surf, and after a major storm, large sections are sometimes washed away.

Despite their fragile condition, the barrier islands are attractive locations for constructing homes and recreational facilities to take advantage of proximity to the seashore. Most of the barrier islands are linked with the mainland by bridge, causeway, or ferry service.

To fight erosion along the barrier islands, people build seawalls and jetties, which are structures extending into the sea, but these projects result in more damage than protection. A seawall or jetty can prevent sand from drifting away, but by trapping sand along the up-current side, it causes erosion on the barrier islands on the down-current side.

The Everglades was once a very wide and shallow freshwater river 80 kilometers (50 miles) wide and 15 centimeters (6 inches) deep, slowly flowing south from Lake Okeechobee to the Gulf of Mexico. A sensitive ecosystem of plants and animals once thrived in this distinctive landscape, but much of it has been destroyed by human actions. The U.S. Army Corps of Engineers built a levee around the lake during the 1930s, drained the northern one-third of the Everglades during the 1940s, diverted the Kissimmee River into canals during the 1950s, and constructed dikes and levees near Miami and Fort Lauderdale during the 1960s. The southern portion of the Everglades became a National Park.

These modifications opened up hundreds of thousands of hectares of land for growing sugarcane and protected farmland as well as the land occupied by the growing South Florida population from flooding. But they had unintended consequences for South Florida's environment. Polluted water mainly from cattle grazing along the banks of the canals flowed into Lake Okeechobee, which is the source of fresh water for half of Florida's population. Fish in the lake began to die from the high levels of mercury, phosphorous, and other contaminants. The polluted water then continued to flow south into the National Park, threatening native vegetation such as sawgrass and endangering rare birds and other animals.

The 2000 Comprehensive Everglades Restoration Plan called for restoring the historic flow of water through South Florida while improving flood control and water quality. The plan called for a national–state partnership to undertake 68 restoration projects over 30 years. Dikes would be removed, farmland flooded, and water stored underground. The state of Florida spent $1 billion on acquiring land in the area, but few elements of the plan were accomplished. In an ironic reminder of the Dutch saying quoted earlier, Floridians say "God made the world in six days, and the Army Corps of Engineers has been tinkering with it ever since."

KEY ISSUE 3

Why Are Different Places Similar?

- Scale: From local to global
- Space: Distribution of features
- Connections between places

Although accepting that each place or region on Earth is unique, geographers recognize that human activities are rarely confined to one location. Discussed in this section are three basic concepts—scale, space, and connections—that help geographers understand why two places or regions can display similar features.

Scale: From Local to Global

Geographers think about scale at many levels, from local to global. At a local scale, such as a neighborhood within a city, geographers tend to see unique features. At the global scale, encompassing the entire world, geographers tend to see broad patterns.

A generation ago, people concerned with environmental quality proclaimed, "Think global, act local." The phrase meant that the environment was being harmed by processes such as global warming that were global in scale, but it could be improved by actions, such as consuming less gasoline, that were local in scale. Contemporary geographers offer a different version of the phrase: "Think and act both global and local." All scales from local to global are important in geography—the appropriate scale depends on the specific subject.

Geography matters in the contemporary world because it can explain human actions at all scales, from local to global. At the national and international scales, geography is concerned with such questions as where the population is growing rapidly, where the followers of different religions live, and where corporations place factories. And geography studies why these arrangements can cause problems: why can rapid population growth exceed available food supply, why are different religious groups unable to live in peace with each other, and why are some places unable to attract or retain industries.

Globalization of Economy

Scale is an increasingly important concept in geography because of **globalization,** which is a force or process that involves the entire world and results in making something worldwide in scope. Human activities are rarely confined to one location. The world contains only a handful of individuals who lead such isolated and sheltered lives that they have never watched a television set, used a telephone, or been in a motor vehicle. Even extremely isolated and sheltered people are at least aware of the existence of these important means of connection.

Globalization means that the scale of the world is shrinking—not literally in size, of course, but in the ability of a person, object, or idea to interact with a person, object, or idea in another place. People are plugged into a global economy and culture, producing a world that is more uniform, integrated, and interdependent.

A few people living in very remote regions of the world may be able to provide all of their daily necessities. The crop grown or product manufactured in a particular place may be influenced by the distinctive features and assets of the place. But most economic activities undertaken in one region are

influenced by interaction with decision makers located elsewhere. The choice of crop is influenced by demand and prices set in markets elsewhere. The factory is located to facilitate bringing in raw materials and shipping out products to the markets.

Globalization of the economy has been led primarily by transnational corporations, sometimes called multinational corporations. A **transnational corporation** conducts research, operates factories, and sells products in many countries, not just where its headquarters and principal shareholders are located.

Historically, people and companies had difficulty moving even small sums of money from one country to another. International transfer of money involved a cumbersome set of procedures, and funds could be frozen for several weeks until all of the paperwork cleared. Most governments prohibited the removal of large sums of money, and in the case of Communist countries, no money could be removed without government approval.

Modern technology provides the means to easily move money—as well as materials, products, technology, and other economic assets—around the world. Thanks to the electronic superhighway, companies can now organize economic activities at a global scale.

Banks, corporations, and other financial institutions are able to operate worldwide in part because the major centers where decisions that affect the global economy are made—New York, London, and Tokyo—are located in different time zones. When Tokyo's stock market closes at 3 P.M., it is 6 A.M. in London, only 2 hours before the opening of the day's trading there. The stock market opens in New York at 9:30 A.M., while London's is still open. When the market closes in New York at 4 P.M., it is 6 A.M. the next morning in Tokyo, only 3 hours before the opening of the market there the next day. As a result, investors can react immediately to changes in the value of gold, the rate of exchange between the dollar and the yen, and other constantly changing elements of the global economy.

Every place in the world is part of the global economy, but globalization has led to more specialization at the local level. Each place plays a distinctive role, based on its local assets. A place may be near valuable minerals, or it may be inhabited by especially well-educated workers. Transnational corporations assess the particular economic assets of each place.

A locality may be especially suitable for a transnational corporation to conduct research, to develop new engineering systems, to extract raw materials, to produce parts, to store finished products, to sell them, or to manage operations. In a global economy, transnational corporations remain competitive by correctly identifying the optimal location for each of these activities. Especially suitable places may be clustered in one country or region or dispersed around the world.

As a result, globalization of the economy has heightened economic differences among places. Factories are closed in some locations and opened in others. Some places become centers for technical research, whereas others become centers for low-skilled tasks. Changes in production have led to a spatial division of labor, in which a region's workers specialize in particular tasks. Transnationals decide where to produce things in response to characteristics of the local labor force, such as level of skills, prevailing wage rates, and attitudes toward unions. Transnationals may close factories in locations with high wage rates and strong labor unions (Figure 1–17).

