WORLD REGIONAL GEOGRAPHY: Global Perspectives

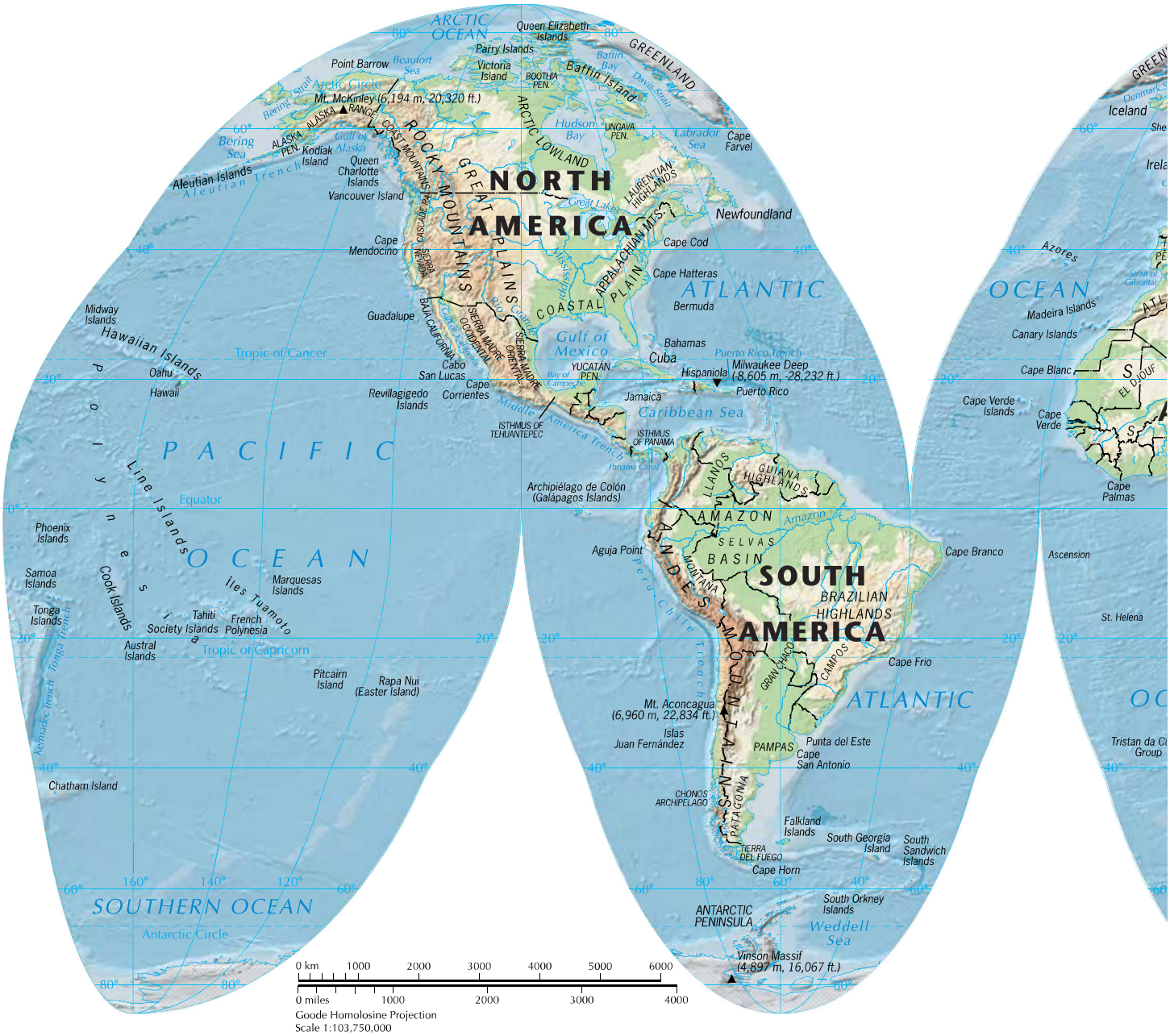
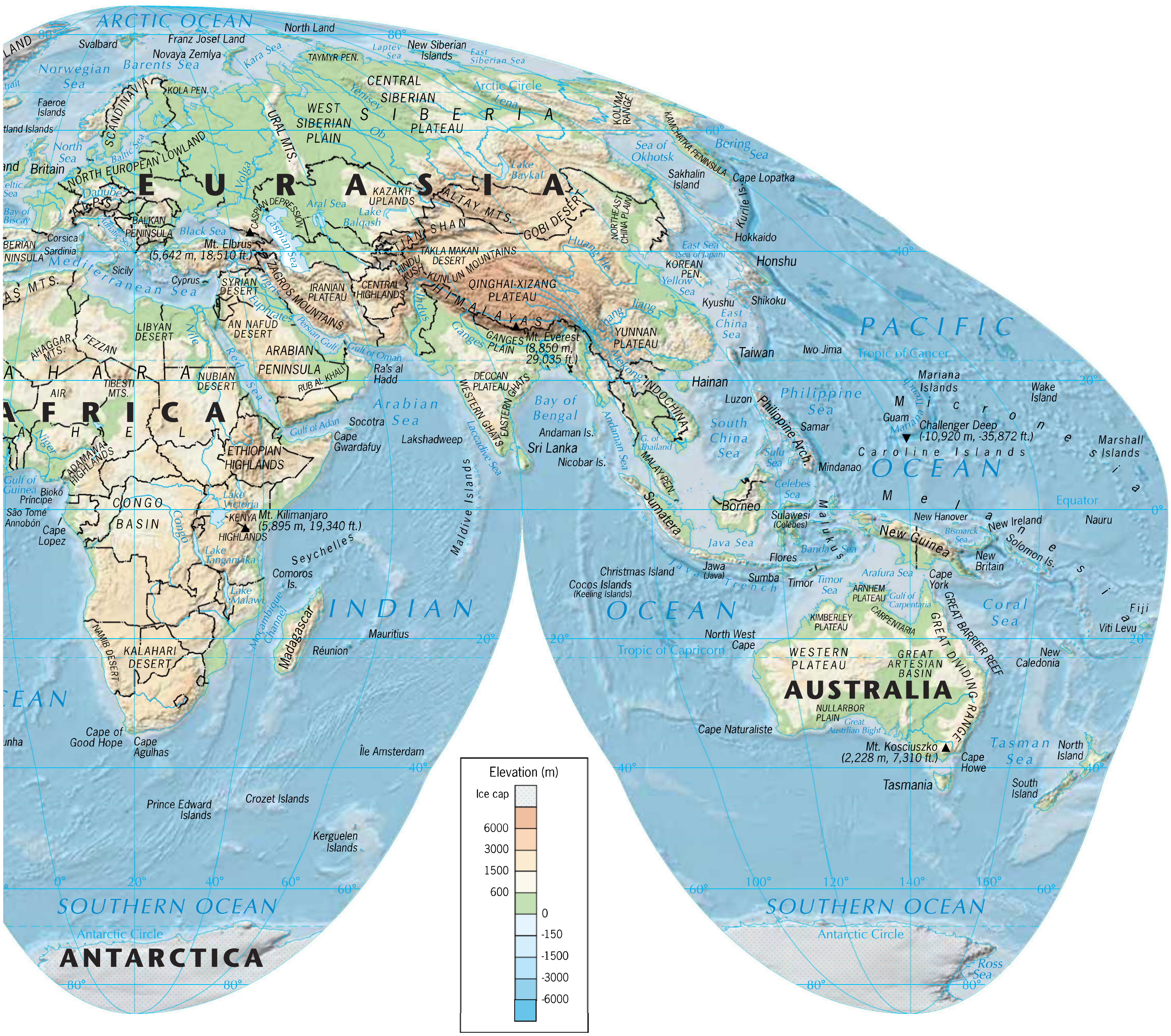


