain is metabolically expensive and that, in order to meet the energy requirements of a larger brain, our digestive system became smaller and shorter, making it more suited for higher-quality, nutrient-dense food such as meat (Aiello and Wheeler 1995). The list below summarizes some of the key evolutionary changes seen in *H. erectus* from 2 MYA to possibly as recent as 50,000 years ago, which provide further support for these correlations (Dorey 2020).

1. There is a progressive increase in brain size in *H. erectus*, from about 550 cc to 1,250 cc.
2. There is evidence of increased use of fire and of eating cooked meat at *H. erectus* sites. *H. erectus* would have needed as much as 35 percent more calories than previous hominins (Fuentes 2012).
3. The eating of softer foods as a result of cooking meat and plants alleviated the need for large chewing teeth and jaws. Over time teeth became smaller, which resulted in thicker enamel.
4. There is a gradual decrease in prognathism, and as in *H. habilis,* skulls provide evidence of smaller teeth and jaws, which would have made room for larger brains.
5. *H. erectus* is taller than any other previous hominin, with longer legs that provided the ability to run great distances and chase prey. New research is shedding some additional light on the possible benefits of running in early hominins The fossil evidence suggests that endurance running is a derived adaptation of

the genus *Homo*, originating about two million years ago, and may have been instrumental in our evolution (Bramble and Lieberman 2004).

The *Homo ergaster* and *Homo erectus* Debate

There is great debate as to whether *Homo ergaster* and *Homo erectus* are one species or two. Some refer to *H. ergaster* as the "early" *H. erectus.* Their differences are largely geographical: *H. ergaster* is associated with Africa and *H. erectus* with Asia. Yet some researchers have concluded that *H. ergaster* and even *H. habilis* should be referred to as *H. erectus*. Whether to lump or split the diverse species in the genus *Homo* is an ongoing challenge in the scientific community. While there are some anatomical differences between *H. erectus* and *H. ergaster*, they are fairly minimal.

FIGURE 5.11 *Homo erectus* (left) has a sagittal keel (ridge on top of head), a shorter forehead, and a different-shaped skull than *Homo ergaster,* seen on the right. (credit: (left) kevinzim/Wikimedia Commons, CC BY 2.0; (right) Reptonix free Creative Commons licensed photos/Wikimedia Commons, CC BY 3.0)

The diversity and number of evolutionary changes seen in *H. erectus* indicate that *H. erectus* set the stage for the arrival of the archaic *Homo*, which we will cover in the next section.

5.3 The Emergence of Us: The Archaic Homo

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Describe the context, time frame, and key anatomical characteristics of archaic *Homo.*
- Explain the potential environmental conditions that led to evolutionary change in anatomy and material culture seen in archaic *Homo*.
- Compare and contrast the current hypotheses regarding the extinction of the Neanderthal.

Defining the Archaic *Homo*

There is no universal consensus on what is included within the term "archaic *Homo*." The term is used as an umbrella category encompassing all the diverse *Homo* species after *H. erectus*. Hominin species classified as **archaic *Homo*** typically have a brain size averaging 1,200 to 1,400 cc, which overlaps with the range of modern humans. Archaic *Homo* are distinguished from anatomically modern humans by the characteristics of a thick skull, prominent supraorbital ridges (brow ridges), and lack of a prominent chin. Archaic *Homo* are viewed as transitional between *H. erectus* and *H. sapiens* and display many overlapping and varied traits. It has been proposed that archaic *Homo* may have been the first species to use language, based on the size of their brains

and the fairly large social groups they lived in. Archaic *Homo* species as presented here will be divided into two groups: the Early Archaic (800–250 KYA) and the Late Archaic (300–30 KYA).

Early Archaic *Homo*

Homo antecessor

Homo antecessor has been found in Spain, France, and England and dates to around 1.2 MYA to 800 KYA. These specimens represent the oldest fossil evidence for the presence of the genus *Homo* in Europe. Some scientists have suggested that this species is the ancestor of *Homo heidelbergensis*, while others suggest that *H. antecessor* is the descendent of *H. ergaster*. *Homo antecessor* was first found at the Sima de los Huesos site of the Sierra de Atapuerca region in Spain. Within this site is a cave known as the Pit of Bones, where more than 1,600 fossils of 28 individuals have been found that date at or before 780,000 years ago. The site is an important one that stretches over a long period of time and displays the emergence and divergence of various *Homo* physical characteristics that later appear in the Neanderthal. Evidence from nuclear DNA suggests that early hominins at this site were related to the Neanderthal and not the Denisovans, indicating divergence earlier than 430,000 years ago (Meyer et al. 2016). The section on the Neanderthal will explore further the interbreeding and divergences of the Neanderthal, Denisovans, and modern *Homo sapiens*.

Homo antecessor was almost six feet tall and males weighed about 200 pounds, well within the range of variation for modern humans. Other anatomical features of this species include a protruding **occipital bun** (a bulge found in the occipital area of the skull), a low forehead, no strong chin, and a cranial capacity of about 1,000 cc. It has been suggested that the purpose of the occipital bun is to balance the weight of the anterior portion of the skull and face. One very modern trait exhibited by this species is the presence of a facial depression above the canine tooth called the **canine fossa**, which is also found in modern humans. The best-preserved fossil is a maxilla (upper jawbone) of a 10-year-old individual.

In addition to the fossil bones, 200 stone tools and 300 animal bones were also found at Gran Dolina, another location at the Atapuerca site, along with a carved stone knife. Stone tools at this site were predominantly Oldowan style and constructed from local raw materials. Tools included cutting flakes and hand-held cores. It has been suggested that the absence of retouched tools at this site indicates that these tools were created primarily for processing and eating meat. Cutmarks are present on the majority of animal remains. One of the most intriguing observations about this site is that there are numerous large animal carcasses (mostly deer) that are believed to have been transported to the site rather than consumed where they were killed. Some scientists have suggested that the practice of bringing food back to the site is evidence of social cooperation, suggesting both a division of labor and a custom of food sharing.

Many of the bones of *Homo antecessor* show the same evidence of cutmarks as the animal bones, indicating that flesh was removed from the bones with the goal of dismemberment. Some scientists have taken this to mean that *H. antecessor* practiced cannibalism. However, humans have also been known to remove the flesh from bones during funerary rites. Whether the cutmarks made by *H. antecessor* represent cannibalism, a funerary rite, or another yet unknown practice is still being debated.

Homo heidelbergensis

Homo heidelbergensis is an incredibly variable group. Many archaic *Homo* species are included in this group because they possess features that can best be described as a mosaic between *H. ergaster, H. erectus*, and anatomically modern humans (AMH). This section looks at just a few of the specimens that are regularly attributed to *Homo heidelbergensis.*

One of the most important *Homo heidelbergensis* specimens is known as Mauer. It was found in 1907 in Germany and is represented by a mandible (lower jaw) that is dated to approximately 600,000 years ago. It has a robust mandible and a receding chin like earlier *Homo ergaster* but has very small molars like anatomically modern *H. sapiens*. The jaw is so big and the teeth are so small that there is plenty of space for additional teeth to develop behind the wisdom teeth. Given that the third molar (the wisdom tooth) has already erupted, it has been suggested that this individual was between 20 and 30 years at death.

FIGURE 5.12 This jawbone from a *Homo heidelbergensis* specimen was found in Germany in 1907 and is dated to approximately 600,000 years ago. (credit: Gerbil/Wikimedia Commons, CC BY 3.0)

Another important specimen of *Homo heidelbergensis* is known as the Petralona cranium. It was found in 1960 in Greece. Dates are uncertain but believed to be in the range of 100,000 to 700,000 years. Animal fossils found with the specimen indicate Petralona is between 350,000 and 200,000 years old. It combines *Homo ergaster*–like traits, such as massive brow ridges and thick cranial bones, with a cranial capacity of 1,200 cc, which is similar to anatomically modern *H. sapiens*.

A third specimen of *Homo heidelbergensis* is known as Bodo. It is very possibly the oldest archaic human specimen from Africa and was found in Ethiopia in 1976. It is dated to approximately 600,000 years and has a relatively large cranial capacity of 1,250 cc, which is again within the range of variation for modern humans. It is a robust cranium with very thick bones and two separate brow ridges.

Homo heidelbergensis Technology and Culture

Bodo is associated with Acheulean bifacial hand axes. Some scientists have suggested that Bodo butchered animals because Acheulean hand axes have been found with animal bones. There are cutmarks on the Bodo cranium that resemble those made by cutting fresh bone with stone tools. It has been suggested that the Bodo cranium is the earliest evidence of the removal of flesh immediately after death using a stone tool. The cutmarks were made symmetrically and with specific patterns on the cranium, which is interpreted as strong evidence that the defleshing was done purposefully for funerary practices. Once again, others have suggested that the cutmarks indicate that Bodo may have been practicing cannibalism.

In addition to their use of stone tools from the Acheulean tool industry, *Homo heidelbergensis* is also believed to have used spears. The earliest known spears have been found in Schöningen, Germany, and are dated to about 400,000 years ago. The spears were made either from spruce or pine wood and are believed to have had a range of about 35 meters. Probably the most important technological achievement evident in these spears is the use of hafting technology. **Hafting** involves attaching stone points to a handle made of another substance, such as wood, metal, or bone. The spears found at Schöningen represent one of the first known instances in which hominins united separate elements into a single tool.

Hafting gives stone tools more utility, as they can now be thrown (as with a spear), shot (as with an arrow), or used with more leverage (like an axe). These hafted stone points are able to be used with increased force and effectiveness, allowing people to hunt and kill animals more efficiently. This increased efficiency in hunting and killing animals is believed to have created a situation in which *H. heidelbergensis* had regular access to

meat and other high-quality foods. Some have suggested that the presence of spears represent evidence that *H. heidelbergensis* could hunt herd animals that can run faster than a human, and that they had sophisticated hunting strategies requiring cognitive skills like anticipatory planning.

Like *Homo ergaster* and *Homo erectus, Homo heidelbergensis* occupied both caves and open-air sites. However, they did not just use the sites as is, they modified them. One of the most interesting aspects of the cultural behavior of *Homo heidelbergensis* is that they are associated with clear archeological evidence for modified dwellings. For example, in the Czech Republic there is a modified dwelling that consists of a stone foundation that is approximately 700,000 years old. Most likely, this dwelling had a roof constructed of thick branches. Other modified dwellings have been found in Germany and France.

Evidence of controlled fire has been found at most reasonably preserved *Homo heidelbergensis* sites. The oldest established continuous fire site for *Homo heidelbergensis* is from Israel and is dated to around 780,000 years old.

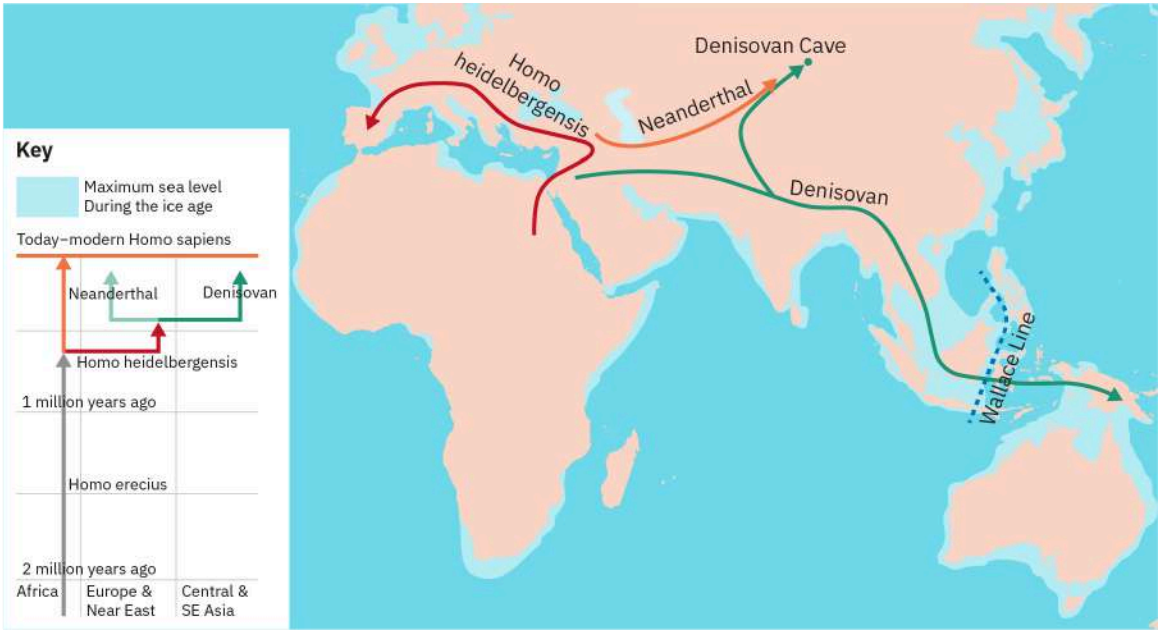

FIGURE 5.13 Phylogenetic tree and proposed migration routes of genus *Homo heidelbergensis* and later Denisovans and Neanderthals. (attribution: Copyright Rice University, OpenStax, under CC BY 4.0 license)

Late Archaic *Homo*

Homo naledi: A Rising Star

The most recently described archaic *Homo* is known as *Homo naledi*. They were found in the Rising Star cave system in South Africa in 2013 and 2014 (Figures 5.14–5.15) and are dated to approximately 235,000–335,000 years old. Over 1,500 bones from as many as 15 individuals were recovered from the cave, which is possibly the largest assemblage of a single hominin species yet discovered. Despite their relatively recent date, they have exceptionally small cranial capacities, comparable to the robust and gracile australopithecines, which are around 560 cc. The encephalization quotient of *H. naledi* is estimated at 4.5, which is the same as *H. floresiensis* but notably smaller than all other *Homo* (contemporary *Homo* are all above 6). The presence of this small-brained hominin at the same time that Neanderthals and *Homo heidelbergensis* were around is further evidence that multiple hominin lineages were coexisting and evolving at the same time. The classification of *H. naledi* proved to be a challenge, as the specimens presented a mosaic of traits and characteristics associated with an array of other hominin species.

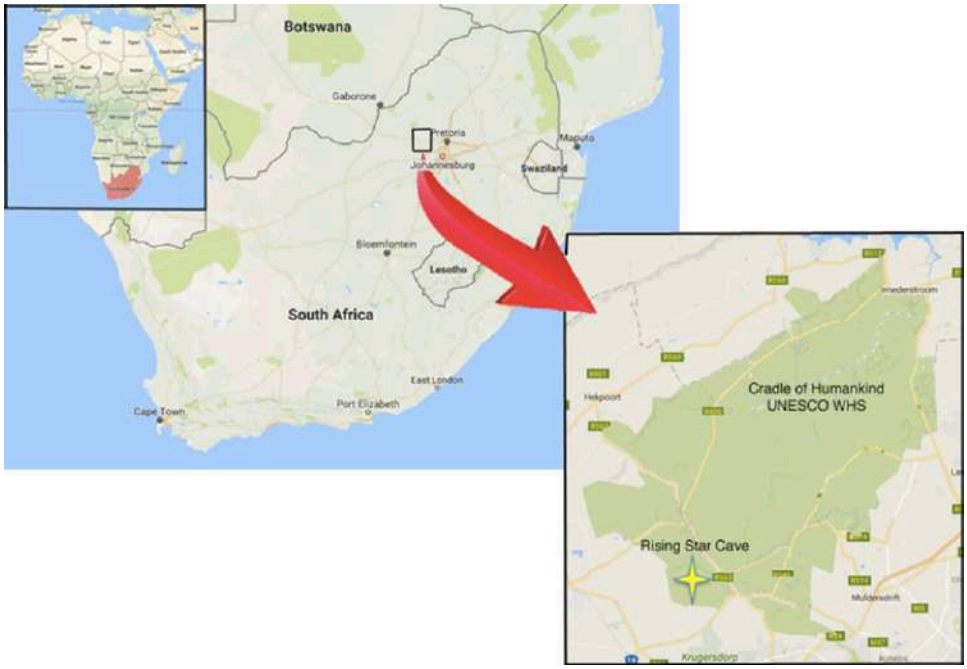

FIGURE 5.14 Maps showing the location of the Cradle of Humankind World Heritage Site in South Africa, where *Homo naledi* fossils were found in the Rising Star cave system. (credit: Hawks et al. (2017), *eLife*, CC BY 4.0)

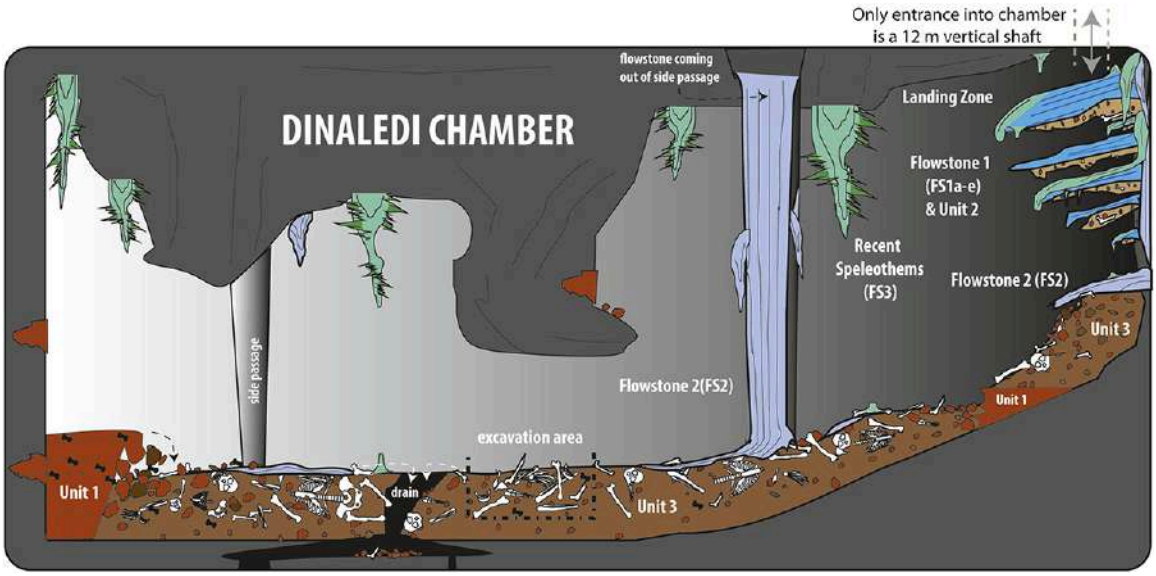

FIGURE 5.15 The Rising Star cave system, showing geological features and the location of the excavation area where numerous *Homo naledi* specimens have been found. (credit: Paul H. G. M. Dirks et al. (2015), *eLife*/Wikimedia Commons, CC BY 4.0)

FIGURE 5.16 *H. naledi* skulls. It is apparent in these images that this species had rather pronounced prognathism (Credit: John Hawks, Marina Elliott, Peter Schmid et al. (2017), eLife/Wikimedia Commons, CC BY 4.0)

FIGURE 5.17 *H. naledi* feet were much like those of modern humans. (credit: W. E. H. Harcourt-Smith, Z. Throckmorton, K. A. Congdon, B. Zipfel, A. S. Deane, M. S. M. Drapeau, S. E. Churchill, L. R. Berger & J. M. DeSilva (2015)/Nature Communications/Wikimedia Commons, CC BY 4.0)

FIGURE 5.18 The hands of *H. naledi* display curved finger bones and large thumbs, indicating that it still had an adaptation for climbing trees. (credit: Lee R. Berger et al. (2015), eLife/Wikimedia Commons, CC BY 4.0)

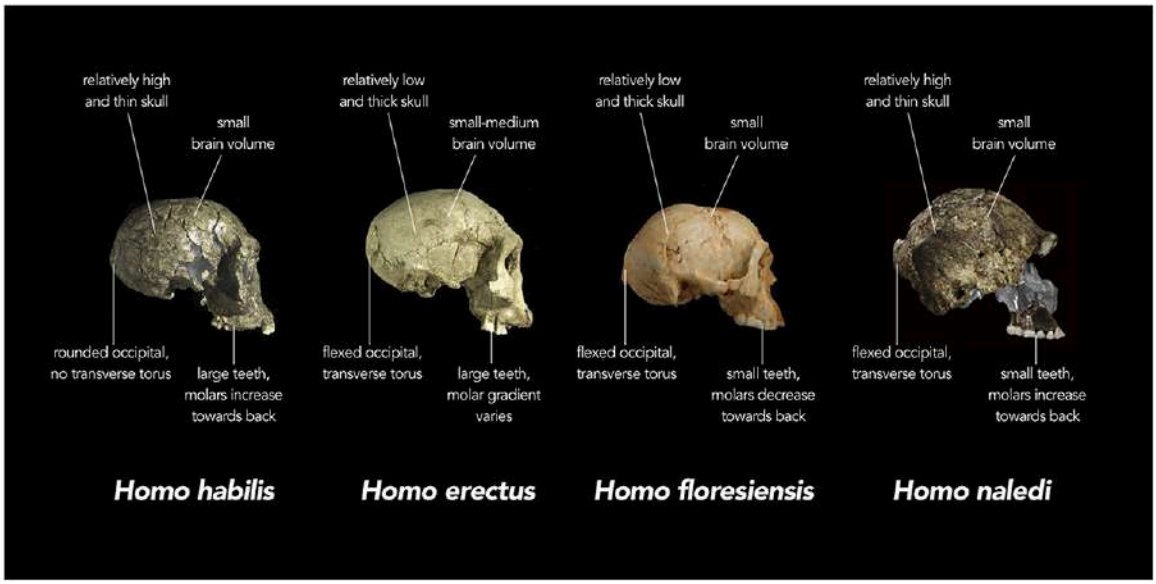

FIGURE 5.19 Comparison of some of the most commonly known *Homo* species (credit: Chris Stringer, Natural History Museum, United Kingdom (2015), eLife/Wikimedia Commons, CC BY 4.0)

Homo naledi: Did They Bury Their Dead?