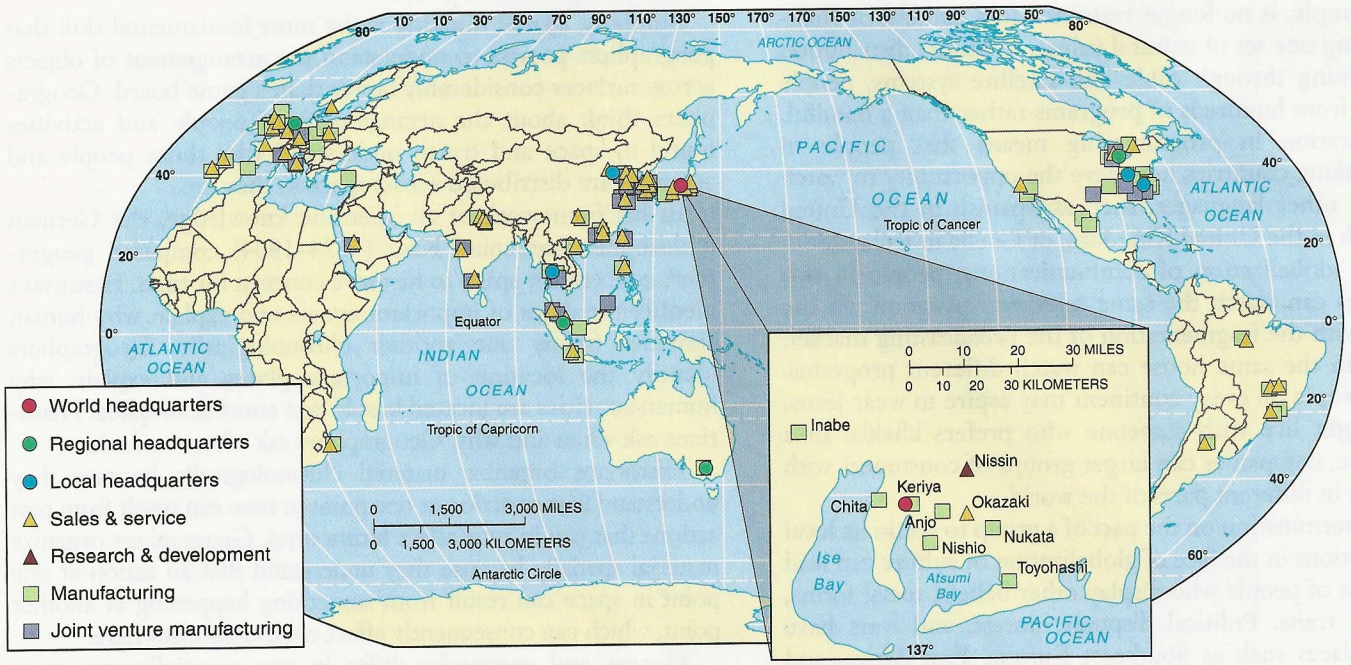

FIGURE 1–17 Globalization of economy. Denso, a transnational corporation that makes parts for cars, such as heaters and air conditioners, has its world headquarters, research labs, and eight factories in its "hometown" of Nagoya, Japan. Regional headquarters are located in the world's two other core regions—North America and Western Europe—the company's main overseas markets. A financial center is located in the Netherlands. Factories and sales centers are located in a number of more developed and less developed countries.

Globalization of Culture

Geographers observe that increasingly uniform cultural preferences produce uniform "global" landscapes of material artifacts and of cultural values. Fast-food restaurants, service stations, and retail chains deliberately create a visual appearance that varies among locations as little as possible so that customers know what to expect regardless of where in the world they happen to be. Houses built on the edge of one urban area will look very much like houses built on the edge of urban areas in other regions.

Regardless of local cultural traditions, people around the world aspire to drive an automobile, watch television, and own a house. The survival of a local culture's distinctive beliefs, forms, and traits is threatened by interaction with such social customs as wearing jeans and Nike shoes, consuming Coca-Cola and McDonald's hamburgers, and displaying other preferences in food, clothing, shelter, and leisure activities.

Underlying the uniform cultural landscape is globalization of cultural beliefs and forms, especially religion and language. Africans, in particular, have moved away from traditional religions and have adopted Christianity or Islam, religions shared with hundreds of millions of people throughout the world. Globalization requires a form of common communication, and the English language is increasingly playing that role.

As more people become aware of elements of global culture and aspire to possess them, local cultural beliefs, forms, and traits are threatened with extinction. Yet despite globalization, cultural differences among places not only persist but actually flourish in many places. Global standardization of products does not mean that everyone wants the same cultural products.

The communications revolution that promotes globalization of culture also permits preservation of cultural diversity. Television, for example, is no longer restricted to a handful of channels displaying one set of cultural values. With the distribution of programming through cable and satellite systems, people may choose from hundreds of programs rather than a handful. The proliferation in programming means that people in English-speaking countries now have the opportunity to watch programs in other languages, such as Spanish in the United States, Welsh in the United Kingdom, or Gaelic in Ireland.

With the globalization of communications, people in two distant places can watch the same television program. At the same time, with the fragmentation of the broadcasting market, two people in the same house can watch different programs. Groups of people on every continent may aspire to wear jeans, but they might live with someone who prefers khakis. In a global culture, companies can target groups of consumers with similar tastes in different parts of the world.

Strong determination on the part of a group to retain its local cultural traditions in the face of globalization of culture can lead to intolerance of people who display other beliefs, social forms, and material traits. Political disputes, unrest, and wars have erupted in places such as Southeast Europe, East Africa, and the Middle East, where different cultural groups have been unable to share the same space peacefully (see Chapter 7).

A much more extreme opposition to globalization led to the attack by al-Qaeda terrorists against the United States on September 11, 2001, with support from the Taliban then in control of Afghanistan (Chapter 8). Al-Qaeda selected targets—the World Trade Center and the Pentagon—they considered especially visible symbols of U.S. domination of globalization trends in culture, politics, and economy. Afghanistan's Taliban leaders justified such actions as banning television and restricting women's activities as being consistent with local traditions, and such punishments as public floggings and severing of limbs as being a necessary counterbalance to strong forces of globalization.

Culturally, people residing in different places are displaying fewer differences and more similarities in their cultural preferences. But although consumers in different places express increasingly similar cultural preferences, they do not share the same access to them. And the desire of some people to retain their traditional cultural elements, in the face of increased globalization of cultural preferences, has led to political conflict and market fragmentation in some regions.

Globalization has not destroyed the uniqueness of an individual place's culture and economy. Human geographers understand that many contemporary social problems result from a tension between forces promoting global culture and economy on the one hand and preservation of local economic autonomy and cultural traditions on the other hand.

Space: Distribution of Features

Chess and computer games, where pieces are placed on a grid-shaped playing surface, require thinking about space. Pieces are arranged on the game board or screen in order to outmaneuver an opponent or form a geometric pattern. To excel at these games, a player needs spatial skills, the ability to perceive the future arrangement of pieces.