FIGURE G-1


ARCTIC OCEAN
North Land
Svalbard
Franz Josef Land
Novaya Zemlya
Kara Sea
Barents Sea
Norwegian Sea
Laptev Sea
New Siberian Islands
East Siberian Sea
TAYMYR PEN.
KOLA PEN.
CENTRAL SIBERIAN PLATEAU
WEST SIBERIAN PLAIN
S I B E R I A
Arctic Circle
Faeroe Islands
SCANDINAVIA
URAL MTS.
KOLYMA RANGE
KAMCHATKA PENINSULA
Bering Sea
Sea of Okhotsk
North Sea
Britain
NORTH EUROPEAN LOWLAND
Baltic Sea
Lake Baykal
Sakhalin Island
Cape Lopatka
E U R A S I A
KAZAKH UPLANDS
ALTAY MTS.
Aral Sea
Lake Balqash
Volga
Danube
CASPIAN DEPRESSION
Caspian Sea
TIAN SHAN
GOBI DESERT
NORTHEAST CHINA PLAIN
Kurile Is.
Hokkaido
BALKAN PENINSULA
Black Sea
Mt. Elbrus
(5,642 m, 18,510 ft.)
Corsica
Sardinia
Mediterranean Sea
Sicily
Cyprus
TAKLA MAKAN DESERT
HINDU KUSH
KUNLUN MOUNTAINS
Huang He
East Sea (Sea of Japan)
Honshu
KOREAN PEN.
Yellow Sea
SYRIAN DESERT
IRANIAN PLATEAU
CENTRAL HIGHLANDS
ZAGROS MOUNTAINS
QINGHAI-XIZANG PLATEAU
Kyushu
Shikoku
East China Sea
Indus
H I M A L A Y A S
Euphrates
Tigris
Persian Gulf
LIBYAN DESERT
AN NAFUD DESERT
Nile
PACIFIC
YUNNAN PLATEAU
Ganges
GANGES PLAIN
Mt. Everest
(8,850 m, 29,035 ft.)
AHAGGAR MTS.
FEZZAN
Red Sea
ARABIAN PENINSULA
Gulf of Oman
Taiwan
Iwo Jima
Tropic of Cancer
S A H A R A
NUBIAN DESERT
RUB AL KHALI
Ra's al Hadd
Mariana Islands
Wake Island
TIBESTI MTS.
AIR
DECCAN PLATEAU
Hainan
Philippine Sea
A F R I C A
Arabian Sea
WESTERN GHATS
EASTERN GHATS
Bay of Bengal
INDOCHINA
Luzon
Philippine Arch.
M i c r o n e s i a
Guam
Challenger Deep
(-10,920 m, -35,872 ft.)
Marshall Islands
Gulf of Aden
Socotra
Cape Gwardafuy
Lakshadweep
Andaman Is.
Sri Lanka
Nicobar Is.
South China Sea
G. of Thailand
Samar
Sulu Sea
Mindanao
ETHIOPIAN HIGHLANDS
ADAMAWA HIGHLANDS
Laccadive Sea
Andaman Sea
MALAY PEN.
C a r o l i n e I s l a n d s
OCEAN
Gulf of Guinea
Bioko
Príncipe
São Tomé
Annobón
CONGO BASIN
Lake Victoria
Mt. Kilimanjaro
(5,895 m, 19,340 ft.)
KENYA HIGHLANDS
Maldive Islands
Sumatera
Borneo
Celebes Sea
Sulawesi (Celebes)
M a l u k u s
M e l a n e s i a
Equator
Nauru
Cape Lopez
Congo
Lake Tanganyika
Seychelles
Java Sea
Banda Sea
New Hanover
New Ireland
New Guinea
Bismarck Sea
Solomon Is.
New Britain
Comoros Is.
Christmas Island
Cocos Islands (Keeling Islands)
Jawa (Java)
Sumba
Flores
Java Trench
Timor
Timor Sea
Arafura Sea
Cape York
ARNHEM PLATEAU
Gulf of Carpentaria
Lake Malawi
Mozambique Channel
Madagascar
INDIAN
OCEAN
Coral Sea
Fiji
Viti Levu
NAMIB DESERT
Mauritius
KIMBERLEY PLATEAU
CARPENTARIA
GREAT DIVIDING RANGE
GREAT BARRIER REEF
North West Cape
Tropic of Capricorn
Réunion
KALAHARI DESERT
WESTERN PLATEAU
GREAT ARTESIAN BASIN
New Caledonia
AUSTRALIA
NULLARBOR PLAIN
Great Australian Bight
Cape Naturaliste
Mt. Kosciuszko
(2,228 m, 7,310 ft.)
Tasman Sea
North Island
Cape Howe
Tasmania
South Island
Cape of Good Hope
Cape Agulhas
Île Amsterdam
Prince Edward Islands
Crozet Islands
Kerguelen Islands
Elevation (m)
Ice cap
6000
3000
1500
600
0
-150
-1500
-3000
-6000
SOUTHERN OCEAN
Antarctic Circle
ANTARCTICA
SOUTHERN OCEAN
Antarctic Circle
Ross Sea

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Camel traders in Pushkar, a small town in India's Rajasthan State, relaxing at the end of a November day in 2011. Pushkar features the biggest annual camel fair on Earth, with tens of thousands of camels (and horses) changing hands during the five-day event.