Homo naledi has not yet been found in association with any stone tools. Despite a lack of established tool use, there is fairly convincing evidence that *H. naledi* may have used the cave system as a place to bury their dead. The hypothesis that *H. naledi* had a ritualistic mortuary practice is based on several observations, such as the bones appearing to lack evidence of gnawing marks from predators and the lack of evidence of layers of sediment that would suggest the bones were deposited by flooding (Dirks et al. 2015). In 2017 additional fossil remains were found in a second chamber in the Rising Star cave system (Hawks et al. 2017), but these remains don't as yet appear to offer additional evidence to support the hypothesis of an intentional burial.

Some scientists believe that there is insufficient evidence to conclude that *H. naledi* were involved in funerary ritual practices. They have noted that the preservation of *H. naledi* specimens are similar to that of cave-dwelling baboons that have died natural deaths. At Sima de los Huesos, remains of about 28 Neanderthal and *H. heidelbergensis* fossils were found in a cave dated to about 430,000 years ago. Researchers who examined the scattering patterns of the remains at both the Rising Star cave system in Africa and the Sima de los Huesos site in Spain (Egeland et al. 2018) concluded that the sites showed evidence of having been scavenged but that this doesn't disprove the possibility that they may also be deliberate burials. The verdict is still out on this. Lee

Berger and other scientists are conducting further investigations of the *H. naledi* skeletal deposits to further explore the possibility they might be evidence of something more deliberate than the actions of predators.

Rethinking the Neanderthal

Homo neanderthalensis

The word "Neanderthal" might conjure up stereotypical images of a brutish caveman-like creature holding a club in one hand and dragging supper with the other. No one said entertainment had to be scientifically accurate, but media can create false perceptions and stereotypes about the past. This section takes a closer look at who the Neanderthal people were and the role they played in the human story.

FIGURE 5.20 Distribution map of Neanderthal sites. The red squares mark locations of Neanderthal remains and the shaded area represents the supposed territory of Neanderthal people in Europe and Asia. (credit: modification of work **Neanderthal distribution** by Berria/Wikimedia Commons, CC BY-SA 4.0)

Neanderthals have been found only in regions of Europe and the Middle East and are dated to between about 400,000 and 40,000 years ago. The first fossils, which were found in the Neander Valley, were believed to be the remains of an extinct kind of human. The Germans called them the Neanderthals, the people of the Neander Valley.

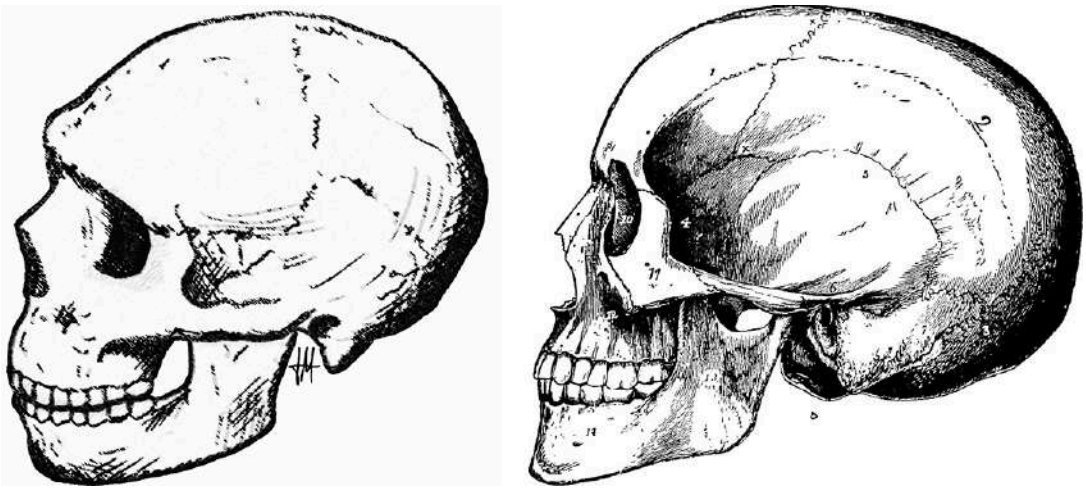

FIGURE 5.21 The Neanderthal skull on the left is noticeably different from the *H. sapiens* skull on the right. (credit: (left) Jose-Manuel Benito/Locutus Borg/Wikimedia Commons, Public Domain; (right) "Image from page 27 of "Human physiology" (1907)" by Furneaux, William S/Internet Archive Book Images/flickr, Public Domain)

Neanderthals possess several distinctive anatomical characteristics: the skull and brain is larger than that of

humans, with an average size in Neanderthals of 1,520 cc compared to modern humans' 1200–1400 cc. Does the Neanderthal's larger brain size mean that it was more intelligent than modern humans? As mentioned earlier in this chapter, while there does seem to be a correlation between brain size and complex cognitive skills, the brain in some hominins may have been organized differently than that of modern humans, with different anatomical areas of the brain emphasized. It is believed that in the Neanderthal brain, the frontal region, which is the center of speech and language, was less developed, while the back of the brain, which deals with the senses, was more developed. This greater development in the back area of the brain could be a survival adaptation found in Neanderthals who had to hunt in often harsh and difficult conditions.

Philip Lieberman, a cognitive scientist at Brown University, argues that Neanderthals lacked the anatomy necessary for humanlike speech. He drew this conclusion based on a reconstruction of a Neanderthal throat, which indicated that the neck could not accommodate the vocal apparatus of modern humans (Lieberman,P. 2007). While there is evidence of a hyoid bone, a small horseshoe-shaped bone in the front of the neck, that would have been able to anchor the tongue muscles, other anatomical evidence suggests that the larynx in Neanderthals was placed high in the throat. A highly placed larynx limits an animal's ability to produce many sounds, such as vowels. In humans, the larynx is positioned further down into the throat. The Neanderthal has been determined to have possessed the gene FOXP2, which is linked to the ability to understand complex language, but the verdict is still out as to whether they were able to produce complex language. It is believed by some researchers that the ability to produce complex speech gave *H. sapiens* a significant edge over the Neanderthal.

Other skull characteristics of the Neanderthal include an occipital bun at the back of the skull (as also seen in *H. antecessor* and *H. erectus*), large brow ridges (which are not solid bone and create an air cavity), a large nasal cavity, and incisors that show a rounded pattern of wear, especially in older individuals. Their large front teeth typically show excessive wear. Chipping and pitting on the incisors are believed to have been caused by chewing on leather. The postcranial bones show that they had a broad scapula, which indicates that their rotator cuff muscles were well developed. They possessed a robust humerus with a massive head and the ability to rotate their arms, which suggests they were capable of throwing projectiles and using spears.

Some of the best-known Neanderthal specimens come from a place called Shanidar Cave in Iraq. Within this cave, various skeletal remains of eight individual Neanderthals were found. These remains are identified as Shanidar 1–9, which were discovered between 1957 and 1961, and Shanidar 10, which was discovered in 2006. Nearly all the skeletal remains show some evidence of trauma, suggesting that hunting was risky business. At various Neanderthal sites it has been observed that men and women exhibit similar cranial injuries, suggesting that women might have also engaged in hunting activities. However, the number of injuries in women were significantly fewer than those found in men (Beier et al. 2008). In a comparative study, it was established that during the Upper Paleolithic, modern *H. sapiens* sustained similar injuries as the Neanderthal, but interestingly, these injuries were less likely to result in death (Beier et al. 2008).

Shanidar 3 features a 40-to-50-year-old Neanderthal man who suffered a rib injury, potentially as the result of an encounter with an animal, and suggests healing as a result of care from others. Shanidar 1, called the "Old Man" (30–45 years old was old in Neanderthal terms), had multiple traumas to his body, one of which resulted in blindness in one eye. He was also missing the lower part of his right arm and hand, which suggests the earliest amputation on record. Although he did heal from this amputation, it may have left him paralyzed on the right side of his body. He also had no teeth. It is believed he was kept alive by taking food that had been chewed by others for him. There is evidence of many of these individuals healing from their injuries, which suggests that compassion and a sense of social responsibility for disabled members of the community existed.

FIGURE 5.22 This cave is the site of the Shanidar 4 Neanderthal flower burial site. Evidence found here and at other sites indicates that the Neanderthal practiced intentional burials of their dead. (credit: "Shanidar Cave, Iraqi Kurdistan" by Sammy Six/flickr, CC BY 2.0)

The Flower Burial Hypothesis

The remains found at Shanidar 4 in Iraq suggest that the Neanderthal practiced **intentional burials**, or deliberate placing of the dead in a ritualistic manner. At Shanidar 4, the individual is placed on his left side with his legs drawn up in a flexed position. Pollen analysis of the soil surrounding the corpse suggests that spring flowers had been placed in the grave, possibly indicating that the Neanderthal had a belief in an afterlife and established mortuary practices. However, there has been a lot of debate as to whether there is sufficient evidence to conclude that that the pollen found at some of the Neanderthal sites was a result of ritualistic placement of flowers. Opposing hypotheses propose that the pollen was brought into the cave and deposited by burrowing rodents (Sommer 1999). In spite of these counterclaims, the consensus supports the theory that the Neanderthal did practice intentional burials. This is largely based on evidence such as the careful placement of bodies in specially dug shallow pits. Recent research at both Shanidar Cave and other sites now support the claim that the Neanderthal did practice ritual and intentional burial.

FIGURE 5.23 This reconstruction of a Neanderthal grave is housed in the Israel Museum in Jerusalem. (credit: "Neanderthal Burial, Cast" by Gary Todd/flickr, Public Domain)

Neanderthal Creativity and Material Culture

Neanderthals have been labeled, perhaps unjustly, as a species with a limited ability to communicate in symbolic or abstract forms. Until recently, the Neanderthal had been assumed to lack the cognitive skills

associated with the practice of ritual and art. However, cave paintings discovered in Spain in 2012 by Alistair Pike, an archaeologist at the University of Southampton, UK, challenge that assumption. These paintings, which have been dated to around 65,000 years ago, before the arrival of *H. sapiens* in the region, have been determined to be the creative works of the Neanderthal and are currently considered the oldest cave art ever found. This discovery may change what people have previously thought about Neanderthal cognition and their ability to express symbolic thought. It should be acknowledged that the ability to depict the world evident in these paintings does not compare with that in the artwork from *H. sapiens* sites like Chauvet and Lascaux in France (to be discussed later in this chapter).

Neanderthals created more technologically advanced tools than those produced by *H. erectus* and seen in the Acheulian tool industry. The tool industry associated with the Neanderthal hominins is called the **Mousterian tool industry** or the Middle Paleolithic tool industry. Archeological sites that date to the Neanderthal period are dominated by flake tools. This means that the Neanderthal struck flakes from cores and then used the flakes as their tools instead of the core. This resulted in smaller and sharper tools with increased utility.

What Happened to the Neanderthal? What Gave Modern Humans the Edge?

The Neanderthal went extinct around 35,000 to 50,000 years ago. There have been various hypotheses as to what caused this, many connected to the fact that Neanderthal coexisted with *H. sapiens* in regions of Europe and Asia for an estimated 2,600–5,400 years. These hypotheses include an inability to adapt to a changing climate and colder temperatures, the spread of disease, competition for food with *H. sapiens*, and even aggressive takeover by the *H. sapiens*, who may have been better able to adapt to environmental changes due to more complex technology and language skills. Another theory points to evidence that the Neanderthal tended to live in small, scattered groups with limited genetic diversity and low birth rates, which potentially impacted the ability of the Neanderthal to be competitive. A low gene pool can result from reduced birth rates and low survival rates of young children. New genetic evidence shows that the Neanderthal were genetically less diverse and more isolated than *H. sapiens.* And then some argue that the Neanderthal didn't go extinct at all because some people still have Neanderthal genes in them.

Are You a Neanderthal?

Recent genetic evidence indicates that human-Neanderthal interbreeding (https://openstax.org/r/the-scientist) was happening as far back as 125,000 years ago. From one Neanderthal toe bone found in the Denisova cave in Siberia Russia, the Max Planck institute has been able to produce a whole genome which revealed evidence of inbreeding amongst the Neanderthal, along with interbreeding with their cousins the Denisovans (discussed further in next section), as well as a mystery yet to be identified species, as well as *Homo sapiens* (Pennisi, E., 2013). The genetic evidence is most prominent in people of East Asian descent, accounting for between 2.3 percent and 2.6 percent of their DNA. Various mutations and diseases are linked to this Neanderthal DNA, including diabetes, addictions, depression, allergies, and Crohn's disease. One study suggests that Neanderthal genes gave people some level of protection from getting a severe case of COVID-19 (Huber, J., 2018), although a later study (Zeberg and Pääbo 2020) proposes that Neanderthal genes may have increased the risk of respiratory failure as a result of the COVID-19 virus. Such differences may have to do with different genetic clusters in Neanderthal populations in different geographical regions (Mortazavi et al. 2021). Neanderthal genes are believed to have provided immunity to some viruses that *H. sapiens,* arriving from Africa, would not have had time to build up an immunity against. On the reverse side, *H. sapiens* may have brought diseases from Africa that the Neanderthal did not have resistance to, possibly playing a role in their extinction. As Janet Kelso, a computational biologist at the Max Plank Institute for Evolutionary Anthropology, states, "Viral challenges, bacterial challenges are among the strongest selective forces out there" (Akst, 2019).

The Denisovans

The Denisovans, like *Homo naledi*, are archaic *Homo*. There are not a lot of specimens—just one finger bone, three teeth, some long bone (https://openstax.org/r/Long_bone) fragments, a partial jawbone, and a parietal bone (https://openstax.org/r/Parietal_bone) skull fragment. Because of this lack of evidence, very little is known of their anatomical features. Some of the specimens come from Denisova Cave in Siberia, Russia, and are dated to between 500,000 and 30,000 years ago. These dates are arrived at based on the few fossils that exist, inferences made from genetic studies, and sediment analysis. More recently another specimen was found on the Tibetan plateau. In 1980 a jaw and two teeth were uncovered in the Baishiya Karst Cave by a

monk, but it wasn't until 2010 that scientists were able to study the jaw. Dating placed the specimen at approximately 160,000 years ago. Protein analysis determined the jaw to be of Denisovan origin and from a member of a population who were most likely well adapted to living in high altitudes (Chen et al. 2019).

Because so few bones have been found, most understanding of this species comes from genetic analyses. According to nuclear DNA studies, Denisovans and Neanderthals were more closely related to each other than they were to modern humans. DNA evidence suggests that the Denisovans interbred with modern humans and with local Neanderthal populations over multiple time periods. Tracing the male Y chromosome, one study indicated that interbreeding between early humans and Neanderthals actually replaced the ancient Denisovan Y chromosome once found in Neanderthals. The time of divergence of the Denisovan is estimated to be around 700,000 years ago, with modern humans diverging from the Neanderthal around 370,000 years ago (Petr et al. 2020). *H. heidelbergensis* is typically considered to have been the direct ancestor of both Denisovans and Neanderthals, and sometimes also of modern humans.

One specimen is a first-generation hybrid, Denisova 11—nicknamed "Denny (https://openstax.org/r/Denny_hybrid_hominin)"—that had a Denisovan father and a Neanderthal mother (Slon et al. 2018). Denisova 11 was found in Denisova Cave in Russia and provides evidence that Late Pleistocene *Homo* species interbred when the groups met. Comparison of the DNA of these three groups suggest that most modern-day Europeans and Asians inherited about 1–4 percent of their DNA from Neanderthals, with no Denisovan ancestry in Europe and 0.1 percent in China. The genetics found in Tibetans, Melanesians, and Indigenous Australian are currently being challenged; originally, they were thought to be about 3–5 percent Denisovan and 2.74 percent Neanderthal. Statistical geneticist Ryan Bohlender and his team have investigated the percentages of extinct hominin DNA in modern humans. They concluded that Neanderthals and Denisovans are not the whole story and that there could be a third group yet unknown contributing to the Pacific Islander **genome** (Rogers, Bohlender, and Huff 2017). Statistical and genetic evidence can serve as indicators of the existence of a group for which no fossils have yet been found. These are referred to as **ghost populations**. For example, there are indications that 2–19 percent of the DNA of four West African populations may have come from an unknown archaic hominin that split from the ancestor of humans and Neanderthals between 360 KYA and 1.02 MYA (Durvasula and Sankararaman 2020). The hypothesis of a third lineage in the genus *Homo* appears to have received further confirmation with a discovery in China.