Similarly, spatial thinking is the most fundamental skill that geographers possess to understand the arrangement of objects across surfaces considerably larger than a game board. Geographers think about the arrangement of people and activities found in space and try to understand why those people and activities are distributed across space as they are.

In his framework of all scientific knowledge, the German philosopher Immanuel Kant (1724–1804) compared geography's concern for space to history's concern for time. Historians identify the dates of important events and explain why human activities follow one another chronologically. Geographers identify the location of important places and explain why human activities are located beside one another in space. Historians ask when and why. Geographers ask where and why.

Historians organize material chronologically because they understand that an action at one point in time can result from past actions that can in turn affect future ones. Geographers organize material spatially because they understand that an action at one point in space can result from something happening at another point, which can consequently affect conditions elsewhere.

History and geography differ in one especially important manner: A historian cannot enter a time machine to study other eras firsthand; however, a geographer can enter an automobile or airplane to study other spaces. This ability to reach other spaces lends excitement to the discipline of geography—and geographic training raises the understanding of other spaces to a level above that of casual sightseeing.

Distribution

Look around the space you currently occupy—perhaps a classroom, residence hall, or room in a house. Tables, chairs, and other large objects are arranged regularly, such as in a row in a classroom or against a wall at home (though books and papers may be strewn about the space randomly). The room is located in a building that occupies an organized space—along a street, a side of a quadrangle, or next to a park. Similarly, the community containing the campus or house is part of a system of communities arranged across the country and around the world.

Each building and community, as well as every other human or natural object, occupies a unique space on Earth, and geographers explain how these features are arranged across Earth. On Earth as a whole, or within an area of Earth, features may be numerous or scarce, close together or far apart. The arrangement of a feature in space is known as its **distribution.** Geographers identify three main properties of distribution across Earth—density, concentration, and pattern.

DENSITY. The frequency with which something occurs in space is its **density.** The feature being measured could be people, houses, cars, volcanoes, or anything. The area could be measured in square kilometers, square miles, hectares, acres, or any other unit of area.

Arithmetic density, which is the total number of objects in an area, is commonly used to compare the distribution of population in different countries. The arithmetic density of Belgium, for example, is 345 persons per square kilometer (900 persons per square mile). This density is the country's total population (10.5 million people) divided by its area (30,278 square kilometers, or 11,690 square miles).

Remember that a large *population* does not necessarily lead to a high *density.* Arithmetic density involves two measures—the number of people and the land area. The most populous country in the world, China, with approximately 1.3 billion inhabitants, by no means has the highest density. The arithmetic density of China—approximately 140 persons per square kilometer (355 persons per square mile)—is less than half that of Belgium. Although China has 125 times more inhabitants than Belgium, it has more than 300 times more land.

High population density is also unrelated to poverty. The Netherlands, one of the world's wealthiest countries, has an arithmetic density of approximately 400 persons per square kilometer (1,040 persons per square mile). One of the poorest countries, Mali, has an arithmetic density of only 11 persons per square kilometer (29 persons per square mile).

Geographers measure density in other ways, depending on the subject being studied. A high **physiological density**—the number of persons per unit of area suitable for agriculture—may mean that a country has difficulty growing enough food to sustain its population. A high **agricultural density**—the number of farmers per unit area of farmland—may mean that a country has inefficient agriculture. A high housing density—the number of dwelling units per unit of area—may mean that people live in overcrowded housing.

CONCENTRATION. The extent of a feature's spread over space is its **concentration.** If the objects in an area are close together, they are *clustered;* if relatively far apart, they are *dispersed.* To compare the level of concentration most clearly, two areas need to have the same number of objects and the same size area.

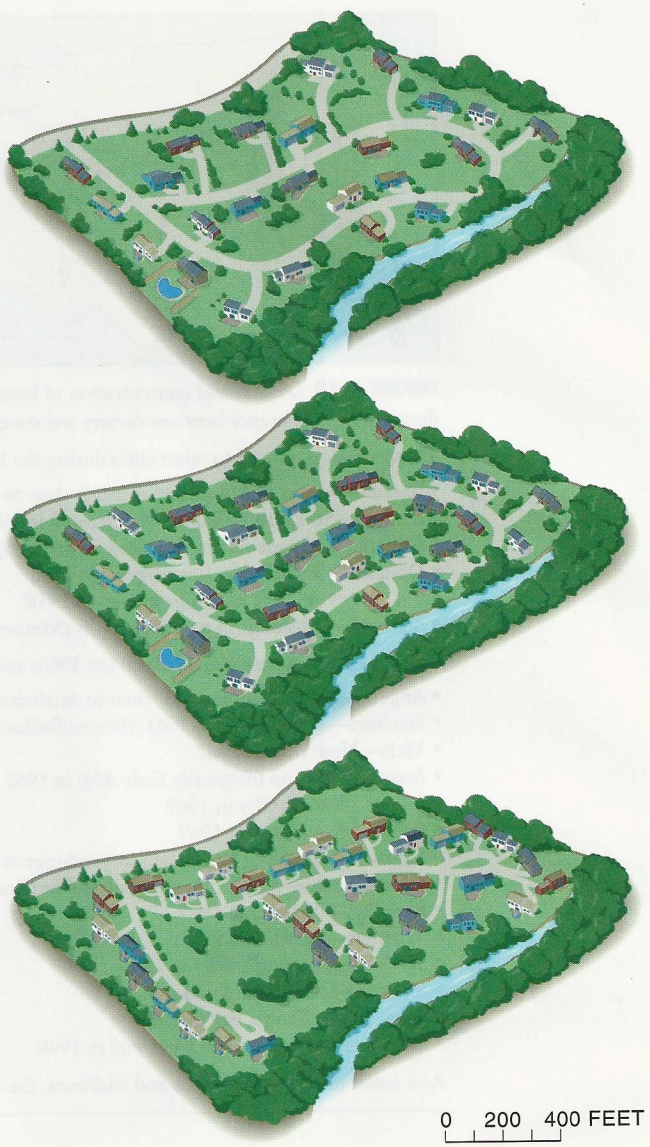

FIGURE 1–18 Distribution. The top plan for a residential area has a lower density than the middle plan (24 houses compared to 32 houses on the same 82-acre piece of land), but both have dispersed concentrations. The middle and lower plans have the same density (32 houses on 82 acres), but the distribution of houses is more clustered in the lower plan. The lower plan has shared open space, whereas the middle plan provides a larger, private yard surrounding each house.

Geographers use concentration to describe changes in distribution. For example, the distribution of people across the United States is increasingly dispersed. The total number of people living in the United States is growing slowly—less than 1 percent per year—and the land area is essentially unchanged. But the population distribution is changing from *relatively clustered* in the Northeast to more *evenly dispersed* across the country.

Concentration is not the same as density. Two neighborhoods could have the same density of housing but different concentrations. In a dispersed neighborhood each house has a large private yard, whereas in a clustered neighborhood the houses are close together and the open space is shared as a community park (Figure 1–18).