IN THIS CHAPTER

- The power of maps
- The spatial order of the world
- Global climate change
- Dangerous places
- Globalization and its discontents
- The power of place

CONCEPTS, IDEAS, AND TERMS

A view of Florence, one of Europe's most iconic, historical cities and birthplace of the Renaissance. The famous Duomo (cathedral) lies at center stage.

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What are your expectations as you open this book? You have signed up for a course that will take you around the world to try to understand how it functions today. You will discover how interesting and unexpectedly challenging the discipline of geography is. We hope that this course, and this book, will open new vistas, bring new perspectives, and help you navigate our increasingly complex and often daunting world.

You could not have chosen a better time to be studying geography. The world is changing on many fronts, and so is the United States. Still the most formidable of all countries, the United States remains a great power capable of influencing nations and peoples, lives and livelihoods from pole to pole. That power confers on Americans the responsibility to learn as much as they can about those nations and livelihoods, so that the decisions of their government representatives are well-informed. But in this respect, the United States is no superpower. Geographic literacy is a measure of international comprehension and awareness, and Americans' geographic literacy ranks low among countries of consequence. That is not a good thing, neither for the United States nor for the rest of the world, because such geographic fogginess tends to afflict not only voters but also the representatives they elect, from the school board to Congress.

A WORLD ON MAPS

Just a casual glance at the pages that follow reveals a difference between this and other textbooks: there are almost as many maps as there are pages. Geography is more closely identified with maps than any other discipline, and we urge you to give as much (or more!) attention to the maps in this book as you do to the text. It is often said that a picture is worth a thousand words, and the same or more applies to maps. When we write "see Figure XX," we really mean it . . . and we hope that you will get into the habit. We humans are territorial creatures, and the boundaries that fence off our 200 or so countries reflect our divisive ways. Other, less visible borders—between religions, languages, rich, and poor—partition our planet as well. When political and cultural boundaries are at odds, there is nothing like a map to summarize the circumstances. Just look, for example, at the map of the African Transition Zone in Chapter 6B: this area's turbulence and challenges are steeped in geography.

Maps in Our Minds

All of us carry in our minds maps of what psychologists call our activity space: the apartment building or house we live in, the streets nearby, the way to school or workplace, the general layout of our hometown or city. You will know what lane to use when you turn into a shopping mall, or where to park at the movie theater. You can probably draw from memory a pretty good map of your hometown. These **mental maps [1]** allow you to navigate your activity space with efficiency, predictability, and safety. When you arrived as a first-year student on a college or university campus, a new mental map will have started forming. At first you needed a GPS, online, or hard-copy map to find your way around, but soon you dispensed with that because your mental map was sufficient. And it will continue to improve as your activity space expands.

If a well-formed mental map is useful for decisions in daily life, then an adequate mental map is surely indispensable when it comes to decision making in the wider world. You can give yourself an interesting test. Choose some part of the world, beyond North America, in which you have an interest or about which you have a strong opinion—for example, Israel, Iran, Pakistan, North Korea, or China. On a blank piece of paper, draw a map that reflects your impression of the regional layout there: the country, its neighbors, its internal divisions, major cities, seas (if any), and so forth. That is your mental map of the place. Put it away for future reference, and try it again at the end of this course. You will have proof of your improved mental-map inventory.

The Map Revolution

The maps in this book show larger and smaller parts of the world in various contexts. Some depict political configurations; others display ethnic, cultural, economic, or environmental features. ***Cartography*** (the making of maps) has undergone a dramatic technological revolution—a revolution that continues. Earth-orbiting satellites equipped with remote sensing technology (special on-board sensors and imaging instruments) transmit remotely sensed information to computers on the surface, recording the expansion of deserts, the shrinking of glaciers, the depletion of forests, the growth of cities, and myriad other geographic phenomena. Earthbound computers possess ever-expanding capabilities not only to organize this information but also to display it graphically. This allows geographers to develop a ***geographic information system (GIS)***, bringing information to a monitor's screen that would have taken months to assemble just a few decades ago.