New *Homo* Genus Discovery *Homo longi*, or Dragon Man

Recently a new archaic *Homo* fossil surfaced in Harbin, China, dated to about 146,000 years ago (Ji et al. 2021). Given the name *H. longi*, it has also been called "Dragon man (https://openstax.org/r/dragonman)" as its origins were determined to be in the province of the Black Dragon River. The fossil (referred to as the Harbin cranium) was donated to the Hebei GEO University museum after being hidden away in a well in the 1930s during the construction of a railway bridge. The verdict is still out as to whether *H. longi* represents a lineage of the Denisovans or a new species, but it is clear it was robust and able to adapt to one of the coldest regions of China. It had a large brain, thick brow ridges, and fairly large teeth, similar to what is found in the Denisovans.

Regional Evolutionary Adaptations: *Homo floresiensis*

The Hobbit of Flores

Homo floresiensis, also known as "the Hobbit" or "Flores Man," was discovered on the island of Flores in Indonesia in 2003. The species has been dated to approximately 100,000–60,000 years ago. What was surprising about this species is its size. An adult individual stood about 3 feet 7 inches tall. Liang Bua, the cave where *H. floresiensis* was found, shows evidence of the use of fire for cooking and contains bones with cutmarks. Since the initial discovery, partial skeletons of nine individuals have been found.

H. floresiensis, like the earlier hominins, did not possess a chin, and its leg bones are thicker than those of modern humans. They had flat feet that were relatively long in comparison to the rest of their bodies. As a result of these anatomical differences, it is believed that their bipedalism was quite different from that of modern humans, with a high stepping gait and slower walking speed. *H. floresiensis* also had substantially more mobility in the elbow joint, which suggests that they were tree climbers.

Their small brain size is not believed to have affected their intelligence. This challenges the view that larger

cranial capacity equals higher cognitive skills. Although *H. floresiensis* has a brain size of just 380 cc, equal to the size of an orange, evidence indicates that they made tools, used fire, and hunted very much like *H. erectus.* The brain of *H. floresiensis* does contain a Brodmann area, which is associated with cognitive abilities, that is the same size as that found in modern humans.

Some have suggested that *H. floresiensis* is a sister species of *Homo habilis* that branched off before or shortly after the evolution of *Homo habilis.* Other hypotheses suggest that they were the descendants of *H. erectus* who became stranded on the island after arriving via water, possibly on bamboo rafts.

Another *Homo* species similar in size to *H. floresiensis* was *H. luzonensis*, found on the island of Luzon in the Philippines and dated to at least 50,000–67,000 years ago. *H. luzonensis* displays a hybrid of australopithecine traits (including curved hands and feet) and *Homo* characteristics, yet lived alongside modern *H. sapiens*. Clearly the genus *Homo* is more diverse and complex than was originally thought, especially within the special evolutionary pressures of island environments.

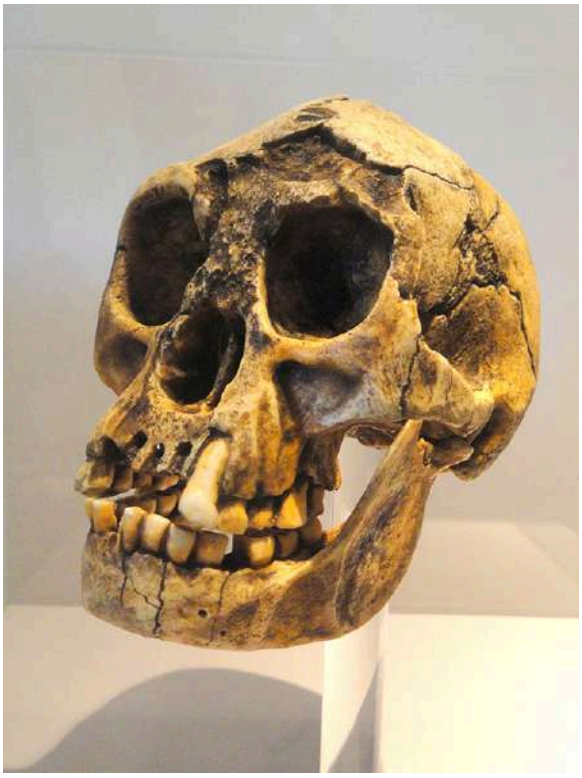

FIGURE 5.24 This *H. floresiensis* skull is on display at the Naturmuseum Senckenberg, a Natural History Museum in Germany. (credit: Daderot/Wikimedia Commons, Public Domain)

Island Dwarfism as an Evolutionary Explanation

Numerous hypotheses have been proposed to account for the small brain size found in both *H. floresiensis* and *H. luzonensis.* One initial theory was that *H. floresiensis* had microcephaly, which is a genetic condition creating an abnormally small head. This was discounted as an explanation once additional specimens were found exhibiting the same size. Perhaps the most convincing explanation is an evolutionary theory called **island dwarfism**, which notes that the evolutionary pressures on islands can be very different from those found on the mainland. Island dwarfism posits that mainland small animal species that colonize islands might evolve larger bodies if the island does not contain key predators. On the other hand, larger species may become smaller due to more limited resources in an island environment. According to the island dwarfism hypothesis, *H. erectus* made its way to Flores, where its descendants became isolated and grew progressively smaller to make the most of limited resources in the island environment. This theory is supported by the fact that there are unique sizes displayed by other animals found with *H. floresiensis*, including a dwarf species of primitive elephant called a *Stegodon*. As *H. floresiensis*'s body shrank, its brain may have undergone "neurological reorganization" to fit a smaller cranial space while maintaining its brain-to-body ratio. The only

potential large predator that may have been a threat to *H. floresiensis* was the Komodo dragon, which ate most of the large mammals on the island. Nevertheless, predation pressures for the little people were likely quite low—that is, until *H. sapiens* arrived.

The Emergence of Us: *Homo sapiens*

Modern *H. sapiens* first appeared about 200,000 years ago in Africa. Anthropologists generally classify these people as "anatomically modern *H. sapiens*," which is a way of noting that while their bodies are the same as modern humans, they had not yet developed the cultural traditions, symbolic behaviors, and technologies that are seen among later *H. sapiens,* including people of today. Probably the most defining feature of anatomically modern *H. sapiens* is their chin. Modern *H. sapiens* is the first hominin to exhibit a projecting chin. One of the most common explanations for this anatomical feature is that the chin evolved in response to human speech and protects the jaw against stresses produced by the contraction of certain tongue muscles.

Sometime around 40,000 years ago there was an abrupt change in tool technology, subsistence patterns, and symbolic expression among *H. sapiens.* These changes seem to have occurred almost simultaneously in Africa, Asia, Europe, and Australia. While there is evidence of some creative artistic activity in earlier groups like the Neanderthal, they were not on the same scale as that seen during the Upper Paleolithic, which is also referred to as "the human revolution." The level of cultural changes associated with this period has been compared to the level of change that occurred during the Industrial Revolution of the 19th century.

Among these changes, *H. sapiens* began assembling a much more elaborate tool kit by constructing tools from a wider variety of materials including antler, ivory, and bone. During the Upper Paleolithic, humans shifted from the manufacture of round flakes to the manufacture of blade tools. This construction method is known as the blade tool industry. Blades are stone flakes that look like a modern knife blades—they are long, thin, and flat, and they have a sharp edge. They have a much longer cutting edge than flakes do and are thus more efficient than older technologies. The prepared-core technique of the Mousterian that provided pre-shaped flakes was refined and extended to create pre-shaped blades.

FIGURE 5.25 This Upper Paleolithic burin tool has a much longer cutting edge than anything that came before it and was much more efficient than previous technologies. (credit: "Large Knife Upper Paleolithic or later 35000-3900 BCE Africa" by Mary Harrsch/flickr, CC BY 2.0)

Over the 23,000 years of the Upper Paleolithic, there were many distinctive tool industries within the larger category of the blade tool industry, including the Aurignacian, Gravettian, Solutrean, and Magdalenian. The most significant tool during the Upper Paleolithic was the burin. The burin is a narrow-bladed flint capable of scraping narrow grooves in bone. Scraping two parallel grooves would allow a sliver of bone to be detached as stock for a needle, pin, or awl.

The Gravettian tool industry lasted from approximately 33,000 to 22,000 years ago. During this tool industry, there are many instances of animal remains being used for both decorative and traditional tool purposes. For example, the teeth of arctic foxes were used for decoration, while their arm bones were used as awls and barbs. Some animal bones such as mammoth tusks and bones were used to not only create tools, but also to make art, as seen in the Lion figurine in Figure 5.26. This figurine could be the earliest example of a figure having both human and animal characteristics, a form often associated with shamans or priests. Some have proposed that the "lion man" is actually a woman due to the lack of a lion mane.

FIGURE 5.26 An ancient figurine of a lion sculpted from a mammoth's tusk. This figure was discovered in a German cave in 1939 and dated to around 40,000 years ago, making it one of the oldest figurative sculptures yet discovered and the earliest example of an animal-shaped figurine. (credit: JDuckeck/Wikimedia Commons, Public Domain)

The Solutrean tool industry utilized tool-making techniques not seen before. It produced finely worked bifacial points made with lithic reduction percussion rather than flint knapping. **Lithic reduction** is the process of fashioning stones or rocks into tools or weapons by removing some parts. The lithic core, such as a partially formed tool or naturally formed rock, is held in one hand and struck with a hammer or percussor with the other hand. As flakes are detached, the original mass of stone or lithic core is reduced.

In addition to stone tool innovations, the Solutrean is characterized by the appearance of the atlatl (https://openstax.org/r/throwing-arrow), or spear thrower. An atlatl is a long stick used to propel a spear or dart. Functioning as an extension of the arm, this stick of wood or antler added kinetic energy, and therefore range, to a short spear tipped with flint or bone. The earliest archeological evidence for this tool innovation comes from France, where a 17,500-year-old atlatl was found constructed out of reindeer antler. It is believed that the atlatl was used by humans to hunt large fauna.

FIGURE 5.27 Contemporary man using an atlatl, a tool for launching a spear or a dart that is at least 17,500 years old. (credit: "Atlatl throwing demonstration" by Hannah Schwalbe/NPS/flickr, Public Domain)

By 17,000 years ago, the Solutrean tool industry was replaced by a new tool industry known as the Magdalenian tool industry. During this period, bone and ivory continue to be used, as well as stone. Unlike Mousterian tools, Solutrean tools are made not only from nearby rocks, but also from rocks that have been transported over relatively long distances. Keep in mind that this required not only transporting the selected rocks, but also finding and extracting them.

The Gravettian tool industry is best known for carved Venus figurines portraying a woman, typically made from ivory or limestone. Most figurines have small heads, wide hips, and large breasts. Most researchers believe that they served a ritual or symbolic function. Some have suggested that they represent an expression of health and fertility.

FIGURE 5.28 Venus of Hohle Fels figurine. This figurine is considered to be the earliest known depiction of a human being in prehistoric art. (credit: Anagoria/Wikimedia Commons, CC BY 3.0)

During the Upper Paleolithic, *H. sapiens* created a great deal of cave art. More than 350 cave painting sites have been discovered, the majority located in France and Spain. Cave art seems to have been created continually from 40,000 to 10,000 years ago and then disappeared around 10,000 years ago, likely due to climate change. As temperatures increased, underground shelters were gradually replaced by surface settlements. The most well-known cave sites in France are the Chauvet (https://openstax.org/r/chauvet-archeologie-culture) (32,400 years ago) (Figure 5.29) and Lascaux Caves (17,000 years ago). The art in both caves features common subjects, such as bison, horses, and deer, as well as tracings of human hands. Most of the animals depicted were commonly hunted but were not always found with associated deposits of bones. The cave art produced during the Upper Paleolithic show a level of sophistication and even sacredness not seen previously in human history.

FIGURE 5.29 These drawings of lions from the Chauvet Cave in France are dated to 32,400 years ago. (credit: HTO/Wikimedia Commons, Public Domain)

FIGURE 5.30 Handprints found in the Cuevas de las Manos upon Río Pinturas, near the town of Perito Argentina. Hand stencils on cave walls have been found in many locations around the world. (credit: "SantaCruz-CuevaManos-P2210651b" by Golan Levin/flickr, CC BY 2.0)

Cave paintings were made with natural pigments created by mixing ground-up elements, such as dirt, red ochre, hematite, manganese oxide, and animal blood, with animal fat and saliva. Paint was applied using twigs formed into brushes and blow pipes made from bird bones, through which paint was sprayed onto the cave wall. Hand stencils on cave walls can be found in many locations around the world including Africa, Argentina, Europe, and Australia. Anthropologist Dean Snow (2013) conducted research at eight cave sites in France and Spain to determine who the artists might be. Based on calculated measurements of the handprints, he concluded that 75 percent of the ochre stenciled handprints in the Paleolithic caves were made by women.

5.4 Tracking Genomes: Our Human Story Unfolds

LEARNING OBJECTIVES

By the end of this section, you will be able to:

- Describe how mtDNA sheds light on early human migrations and explain the Out of Africa model.
- Explain how studying the genomes and coevolution of lice can fill current gaps in the human fossil record.
- Describe the origin of human variation from an evolutionary perspective.

Mitochondrial Eve

Begun in 1990 and concluding in 2003, the Human Genome Project was an ambitious international effort that sequenced about 99 percent of the human **genome** with an accuracy of 99.99 percent. Genetics has thus far largely confirmed the **Out of Africa theory**, which proposes that early humans left Africa around 100,000 years ago and migrated to diverse areas of the world. When early humans left Africa and moved into Europe, they not only lived alongside but also interbred with non-African species such as the Neanderthal, who were already inhabiting the region.

Molecular anthropologists have an interest in determining when living human populations began diverging from one another. This has been difficult to do using nuclear DNA because it mutates much too slowly for measurable accumulations to occur in 200,000 years. Many of the genetic studies that have been conducted are thus based on genetic material carried in the **mitochondria (mtDNA)**, which are passed on maternally. There is no recombination in mtDNA, so unless the mitochondria carries a novel mutation, a child has exactly the same mitochondrial genes as its female genetic contributor (which may be its mother, egg donor, or someone in a similar genetic relationship). The mitochondria of every living person is a copy, modified only by rare mutations, of the mitochondria passed down via matrilineal descent from a population in our ancient past. This population is referred to as **Mitochondrial Eve or mtMRCA** (mitochondrial most recent common ancestor), believed to have lived in southern Africa 100,000–200,000 years ago.

As discussed in Chapter 4, the longer ago two populations share a common ancestor, the more time there is for mutations to occur and for adaptations and change to take place. Although genetic variation is small among the world's human populations, it is greatest in Africa. This indicates that the human populations in Africa have the longest established genetic lineage. While multiple hypotheses exist as to human origins and new evidence could change the current views, the consensus is an Out of Africa model traced back to the matrilineal descent of a population living in Africa about 200,000 years ago.

How the Genome of Lice Can Fill in the Gaps

While perhaps not a pleasant thought, lice have long been a part of human history. Studying the **coevolution** relationship between humans and lice has shed much light on human story. Dr. David Reed, the Curator of Mammals and Associate Director of Research and Collections at the University of Florida Museum, has been studying the coevolution of humans and lice, an area of research that has developed only within the last 20 years. Reed's groundbreaking research has the potential to fill in some big gaps in humans' rather sketchy fossil record and provides important data that might have applications in medicine and biology. Two questions that this research has already begun to ask are when did we become less hairy and when did we start wearing clothes.

FIGURE 5.31 There are three types of lice associated with humans: (a) crab or pubic louse; (b) body louse; (c)) head louse. The coevolution of humans and lice is a developing area of research. (credit: (a) Noizyboy1961/ Wikimedia Commons, CC BY 4.0; (b) Janice Harney Carr, Centers for Disease Control and Prevention/Wikimedia Commons, Public Domain; (c) Dr. Dennis D. Juranek, Centers for Disease Control and Prevention/Wikimedia Commons, Public Domain)

Figure 5.31 shows three types of lice associated with humans: the head louse (*Pediculus humanus capitis*), the body louse (*Pediculus humanus corporis*), and the crab louse or pubic louse (*Pthirus pubis*). Body lice infest clothing and lay their eggs on fibers in the fabric. Head and pubic lice infest hair, laying their eggs at the base of hair fibers. The human head and body lice (genus *Pediculus*) share a common ancestor with chimpanzee lice, while crab lice (genus *Pthirus*) share a common ancestor with gorilla lice. By tracking louse variations, scientists have been able to determine when the head louse and pubic louse diverged, enabling estimates as to when we lost our extra hair and when we started to wear clothes. It is interesting to note that the divergence of the genus *Pediculus* (head and body lice) correlates with the divergence of the human lineage from chimpanzees about six million years ago. Research on lice also provides further support for the Out of Africa model of human migration. Reed has observed that the genome of African lice shows a higher degree of genetic diversity than that of lice found elsewhere in the world, supporting the hypothesis that both humans and lice existed in Africa first.

Many hypotheses about what may have triggered the loss of hair in humans point to **thermoregulation**, the need to control body temperature in extreme conditions. Living in the heat of the savanna, humans needed a cooling mechanism to enable them to be better hunters. Other evidence of adaptation to the heat includes the appearance of sweat glands, which are more numerous in humans than in other primates. Another theory about the cause of the loss of hair among humans suggests that it was an adaptation to control parasites on the body. Did people immediately throw on clothes after losing all of that extra body hair? Reed's research suggests that the wearing of clothes was not something that happened quickly. Humans lost body hair about a million years ago and didn't start wearing clothes until around 170,000 to 190,000 years ago. That's about 830,000 years living in their birthday suits! When humans began to wear clothes, the body louse adapted structures that enabled them to attach to clothes instead of hair.

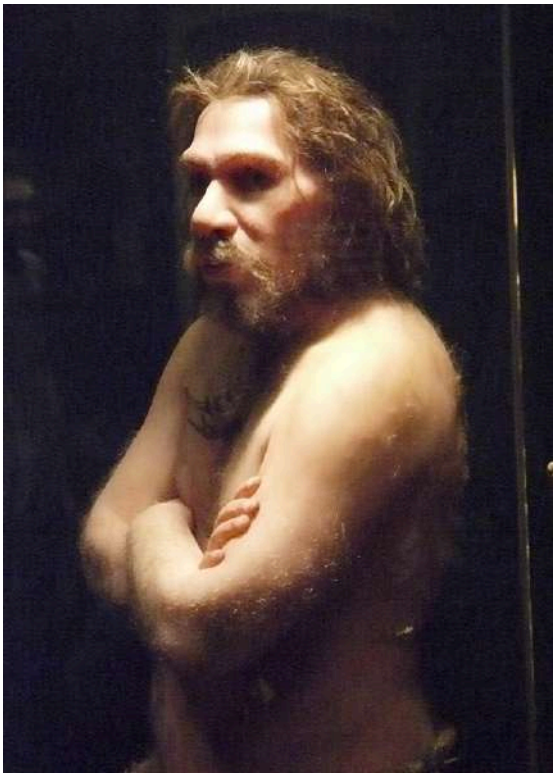

FIGURE 5.32 Humans lost most of their body hair about a million years ago. (credit: "Neanderthal" by Eden, Janine and Jim/flickr, CC BY 2.0)

PROFILES IN ANTHROPOLOGY

Molly Selba

FIGURE 5.33 Molly Selba (holding skull) leading a study session. (credit: Molly Selba, Public Domain)

Personal History: From the time Molly was young, she knew she wanted to be an anthropologist.