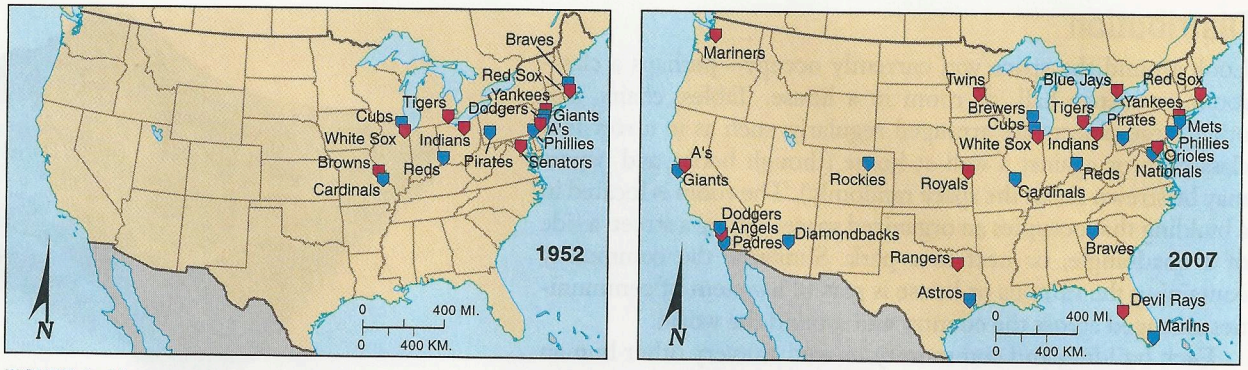

FIGURE 1–19 Density and concentration of baseball teams. The changing distribution of North American baseball teams illustrates the difference between density and concentration.

These six teams moved to other cities during the 1950s and 1960s:

- Braves—Boston to Milwaukee in 1953, then to Atlanta in 1966
- Browns—St. Louis to Baltimore (Orioles) in 1954
- Athletics—Philadelphia to Kansas City in 1955, then to Oakland in 1968
- Dodgers—Brooklyn to Los Angeles in 1958
- Giants—New York to San Francisco in 1958
- Senators—Washington to Minneapolis (Minnesota Twins) in 1961

These 14 teams were added between the 1960s and 1990s:

- Angels—Los Angeles in 1961, then to Anaheim (California) in 1965
- Senators—Washington in 1961, then to Dallas (Texas Rangers) in 1971
- Mets—New York in 1962
- Astros—Houston (originally Colt .45s) in 1962
- Royals—Kansas City in 1969
- Padres—San Diego in 1969
- Expos—Montreal in 1969, then to Washington (Nationals) in 2005
- Pilots—Seattle in 1969, then to Milwaukee (Brewers) in 1970
- Blue Jays—Toronto in 1977
- Mariners—Seattle in 1977
- Marlins—Miami (Florida) in 1993
- Rockies—Denver (Colorado) in 1993
- Devil Rays—Tampa Bay in 1998
- Diamondbacks—Phoenix (Arizona) in 1998

As a result of these relocations and additions, the density of teams increased, and the distribution became more dispersed.

We can illustrate the difference between density and concentration at a far larger scale than a neighborhood. Within North America the distribution of major-league baseball teams changed during the second half of the twentieth century after remaining unchanged during the first half of the twentieth century (Figure 1–19). The major leagues expanded from 16 to 30 teams in North America between 1960 and 1998, thus increasing the density.

At the same time, six of the 16 original teams moved to other locations. In 1952 every team was clustered in the Northeast United States, but the moves dispersed several teams to the West Coast and Southeast. These moves, as well as the spaces occupied by the expansion teams, resulted in a more dispersed distribution.

PATTERN. The third property of distribution is the **pattern,** which is the geometric arrangement of objects in space. Some features are organized in a geometric pattern, whereas others are distributed irregularly. Geographers observe that many objects form a linear distribution, such as the arrangement of houses along a street or stations along a subway line.

Objects are frequently arranged in a square or rectangular pattern. Many American cities contain a regular pattern of streets, known as a grid pattern, which intersect at right angles at uniform intervals to form square or rectangular blocks. The system of townships, ranges, and sections established by the Land Ordinance of 1785 is another example of a square or grid pattern. The distribution of baseball teams also follows a regular pattern—the teams are located in North America's largest metropolitan areas (the three largest metropolitan areas have two teams).

A sinister pattern was placed on the American landscape in 2002 by a college student through placement of two dozen pipe bombs. The bomber confessed that he was trying to create a large "smile" pattern across the U.S. interior. He got as far as creating the two "eyes" by placing bombs in two large circles, one in Nebraska and one in eastern Iowa and western Illinois. Before being caught, he also placed bombs in Colorado and Texas to start the "mouth."

Gender and Ethnic Diversity in Space

Patterns in space vary according to gender and ethnicity. Consider first the daily patterns of an "all-American" family of mother, father, son, and daughter. Leave aside for the moment that this type of family constitutes less than one-fourth of American households. In the morning Dad gets in his car and drives from home to work, where he parks the car and spends the day; then, in the late afternoon, he collects the car and drives home. The location of the home was selected in part to ease Dad's daily commute to work.

The mother's local-scale travel patterns are likely to be far more complex than the father's. Mom takes the children to school and returns home. She also drives to the supermarket, visits Grandmother, and walks the dog. In between she organizes the several thousand square feet of space that the family calls home. In the afternoon she picks up the youngsters at school and takes them to Little League or ballet lessons. Later she brings them home, just in time for her to resume her responsibility for organizing the home.

Most American women are now employed at work outside the home, adding a substantial complication to an already complex pattern of moving across urban space. Where is her job located? The family house was already selected largely for access to Dad's place of employment, so Mom may need to travel across town. Who leaves work early to drive a child to a doctor's office? Who takes a day off work when a child is at home sick?

The importance of gender in space is learned as a child. Which child—the boy or girl—went to Little League, and which went to ballet lessons? To which activity is substantially more land allocated in a city—ballfields or dance studios?

If the family described above consisted of persons of color, its connections with space would change. The effects of race on spatial interaction can be seen across America. In downtown Dayton, Ohio, watch the people at the bus stops along the main east–west street, Third Street. In the afternoon, when office workers are heading home, persons of color are waiting on the north side of Third Street for westbound buses, while whites are waiting on the south side for eastbound buses. Why do persons of color head west on Dayton's afternoon buses? Virtually all African Americans in Dayton live on the west side, whereas the east side is home to a virtually all white population.

In most U.S. neighborhoods the residents are virtually all white people or virtually all persons of color. Although it is illegal to discriminate against people of color, segregation persists in part because people want to reinforce their cultural identity by living near persons of similar background, and in part because persons of color have lower than average incomes. But many Americans of European ancestry still practice discrimination because of a deep-seated fear of spatial interaction with a person of color.