There has also been a map revolution in the astounding proliferation of navigation systems in cars and on mobile phones. Smartphones allow the use of maps on the go, and

many of us, in the developed world at least, have become dependent on them to traverse cities, to get to a store or restaurant, even to move around shopping malls. Google, the biggest company in this market, used to aim at cataloguing all of the world's information, but today it is also aiming to map the world in almost unimaginable detail. And the competition is now joined by Nokia and Apple. Whereas the maps on our smartphones allow us to move around more efficiently, the maps in this book are aimed at better *understanding* the world and its constituent parts.

Satellites—even spy satellites—cannot record everything that occurs on the Earth's surface. Sometimes the borders between ethnic groups or cultural sectors can be discerned by satellites—for example, in changing types of houses or religious shrines—but this kind of information tends to require on-the-ground verification through field research and reporting. No satellite view of Iraq could show you the distribution of Sunni and Shia Muslim adherents. Many of the boundaries you see on the maps in this book cannot be observed from space because long stretches are not even marked on the ground. So the maps you are about to "read" have their continued uses: they summarize complex situations and allow us to begin forming durable mental maps of the areas they represent.

There is one other point we should make that is especially important when it comes to world maps: never forget that the world is a sphere, and to project it onto a two-dimensional flat surface must necessarily entail some very significant distortions. Try peeling an orange and flattening the entire peel on a surface—you will have to tear it up and try to stretch it in places to get the job done. Take a look at Figure G-1 and note how the Atlantic Ocean and other segments of the planetary surface are interrupted. You can produce a map like this in many different ways, but you will always end up distorting things. When studying world maps, there is nothing like having a globe at hand to remind you of our three-dimensional reality.

GEOGRAPHY'S PERSPECTIVE

Geography is sometimes described as the most interdisciplinary of disciplines. That is a testimonial to geography's historic linkages to many other fields, ranging from geology to economics and from sociology to political science. And, as has been the case so often in the past, geography is in the lead on this point. Today, interdisciplinary studies and research are more prevalent than ever. The old barriers between disciplines are breaking down.

This is not to suggest that college and university departments are no longer relevant; they are just not as exclusive as they used to be. These days, you can learn some useful geography in economics departments and some good economics in geography departments. But each discipline still has its own particular way of looking at the world.

A Spatial Perspective

Most disciplines focus on one key theme: economics is about money; political science is about power; psychology

From the Field Notes . . .

"On the descent into Tibet's Lhasa Gongga Airport, I had a great view of the Yarlung Zangbo Valley, its braided stream channels gently flowing toward the distant east. The Yarlung Zangbo is the highest major river on Earth, running from the Tibetan Plateau into northeastern India where it joins the mighty Brahmaputra River that continues on to Bangladesh where it empties into the Indian Ocean. It was mid-October and the water levels were low. The landing strip of the airport can be seen in the center-right of the photo, on the south bank. The airport is quite far from Lhasa, the Tibetan capital, located about 62 kilometers (40 mi) to its southwest. Despite major road and tunnel construction, it is still more than an hour's drive. The airport had to be built away from the city and in this widest part of the valley because it allows the easiest landings and takeoffs in this especially rugged terrain. It lies at 3700 meters above sea level (12,100 ft), one of the highest airports in the world."

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is about the mind; biology is about life. Geography, then, is about space on the Earth's surface. More specifically, geographers are interested in the organization of ***terrestrial space***. Social space (cities, buildings, political boundaries, etc.) as well as natural space (climates, terrain, water bodies, etc.) are not randomly configured. Instead, there generally prevails a particular order, regularity, even predictability about the ways in which space is organized. Sometimes it is the deliberate work of human beings and sometimes it is the work of nature, but very often there are particular patterns. Geographers consider these spatial patterns and processes as not only interesting but also crucial to how we live and how we organize our societies. The **spatial perspective [2]** has defined geography from its beginning.

Environment and Society

There is another glue that binds geography and has done so for a very long time: an interest in the relationships between human societies and the natural (physical) environment. Geography lies at the intersection of the social and natural sciences and integrates perspectives from both, being the only discipline to do so explicitly. This perspective comes into play frequently: environmental change is in the news on a daily basis in the form of worldwide climate change, but this current surge of global warming is only the latest phase of endless atmospheric and ecological fluctuation. Geographers are involved in understanding current environmental issues not only by considering climate change in the context of the past, but also by looking carefully at the implications of global climate change for human societies.