She took an archaeology class at the local community college when she was a high school student and went to field school over the summer. In college, she completed a double major in archaeology and anthropology, with a minor in Museums and Society. She later gained experience working with different museum collections and held internships at the Baltimore City Medical Examiner's Office and the Smithsonian Museum of Natural History. After completing her undergraduate degrees, she knew that she wanted to pursue anthropology as a full-time career and began working towards her master's and doctorate in biological anthropology.

Area of Anthropology: For Molly the most interesting thing about biological anthropology is the information that bones can tell us. Initially she was interested in what the history of disease could tell us about the lives of people in the past, but as she worked with biological anthropologists, her focus shifted to understanding how evolution can impact the shape of different bones.

She received her undergraduate degree from Johns Hopkins University in Baltimore, Maryland, and her Master's degree from the University of Florida, where she is currently a PhD candidate. Her research interests include comparative anatomy, cranial morphology, and anatomical sciences education. She is most interested in how cranial morphology varies within and between species and how it is impacted by factors such as evolution and selective breeding practices. Her earlier research focused on the differences in cranial morphology in dogs created by artificial selection for facial reduction. Her dissertation research currently focuses on a comparative study of facial reduction across bats, primates, and dogs.

Accomplishments in the Field: For Molly her most important accomplishment in the field of anthropology has been in education and outreach. Throughout her time in graduate school, she was involved in school visits, working with teachers to facilitate the inclusion of human evolution into existing science curricula. She has specifically focused on helping educators find teaching materials that are culturally inclusive and responsive. She has led multiple professional development workshops for teachers on the same topic and has visited over two dozen classrooms and interacted with over 1,200 students in the last four years. Making science accessible to K-12 educators is an extremely important part of being a researcher, and she believes everyone in academia should strive to be effective science communicators.

"Studying biological anthropology helps us better understand our origin story as a species. It helps us recognize why our anatomy is the way that it is, how morphological changes over time can take place, and why we have such a diversity of life on earth. Just being able to recognize and identify our anatomy is only half the challenge—more important is our understanding why various traits are adaptive, how structure relates to function, or why leftover anatomical traits still persist in our body to this day."

Natural Selection and Human Variation: Are Humans Still Evolving?

Human variability is attributed to a combination of environmental and genetic factors, including social status, ethnicity, age, nutrition, quality of life, access to healthcare, work and occupation, etc. As mentioned in Chapter 1, anthropology contributes many insights into both the social construct of race and the impacts racial categories have on people's lives. The focus in this chapter is the role of natural selection in human variation.

A number of changes are associated with the Neolithic era and the rise of agriculture around 10,000 to 8,000 years ago. Many have noted that changes during this time period did not have positive effects on human and environmental health. The **evolutionary mismatch** hypothesis proposes that our bodies are best suited to the environments we have spent much of our evolutionary history in, which are very different from the environments we inhabit today (Li, van Vugt, and Colarelli 2018).

Humans evolved for one million years as hunter-gatherers. Today, human bodies are still trying to adapt to the largely grain-based diet brought about by agriculture, a diet characterized by less diversity and lower levels of nutrition than that of a typical hunter-gatherer. Incomplete adaptation to this change has made people susceptible to a number of diseases and nutritional deficiencies. Lactose intolerance is a prime example. The domestication of cattle and the drinking of cow's milk began during the agricultural age, not very long ago in evolutionary history. Currently 65 percent of humans are unable to digest cow's milk. Dental caries (cavities) are another problem linked to the change in diet associated with agriculture. The grain-based and high-sugar diets associated with agriculture are very different from the diet of hunter-gatherers. Neither our bodies nor the bacteria in our mouths have had time to fully adapt to this change.

Another adaptation that took place during the Neolithic era is related to variation in skin pigmentation. Humans who left Africa and settled in Europe about 40,000 years most likely had dark skin with high levels of **melanin**, which provides protection against ultraviolet radiation New data confirms that about 8,500 years ago, early hunter-gatherers in Spain, Luxembourg, and Hungary also had darker skin. Skin pigmentation is an adaptation to ultraviolet radiation, with different tones offering different advantages, depending on one's

distance from the equator. As humans migrated to the Northern Hemisphere, they were exposed to less ultraviolet radiation, which also meant less absorption of the Vitamin D needed for strong bones and other important immune functions. In order to compensate for this loss and to allow for greater exposure to ultraviolet radiation, skin pigmentation became lighter.

Another example of human variation as a result of adaptation to the environment can be seen in Indigenous populations in the Andes, Tibet, and the Ethiopian highlands. Each of these three groups faces the same environmental challenge, living in a low-oxygen environment, and they have responded with unique adaptations. Tibetans compensate for low oxygen levels by taking more breaths per minute than people who live at sea level. Those living at high altitudes in the Andes have been found to have higher concentrations of hemoglobin in their blood than other people. Ethiopians living at altitudes of 9,800 to 11,580 feet have neither of these adaptations. The explanation as to how the Ethiopian highlanders thrive in their environment is still a mystery.

FIGURE 5.34 A valley in the Andes near Ollantaytambo, Peru. Indigenous peoples living at high altitudes in the Andes have been found to have higher concentrations of hemoglobin in their blood than other people. (credit: "Snows of the Andes" by David Stanley/flickr, CC BY 2.0)

This chapter has explored just some of the immense biological and cultural diversity of the genus *Homo*. This diversity has emerged in response to highly complex and variable environments connected to factors such as exposure to UV radiation, low oxygen levels at high altitude, changes in diet as a result of hunting or agricultural practices, geographic isolation in island populations, and climate variability and temperature. The genus *Homo* has proven to be resilient and adaptive in response to whatever environment or challenge it has faced. Variation is the key to survival. While scientists recognize that biological and cultural variation has greatly contributed to our human evolution, the human species is now facing a moment in which we must contemplate a difficult question: To what extent has our success as a species jeopardized the survival of other species and the health of the planet we all call home?

MINI-FIELDWORK ACTIVITY

Identify the Fossil

Imagine that you have just discovered a hominin fossil with some of the characteristics listed below. Write each of the characteristics on a card and shuffle them together. Then, working in a group, decide which characteristics belong in the *Homo* group and which belong in the *Australopithecus* group. What scientific name (genus/species) would you give it, and what criteria did you use? (Note: This is an actual hominin fossil!)

- Brain similar in shape and structure to modern human brains
- Hands suited for tool use
- Small jaws and teeth
- Third molar larger than other molars (found in australopithecines and some early *Homo* species)
- Skull shaped more like *H. erectus* or *H. habilis*
- A sagittal keel (as seen in *H. erectus*)—a small raised ridge on top of the skull
- Bipedal and walked with a human gait
- Humanlike feet with arches and ankles
- Flaring blades of the pelvis (primitive)
- Broad rib cage
- Lower part of pelvis like modern humans'
- Small braincase (EQ 4.5)
- Skull shows prognathism (protruding face)
- Primitive shoulder position suggests suitability for climbing and swinging
- Curved fingers (What would that suggest?)

Additional Resources

Visual timelines and maps

The Atlas of Human Evolution has put together a user friendly interactive map (https://openstax.org/r/atlasofhumanevolution) on the development of Homo sapiens.

The Smithsonian Institute's Human Evolution Interactive Timeline (https://openstax.org/r/human-evolution-interactive-timeline) provides an interactive overview of major milestones and species ranges.

Coevolution of lice and humans

David Reed, associate curator of mammals at the Florida Museum of Natural History, offers an explanation of his research (https://openstax.org/r/liceshowhumans) for a general audience.

The Smithsonian Magazine explores possible causes and benefits (https://openstax.org/r/smithsonianmag) of the human loss of hair.

Key Terms

Acheulean tool industry the production of more complex tools, including hand axes, by *H. erectus* from 1.6 million to 200,000 years ago.

archaic *Homo* the period of time that precedes the emergence of the earliest early modern humans (*Homo sapiens*) around 300,000 years ago.

biface tools a type of tool characteristic of the Acheulean tool industry, with both sides worked.

Broca's area a region in the frontal lobe of the brain (which includes two Brodmann areas) first found in *H. habilis* and connected with the production of speech.

canine fossa a facial depression above the canine tooth found in modern humans.

coevolution an interaction between different species that influences each species' evolution; the simplest case of this is predator-prey relationships.

cranial capacity the volume of the interior of the cranium or skull, providing an approximate size of the brain.

encephalization increased brain size over time.

encephalization quotient a measurement defined as the ratio between brain and body size.

endocranial cast an impression taken from the inside of the cranium (braincase), frequently used by paleoanthropologists to determine the shape and approximate size of the brain in hominids and other primates.

evolutionary mismatch a hypothesis that disease and nutritional deficiencies result when people's bodies are unable to adapt to an environment that they have not spent most of their evolutionary history in.

genome the complete set of genes or genetic material present in a cell or organism.

ghost population proposed group for which no fossil evidence has yet been found.

hafting the process of attaching stone points to a handle, which increases a tool's effectiveness for hunting.

handedness the use of a dominant hand, suggests lateralization of the brain and cognitive development.

intentional burials evidence of placing the dead in a specific manner, suggesting ritualistic practice.

island dwarfism mainland small animal species that colonize islands might evolve larger bodies if the island does not contain key predators. On the other hand, larger species may become smaller due to more limited resources in an island environment.

lithic reduction the process of fashioning stones or rocks into tools or weapons by removing some parts.

melanin substance that determines the color of skin pigmentation and protects people from ultraviolet radiation. Skin will have higher levels of melanin the closer to the equator one lives.

Mitochondrial Eve genes traced through mitochondrial DNA that represent the female genetic originator of all humans who lived 200,000 years ago in Africa.

Mousterian tool industry a complex stone tool technology largely associated with the Neanderthal.

mtDNA the DNA located in the mitochondria that can be passed down unchanged from female genetic contributor to child.

mtMRCA "mitochondrial most recent common ancestor," or Mitochondrial Eve, representing the common ancestor of *H. sapiens* around 200,000 years ago.

occipital bun an anatomical feature seen in the Neanderthal skull that appears in the rear of the skull.

Oldowan tool Industry the oldest and most primitive tool industry; production and use are largely in association with *H. habilis.*

Out of Africa theory theory that proposes that *Homo sapiens* developed first in Africa and then spread around the world between 100,000 and 200,000 years ago.

postcranial features skeletal material found in the body that is not related to the skull (cranial bones).

sexual dimorphism differences in physical characteristics other than reproductive organs that appear between males and females of the same species.

thermoregulation an adaptation that allows the body to control and regulate body temperature.

Summary

In this chapter we have explored our human journey as a member of the genus *Homo*, following a trail of adaptations and change that ultimately led to *us*.

First on the scene were the australopithecines, who were already walking on two feet and paved the way for the evolutionary changes and cultural

achievements that were to follow. A colder climate with drastic changes in climate were associated with an increased reliance on cooked meat, which may have contributed to a growing brain. A brain with highly developed cognitive skills gave humans the capacity to solve problems and create tools that enabled better hunting and survival skills. Adaptations provided *H. ergaster and H. erectus* the ability to walk and run longer distances, to more effectively track and follow game, and to explore nearby continents.

Genetic information provided by mtDNA indicates that all humans shared common ancestors who lived in Africa 200,000 years ago. Studies of genetics shows examples of coevolution and how even small organisms such as lice can shed light on the human story. The rise of agriculture created new challenges for humanity, with evolutionary mismatch still impacting people today. From the earliest toolmakers to the cave art of the Upper Paleolithic to the modern computer age, the predominant theme of human history has always been about change. The ability to adapt to this change is why humans are still here. Humans' evolutionary story, however, does not end with the emergence of the species. Today humans are faced with numerous challenges as they adapt to an increasingly changing environment as a result of climate change, loss of habitat, and decreasing biodiversity. In 2020, Darwin's theory of natural selection played out in real time as people began an arms race with a mutating and evolving COVID virus. Evolutionary change is not something that happened to people just in the past—it is very much still happening today, and it will continue to be part of the future.

Critical Thinking Questions

1. What are some of the key anatomical differences between *Australopithecus* and one of the species in the genus *Homo*?
2. What criteria would you use to define a species belonging to the genus *Homo*?
3. What are some of the limitations in using the currently known criteria for classifying a species under the genus *Homo*?
4. What are some of the explanations or hypotheses for the increasing brain size (encephalization) seen in the genus *Homo*?
5. Based on current evidence, form a hypothesis as to what you think caused the extinction of the Neanderthal. What gave modern humans the edge?
6. In what ways has genetic research enabled modern humans to track their story?
7. What are some similarities between *Homo naledi, Homo floresiensis*, and *Homo luzonensis*, and what makes them so unique?
8. In what way are humans still evolving today? Can you provide an example?

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CHAPTER 6
Language and Communication

Figure 6.1 Family members gather at a sweet potato festival in Gushegu in northern Ghana. This highly social event brought together families, farmers, chiefs, and community members to celebrate the harvest of sweet potatoes. (credit: Official photographer of the US Embassy in Ghana/USAID in Ghana/Wikimedia Commons, Public Domain)

CHAPTER OUTLINE

INTRODUCTION Talk, talk, talk. As human beings, that is what we do all day (and sometimes all night). Even when we are alone, we might be listening to the radio, watching a video, reading, or texting—all activities that incorporate language. **Language** is often considered to be one of the quintessential elements of humanity, key to our social interactions and cultural development. No other animal does it the way we do. A few apes have been taught words in sign language, mainly using simple word combinations to ask for particular treats or desired activities. Is that anything compared to what we do with language?

Consider a situation from the author, Jennifer Hasty's own fieldwork.

> *While conducting research in Ghana, I once attended a large family gathering to honor the birth of a child, an event called an "outdooring." After everyone had arrived and socialized a bit, a middle-aged man stood up and took the microphone in his hand to pour libation. Libation is the ritual offering of*

drink to the ancestors, welcoming them to the ceremony and asking for their blessings. As he took the cup in his hand, he surveyed his audience, then stopped short, appearing extremely embarrassed. Looking down at his feet, he sputtered, "Oh! When the tongue is present, the teeth do not make noise."

Everyone laughed. It was a proverb I'd heard before, but I had no idea what it meant in this context. The speaker stepped aside as an even older man rose from a table at the edge of the gathering and slowly made his way to the microphone. The first speaker had assumed he was the eldest member of the family present at the gathering, but in fact, his older brother was there. By the rules of seniority, it was the older brother who should present the libation.

What did the proverb mean in that situation? In most cultures, people do not usually explain proverbs, so the listener has to piece together the meaning. In this case, the proverb was used metaphorically to compare the production of words in the mouth and the roles of the people involved in this particular performance of libation. The nimble tongue is central to human speech, while the teeth play a more fixed and supportive role, providing surfaces used by the tongue to make certain sounds. Alone, the teeth can only clash against each other meaninglessly. A tongue is needed to produce speech. Using the proverb, the first speaker was comparing his elder brother to the tongue—he was more central to the gathering and more proficient in the production of ceremonial speech such as libation. The younger man assigned himself the role of a tooth, only able to make noise rather than ceremonial speech.

In humans, language has developed into an extremely complex feature of sociocultural life. Just as the tongue is central to the production of human speech, language is central to the production of human culture. The subfield of linguistic anthropology examines the role of language in sociocultural life. Linguistic anthropologists are interested in how language affects our thinking and our experience of the world around us. Some explore the different categories of formal and informal speech that people have developed to organize rituals and ceremonies as well as everyday activities. Others listen carefully to various kinds of conversation, looking for patterns in the way people interpret and build on one another's speech acts.

The discipline linguistics is devoted to the study of language. Linguistics is the science of language, including subfields devoted to speech sounds, word forms, word arrangement, meanings, and practical language use. One subfield of linguistics, sociolinguistics, examines the social context of language use, such as how language varies according to age, gender, class, and race. While sociolinguistics and linguistic anthropology share an interest in the social side of language, linguistic anthropologists tend to focus on language as an aspect of larger cultural processes. Rather than looking at language as a sole object of study, linguistic anthropology studies language as one cultural element among many, all interwoven into the sociocultural life of a people.

6.1 The Emergence and Development of Language

LEARNING OUTCOMES

By the end of this section, you will be able to do the following:

- Describe the communicative abilities of wild animals such as birds and primates.
- Distinguish primate communication from human language.
- Identify the biological features of early hominins that were central to the emergence of language.
- Identify the archaeological evidence for the emergence of language.

There are some seven thousand languages spoken in the world today. Most people are proficient in at least one of them, possibly more. But people are biologically capable of mastering any of them, and have been since birth. Humans are born language ready. For a human baby, any language will do. With passive exposure to language (simply hearing it without any formal instruction), human toddlers learn the complex rules and vast vocabularies of the language spoken (or signed) around them. This astounding feat is made possible by specific biological features in the brains and bodies of human babies, features designed to help them understand and produce language. The learning of language then triggers further changes in our brains, making possible certain kinds of reasoning and thought as well as communication with others.

FIGURE 6.2 When teaching language to their children, some parents teach signs (such as those of American Sign Language) as well as spoken words for objects. The theory is that sign language and spoken language are processed in different parts of the brain. Teaching these two forms of language together may provide deeper cognitive reinforcement and greater chance of recall. This baby is making the sign for "bird." (credit: "Bri signs 'Bird'" by Bev Sykes/flickr, CC BY 2.0)

Drawing on biological and archaeological evidence, researchers seek to understand how, why, and when humans developed the biological features associated with language and, once language emerged, how the practice of language changed the way of life of early humans. Language became a building block for human culture of increasing complexity. Innovations such as stone tools, hunting, and using fire for heat and cooking were made possible by language. In turn, these new skills enhanced the survival of those who practiced them, increasing the likelihood that those people would live to pass on their genetic makeup to their offspring. This means that certain biological features were key to the invention of human culture and that human culture was key to the biological development of humans. We think of this as a reciprocal system of biocultural coevolution. Put another way, biology and culture developed in tandem, with language as the link between the two.

No one really knows when or how humans invented language. The problem is that language, whether spoken or gestural, leaves no direct trace in the archaeological record. Lacking direct evidence, researchers must be creative, combining various indirect forms of evidence to suggest theories about how language may have begun in humans. Based on such methods, researchers think that language may have emerged between 50,000 and 200,000 years ago. The largeness of this window of possibility is due to the indirect nature of the evidence and a great deal of controversy about which elements may have been most important in the process of language development. In this section, we look at these forms of indirect evidence, starting with communication in the animal kingdom.

Animal Communication

All animals communicate with each other and even with other species (Tallerman and Gibson 2011). Many use vocalizations like calls, growls, howls, and songs. Many also use gestures such as dances, postures, and facial expressions. Some change the color of their scales, skin, or fur. Some produce strong-smelling body fluids sprayed in their environment or rubbed on their own bodies. All of these activities are used to tell other animals about territory, food sources, predators, and mating opportunities.

FIGURE 6.3 Canada geese fly in a V formation to conserve energy and to keep track of all the birds in the formation. Coordination and communication are essential for the group. (credit: "Canada Geese" by Alex Galt, US Fish and Wildlife Service/flickr, CC BY 2.0)

Many people might be tempted to think that animals speak to each other just as we do, that their various forms of communication are roughly equivalent to language. Does your dog bark and jump excitedly whenever you pick up the leash? Isn't that a way of saying, "C'mon! Let's go for a walk!"

Some forms of animal communication are fairly simple, such as this canine leash mania. Others are far more complex, such as the way an octopus can change the color of and patterns on its skin for hunting, courtship, and camouflage. Fireflies use bioluminescence to attract mates and as a defense mechanism. Some fish generate electric fields to advertise their species and sex. Many animals use a vast lexicon of postures and gestures to communicate messages to one another and even to other species. When a bird issues a predator-alert call, squirrels respond as well. Many mammals pay attention to the predator warnings of birds.