Openly homosexual men and lesbian women may be attracted to some locations to reinforce spatial interaction with other gays. San Francisco reinforces its reputation as a sympathetic home for homosexuals and lesbians through such practical means as preventing the city from doing business with companies that do not provide their employees with domestic-partner benefits. Specific neighborhoods in other cities may be known to have large gay populations.

A pet dog doesn't care if you are male or female, black or white, gay or not. As long as you feed it, take care of it, and maintain close spatial interaction with it, your dog will respond with total, unquestioned devotion. Although dogs don't care about these cultural traits, people do. They are key characteristics to which people refer in order to identify who they are. Cultural identity is a source of pride to people at the local scale and an inspiration for personal values.

Even more important than self-identification, these traits matter to other people. They are the criteria by which other people classify us and choose to interact with us. Whatever biological basis may or may not exist for distinguishing among humans, differences in gender, race, and sexual orientation are first and foremost constructed by the attitudes and actions of others. Geographers consider cultural identity to be important in understanding spatial interaction, because humans repeatedly demonstrate that these factors are important in explaining why they sort themselves out in space and move across the landscape in distinctive ways.

All academic disciplines and workplaces have proclaimed sensitivity to issues of cultural diversity. For geographers, concern for cultural diversity is not merely a politically correct expediency; it lies at the heart of geography's spatial tradition. Nor for geographers is deep respect for the dignity of all cultural groups merely a politically correct expediency; it lies at the heart of geography's explanation of why each place on Earth is unique.

Connections Between Places

Geographers increasingly think about connections among places and regions. More rapid connections have reduced the distance across space between places, not literally in miles, of course, but in time. Geographers apply the term **space-time compression** to describe the reduction in the time it takes for something to reach another place. Distant places seem less remote and more accessible to us. We know more about what is happening elsewhere in the world, and we know sooner.

Space-time compression promotes rapid change, as the culture and economy of one place reach other places much more quickly than in the past. With better connections between places, people in one region are now exposed to a constant barrage of cultural traits and economic initiatives from people in other regions, and they may adopt some of these cultural and economic elements (Figure 1–20). Geographers explain the process, called diffusion, by which connections are made between regions, as well as the mechanism by which connections are maintained through networks.

Spatial Interaction

In the past, most forms of interaction among cultural groups required the physical movement of settlers, explorers, and plunderers from one location to another. As recently as

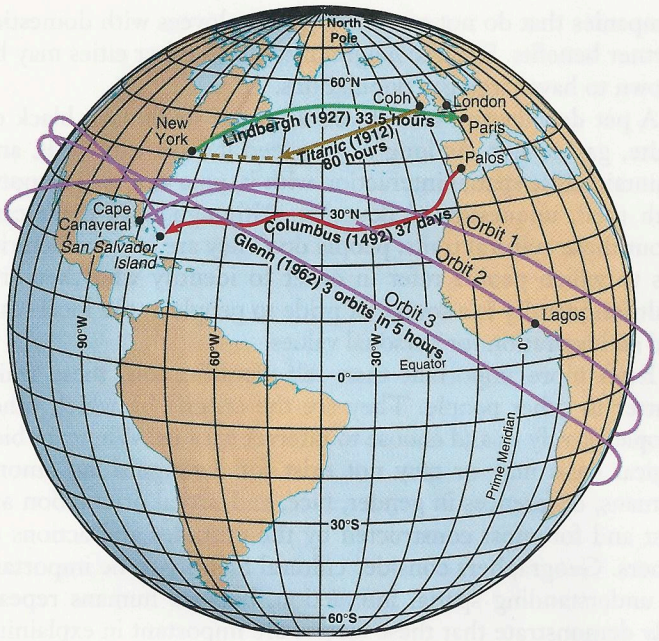

FIGURE 1–20 Space-time compression. Transportation improvements have shrunk the world. In 1492 Christopher Columbus took 37 days (nearly 900 hours) to sail across the Atlantic Ocean from the Canary Islands to San Salvador Island. In 1912 the Titanic was scheduled to sail from Queenstown (now Cobh), Ireland, to New York in about 5 days, although two-thirds of the way across, after 80 hours at sea, it hit an iceberg and sank. In 1927 Charles Lindbergh was the first person to fly nonstop across the Atlantic, taking 33.5 hours to go from New York to Paris. In 1962 John Glenn, the first American to orbit in space, crossed above the Atlantic in about a quarter-hour and circled the globe three times in 5 hours.

A.D. 1800, people traveled in the same ways and at about the same speeds as in 1800 B.C.—they were carried by an animal, took a sailboat, or walked.

Today travel by motor vehicle or airplane is much quicker. But we do not even need to travel to know about another place. We can transmit images and messages from one part of the world to another at the touch of a button. We can communicate instantly with people in distant places through computers and telecommunications, and we can instantly see people in distant places on television. These and other forms of communication have made it possible for people in different places to be aware of the same cultural beliefs, forms, and traits. When places are connected to each other through a network, geographers say there is spatial interaction between them.

Interaction takes place through networks, which are chains of communication that connect places. A well-known example of a network in the United States is the television network (ABC, CBS, FOX, NBC, PBS). Each comprises a chain of stations around the country simultaneously broadcasting the same program, such as a football game.

Transportation systems also form networks that connect places to each other. Airlines in the United States, for example, have adopted distinctive networks known as "hub-and-spokes." Under the hub-and-spokes system, airlines fly planes from a large number of places into one hub airport within a short period of time and then a short time later send the planes to another set of places. In principle, travelers originating in relatively small towns can reach a wide variety of destinations by changing planes at the hub airport (Figure 1–21).

Interaction among groups can be retarded by barriers. These can be physical, such as oceans and deserts, or cultural, such as language and traditions. We regard the landscape as part of our inheritance from the past. As a result, we may be reluctant to modify it unless we are under heavy pressure to do so. A major change in the landscape may reflect an upheaval in a people's culture.