More generally, think of this relationship between humans and their environment as a two-way street. On one hand, human beings have always had a transformative effect on their natural surroundings, from the burning of forests to the creation of settlements. On the other hand, humans have always been heavily dependent on the natural environment, their individual and collective behaviors very much a product of it. There are so many examples that it is hard to know where to begin or when to end: we eat what nature provides and traditional diets vary regionally; rivers allow us to navigate and connect with other peoples—or they serve as natural boundaries like the Rio Grande; wars are fought over access to water or seaports; landlocked countries seem to have different cultures from those of islands; and so on.

At times we are faced with the interrelationship between humans and their environment. For example, humans modify the environment through escalating carbon dioxide emissions (the so-called greenhouse effect) and are subsequently confronted with the need to adjust to rising sea levels. We will always be part of nature, no matter how far technology advances.

Spatial Patterns

Geographers, therefore, need to be conversant with the location and distribution of salient features on the Earth's surface. This includes the natural (physical) world, simplified in Figure G-1, as well as the human world, and our inquiry will view these in temporal (historical) as well as spatial perspective. We take a penetrating look at the overall geographic framework of the contemporary world, the still-changing outcome of thousands of years of human achievement and failure, movement and stagnation, stability and revolution, interaction and isolation. The spatial structure of cities, the layout of farms and fields, the networks of transportation, the configurations of rivers, the patterns of climate—all these form part of our investigation. As you will find, geography employs a comprehensive spatial vocabulary with meaningful terms such as area, distance, direction, clustering, proximity, accessibility, and many others we will encounter in the pages ahead. For geographers, some of these terms have more specific definitions than is generally assumed. There is a difference, for example, between *area* (surface) and *region*, between *boundary* and *frontier*, and between *place* and *location*. The vocabulary of geography holds some surprises, and what at first may seem to be simple ideas turn out to be complex concepts.

Scale and Scope

One prominent item in this vocabulary is the term **scale [3]**. Whenever a map is created, it represents all or part of the Earth's surface at a certain level of detail. Obviously, Figure G-1 displays a very low level of detail; it is little more than a general impression of the distribution of land and water as well as lower and higher elevations on our planet's surface. A limited number of prominent features such as the Himalayas and the Sahara are named, but not the Pyrenees Mountains or the Nile Delta. At the bottom of the map you can see that one inch at this scale must represent about 1650 miles of the real world, leaving the cartographer little scope to insert information.

A map such as Figure G-1 is called a *small-scale* map because the ratio between map distance and real-world distance, expressed as a fraction, is very small at 1:103,750,000. Increase that fraction (i.e., zoom in), and you can represent less territory—but also enhance the amount of detail the map can represent. In Figure G-2, note how the fraction increases from the smallest (1:103,000,000) to the largest (1:1,000,000). Montreal, Canada is just a dot on Map A but an urban area on Map D. Does this mean that world maps like Figure G-1 are less useful than larger-scale maps? It all depends on the purpose of the map. In this chapter, we often use world maps to show global distributions as we set the stage for the more detailed discussions to follow. In later chapters, the scale tends to become larger as we focus on smaller areas, even on individual countries and cities. But whenever you read a map, be aware of the scale because it is a guide to its utility.

The importance of the scale concept is not confined to maps. Scale plays a fundamental role in geographic research and in the ways we think about geographic problems: scale in terms of *level of analysis*. This is sometimes