Are these complex forms of communication equivalent to language? Take a closer look at one famous example of complex animal communication and compare it to human language.

A Waggle is Not a Word: The Complexity of Language

Consider the famous "waggle dance" of the honeybee. Upon finding a good source of nectar such as a grove of wildflowers, a worker bee returns to the hive and performs a special flight pattern consisting of a figure-eight waggle followed by a return loop alternating right and left. The direction and duration of the waggle communicate the direction and distance to the location of the desirable food source (Seeley 2010; Frisch 1993).

FIGURE 6.4 Diagram of the waggle dance of the honeybee. The movements performed by the bee during this dance communicate the direction of and distance to a food source to its fellow hive members. (credit: "20180622-FS-WashingtonDC-KTC-024" by Kelly Chang, US Forest Service/flickr, Public Domain)

The waggle dance is certainly a complex and effective form of communication, but does it qualify as language? **Communication** refers to the transfer of information from a sender to a receiver. Communication can be voluntary or involuntary, simple or complex. Language is a specific, complex, systematized form of communication involving the use of vocal or gestural units (words or signs) that can be combined and recombined in larger structures (sentences) that can convey an infinite array of complex meanings. Language is a form of communication. Not all communication is language.

Central to the infinite possibilities of language is a set of rules that govern just how sounds, signs, words, and phrases may be combined. These rules structure the order of words, dictating, for example, where to put subjects and actions in an utterance so that listeners will be able to find them. Rules also tell us whether words indicate a single thing or multiple things and whether actions occur in the past, present, or future. Complex forms of animal communication such as the waggle dance do contain some systematic rules governing the sequence, duration, and intensity of certain segments of the communication, but they are highly constrained to very limited contexts. For example, the waggle dance can be used to signal nectar sources near and far, but it cannot be used to discuss the weather or comment on the laziness of the queen. Unlike the relatively "closed" systems of communication common among animals, human language is open-ended. Our languages have the distinctive quality of allowing actors to combine units in an infinite number of ways to produce new meanings.

Simple Signs and Pant-Hoots: Language in Primates

Biological anthropologists posit that we share a common ancestor with the other great apes (gorillas, chimpanzees, bonobos, and orangutans) about five to eight million years ago. As nonhuman primates do not produce language in the wild, the biological and cultural features that promoted language must have emerged after that. However, studies aimed at teaching human language to nonhuman primates have revealed that individuals of these species are able to master basic vocabulary and use simple words and word combinations to obtain the things they want. So the great apes must have some biological features that enable them to learn human language in a partial and limited way.

You may have heard of Koko, the gorilla famous for learning to use sign language. Sign language is used in such studies because nonhuman primates lack the distinctive vocal tract required to make the sounds of human language. Researcher Penny Patterson taught Koko to use about a thousand signs, roughly the vocabulary of a three-year-old child (Patterson and Linden 1981). Patterson reported that Koko could comment on things that were not currently present in her environment, such as personal memories. According to Patterson, Koko could joke and lie and teach other gorillas to sign. She could even invent new signs. Many of these claims are disputed by other researchers. Some point out that the evidence is largely anecdotal and relies on the interpretation of Patterson herself, hardly an objective observer. Though controversial, Patterson's path-

breaking work with Koko provided a wealth of data and opened up new possibilities for understanding the language abilities of nonhuman primates.

FIGURE 6.5 Koko learning to play the guitar. Koko became famous for learning to communicate with humans using roughly 1,000 signs taught to her by researcher Penny Patterson. (credit: "ODCnewBegin9" by FolsomNatural/flickr, CC BY 2.0)

Human-reared chimps, gorillas, bonobos, and orangutans have all been taught to use gestures or tokens to refer to things in the world around them, often combining those signs in a rule-based way to make comments and requests. Even though many linguists are skeptical of these studies, the use of symbolic systems in cooperative interactions to achieve goals does seem to indicate that great apes have the basic capacity to generate some sort of protolanguage. **Protolanguage** refers to a very simple set of gestures or utterances that may have preceded the development of human language. But do apes display these abilities due to some innate capacity or because we have taught them symbolic systems? Perhaps learning a symbolic system has changed the brains of these individual animals in distinctive ways.

FIGURE 6.6 Chimpanzees use gestures and facial expressions as well as vocalizations to communicate with one another. (credit: "Chimpanzees" by foshie/flickr, CC BY 2.0)

Many primatologists conduct research on the vocal and gestural forms of communication used by primates in

the wild, looking for those biological features that might underpin the human capacity for language. Wild chimpanzees, for instance, produce a wide range of calls, including hoots, pant-hoots, pant-grunts, pant-barks, rough-grunts, nest-grunts, alarm barks, waa-barks, wraas, screams, and soft panting play sounds (Acoustical Society of America 2018). Primatologists have listened closely to these calls. Some argue that chimp vocalizations are not much like human language, as calls are fairly fixed and limited in their meanings. Chimps may use a rough grunt to indicate a food source, but they do not seem to have specific grunts for specific food types. Monogamous pairs of gibbons, a smaller species of ape, are known to perform elaborate morning duets. Gibbons have an array of predator calls as well. Research comparing duets with predator calls suggests that gibbons compose their songs to convey specific information, each note carrying a certain meaning (Clark et al. 2006). While impressive, the ability to manipulate notes to convey a limited range of meanings is still a far cry from the infinite productivity of human language. The limitless recombination of signs that produces the flexible, open-ended quality of language is missing in the communication systems of wild primates.

Human Biology and the Emergence of Language

There must be something special about us to make possible the distinctively flexible and open-ended communication system of language. Research has focused on our throats, our brains, and our genes, looking for the biological features that allowed for the emergence of language.

The Vocal Tract

Humans have evolved a very unusual vocal tract with a descended larynx (otherwise known as the "voice box") and a large and rounded tongue positioned in the mouth to enable a remarkable array of sounds (Lim and Snyder 2015). Some researchers suggest that our throats may have evolved in response to walking upright or changes in diet or a combination of those two factors. Humans also have more deliberate control over breathing than nonhuman primates. In order to better understand when hominins developed this distinct vocal apparatus, researchers examine the hyoid bones of hominins to see if they resemble those of modern humans. The hyoid is a U-shaped bone in the human throat that helps us swallow and move our tongues. The few hyoids that have been found in the fossil record suggest that our distinctive vocal tract may have been developed around 500,000 years ago. This means that Neanderthals likely had the same vocal abilities as modern humans.

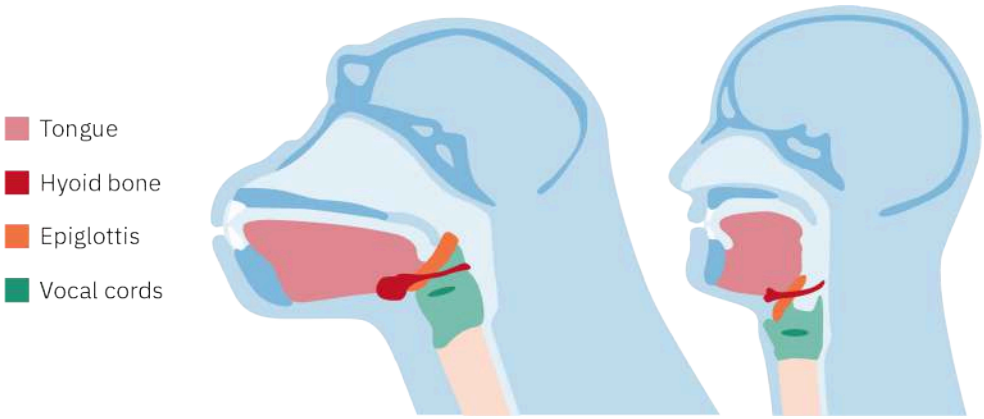

FIGURE 6.7 Evolutionary changes in the vocal tract enabled the development of spoken language in humans. The image on the left shows the vocal structures an early ancestor to humans. The image on the right shows the vocal tract of modern humans. The position of the vocal structures in the early ancestor allows for eating and breathing at the same time. The position of these structures in modern humans allows more sounds to be produced and more words to be spoken in sequence. (attribution: Copyright Rice University, OpenStax, under CC BY 4.0 license)

Brain Structure

Several features of the human brain are considered prerequisites to language, including the overall (large) size, the division into specialized hemispheres, and certain structures like Broca's and Wernicke's areas. Broca's area is a region of the brain associated with the production of speech. Wernicke's area is essential to the comprehension of language. Both are most often located in the left hemisphere of the human brain (for left-

handed people, both *can* be located on the right side). How did we acquire these brain features so essential to language? A great deal of controversy surrounds this question, as researchers debate when and how these structures evolved.

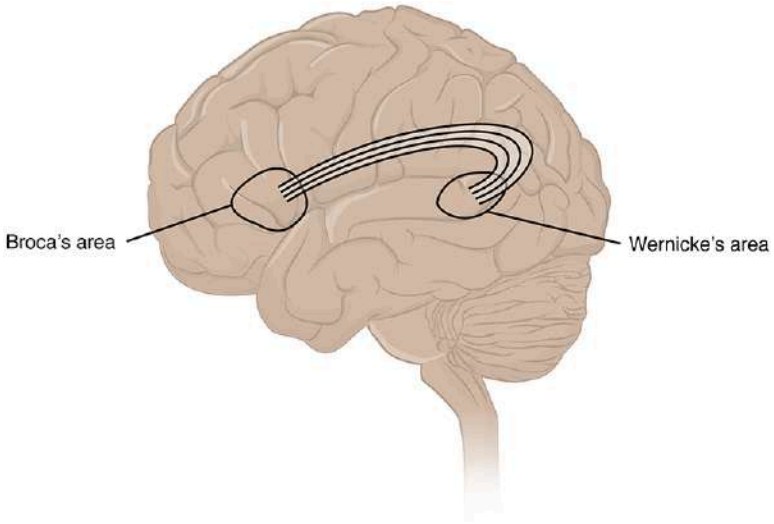

FIGURE 6.8 The locations of Broca's area and Wernicke's area in the human brain. Broca's area, responsible for the articulation of speech, is next to the motor area, where the movements of the body are controlled. Wernicke's area, associated with language comprehension, is situated beside the primary auditory area, where sounds are processed. (credit: "1605 Brocas and Wernickes Areas-02" by OpenStax College/Wikimedia Commons, CC BY 3.0)

Most recently, research has focused on "**mirror neurons**," special brain cells that seem to enable mimicry (Lim and Snyder 2015). Many researchers think that the ability to understand the actions of others and recreate those actions ourselves is a fundamental prerequisite for language. That is, in order to be able to talk to each other, early hominins must have been able to evaluate and interpret each other's actions and reproduce them in similar contexts. In primates like monkeys, scientists have discovered a system of specialized neurons called the "mirror neuron system" that enables primates to recognize and imitate actions. Monkeys and apes cannot talk, but they can recognize, interpret, and imitate actions performed by other primates. The neurological studies that revealed mirror neurons are too invasive to perform on humans, but neuroimaging studies suggest that a similar mirror neuron system does exist in humans.

FIGURE 6.9 Mirror neurons are most likely involved in the spread of contagious yawning. Mirror yawning happens between humans and can even happen across species. You can make your dog yawn! (credit: "Sleepy" by Toshimasa Ishibashi/flickr, CC BY 2.0)

Brain imaging studies on humans have located evidence for the mirror neuron system in a region of the brain

close to Broca's area. So it is possible that the mirror neuron system inherited from primates provided a foundation for the later emergence of a brain structure devoted to language production in hominins. If imitation and language are in fact connected in this way, then a system of gestures may have paved the way for the development of language. Some researchers now hypothesize exactly this: that hominin language evolved from a system of gestures to a system of vocalizations.

The "Language Gene"

In the late 1980s, medical researchers became aware of a particular speech disorder common among members of one family in West London. Many members of this family could not pronounce words. Many stuttered. Many had very limited vocabularies. Geneticists traced the disorder to a genetic mutation on chromosome number 7 of the human genome. (See Biological Evolution and Early Human Evidence for more on chromosomes and genes.) The mutation was located on a gene named **FOXP2**, prompting some researchers to dub this "the language gene." Some hypothesize that FOXP2 may have played a role in the development of language in humans (Lim and Snyder 2015).

At first, researchers thought that only humans had the FOXP2 gene, but subsequently a form of this same gene has been identified in many vertebrates, including mice, bats, fish, and songbirds. In mice, the gene appears to be related to vocalizations. In birds, it seems to be linked to birdsong. All primates have FOXP2, but the human copy is slightly different than that of nonhuman primates. Some researchers think this mutation occurred around 260,000 years ago and may have enabled the development of spoken language in Neanderthals and *Homo sapiens*.

Other researchers are skeptical of the notion that one gene could be responsible for the emergence of spoken language (Tallerman and Gibson 2011). Many anatomical developments and cognitive processes—connected to different parts of the human genome—are involved in human language. These developments and changes would have required mutations in other parts of the genome of early Homo. While the mutation of FOXP2 in Homo may have played a role in language development, other mutations would have been important as well.

Hominin Material Culture

Evidence from the material culture of hominins such as *Homo habilis* and *Homo erectus* is also used to speculate about the emergence of human language. Early hominins developed stone tool technologies and created stunning works of art. The production and use of such tools and artwork must have required a complex set of social and cognitive abilities. Those same types of social and cognitive skills are important to human language. It is possible that language emerged as part of a whole complex of material culture.

Archaeological evidence and linguistic theory come together in a model suggesting that the invention of tools by early hominins was linked to the invention of language. Some linguistic theorists suggest that the evolutionary changes in brain structure that allowed for the development of tool use also support the emergence of language. Furthermore, the innovations of tools and language are entwined in a reciprocal relationship; evolutionary pressure to develop tools stimulated the development of language, and the development of language facilitated increasingly complex tool making and tool use.

There are two theories to explain the connections between advances in tool use and language. The first rests on the assumption that tool making requires a considerable degree of cognitive planning. You cannot make a useful tool by just picking up a rock and randomly chipping away at it. Hominins like *Homo habilis* and *Homo erectus* must have known just what kind of rocks would work as base and chipper and how to execute a set of precise chips in a certain sequence to achieve a sharp blade without breaking the core. The mental processes important to this sort of planning are hypothesized to have also enabled hominins to do the sort of quick planning involved in the production of complex speech (Tallerman and Gibson 2011).

A second theory linking tool use and language emphasizes the importance of imitation in passing along the complex set of skills involved in tool making. Neuroscientist Michael Arbib suggests that the ability to imitate may have generated the first gestural language among hominins (2011). And he has developed a model to describe how imitation and tool making may have evolved together over time. About 2.5 million years ago, *Homo habilis* began making basic stone choppers, cores with flakes removed, used for butchering carcasses. Such choppers are called Oldowan tools, named after the site in Olduvai Gorge in Tanzania where they were

first found. Arbib has theorized that the production of Oldowan tools required the ability for hominins to imitate each other's actions. Simple imitation would make it possible for a learner to reproduce the actions of an accomplished tool maker through observation and mimicry. This ability to imitate is biologically rooted in the system of mirror neurons discussed earlier. As hominin brains acquired the ability of simple imitation involved in tool production, they might also become capable of the kind of gestural communication we see in apes today—not language, but a precursor to it. Investigate this diagram for more about the evolution of language (https://openstax.org/r/researchgate).

The array of action-oriented mirror neurons, tool innovation, and language all progressed together in hominin evolution. As tool technology developed, Homo erectus began making distinctive pear-shaped hand axes about 1.6 million years ago. A more intricate form of imitation would have been necessary to teach this sort of tool making to others, corresponding to the emergence of protolanguage. This protolanguage might have been a set of simple one-word utterances corresponding to concepts such as "yes," "no," "here," or "there."

We don't have any hominin brains to examine, but remember that in the human brain, the system of mirror neurons is assumed to be situated near Broca's area, which is associated with human speech. So very likely, protolanguage emerged in the same part of the brain as the ability to imitate. The explosion of innovations in tool making over the past 100,000 years is linked to the emergence of complex human language. While the development of mirror neurons and the ability to learn tool making required biological changes to the brain, Arbib argues that the last step, the emergence of language, was purely cultural.

6.2 Language and the Mind

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Describe the role of language in categorizing items in the natural world.
- Explain the Sapir-Whorf hypothesis.
- Provide at least two examples of linguistic universals.
- Describe how metaphor shapes how we talk about abstract concepts.

As discussed in the previous section, certain cognitive abilities were crucial to the development of language in humans. And reciprocally, once language emerged, it shaped our thoughts and actions in ways that helped our species cooperate, invent, learn, and adapt to the environment. Language must have been a fundamental element in the creation of human culture (singular) and the eventual development into human cultures (plural) as different groups of humans moved into different geographical areas and began adapting to different conditions.

One key advantage of language is that it provides a way of encoding specific information about the environment and sharing that information with others so that it endures over time. If, say, there are snakes in an area, it would certainly be important to distinguish the venomous ones from the harmless ones, so probably there would be separate words for those two categories of snake or at least words for each specific snake so that people could alert each other to the presence of a dangerous one.

This means that early language must have been developed *relative* to environmental conditions. Linguistic anthropologists are interested in the way that language varies across cultures, reflecting different environmental, historical, and sociocultural conditions. This is called **linguistic relativity**.

On the other hand, languages are also constrained by human anatomy and cognitive abilities. Say there were two species of snake in an area, one poisonous and the other harmless, but you could not tell them apart by looking at them. (This is actually an adaptive strategy deployed by harmless animals called adaptive mimicry.) In this case, early humans probably would have had just one word for snake, indicating that sometimes a snake's bite made you sick and sometimes it didn't. As this example shows, the human visual apparatus shapes our understanding of the world, which, in turn, shapes our language.

Consider another example from the natural world—the beetle. There are over 300,000 types of beetles in the world. How many can you name? All of them? Ten of them? Two of them? Outside of written scientific taxonomy, there is no language in the world that contains separate terms for each kind of beetle. This is not

only because there are only a few thousand of each type of beetle living in any one environment but also because of limits to the number of terms any person can learn and remember. Our vocabulary is constrained by the limits of human memory.

FIGURE 6.10 So many beetles. How many can you name? There are over 300,000 types of beetles in the world. Outside of written scientific taxonomy, no language in the world contains separate terms for each kind of beetle. (credit: "display drawer 3" by Joana Cristovao, Natural History Museum/flickr, CC BY 2.0)

So language is shaped not only by environmental conditions but also by how humans interact with their environments. Our common human anatomy influences our comprehension of the world, and that comprehension is expressed in language. This insight suggests that all languages must have some things in common by virtue of the fact that all humans have the same anatomy and cognitive abilities. Some linguistic anthropologists are interested in discovering these **linguistic universals**.

In the next section, we take a look at some intriguing research on both linguistic relativity and linguistic universals, seeking to better understand how language interacts with our human minds.

Linguistic Relativism and the Sapir-Whorf Hypothesis

As seen in previous chapters, it was lamentably common for scholars in the early 20th century to think of non-Western societies as backward and primitive, incapable of complex, abstract thought. Franz Boas worked hard to disprove these racist notions, seeking to demonstrate the equal sophistication of all peoples and cultures. Boas trained a student named Edward Sapir who was particularly interested in how non-Western languages conveyed forms of complex, abstract thought that were different from the Euro-American habits of thought. Sapir, in turn, trained a student named Benjamin Whorf who further elaborated on this theme in his own research (Ahearn 2017). The result is what we have come to call the "Sapir-Whorf" hypothesis.