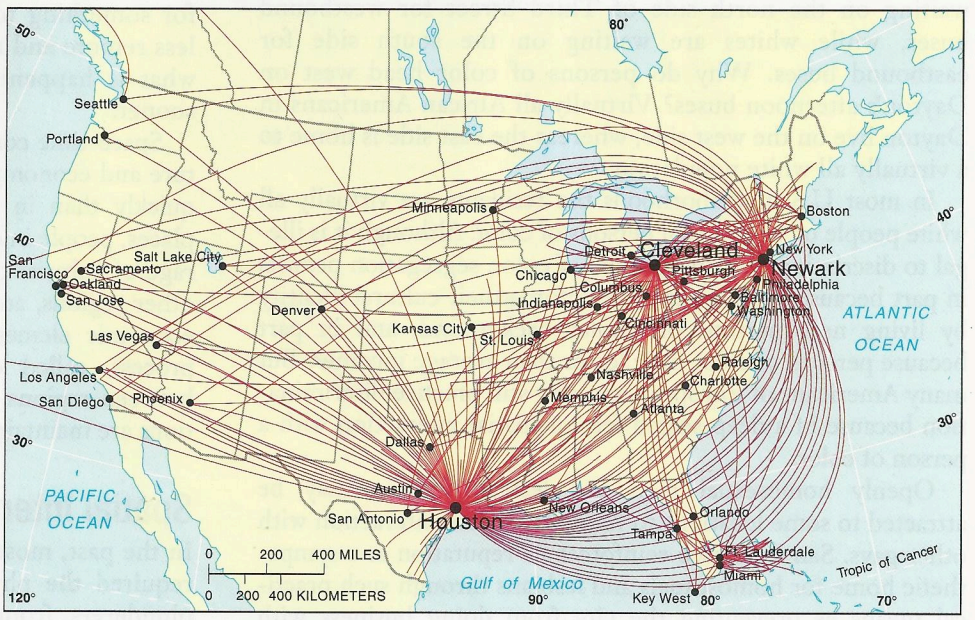

FIGURE 1–21 Continental Airlines' network. Continental, like other major U.S. airlines, has configured its route network in a system known as "hub and spokes." Lines connect each airport to the city to which it sends the most nonstop flights. Most flights originate or end at one of the company's hubs, especially at Houston, Newark, and Cleveland.

Typically, the farther away one group is from another, the less likely the two groups are to interact. Contact diminishes with increasing distance and eventually disappears. This trailing-off phenomenon is called **distance decay.**

Electronic communications, such as the Internet and e-mail, have removed barriers to interaction between people who are far from each other. The birth of these electronic communications was initially viewed as the "death" of geography, because they made it cheap and easy to stay in touch with someone on the other side of the planet. Regardless of its location, a business could maintain instantaneous communications among employees and with customers.

In reality, geography matters even more than before. Internet access depends upon availability of electricity to power the computer and a service provider. Broadband service requires proximity to a digital subscriber line (DSL) or cable line. The Internet has also magnified the importance of geography, because when an individual is online the specific place in the world where the individual is located is known. This knowledge is valuable information for businesses that target advertisements and products to specific tastes and preferences of particular places (see Chapter 12).

Diffusion

Diffusion is the process by which a characteristic spreads across space from one place to another over time. Today ideas that originate in one area diffuse rapidly to other areas through sophisticated communications and transportation networks. As a result of diffusion, interaction in the contemporary world is complex. People in more than one region may improve and modify an idea at the same time but in different ways.

The place from which an innovation originates is called a **hearth.** Something originates at a hearth or node and diffuses from there to other places. Geographers document the location of nodes and the processes by which diffusion carries things elsewhere over time.

How does a hearth emerge? A cultural group must be willing to try something new and be able to allocate resources to nurture the innovation. To develop a hearth, a group of people must also have the technical ability to achieve the desired idea and the economic structures, such as financial institutions, to facilitate implementation of the innovation.

As discussed in subsequent chapters, geographers can trace the dominant cultural, political, and economic features of contemporary United States and Canada primarily to hearths in Europe and the Middle East. However, other regions of the world also contain important hearths. In some cases an idea, such as an agricultural practice, may originate independently in more than one hearth. In other cases, hearths may emerge in two regions because two cultural groups modify a shared concept in two different ways.

For a person, object, or idea to have interaction with persons, objects, or ideas in other regions, diffusion must occur. Geographers observe two basic types of diffusion—relocation and expansion.

RELOCATION DIFFUSION. The spread of an idea through physical movement of people from one place to another is termed **relocation diffusion.** We shall see in Chapter 3 that people migrate for a variety of political, economic, and environmental reasons. When they move, they carry with them their culture, including language, religion, and ethnicity. The most commonly spoken languages in North and South America are Spanish, English, French, and Portuguese, primarily because several hundred years ago Europeans who spoke those languages comprised the largest number of migrants. Thus these languages spread through relocation diffusion. We will examine the diffusion of languages, religions, and ethnicity in Chapters 5 through 7.

Introduction of a common currency, the euro, in 12 Western European countries gave scientists an unusual opportunity to measure relocation diffusion from hearths. Although a single set of paper money was issued, each of the 12 countries minted its own coins in proportion to its share of the region's economy. A country's coins were initially distributed only inside its borders, although the coins could also be used in the other 11 countries. Dutch scientists took month-to-month samples to monitor the proportion of coins from each of the other 11 countries. The percentage of coins from a particular country is a measure of the level of relocation diffusion to and from the Netherlands.

The process of relocation diffusion helps us understand the distribution of acquired immunodeficiency syndrome (AIDS) within the United States. New York, California, and Florida were the nodes of origin for the disease within the United States during the early 1980s (Figure 1–22). Half of the 50 states had no reported cases, whereas New York City, with only 3 percent of the nation's population, contained more than one-fourth of the AIDS cases. New AIDS cases diffused to every state during the 1980s and early 1990s, although California, Florida, and New York remained the focal points. These three states, plus Texas, accounted for half of the nation's new AIDS cases in the peak year of 1993.

At a national scale, the diffusion of AIDS in the United States through relocation halted after 1993. The number of new AIDS cases dropped by one-fourth in just 2 years. Relocation diffusion can explain the rapid rise in the number of AIDS cases in the United States during the 1980s and early 1990s but not the rapid decline beginning in the mid-1990s. Instead, the decline resulted from the rapid diffusion of preventive methods and medicines such as AZT. The rapid spread of these innovations is an example of expansion diffusion rather than relocation diffusion.

EXPANSION DIFFUSION. The spread of a feature from one place to another in a snowballing process is **expansion diffusion.** This expansion may result from one of three processes:

- Hierarchical diffusion
- Contagious diffusion
- Stimulus diffusion

Hierarchical diffusion is the spread of an idea from persons or nodes of authority or power to other persons or