EFFECT OF SCALE

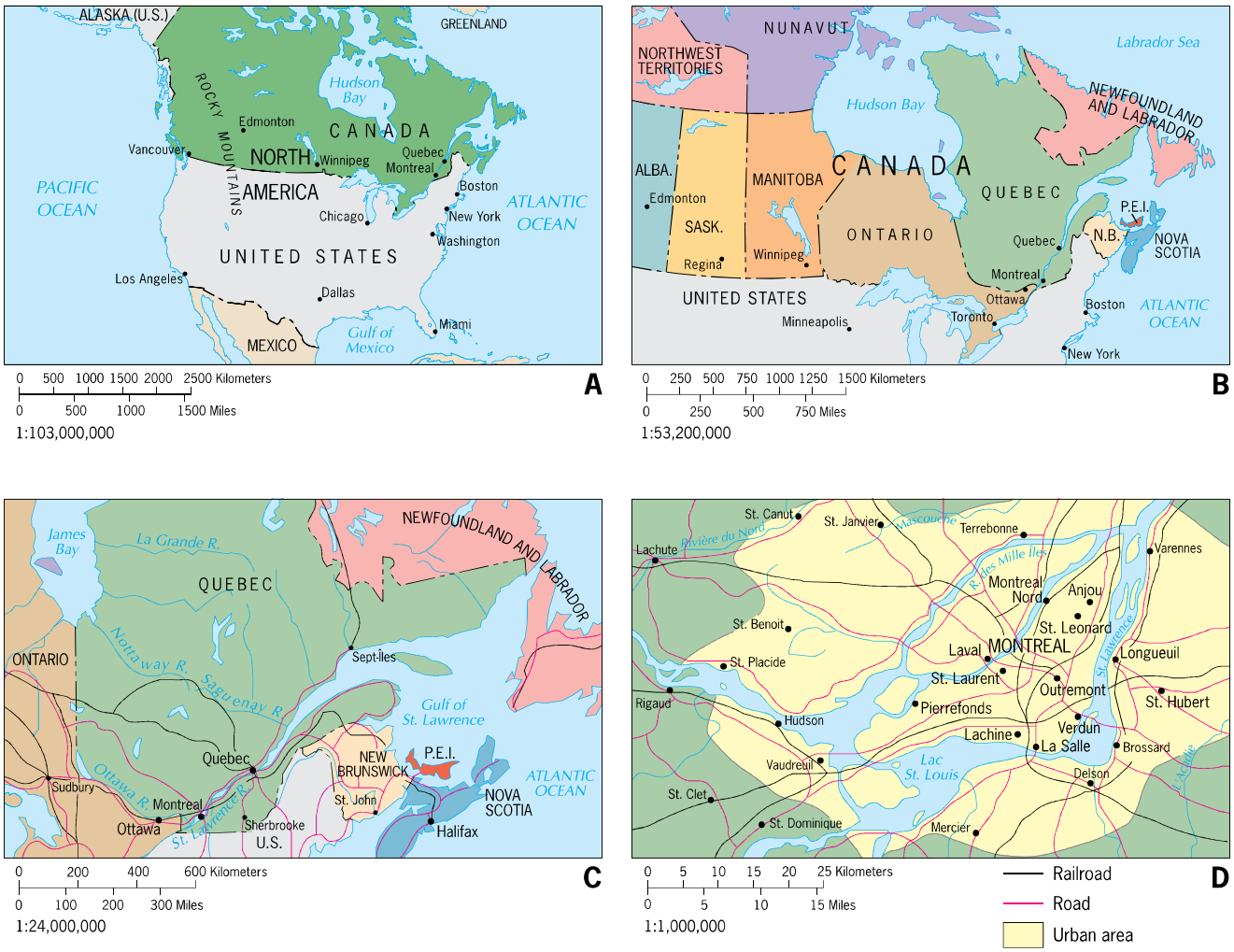


FIGURE G-2

referred to as *operational scale*, the scale at which social or natural processes operate or play out. For instance, if you want to investigate the geographic concentration of wealth in the United States, you can do so at a range of scales: within a neighborhood, a city, a county, a State,* or at the national level. You choose the scale that is the most appropriate for your purpose, but it is not always that straightforward. Suppose you had to study patterns of ethnic segregation: what do you think would be the most relevant scale(s)?

In this book, our main purpose is to understand the geography of the world at large and how it works, and so, inevitably, we must deal with large spatial entities. Our focus is on the world's realms and on the main regions within those realms, and in most cases we will have to forego analyses at a finer scale. For our purposes, it is the big picture that matters most.

*Throughout this book we will capitalize State when this term refers to an administrative subdivision of a country: for example, the U.S. State of Ohio or the Australian State of New South Wales. Since this term is also synonymous with country (e.g., the state of Brazil), we use the lower case when referring to such a national state.