The **Sapir-Whorf hypothesis** argues that the particular language you speak influences how you think about reality (Lucy 2001). Thus, different languages encourage different habits of thought. This is an essential tenet of linguistic relativity. Whorf based his argument on a comparison between the Native American language of Hopi and what he called "Standard Average European" (SAE), a broad category of European languages including English. Whorf was interested in how speakers of each language might think differently about time. In English vocabulary, time is divided into units that can be counted. English speakers talk about the number of seconds, minutes, or days before an event or consider the number of months or years since something

occurred. In Hopi, according to Whorf, time is conceived as indivisible and enduring, a whole process unfolding. The Hopi talk about the flow of events in a completely different way, a processual way Whorf termed "eventing." Whorf argued that these linguistic features profoundly influenced sociocultural life in each of these two contexts. Holding with the understanding of time as process, Hopi culture emphasized preparation, endurance, and intensity. Coordinating with the SAE expression of time as countable units, Euro-American culture emphasized schedules, accounting, and record keeping. Many people use a calendar to keep track of meetings, appointments, and assignments. Whorf would argue that the English language encourages us to think of time and events in this way, as a spatialized set of boxes to be filled up with discrete objects.

In connection with the Sapir-Whorf hypothesis, it is sometimes said that the "Eskimos" have 400 words for snow. This notion is both problematic and untrue. The first problem is that "Eskimo" is considered a derogatory term by the Inuit and Aleutian peoples to whom it has been applied. And, secondly, the claim turns out to be wrong. Anthropologist Laura Martin (1986, also described in Ahearn 2017) has debunked the myth by documenting that Arctic peoples really have just two root words for talking about snow, one for snow that is falling and the other for snow that is on the ground. They use these roots much as English-speakers would, to talk about snowstorms, snowflakes, snow drifts, and snow melt. The Sapir-Whorf hypothesis is not typically applied to the vocabularies of different cultures anymore.

Recall the earlier example about snakes. We hypothesized that a culture might not distinguish between two species of snakes if those snakes looked identical. But if people gradually came to notice that the poisonous snakes were always found in trees while the harmless snakes were always found on the ground, it is likely that a different term would come to be used for the tree-dwelling kind of snake, the one with the harmful bite. That is to say, even if a culture previously had only one term for snake, the people in that culture could easily understand that there were, in fact, two kinds and would be able to change their language to mark that difference in their vocabulary for future reference. Their vocabulary would not limit their thinking to such a degree that they could not conceive of two different kinds of snake.

Rather than specific vocabulary words, researchers who study linguistic relativity have come to focus on larger abstract topics like space. In languages such as English, when people want to tell someone where a particular object is, they most frequently use language focused on their own bodies. English-speakers say, "You have a bit of arugula on the left side of your mouth" or "Grab the pink top hat on the shelf above you." This way of talking relies on the human body as a point of reference and therefore is relative to the bodies of the speaker and/or hearer. This creates confusion when the speaker is facing the person they are talking to, sometimes prompting someone to say, "No, *my* left, not *your* left!" Steven Levinson has conducted research on languages that do not use the human body to talk about direction at all (2003). Instead, they use the cardinal directions (north, south, east, west) and specific features of their environments (mountains, oceans) to talk about where things are. A speaker of the Australian indigenous language of Guugu Yimithirr might say, "Watch out for the snake just north of your foot!" This way of talking about space is absolute, not relative. Such speakers never have to say "No, *my* north, not *your* north," as there's only one absolute north. Research suggests that these different ways of reckoning give us different kinds of mental maps, such that a Guugu Yimithirr speaker might be better at absolute navigation than an English speaker, and perhaps more adept at finding her way back home if she lost her way.

Linguistic Universals and Folk Taxonomies

While linguistic relativists explore how different linguistic patterns shape different thought patterns (and vice versa), other linguists are interested in how all languages are constrained by our common human biology and in finding universal linguistic patterns. There are specific domains of language that lend themselves particularly well to this kind of inquiry. One of them is color. The reason for this is that color relies directly on our human visual system, invariant across cultures.

And yet there is enormous diversity in the ways that different cultures divide up the spectrum of possible color. Some cultures have hundreds of color terms, while others have only two or three. Researchers Brent Berlin and Paul Kay analyzed the color term systems of 98 languages and found that the diversity of color term systems is governed by one set of rules. All of these color term systems are comprised of a few basic colors with specific colors added to the scheme over time (Kay 2015, Berlin and Kay 1969). The color schemes of all cultures are

based on the distinction between black and white (or light and dark). If a culture has only two terms, those two terms will always be black and white. The next most important color is red. If a culture has three color terms, those terms will be black, white, and red. Next comes green and yellow, then blue, then brown, then purple, pink, orange, and gray, always in that order. Berlin and Kay suggested that these rules form a pattern for the way all languages develop over long periods of time. Although the scheme proposed by Berlin and Kay has been revised a little in the past 50 years, the basic tenets have held up pretty well (Haynie and Bowern 2016).

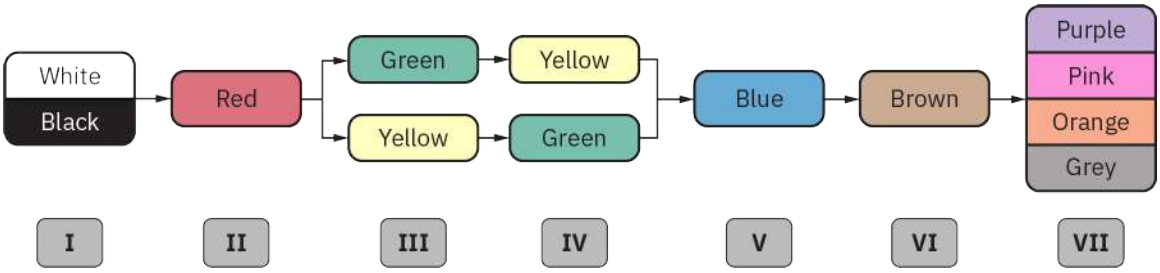

FIGURE 6.11 Berlin and Kay's developmental scheme for the elaboration of color terms. Some cultures only distinguish black from white. When another term emerges, that color is red. After that, green and yellow are added, either one first. Then blue and brown are added, in that order, and then one of these four: purple, pink, orange, or gray. (attribution: Copyright Rice University, OpenStax, under CC BY 4.0 license)

VIDEO

Vox: The Surprising Pattern behind Color Names around the World
Click to view content (https://openstax.org/r/surprisingpattern)

Oddly, though this finding lends very strong support to the notion of linguistic universals, the very same research has also been used to argue for linguistic relativity. Paul Kay later teamed up with another linguist, Willet Kempton, to consider how different color schemes might affect how people "see" color in the environment around them (1984). They presented people with color chips on the spectrum between true blue and true green. They asked subjects how they would group all the colors into two categories. People who spoke languages that had terms for both blue and green drew a more distinct boundary between the two colors than people who had just one word for both blue and green.

Clearly, relativity and universalism are both aspects of human language. Our common biology plays a role in how humans interact with the world, providing regularity to the way all languages categorize not only color but also plants, animals, weather, and other natural phenomena. Researchers who study the systems of categories people use to organize their knowledge of the world have a term for those cultural systems: **folk taxonomies**. The folk taxonomy for any area of human knowledge reflects both human biology and the surrounding environment and sociocultural practices. There are folk taxonomies for plants, animals, clouds, foods, and the cries of babies.

Folk taxonomies are not just vocabulary terms; they frequently structure any kind of distinction that is meaningful within a culture, even those that rely on simple qualifiers like "good" and "bad." One example is death, surely invariant across cultures. Societies all over the world distinguish between a "good" death and a "bad" death. These notions reflect cultural beliefs and values—such as the American notion that a good death is a painless one. Among the Akan peoples of Ghana, a good death is the death of someone who has led a very long life, achieving all of the culturally valued accomplishments in life, such as getting married, having children, accumulating property, and providing support to friends and family members (Adinkra 2020). Imagine a very old great-grandmother surrounded by her many descendants as she lies in her bed, heaving one final breath as she drifts away peacefully into death. That is a good death. A bad death is tragic and violent, the sudden death of a person who has not had the chance to really live a full life. Think of a young person drowning or dying in a traffic accident. That is a very bad death. If someone has had a good death, that person is eligible to become an ancestor if the correct rituals are performed. The body must be washed, publicly mourned, and buried in a beautiful casket in a public cemetery, often with grave goods like tools and money to help the person in the afterlife. Ancestors are important, as they watch over their living relatives, possibly

helping them out if called upon through libation or other ritual means. If someone has had a bad death, however, they may become an angry ghost, haunting family members with bad luck. The funeral rites of bad deaths are rushed, minimal, and private in order to avoid commemorating or communicating with the agitated spirit.

Categorization is central to our perceptions, thoughts, actions, and speech. The way humans categorize objects and experiences is limited by the way our brains and bodies work, resulting in linguistic universals like the developmental scheme of color terms. However, the complex meanings associated with cultural categories vary widely, resulting in a great deal of linguistic relativity. Linguistic relativism and universalism are often described as opposite positions, but in fact, they are both essential and complementary features of human language.

Meaning and Metaphor

How are you feeling today? Are you feeling *up* or feeling *down*? If you're feeling *low*, try doing something fun to *lift your spirits*. Take care of yourself so you don't *fall into a depression*.

An old theory suggested that languages are primarily referential; that is, each language contains a set of vocabulary terms that correspond to elements in the natural world. According to this theory, language functions as a mirror of reality. We have seen in the last section, however, that different languages divide up the natural world in different ways, from the natural domains of color and plants to the human domains of life and death. Moreover, humans use language to talk about abstract issues like mood, social relationships, and communication itself. It is fairly easy to use our terms for spatial organization to talk about the location of concrete objects like arugula on somebody's face. But what about more abstract issues? How do we talk about becoming friends with someone? How do we discuss an argument we're making in a term paper? How do we talk about how we're feeling today?

Mood is like color insofar as the human physiology of mood structures a set of near-universal basic categories including happiness, sadness, anger, fear, disgust, and surprise. And yet, because mood occurs on a spectrum, it is divided up in different ways by different cultures. Consider "schadenfreude," a German word combining the roots for "damage" and "joy." Schadenfreude refers to taking pleasure in another's misfortune. There is no equivalent word in English.

We don't just use language to identify the emotions we're feeling. We also talk about the process of developing an emotion, how one mood leads to another, and how we can prevent ourselves from feeling a certain way. These are mysterious and abstract processes. How do we do this? We use metaphor. A **metaphor** is a linguistic idiom where use what we know about something *concrete* to think and talk about something *abstract*. Cognitive linguists George Lakoff and Mark Johnson argue that metaphor is the primary way we create complex meaning in language (1980). In terms of mood, we use our *concrete* language of direction to talk about our *abstract* experience of mood. A positive mood is understood as *up*, while a negative mood is considered *down.* If you're feeling really happy, you might say you're *on top of the world*. If you're really sad, you might say you're *down in the dumps*. In fact, the word for prolonged sadness, *depression*, literally refers to a sunken place or the act of lowering something.

Metaphor is one of those things that you don't notice until you start paying attention to it. And then you realize that it's everywhere: in the way you think about time, number, life, love, physical fitness, work, leisure, sleep, and thought itself, just to name a few highly metaphorical topics. Just about any abstract area of experience is structured by metaphorical thinking. Here are three common metaphors in English, with examples.

LIFE IS A JOURNEY

> He took the wrong *path* in life.
> As you *move ahead*, you should *follow* your dreams.
> When I left home, I came to a *crossroads* in life.
> If you work hard, you'll *arrive* at a sense of accomplishment later in life.

LOVE IS SWEET

> She's my *sweetheart*.

The newlyweds went on a *honeymoon*.
Sugar, would you pass the salt?
Our love was *sweet*, but then it went *sour*.

ARGUMENT IS COMBAT

The candidate launched a personal *attack* against her opponent.
His position on taxes is *indefensible.*
Armed with facts, she won the argument.
His criticism really *hit the mark*.

There are thousands and thousands of metaphors in English. Many abstract domains rely on a combination of various metaphors used to describe different aspects of the experience. You can think of love as sweet (as above) but also as a journey (as in "Will the couple *go forward* together, or will they go their *separate ways*?") or as combat (as in "He *slew me* with his come-hither glance").

Metaphor is found in all human languages. Some specific metaphors, like the directional metaphors used to describe mood, are found in many, many cultures. A study by Esther Afreh (2018) found that the king of Asante (in Ghana) frequently uses metaphorical language in his public speeches, including such familiar ones as "life is a journey," "life is a battle," "ideas are food," "knowing is seeing," and "death is sleep." Though the speeches were delivered in English, Afreh notes that these metaphors also exist in Akan, the local language of the Asante people. Alongside her analysis of the English-language speeches, she notes many proverbs and phrases in Akan that use the same metaphors.

As with our discussion of categorization in the last section, metaphor is both relative and universal. Lakoff and Johnson argue that our common human biology structures our experiences of things like emotion and life. When you're feeling really sad, you might literally feel like lying down, and when you're really happy, you might jump with joy. We may use the notion of a journey to structure our understanding of life, social relationships, and time in general because in our everyday life, we move forward in space to pursue objects and activities.

Sometimes the reasons for cross-cultural similarities are not so directly linked to human biology. English and Chinese have similar metaphorical systems for talking about moral issues. In both languages, the adjective meaning "high" is associated with things that are lofty, noble, or good, while the adjective "low" is used to describe things that are mean, contemptible, or evil (Yu 2016). Alternatively, it is also possible in both languages to describe moral behavior as "straight," while immoral behavior can be termed "crooked."

On the other hand (to deploy a useful metaphor), different cultures do rely on different metaphors to talk about some domains of experience, metaphors that emphasize certain aspects of those abstract topics. Consider the English notion that "time is money." This is a metaphor, pure and simple, but many English speakers believe it to be absolutely true. You can *spend* time, *waste* time, *save* time, and *invest* time. So time does seem like money in capitalist cultures. But time is *not literally* money. Nor is time a journey or a horizontal line in space, though these are common ways of thinking about time in the English language. Time is just time, an abstract idea. Certainly Whorf did not find the Hopi talking about time as money. English speakers think of time in terms of money because they live in a society in which time is *treated as* money, a society that tends to monetize nearly everything, from land and labor to advice, attention, and even body parts like human sperm.

6.3 Language, Community, and Culture

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Explain the role of culture in the acquisition of language.
- Describe how language can form the foundation of sociocultural groups in speech communities.
- Describe how people code-switch among speech communities.

While language is critical to individual human thought, its basic function is to communicate messages in human communities. That is, language is fundamentally social. Through social interaction, humans learn the language of their community. And through language, humans express community identity and coordinate

their activities.

Language Acquisition and Language Socialization

Imagine that someone handed you a babbling baby and said to you, "Teach this baby the basic rules and values of our culture." What would you do?

Likely, you'd start by teaching the baby your language. Without language, it's pretty hard to teach rules and values (unless you are a *really* good mime). Luckily, babies come into the world with special cognitive abilities that make them ready to learn language. Most babies undergo a rapid process of language learning between the ages of nine months and three years. Babies proceed through a set of stages that allow them to learn language just by being exposed to surrounding talk. Many scholars study the problem of **language acquisition**, examining precisely how humans manage to learn language in a diversity of sociocultural contexts.

So your babbling baby would probably learn language just by being exposed to it. But what if someone wanted to hasten the process or make sure their baby was particularly excellent with language?

An American would probably interact with the baby in a particular way, sitting the baby on their lap facing them, pointing to objects and asking basic questions in a quiz-like fashion. "See the cookie? Where did the cookie go? In my tummy!" The person might say these types of things while talking in a high-pitched, sing-song voice. Linguists call this type of talk "motherese." In many other cultures, caregivers do not interact with babies in this way. In some cultures, oversimplified "baby talk" is considered detrimental to language learning. The context of language learning might involve a whole host of characters beyond the baby and the caregiver, encompassing all household relatives, neighbors, visitors, and even strangers. Language is not always "taught" to babies, but is often witnessed and overheard. Rather than quizzing her baby American style, a mother in Kaluli society in Papua New Guinea is more likely to sit her baby on her lap facing outward, talking "for" the baby in conversations with siblings (Ochs and Schieffelin [1984] 2001). In West Africa, babies spend large parts of the day wrapped on the backs of their mothers where face-to-face interaction with her is impossible. But they overhear the talk around them all day long, and people frequently engage their attention in brief interactions. In the field of **language socialization**, researchers go beyond the various stages of language learning to focus on the social contexts in which language is acquired. As social contexts shape the way children learn language, language itself becomes a means of learning about sociocultural life.

Whether facing their caregivers or facing out to the social world around them, babies in all cultures learn to be proficient in their languages. And yet, in American culture, the notion persists that language proficiency relies on very precise forms of interaction between caregiver and baby, the American model of motherese. Every culture has specific ideas about language, how it is acquired, how it varies across social groups, how it changes over time, etc. These ideas are termed **language ideologies**. Some of these ideas, like the notion that babies have a special "window" of opportunity for learning language, are supported by linguistic research. Others, however, are challenged by ethnographic and cross-cultural research.

Speech Communities and Code Switching

A ten-year-old girl described one of her stuffed animals as "derpy." Here is a snippet of her conversation with her mother:

Thisbe: Look at his face. He's so derpy.
Jennifer: Derpy? I don't know that word. What does it mean?
Thisbe: Like, kind of stupid. Kind of dumb.
Jennifer: Oh, ok. Like Clover [our dog], when she fell off the couch. Was that derpy?
Thisbe: No, that's not derpy! It's like … Mom, I just can't explain it to you. You just have to know.

All speakers of a particular language form a hypothetical community, sharing a common grammar and vocabulary, as well as a set of understandings about how language is used in different situations. Within this large group are smaller groups of speakers who use the common language in special ways unique to that group. Anthropologists use the term **speech community** to describe such a group (Muehlmann 2014). Speech communities often have distinctive vocabularies, grammatical forms, and intonation patterns. Using these features appropriately, members of the speech community demonstrate their membership in the group.

The concept of speech community was originally used to describe the distribution of dialects in a language. A **dialect** is a form of language specific to a particular region. For instance, in the Philadelphia metropolitan area, it's common for local people to pronounce the word "water" as "woohder," as if it nearly rhymes with the word "order." It's also common to use the phrase "yooz" for the second-person plural (as in, "Yooz better drink some woohder!"). Linguists William Labov, Sharon Ash, and Charles Boberg famously mapped out these dialectical differences in different regions of the United States (2006). Over time, a dialect can accumulate such unique linguistic features that it develops into a separate language. Indeed, the distinction between a well-developed dialect and a language is largely political. Nation-states may downplay regional differences as mere dialects in order to maintain linguistic unity, while separatist political movements may champion their way of speaking as an entirely different language in order to justify their demands for independence.