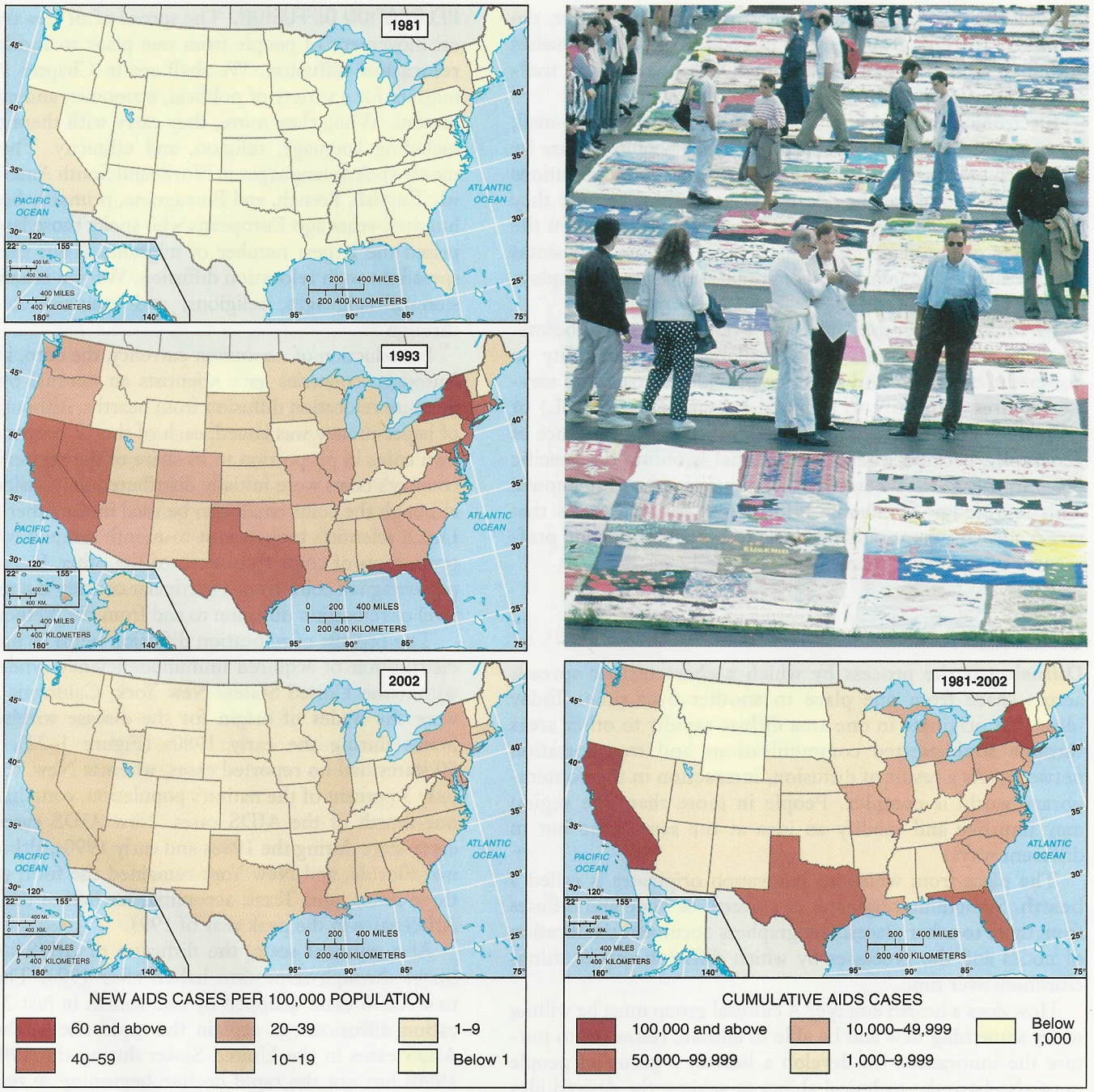

FIGURE 1–22 Diffusion of AIDS in the United States. Acquired immunodeficiency syndrome (AIDS) diffused across the United States from nodes in New York, California, and Florida. In 1981 virtually all people with AIDS were found in these three nodes. During the 1980s the number of cases increased everywhere, but the incidence remained highest in the three original nodes. The number of cases declined relatively rapidly in the original nodes during the 1990s. The AIDS Memorial Quilt, on display in Washington, DC, was assembled as a memorial to people who have died of AIDS.

places. Hierarchical diffusion may result from the spread of ideas from political leaders, socially elite people, or other important persons to others in the community. Innovations may also originate in a particular node or place of power, such as a large urban center, and diffuse later to isolated rural areas. Hip-hop or rap music is an example of an innovation that diffused from low-income African Americans rather than from socially elite people, but it originated in urban areas.

Contagious diffusion is the rapid, widespread diffusion of a characteristic throughout the population. As the term implies, this form of diffusion is analogous to the spread of a contagious disease, such as influenza. Contagious diffusion

spreads like a wave among fans in a stadium, without regard for hierarchy and without requiring permanent relocation of people. The rapid adoption throughout the United States of AIDS prevention methods and new medicines is an example of contagious diffusion. Ideas placed on the World Wide Web spread through contagious diffusion, because Web surfers throughout the world have access to the same material simultaneously—and quickly.

Stimulus diffusion is the spread of an underlying principle, even though a characteristic itself apparently fails to diffuse. For example, early desktop computer sales in the United States were divided about evenly between Macintosh Apple and IBM-compatible DOS systems. By the 1990s Apple sales had fallen far behind IBM-compatibles in the United States, and the company had limited presence in rapidly expanding overseas markets. But principles pioneered by Apple, notably making selections by pointing a mouse at an icon rather than typing a string of words, diffused through a succession of IBM-compatible Windows systems.

Expansion diffusion occurs much more rapidly in the contemporary world than in the past. Modern methods of communications, such as computers, facsimile machines, and electronic mail systems, have encouraged more rapid hierarchical diffusion than in the past. Use of the Internet, especially the World Wide Web, has encouraged more rapid contagious diffusion. All the new technologies support the possibility of stimulus diffusion. Diffusion from one place to another can be instantaneous in time, even if the physical distance between two places—as measured in kilometers or miles—is large.

DIFFUSION OF CULTURE AND ECONOMY. In a global culture and economy, transportation and communications systems have been organized to rapidly diffuse raw materials, goods, services, and capital from nodes of origin to other regions. Every area of the world plays some role intertwined with the roles played by other regions. Workers and cultural groups that in the past were largely unaffected by events elsewhere in the world now share a single economic and cultural world with other workers and cultural groups. The fate of an autoworker in Detroit is tied to investment decisions made in Mexico City, Seoul, Stuttgart, and Tokyo.

Global culture and economy are increasingly centered on three core or hearth regions of North America, Western Europe, and Japan. These three regions have a large percentage of the world's advanced technology, capital to invest in new activities, and wealth to purchase goods and services. From "command centers" in the three major world cities of New York, London, and Tokyo, key decision makers employ modern telecommunications to send out orders to factories, shops, and research centers around the world, an example of hierarchical diffusion.

Meanwhile, "nonessential" employees of the companies can be relocated to lower-cost offices outside the major financial centers. For example, Fila maintains headquarters in Italy but has moved 90 percent of its production of sportswear to Asian countries. Mitsubishi's corporate offices are in Japan, but all of its VCRs and DVDs are produced in other Asian countries.

Countries in Africa, Asia, and Latin America contain three-fourths of the world's population and nearly all of its population growth, but they find themselves on a periphery, or outer edge, of global investment that arrives through hierarchical diffusion of decisions made by transnational corporations through hierarchical diffusion. People in peripheral regions, who once toiled in isolated farm fields to produce food for their families, now produce crops for sale in core regions or have given up farm life altogether and migrated to cities in search of jobs in factories and offices.

As a result, the global economy has produced greater disparities than in the past between the levels of wealth and well-being enjoyed by people in the core and in the periphery. The increasing gap in economic conditions between regions in the core and periphery that results from the globalization of the economy is known as **uneven development.**

Many people take for granted the ability to watch events in distant places through television, speak to others in distant places by telephone, and travel to far-off places by motor vehicle. An increasing number of the world's population regard access to these communications systems as novelties, perhaps recently experienced for the first time.