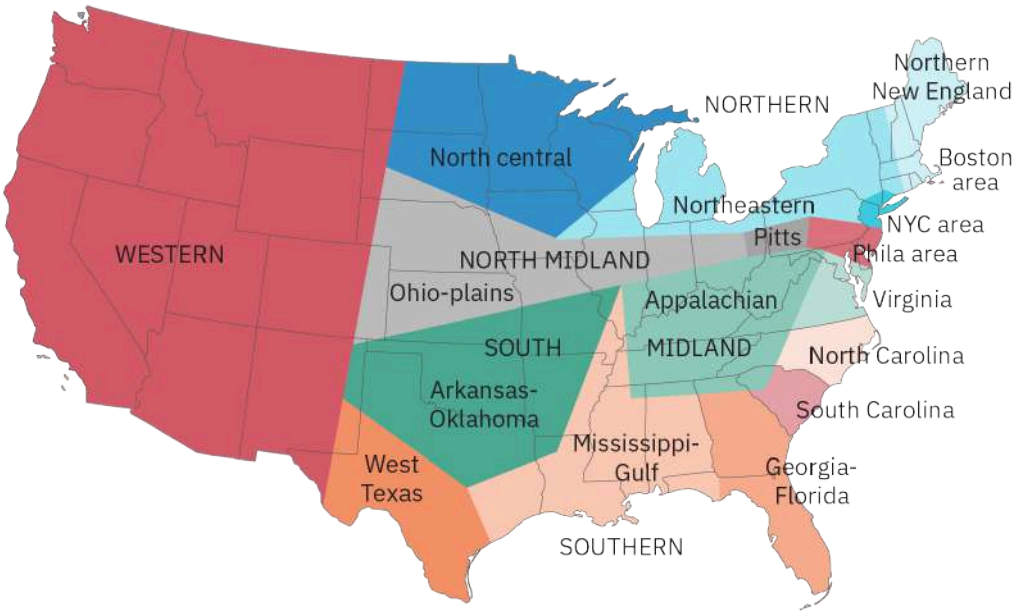

FIGURE 6.12 Map of American dialects. While English is the official language in all areas of the United States, the particular way it is spoken varies from region to region. (attribution: Copyright Rice University, OpenStax, under CC BY 4.0 license)

Other researchers have focused on the speech communities of ethnic groups and immigrants. Researchers use the term **vernacular** to describe dialects that are not necessarily regional but associated with specific social categories, such as groups based on ethnicity, age, or gender. Anthropological research on African American Vernacular English (AAE), Chicano English, and Native American English have all shown how these vernaculars shape distinctive forms of storytelling, arguing, and criticism (Chun and Lo 2015). Rather than seeing ethnic vernaculars as "incorrect" forms of English, researchers demonstrate how vernaculars like AAE are highly structured linguistic systems with regular grammatical patterns and innovative vocabularies (Labov 1972a). In formal settings like American classrooms and courtrooms, these alternative ways of using English are too often stigmatized as lazy, unintelligent, or just plain wrong. Believing their own English to be the "correct" form, authority figures often forbid the use of alternative vernaculars of English and refuse to engage in any effort to understand those forms.

More recent research on vernaculars has explored how speakers maneuver among the styles of language they encounter in their daily lives, engaging in various languages, dialects, vernaculars, and other elements of style. We all use a variety of linguistic styles, and many speak more than one language. Addressing different audiences, U.S. President Barack Obama used linguistic strategies to "Whiten," "Blacken," "Americanize," and "Christianize" his public identity, thus subverting racial stereotypes and indicating his membership in a diversity of communities (Alim and Smitherman 2012). In parts of the world that were previously colonized by Europeans, European languages have been maintained as the formal language of government and education even as most people speak local languages in their everyday interactions with kin, neighbors, merchants, and other community members. In these postcolonial contexts, people tack back and forth between various styles

of their local languages as well as shifting between the local language and the European one. Such strategic maneuvering among linguistic styles, called **code-switching**, is done by people in many difference contexts.

For many people, the style of language spoken in elite settings such as schools and government institutions has the effect of disempowering and marginalizing them. Linguistic anthropologists examine how vernaculars associated with elite and professional groups become a means of in-group solidarity and out-group exclusion. Anthropologist and lawyer Elizabeth Mertz (2007) conducted participant observation in first-year classes at several American law schools, looking at how law students are taught to "think like a lawyer." Using a version of the Socratic method, law professors teach their students to set aside the moral and emotional elements of cases to view them purely as texts subject to abstract, professional analysis. The ability to master the linguistic maneuvering and arcane vocabulary of this form of analysis becomes a prerequisite for becoming a lawyer. The American justice system is thus dominated by people who are trained to set aside humanistic concerns in favor of textual authority and manipulation. Mertz's study shows how people are socialized by language throughout their lives, not just in childhood. And it alerts us to the way that language can be used to elevate the learned perspectives of elites, dismissing the moral and emotional perspectives of others.

6.4 Performativity and Ritual

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Provide examples of the performative function of speech acts.
- Describe how ritual language can be performative.
- Identify the informal ways that people "talk back" to formal speech.

The Performativity of Language: Speaking as Action

Consider the following pairs of sentences. What are the differences between the two sentences in each case?

1. Boris and Natasha are married.
2. Boris and Natasha, I now pronounce you husband and wife.

1. Natasha: Boris lost his job.
2. Natasha: Boris, you're fired!

1. Boris: Natasha, I ate the last pickle.
2. Boris: Natasha, I apologize for eating the last pickle.

In all the above pairs, the first sentence is a report about an event. The second sentence makes an event happen. In the sentences about the pickle, the second sentence does not make the pickle disappear, but it does create an apology for that action, hopefully altering the consequences of the pickle-eating. In the previous section, we explored how we use language to think and reason about the world around us. This is an essential function of language, but it is not the only one. We also use language to *do* things—that is, to perform actions in the world.

Way back in the 1930s, Bronislaw Malinowski explored how people use language in culturally specific ways to play an active part in their societies (Duranti 2012). Malinowski described how the people of the Trobriand Islands used magical language to compel the growth of yams, bananas, taro, and palms in their carefully cultivated gardens. Magical spells, like all ritual language, aim at making something happen through the special manipulation of public speech. We see the same use of language in other ritual settings like marriages and naming ceremonies. The plot of many a Hollywood romantic comedy hinges on the moment the partners say "I do" and the officiant pronounces them married. In American marriage ceremonies, it is clear that ritual language is the tool that marries people—not the rings, or the pageantry, or the blessings of family and friends, or any other aspect of the ritual.

In his influential book *How to Do Things with Words* (1962), philosopher of language J.L. Austin coined a term for action-oriented language: performatives. The most obvious performatives use phrases like "I pronounce," "I order," "I promise," "I warn," or "I appoint." Sentences that begin with these phrases are explicitly uttered with the intention of doing something through the act of speaking. As he dug deeper into the performative

function of language, however, Austin realized that performatives are not so much a separate category of utterances but an aspect of most of the things we say. Even when people are making a simple descriptive statement, they are saying it for a reason. The power of speech to make things happen is called **performativity**. Consider the following sentences:

The exam is next week.
The dog is pawing on the door.

The above sentences are statements about an event or situation. However, if a professor announces to the class, "The exam is next week," this is not merely an observation, but a warning—a cue to students to study in preparation for the upcoming exam. And if someone tells their roommate, "The dog is pawing on the door," they are essentially telling that person to let the dog out.

Like metaphor, performativity is one of those aspects of language that permeates everyday speech. Once you learn about it, you recognize performativity in just about everything you say. Spend a few hours paying attention to each utterance as you go about your activities. You'll find that you rarely use language to merely describe what's going on. You speak in order to generate a response or result, even when you just say "Hi."

The Performativity of Ritual Language

Just as Malinowski studied the special language used in garden magic among the Trobrianders, many contemporary linguistic anthropologists study the role of performative language in various ritual settings. In a recent article, Patience Epps and Danilo Paiva Ramos examine the performance of **incantations** among the Indigenous Hup community of the northwest Amazon (Epps and Ramos 2020). An incantation is a patterned set of phrases or sentences used to compel a magical result. Among the Hup, incantations are used by elders for protection, healing, and causing harm. While Epps and Ramos were conducting fieldwork in the area, Hup elders expressed concerns that the young men in the village were not learning the repertoire of important incantations properly, thus endangering the health and safety of the community. The elders invited Epps and Ramos to write down their incantations for healing and protection in order to preserve them for future generations. Epps and Ramos documented and analyzed these incantations in consultation with Hup elders.

In the article, Epps and Ramos analyze an incantation used by the Hup to protect travelers on paths through the rain forest. This incantation is recited by an elder before a group of Hup people embark on a journey. After providing the original text and its English translation, Epps and Ramos describe the incantation's structure and poetic features, including the use of metaphor and repetition of phrases. As a whole, the incantation lists various dangers and helpful entities and enacts certain magical practices through the speech itself. At the beginning of the incantation, the elder states that he is enclosing the entire path in a protective "canoe," much as a traveler on a river would ride in a canoe. This canoe is named after a particular snake, the mussurana snake (*Clelia clelia*), a constrictor snake that eats other snakes and is immune to their venom. Thus, the incantation is creating a metaphorical shield of protection around the travelers, making them safe from venomous snakebites. In the second section of the incantation, the elder lists all classes and subtypes of snakes that might be encountered in the rain forest, asserting a kind of taxonomic mastery over the snakes. Summoning the snakes one by one, he tells of lining them up, sitting them down, and feeding them sticky coca and tobacco. The snakes then sit quietly, their jaws stuck together by the sticky substance so that they are unable to bite anyone. The incantation goes on to deal with several other malevolent entities and engage with beneficial entities to help the travelers in their journey.

Informal Back-Talk: Teasing, Grumbling, and Gossip

Linguistic anthropologists most frequently rely on long periods of fieldwork, living in the communities they study and witnessing and even participating in ritual events where performative language is deployed. Such events include protection and healing magic, but also naming ceremonies, puberty rites, weddings, funerals, and other rituals that mark the passage of persons from one social status to another. Anthropologists term such rituals "rites of passage" (discussed in detail in Anthropology of Food). At such ritual events, elders or religious specialists are called upon to perform the ritual language necessary to publicly move persons from the previous category to the new one.

Naming ceremonies are a great example of the power of performative language in rites of passage. In many

West African societies, a baby is not considered a true person until they have been publicly named by an elder or religious official in a naming ceremony performed a certain number of days after the baby is born. Extended family and friends attend the ceremony as markers of their relationship to the baby. Guests bring gifts such as rice and cloth for the baby, and they are rewarded for their attendance with prepared food and kola nuts.

During his fieldwork in southeastern Senegal, linguistic anthropologist Nicholas Sweet witnessed the naming ceremony for a baby in a Pular-speaking village (2019). When the family were gathered in the compound of the baby's father, the imam rose, faced east, gave the blessings of the prophet, and then performed the naming of the baby girl (in Arabic, English translation below):

In the name of God, the gracious and the compassionate
O Allah, send blessings on our master Muhammad
O Allah, send blessings on our master Muhammad
O Allah, send blessings on our master Muhammad
The name of the child has come here, her mother and her father have named her Aissatou
The name of the child has come here, her mother and her father have named her Aissatou
This is what was written on the tablet of Allah
May God grant her blessings

While carefully recording the formal performative language so important to this naming ceremony, Sweet was also attuned to the more informal kinds of language that surrounded the main action. For instance, just before the imam's performance, some friends of the family were gathered around the baby, remarking on her beauty. As a way of showing their admiration, some of the men joked and teased one another about the prospect of marrying her someday. Other relatives teased the baby's parents with demands for kola nuts and other food. As dramatically performative as the official naming was, this informal language was also performative, providing a way for guests to socially configure their various relationships to the new person in their community.

Someone important had been left out of the ceremony—the great-aunt of the baby, also named Aissatou. As the baby was her namesake, Auntie Aissatou had been invited and should have been a featured guest at the ceremony. But when the time came to perform the ceremony, she had not arrived yet, and so they went on without her. Afterward, as guests were making their way home, they crossed paths with Auntie Aissatou, who was just then on her way to the event. Realizing that the naming had already been performed, she complained that she had been waiting for someone to fetch her and bring her to the ceremony. Auntie Aissatou was angry that she had missed the ceremony as well as the gifts distributed afterward.

Wrapping a scarf around her head in imitation of an imam, Auntie Aissatou continued on to the compound of the baby's father. Striding ceremoniously into the compound, she addressed a number of elders still gathered there. In a parody of the official naming performance, she faced east, delivered the blessings of the prophet, and then announced:

The name of the child has come here. It is Buubu Nooge (Trash Owl).

The audience of relatives erupted in laughter but also protest, interrupting Auntie Aissatou to correct her with the baby's true given name. But Auntie Aissatou persisted, saying over and over again that the baby's name had come and it was "Trash Owl."

Why Trash Owl? In this community, it is believed that witches turn themselves into owls when they fly through the night. "Trash" seemed to refer to the joke gifts of garbage (broken flip-flops, an old sock) in a small gourd that Auntie Aissatou presented in lieu of the usual baby gifts of food, cloth, and soap.

In the days following the naming ceremony, the teasing name for the baby became a running joke in the community, especially among people who had not been invited to the ceremony but felt that they should have been. In order to quash the teasing nickname, the baby's family was compelled to make a number of visits around the community with appeasing gifts of kola in an effort to get everyone to recognize the baby's proper name. Once Auntie Aissatou and the others had received their visits and kola, they abandoned the name Trash Owl, recognizing the baby as Aissatou, the namesake of Auntie Aissatou.

This incident illustrates the power of parody and gossip to steal performative power from the authoritative realm of formal speech, giving excluded and marginalized people a way to "talk back" to authority. There are many ways of doing this. Often, audiences to formal speech will deliberately misunderstand or creatively interpret the proclamations of authority figures.

6.5 Language and Power

LEARNING OUTCOMES

By the end of this section, you will be able to:

- Explain how language can operate as a gendered form of power.
- Identify how racial categories and bias are expressed through linguistic practices.
- Describe strategies used by communities to revive their dormant languages.

Gender and Language

In 2018, the word "mansplaining" was added to the Merriam-Webster dictionary. The word is defined as "what occurs when a man talks condescendingly to someone (especially a woman) about something he has incomplete knowledge of, with the mistaken assumption that he knows more about it than the person he's talking to does" ("Words We're Watching" 2018).

The word was inspired by an article written in 2008 by the feminist blogger Rebecca Solnit. In the article "Men Explain Things to Me," Solnit described an incident at a party in which she mentioned to a man that she had recently written a book about a particular photographer. Immediately, the man interrupted to inform her about a *very important* book that just came out about that same photographer, a book he had read about in *The New York Times*. After the man had described the book in great detail, Solnit's friend finally intervened to say that the book he was talking about was, in fact, written by Solnit. In the wake of Solnit's article, other women writers described similar experiences in their workplaces, schools, and relationships, and the whole phenomenon came to be called "mansplaining."

FIGURE 6.13 Rebecca Solnit, the author of the article "Men Explain Things to Me". The term "mansplaining" has become a well discussed topic in the years since she introduced the term. (credit: "Rebecca Solnit" by Charles Kremenak/Wikimedia Commons, CC BY 2.5)

Have you ever witnessed mansplaining? Have you ever mansplained to someone? Embedded in the very term is a notion about gender and language. The idea is that men and women have different styles of speech, styles that reflect and reinforce inequality between genders.

In recent years, many writers have pushed back against the term "mansplaining," arguing that *all* men do not *always* speak this way to *all* women. Some argue that many men are much more respectful and sensitive to the

dynamics of power in their conversations with women. Some argue that privileged White women tend to speak in a mansplaining way to male waiters and salespersons or to people of color more generally. Others suggest that older people speak in a condescending way to younger people, or vice versa.

Have you ever become annoyed with a friend or relative who repeatedly interrupts you? Have you ever noticed how some people tend to end their sentences with rising intonation, making everything they say sound like a question? How about a person who ignores what you say but then rephrases your idea and takes credit for it? Many people associate these ways of speaking with gender, the way men speak or the way women speak. As noted in the discussion of language acquisition, every culture has ideas about how language operates, called language ideologies. The idea that American men and American women have distinctive styles of speech is a language ideology. Whether it is true or not is a question for linguistic research, but this idea has become a widespread way of thinking about gender, power, and language in American culture.

In the 1970s, linguists inspired by the women's movement turned their attention to the way gender shapes different patterns of speech. In her influential book *Language and Woman's Place* (1975), Robin Lakoff argues that women and men are socialized to speak in distinctive ways that empower men and subordinate women. Lakoff describes women's speech as uncertain, excessively polite, and full of hedges, emotional language, euphemism, and tag questions ("Don't you think?"). Other linguistic researchers have found that men tend to interrupt women far more than vice versa, even when the women speaking are doctors and the men are their patients (Zimmerman and West 1975, West 1998).

Building on this research, Deborah Tannen generalized beyond speech patterns to describe two entirely different communicative subcultures for American men and American women (1990). When men and women speak to one another, Tannen argues, they are speaking cross-culturally, deploying different motivations and expectations for talk. Men engage in conversation to assert their status in a social hierarchy, while women are more interested in building solidarity through social connection. Men authoritatively report information *to* their interlocutors, while women engage in conversational rapport *with* their interlocutors. In popular media, differences in the speech styles of men and women are frequently linked to purported differences in specific parts of male and female brains, such the corpus callosum, the amygdala, and the hippocampus. In this way, gendered patterns of speaking are naturalized as biological.

Like the pushback against the term "mansplaining," researchers have begun to challenge the view that women and men are embedded in different linguistic subcultures with different patterns of speech, motivation, and interpretation. Psychologist Janet Hyde conducted a meta-analysis of hundreds of quantitative studies to see if widespread notions about gender and language were actually borne out by linguistic data (2005). Along with notions of power, Hyde was interested in testing the idea that women are chattier and more deferential than men. Focusing on studies of children, Hyde found that boys and girls exhibited no differences at all in reading comprehension, verbal reasoning, and vocabulary. The tendency for boys to interrupt or speak assertively was only very slightly higher than for girls. The girls' tendency toward self-disclosure and cooperation with their conversation partners was only slightly higher than for boys. The only significant differences Hyde found were in smiling and correct spelling (girls did more of both).

How do we reconcile research demonstrating differences in the way men and women talk with data that suggests very little difference in the speech patterns of girls and boys? One could argue that children have not been entirely socialized into their assigned gender category. Perhaps the discrepancy suggests that gendered ways of speaking are cultural, not biological, and that, for children, the most intense period of socialization is yet to come in adolescence.

Moreover, ethnographic research by linguistic anthropologists shows that patterns of speech associated with men and women are culturally relative. Reversing the American stereotypes, anthropologists working in Madagascar and New Guinea have found that women are expected to speak in a more confrontational and argumentative style, while men are associated with more cooperative, euphemistic, and ceremonial speech (Keenan [Ochs] 1974, Kulick 1992, both cited in Ahearn 2017).

So both quantitative and ethnographic research overturn the notion that women and men are biologically engineered to use language in different ways. That leaves us with the conclusion that any differences in the ways men and women talk are entirely cultural. Literary scholar Judith Butler argues that gender identities are

not biological but are performed through language and other cultural practices, particularly those centered on the body (1988). So when men and women speak in certain ways, they are socially performing their gender identities, whether consciously or unconsciously. Moreover, through their linguistic performances, people enact their own versions of gender in complicated ways that transcend the neat dichotomy of male and female. You probably have a language ideology that tells you how men and women speak in your culture, but do you *always* speak in the style associated with your assigned gender category? Nobody does. And some people rarely do. As these contradictory performances build up over time, the very notion of gender can change.