For some people, access to these cultural elements is a distant aspiration. Knowledge of these communications systems is global, but the ability to purchase them is not. Access to television, telephones, motor vehicles, and other means of communicating culture is restricted by an uneven division of wealth in the world. In some regions possession of these objects is widespread, but in other regions few people have enough wealth to buy them. Even within regions, access to cultural elements may be restricted because of uneven distribution of wealth or because of discrimination against women or minority groups.

SUMMARY

Each chapter has a summary that reviews the chapter's most important concepts. The summary is organized around the major headings within the chapter. In all of the subsequent chapters, these headings will be in the form of questions that are answered in the text. In this first chapter, the principal headings concern thinking about five key concepts in geography:

1. **How do geographers describe where things are?** Geography is most fundamentally a spatial science. Geographers use maps to display the location of objects and to extract information about places. Early geographers drew maps of Earth's surface based on exploration and observation. GIS and other contemporary tools assist geographers in understanding reasons for observed regularities across Earth.

2. **Why is each point on Earth unique?** Every place in the world has a unique location or position on Earth's surface. Geographers also identify regions as areas distinguished by distinctive combinations of cultural as well as economic and environmental features. The distributions of features help us to understand why every place and every region is unique.

3. **Why are different places similar?** Geographers work at all scales, from local to global. The global scale is increasingly important because few places in the contemporary world are totally isolated. Because places are connected to each other, they display similarities. Geographers study the interactions of groups of people and human activities across space, and they identify processes by which people and ideas diffuse from one location to another over time.

CASE STUDY REVISITED

The Geography of a Big Mac Attack

Each chapter in this textbook concludes by reviewing the opening case study in light of the issues raised in the chapter. This chapter presented five basic concepts—space, place, region, scale, and connections. The opening case study presented a typical everyday geographic concern—a search for a restaurant—to which these five concepts can be applied.

Geography is fundamentally concerned with the organization of space. McDonald's restaurants are not distributed randomly across the landscape; rather, each restaurant has a unique location that can be depicted on a map. Geographers use the map to describe where these establishments are found and explain why they are so arranged. Because "where" and "why" are the questions most fundamental to geographic inquiry, they are used to organize the material presented within all of the other chapters in this book.

Geographers observe from a map that McDonald's restaurants cluster in some regions, whereas other regions have few. A world map of McDonald's restaurants helps us to understand global-scale patterns of investment by a major international corporation. Most McDonald's are located in countries where average incomes are high enough to buy the products. On the other hand, a world map of McDonald's doesn't help a hungry American driving on an interstate highway. The motorist needs a local-scale map showing the location of McDonald's in relation to specific highway exit ramps. As McDonald's have diffused from the United States to other regions of the world, each McDonald's is connected to all other McDonald's by a communications network through which uniform standards and practices are set.

Franchised restaurants tend to cluster near each other.

In subsequent chapters, these five basic concepts will be applied to elements of human geography. Chapters 2 and 3 examine where humans are clustered in the world, why the number of people has increased in some places, and why people have moved to certain places. The focus in Chapters 4 through 8 will be on where important cultural traits, including popular and folk customs, language, religion, ethnicity, and political institutions, are distributed. In these chapters, explanations are also given as to why these cultural features are so distributed and why these distributions can lead to conflict. Described in Chapters 9 through 14 are where different economic activities are found around the world, why people earn a living in different ways in different regions of the world, and why people increasingly earn a living by residing in urban areas.

KEY TERMS

Agricultural density (p. 33)
Arithmetic density (p. 33)
Base line (p. 10)
Cartography (p. 6)
Concentration (p. 33)
Connections (p. 5)
Contagious diffusion (p. 38)
Cultural ecology (p. 25)
Cultural landscape (p. 20)
Culture (p. 23)
Density (p. 33)
Diffusion (p. 37)
Distance decay (p. 37)
Distribution (p. 33)
Environmental determinism (p. 25)
Expansion diffusion (p. 37)
Formal region (p. 21)
Functional region (p. 21)
Geographic information system (GIS) (p. 12)
Global Positioning System (GPS) (p. 14)
Globalization (p. 30)
Greenwich Mean Time (GMT) (p. 19)
Hearth (p. 37)
Hierarchical diffusion (p. 37)
International Date Line (p. 20)
Land Ordinance of 1785 (p. 10)
Latitude (p. 17)
Location (p. 14)

Longitude (p. 17)
Map (p. 5)
Mental map (p. 22)
Meridian (p. 17)
Parallel (p. 17)
Pattern (p. 34)
Physiological density (p. 33)
Place (p. 5)
Polder (p. 28)
Possibilism (p. 25)
Prime meridian (p. 17)
Principal meridian (p. 10)
Projection (p. 9)
Region (p. 5)
Regional studies (p. 20)
Relocation diffusion (p. 37)
Remote sensing (p. 12)
Resource (p. 25)
Scale (p. 5)
Sections (p. 11)
Site (p. 16)
Situation (p. 16)
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Space-time compression (p. 35)
Stimulus diffusion (p. 39)
Toponym (p. 14)
Township (p. 10)
Transnational corporation (p. 31)
Uneven development (p. 39)
Vernacular region (p. 22)

THINKING GEOGRAPHICALLY

1. Cartography is not simply a technical exercise in penmanship and coloring, nor are decisions confined to scale and projection. Mapping is a politically sensitive undertaking. Look at how maps in this book distinguish between the territories of Israel and its neighbors, the locations of borders in South Asia, the Arabian Peninsula, and northwest Africa. Are there other logical ways to draw boundaries and distinguish among territories in these regions? What might they be?
2. Imagine that a transportation device (perhaps the one in *Star Trek* or *Harry Potter*) would enable all humans to travel instantaneously to any location on Earth's surface. What would be the impact of that invention on the distribution of peoples and activities across Earth?
3. When earthquakes, hurricanes, or other environmental disasters strike, humans tend to "blame" nature and see themselves as innocent victims of a harsh and cruel nature. To what extent do environmental hazards stem from unpredictable nature, and to what extent do they originate from human actions? Should victims blame nature, other humans, or themselves for the disaster? Why?
4. The construction of dams is a particularly prominent example of human–environment interaction in regions throughout the world. Turkey is building the Ataturk Dam on the Euphrates River, a move opposed by Syria and Iraq, the two downstream countries. Egypt, which operates the Aswan Dam on the Nile River, has blocked loans to Ethiopia that could be used to divert the source of the Nile. Some Russians oppose construction of the Gorskaya Dam in the Gulf of Finland near St. Petersburg. Similarly, the Balbina Dam on the Uatruma River, a tributary of the Amazon, has generated considerable opposition in Brazil. Why do governments push the construction of dams so forcefully, and why do others oppose their construction so passionately?
5. Geographic concepts are supposed to help explain contemporary issues. Are there any stories in your newspaper to which geographic concepts can be applied to help understand the issues? Discuss.

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