PROFILES IN ANTHROPOLOGY

Kira Hall
1962-

Area of Anthropology: Kira Hall's (https://openstax.org/r/colorado) work is situated at the intersection of sociolinguistics and linguistic anthropology. In graduate school, she studied with Robin Lakoff in the linguistics department at the University of California–Berkeley, earning her PhD there in 1995. For her dissertation, she examined the linguistic strategies of Hindi-speaking *hijras* in Banaras, India. Hijras are members of a third-gender group in many Indian communities. Most hijras were raised as boys and later adopted the intersex behaviors and language of the hijra identity. Hall analyzed how hijras navigated aspects of gender embedded in Hindi, such as certain verbs and adjectives that are marked as feminine or masculine. She showed how hijras alternate between these gendered forms, code-switching as a reflection of their own ambiguous identities. She explored how hijras use obscene forms of language to shame people into giving them money. She showed how they had developed their own secret language as a way of communicating with one another, signaling their identity to others, and excluding non-hijras from understanding their conversations.

Accomplishments in the Field: Reflecting her work at the boundaries of linguistics and anthropology, Hall has held academic positions in the anthropology department at Yale University and the linguistics department of Stanford University. Currently, she is professor of linguistics at the University of Colorado at Boulder, with a joint appointment in the anthropology department. She is also director of the Program in Culture, Language, and Social Practice at UC-Boulder. Since 2019, she has served as the president of the Society for Linguistic Anthropology of the American Anthropological Association.

Importance of Their Work: Hall's work highlights how language operates within hierarchies of gender, sexuality, and socioeconomic class. In addition to her work on hijras, she has published articles on language and sociality in autism, female mass hysteria in upstate New York, and Donald Trump's use of gesture and derisive humor in the 2016 Republican Party primaries.

Race and Ethnicity

On many government forms, people are asked to identify their "race." Forms in the United States often include five categories: Black, White, Asian, American Indian/Alaska Native, and Native Hawaiian/Other Pacific Islander. The category "Hispanic or Latino" is often listed as an ethnicity rather than a race. On the 2020 U.S. Census, people were presented with 14 racial categories to choose from: White, Black or African American, American Indian or Alaska Native, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, Other Asian, Native Hawai'ian, Samoan, Chamorro, and Other Pacific Islander. Again, "Hispanic, Latino, or Spanish" was listed as a question of "origin." Even with so many options, many Americans still could not find a category that represented their racial or ethnic identity.

As you'll remember from earlier chapters in this text, race is not biological. There is no accurate way to divide up the gradual spectrum of human biological variation, meaning that biological categories of race are entirely imaginary. However, we also know that social categories of race are very powerful tools of discrimination, subordination, solidarity, and affirmative action. Earlier in this chapter, we studied how sets of categories, "folk taxonomies," are embedded in language. We saw how different cultures divide up the natural world differently.

Likewise, race and ethnicity are folk taxonomies, embedded in language and organizing the social world into a neat set of groups. These categories are real insofar as they have shaped the structure of our society, advantaging some groups and disadvantaging others. And they are real insofar as they shape our thoughts and actions and even our subconscious habits and tendencies.

Like gender, race and ethnicity are performed in language. We use language in conscious and unconscious ways to express racial and ethnic belonging as well as exclusion. Take the use of Spanish catchphrases by Americans who do not speak Spanish. Many Americans intend to be jokey and fun by using Spanish phrases such as "hasta la vista!" and "no problemo" as well as deliberately incorrect ones such as "buenos nachos" and "hasta la bye bye!" Anthropologist Jane Hill found that middle-class, college-educated White Americans were most likely (among other Americans) to use this "mock Spanish" (2008). People who use these phrases consider them harmless and even respectful, while Spanish speakers are often insulted by the association of Spanish with silliness. Hill argues that such phrases are only funny because they covertly draw from stereotypes of Spanish speakers as foolish, lazy, and inept.

Similar arguments about cultural appropriation and stereotyping can be made about the use of Black vernacular speech by White Americans. In the United States, a variety of English called African American English (AAE), or African American Vernacular English, is spoken by many people in predominantly Black communities. With the widespread popularity of Black culture, many White Americans have picked up phrases and grammatical features of AAE while knowing very little about the vernacular and the people who speak it as their primary language. To many Americans, AAE is just imperfect English (it is not, as we'll see in a moment). So what are White people signaling when they say things like "chillin'," "lit," "on fleek," "aa'ight" (for "alright"), "ima" (for "I'm going to") and "Yasss, Queen!" Does the use of this language convey respect for the communities associated with Black vernacular English? Or does it demean and subordinate Black Americans who speak AAE?

People who use mock Spanish and mock AAE typically do not mean to insult anyone. The problem is not one of intent, but of context. In American culture, most middle-class White people speak forms of English considered standard or mainstream (Lippi-Green 2012). In fact, Standard American English (SAE) is historically based on the language of Anglo American immigrants. The adoption of White Anglo-English has always been considered critical to successful assimilation by minority and immigrant groups. Success at complete assimilation is often measured by the ability to speak SAE without an accent. But SAE is not speaking "without an accent." SAE *is* an accent—the accent of White people whose ancestors emigrated from the British Isles.

SAE is the dominant language of American public spaces, including schools, workplaces, government, and media. People who speak SAE without effort or accent can speak freely in these spaces, knowing that their language will be understood and respected. Americans whose primary language is Spanish or AAE often struggle to be understood and taken seriously in American public life. Given this context, it can seem disrespectful for White Americans to appropriate Spanish and AAE as tools of humor while denigrating and marginalizing the actual speakers of these languages.

The issue is further complicated by the widespread and persistent notion among White Americans (and many Black Americans too) that AAE is not a language at all, but merely a hodgepodge of slang and bad grammar. This view is simply wrong, another language ideology that has no basis in fact. AAE is a rule-governed form of English with its own regular system of sounds, grammar, and vocabulary (Labov 1972b). For historical reasons, AAE shares many features with the English spoken by White southerners in the United States as well as working-class Cockney English from London (Ahearn 2017). Rooted in historical experiences of slavery and segregation, Black Americans have developed their own distinctive set of innovative linguistic features to supplement the more basic structure of American English. Consider the following three sentences:

He is angry.
He angry.
He be angry.

The first sentence is SAE, and the second and third are AAE alternatives. In SAE, this conjugation of the verb "to be" describes a situation happening in the present. But the SAE present tense of "to be" is a bit vague, as it can mean "right now, this very minute" or a more ongoing situation, perhaps describing a person who is

frequently or enduringly angry. AAE helpfully distinguishes between these two possibilities. “He angry” means angry “right now,” whereas “He be angry” indicates a more ongoing situation. In linguistic terminology, the second example is called “copula deletion” and the third is called “the habitual be.” Both are used in regular ways to indicate the difference between momentary and enduring conditions.

AAE is governed by many more rules and features that provide its speakers with expressive possibilities not available to speakers of SAE. In other words, AAE is not only a rule-bound vernacular; it’s a more developed and complex form of English. Linguists have been trying to convey this message to the American public since the 1970s (Labov 1972a). Read more about AAE at the Anti-Racism Daily website (https://openstax.org/r/Anti-Racism).

Rather than recognizing the innovative contributions of vernaculars like AAE, language policy in the United States stigmatizes non-SAE vernaculars as “bad English” spoken by uneducated and unintelligent people. Linguist John Baugh calls this “linguistic profiling” (2003). With colleagues Thomas Purnell and William Idsardi, Baugh (1999) compared the response of California landlords to apartment inquiries spoken in SAE, AAE, and Chicano-American English (CAE). In Woodside, California, landlords responded to SAE inquiries 70.1 percent of the time. Inquiries in AAE received responses only 21.8 percent of the time and CAE inquiries only 28.7 percent of the time. Research in American schools and courtrooms corroborates the discriminatory effects of linguistic profiling on access to housing, education, and justice.

The use of language to discriminate and marginalize is certainly not limited to American English. Elites in many cultures define their own way of speaking as “correct” and “official,” using linguistic practices in public spaces to disempower other groups based on class, race, ethnicity, gender, and sexuality. How can people respond to these forms of linguistic marginalization? For many upwardly mobile speakers of “nonstandard” vernaculars and languages, the process of becoming successful has involved the abandonment of their primary way of speaking in favor of standard, elite forms of language privileged in public discourses. But there is another alternative. As speakers of nonstandard vernaculars and languages move into public discourses, they can hold on to their primary languages, code-switching from context to context. Some language activists celebrate the genius of their “home” languages and work to nurture and revive them, as we will see in the next section.

Can speakers of dominant languages contribute to the process of celebrating and revitalizing marginalized languages? Is it *always* insulting or racist for speakers of a dominant language to use phrases from another vernacular or language? Some people think so. Certainly it is harmful to use phrases that reference negative stereotypes (even indirectly). But what if your limited use of a few phrases can help you communicate with someone from a different background? What if SAE speakers started quoting Spanish or AAE in ways that highlight positive aspects of those speech communities? What if White people started learning AAE in order to publicize the genius and complexity of this American vernacular? What if you learn another language or vernacular in order to subvert the forces of cultural segregation in your own society? There are no easy answers to such questions.

Endangered Languages: Repression and Revival

In 1993, a Wampanoag (https://openstax.org/r/tribalpedia) woman living on a reservation in Cape Cod, Massachusetts, had a mysterious dream, recurring on three consecutive nights (Feldman 2001). In the dream, a circle of Wampanoag were singing in a language she did not understand. When she woke, words of the language stuck with her, and she longed to find out what they meant. Were these words of Wôpanâak, the language of her ancestors? Wôpanâak had died out in the mid-1800s.

The woman was Jessie Little Doe Baird, a social worker and mother of five. Haunted by those words, she began reading through documents from the 1600s written in Wôpanâak, including letters, deeds to property, and the earliest translation of the Bible printed in the Western hemisphere (Sukiennik 2001). Though frustrated in her efforts to find the meaning of her dream words, she developed a passion for the language of her ancestors and began working with local Wampanoag communities to reclaim their common language of Wôpanâak. Community response was enthusiastic. Committed to the project, Baird went to MIT to study linguistics, earning a master’s degree. Based on her survey of Wôpanâak documents, she wrote a dictionary and began teaching Wampanoag students to speak the language (https://openstax.org/r/Women_of_the_Century).

By learning their ancestral language, Baird and her students found themselves reconnecting with Wampanoag culture in unexpected ways. The grammar of Wôpanâak, for instance, puts the speaker at the end of the sentence rather than the beginning. Whereas English speakers would say "I see you," Wôpanâak speakers would say something like "You are seen by me." Baird suggests that this word order highlights the value of the community over the individual, putting awareness of the other ahead of the self. Wôpanâak displays alternative logic in the formulation of nouns as well. For instance, in English, animal names reveal little or nothing at all about the animal. The words "cat," "mouse," and "ant" are based on arbitrary sounds that convey no information about their referents. In Wôpanâak, however, animal names frequently contain syllables that refer to the animal's size, movement, and behavior. The word for "ant," for instance, incorporates syllables communicating that the animal moves about, does not walk on two legs, and puts things away.

By now, you know that forms of cognition and culture are embedded in language. The languages of the world encode diverse experiences of time, space, life, death, color, emotions, and more. A language serves as a form of oral documentation of the surrounding environment, a survey of the flora, fauna, topography, and climate of an area. Forms of cultural wisdom are preserved in the stories and proverbs of a language. History is recorded in epic tales and legends. Language can be essential to maintaining cultural identity, affirming the common history and values of a people while providing them with a distinctive way of communicating with one another.

Among the seven thousand languages spoken in the world today, roughly 40 percent of them are in danger of dying out in the next hundred years. A language is considered dead when it is no longer spoken by any living person. Wôpanâak was once considered a dead language. Some linguists argue that no language should ever really be considered "dead," however, and prefer the terms "dormant" or "sleeping." So long as there are written or audio records of a language, it can come to life again, a process called **language revitalization**. Returning to a language that has become dormant or endangered, community members can develop strategic programs to spread, nurture, and modernize the language, ensuring it has a future for generations to come.

Languages generally become endangered or dormant through processes of colonialism and imperialism. In North America, as Native Americans were forcibly removed from their lands and confined to reservations in the 1800s, they were compelled to send their children to boarding schools where they were forbidden to speak their Native languages or practice their Native cultures. As foreign settlers seized lands in Australia, New Zealand, and Hawaii, they established similar schools, aimed at assimilating Indigenous children by stamping out their language and culture. Elsewhere, more gradual processes of endangerment can occur when a new language offers opportunities for employment and trade only available to speakers of that language. Parents may encourage their children to learn the new language in order to take advantage of these opportunities, and children may come to reject their own language as a backward language of old people.

Many, many languages have risen from dead or comatose states, among them Cornish, Hawaiian, Hebrew, Scots-Gaelic, the Ainu language of Japan, the Indigenous Australian language of Barngarla, the Indigenous New Zealand language of the Māori people, and the Native American languages of the Navaho and Blackfoot peoples. Often, as with Wôpanâak, the impetus for language revival comes from energetic community members who feel the loss of their language as a threat to their cultural survival. These concerned people create programs to document the language and teach it to children and adults. They establish contexts where the language is spoken routinely and exclusively. Sometimes they work with linguists to develop these programs.

The most successful of these revitalization strategies are immersion schools and master-apprentice programs. In the early 1980s, Māori language activists developed full-immersion preschools, called *Te Kōhanga Reo*, or "language nests" (King 2018). In these nests, very young children are taught language and culture by Māori elders—grandmothers and grandfathers in the community. Native Hawaiians have developed a similar program of language nests, called *Pūnana Leo*. Early on, some parents worried that children in immersion schools would not learn the dominant national language well enough to be successful in later life, but research has shown that such children do just as well or better in later classroom performance and standardized testing. Many language revitalization projects combine early immersion with later bilingual education (Hinton 2011, 2018). The Navaho Immersion School in Arizona provides immersion education for the first three years of schooling and then introduces English as the medium of instruction through grade seven. From grades eight to twelve, children are taught in Navaho half the time and English the other half.

FIGURE 6.14 Sign in front of a full-immersion school in Seatoun, New Zealand. All classes are held in the Māori language. (credit: "Te Kura Kaupapa Maori O Nga Mokopuna" by Tom Law/flickr, CC BY 2.0)

One of the challenges of school-based revitalization programs is finding enough adults sufficiently proficient in the language to teach it to children. Among the strategies of language revitalization that target adult learners is the master-apprentice approach. The original Master-Apprentice Language Learning Program was founded in California by the Advocates for Indigenous California Language Survival (Hinton 2018). The strategy has since spread all over the world. In these programs, a proficient speaker and a motivated learner spend 20 hours a week together, using the target language plus gestures and other nonverbal communication to engage in various activities.

When successful, language revitalization can empower individuals and energize communities. Learning their heritage language, people come to understand the distinctive genius and complexity of their culture while preserving a crucial means of transmitting that culture across generations.

MINI-FIELDWORK ACTIVITY

Dispute Analysis

Choose a friend, relative, or acquaintance with whom you might disagree on a particular issue. Suggested issues might include musical taste, what makes a good restaurant, how to behave on a date, the best form of physical exercise, or anything else you feel comfortable talking about but might disagree on. Ask the person if they would consent to being recorded for an anonymous fieldwork exercise. If so, record a 5-to-10-minute conversation with that person in which you discuss the issue. Then, review the conversation. What seem to be the goals of the two interlocutors? What is the pattern of turn taking? What truth or knowledge claims are made by each speaker, and what are the bases of those claims? How is authority constructed and challenged? How does each one respond to the assertions of the other? How does the conversation turn out in the end?

Suggested Readings

Ahearn, Laura. 2017. *Living Language: An Introduction to Linguistic Anthropology*. 2nd ed. Chichester, West Sussex, UK; Malden, MA: Wiley-Blackwell.

Duranti, Alessandro. 1997. *Linguistic Anthropology.* Cambridge, UK: Cambridge University Press.

Key Terms

code-switching the practice of tacking back and forth between various linguistic styles depending on contexts and interlocutors.

communication the transfer of information from a sender to a receiver; can be voluntary or involuntary, simple or complex.

dialect a form of language specific to a particular region.

folk taxonomies systems of categories that people use to organize their knowledge of the world.

FOXP2 a gene on chromosome number seven that is found in many vertebrates; sometimes called "the language gene" because the human mutation seems to be associated with language.

incantation a patterned set of phrases or sentences used to compel a magical result.

language a complex, systematized form of communication involving the use of vocal or gestural units (words or signs) that can be combined and recombined in larger structures (sentences) that can convey an infinite array of complex meanings.

language acquisition the process of learning a language.

language ideologies specific ideas about language that are widespread in a culture, including how language is acquired, how it varies across social groups, how it changes over time, etc.

language revitalization the process of reviving an endangered or dormant language using strategies such as immersion schools and master-apprentice programs.

language socialization the social contexts in which language is learned as well as the role of language in social learning.

linguistic relativity the way that language varies across cultures, reflecting different environmental, historical, and sociocultural conditions.

linguistic universals common elements found in all human languages, attributable to human anatomy, perception, and cognition.

metaphor a linguistic idiom using something *concrete* to think and talk about something more *abstract*.

mirror neurons special brain cells that seem to enable mimicry.

naming ceremony a public ritual that officially grants personhood by bestowing a name.

performativity the functional power of language to make things happen.

protolanguage a very simple set of gestures or utterances that may have preceded the development of human language.

Sapir-Whorf hypothesis the theory that the particular language you speak influences how you think about reality.

speech community a community of speakers sharing a common grammar and vocabulary, as well as a set of understandings about how language is used in different situations.

vernacular dialects that are not necessarily regional but associated with specific social categories such as groups based on ethnicity, age, or gender.

Summary

Language and culture are closely entwined in the evolutionary development and contemporary diversity of human societies. Human language differs from animal communication in its complexity and flexibility, aspects of human communication made possible by unique human biological and genetic features. The complexity of language makes it a powerful tool in shaping human thought, providing categories and metaphors for organizing our information about the world. Though language shapes thought and action in universal ways, many aspects of language vary widely relative to local cultures. The social aspects of language are particularly relative, influencing how children learn languages in various sociocultural contexts as well as how people use language to create speech communities. In ritual contexts, language is used performatively to accomplish social action as well as challenging those actions. As a tool of power, language structures gender, race, and ethnic dynamics. Recognizing the fundamental importance of language to the preservation of culture, many Indigenous communities have developed strategies to revive their heritage languages using immersion schools and master-apprentice programs.

Critical Thinking Questions

1. What might humanity be like if humans had never developed language? What social and

cultural forms would not be possible without language? How would we survive? Would we be capable of creating tools or art? Would our social relationships be different? Would our social groups be different?

2. Describe a romantic relationship, one you have experienced or observed. How did it begin, develop, endure, or end? Now, make note of how many times in your description you relied on various metaphors. Is it possible to fully describe romance without the use of metaphor? Do these metaphors shape the way we think about romance?
3. List the speech communities to which you belong. Do all members of a speech community share exactly the same vocabulary and practices? Do speech communities overlap?
4. Aside from weddings, list rituals in your culture that rely on the performance of language. How do people use forms of commentary and back talk to reshape those performances?
5. How does language operate as a form of power in schools and universities? Consider the gendered norms of language as well as racial and ethnic dynamics.

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