WORLD GEOGRAPHIC REALMS

Ours is a globalized, interconnected world, a world of international trade and travel, migration and movement, tourism and television, financial flows and Internet traffic. It is a world that, in some contexts, has taken on the properties of a "global village"—but that village still has its neighborhoods. Their names are Europe, South America, Southeast Asia, and others familiar to us all. Like the neighborhoods of a city or town, these global neighborhoods may not have sharply defined borders, but their persistence, after tens of thousands of years of human dispersal, is beyond doubt. Geographers call such global neighborhoods **geographic realms [4]**. Each of these realms possesses a particular combination of environmental, cultural, and organizational properties.

These characteristic qualities are imprinted on the landscape, giving each realm its own traditional attributes and social settings. As we come to understand the human and environmental makeup of these geographic realms, we learn not only where they are located but also why they are located where they are (a key question in geography), how they are constituted, and what their future is likely to be in our fast-changing world. Figure G-3, therefore, forms the overall framework for our investigation in this book.

Criteria for Geographic Realms

The existence and identification of world geographic realms depends on a combination of factors. Our world offers a highly complex and variable environment of large and small continents, enormous oceans and countless waterways, innumerable islands, diverse habitats and cultures, and intricate political geographies. What constitutes a realm depends on the circumstances, but we can still identify three main sets of criteria:

- ***Physical and Human*** Geographic realms are based on sets of spatial criteria. They are the largest units into which the inhabited world can be divided. The criteria on which such a broad regionalization is based include both physical (that is, natural) and human (or social) yardsticks. On the one hand, South America is a geographic realm because physically it is a continent and culturally it is comprised of comparable societies. The realm called South Asia, on the other hand, lies on a Eurasian landmass shared by several other geographic realms; high mountains, wide deserts, and dense forests combine with a distinctive social fabric to create this well-defined realm centered on India.
- ***Functional*** Geographic realms are the result of the interaction of human societies and natural environments, a *functional* interaction revealed by farms, mines, fishing ports, transport routes, dams, bridges, villages, and countless other features that mark the landscape. According to this criterion, Antarctica is a continent but not a geographic realm.
- ***Historical*** Geographic realms must represent the most comprehensive and encompassing definition of the great clusters of humankind in the world today. China lies at the heart of such a cluster, as does India. Africa constitutes a geographic realm from the southern margin of the Sahara (an Arabic word for desert) to the Cape of Good Hope and from its Atlantic to its Indian Ocean shores.

Figure G-3 displays the 12 world geographic realms based on these criteria. As we will show in greater detail later, waters, deserts, and mountains as well as cultural and political shifts mark the borders of these realms. We shall discuss the positioning of these boundaries as we examine each realm.

Delineating Realms: Boundaries and Transition Zones

Oceans and seas are the most common natural boundaries of the world's realms, such as the South Atlantic to Subsaharan Africa's west or the North Atlantic to North America's east. But where two geographic realms meet, **transition zones [5]**, not sharp boundaries, often mark their contacts.

We need only remind ourselves of the border zone between the geographic realm in which most of us live, North America, and the adjacent realm of Middle America. The line in Figure G-3 coincides with the boundary between Mexico and the United States, crosses the Gulf of Mexico, and then separates Florida from Cuba and the Bahamas. But Hispanic influences are strong in North America north of this boundary, and the U.S. economic influence is strong south of it. The line, therefore, represents an ever-changing zone of regional interaction. Again, there are many ties between South Florida and the Bahamas, but the Bahamas resemble a Caribbean more than a North American society. Miami has so many Cuban and Cuban-American inhabitants that it is sometimes referred to as the second-largest Cuban city after Havana.

In Africa, the transition zone from Subsaharan to North Africa is so wide and well defined that we have put it on the world map; elsewhere, transition zones tend to be narrower and less easily represented. In the first half of this second decade of the twenty-first century, such countries as Belarus (between Europe and Russia) and Kazakhstan (between Russia and Muslim Southwest Asia) lie in inter-realm transition zones. Remember, over much (though not all) of their length, borders between realms are zones of regional change.

Transition zones are fascinating spaces: it is almost as if they rebel against a clear ordering of the world's geography. They remind us that the world is a restless and contested place with shifting boundaries and changing geographic fortunes. They challenge the geographer's mapping skills, and, above all, they underscore just how complex the study of geography is. As you will see, transition zones are often places of tension and/or conflict.

Geographic Realms: Dynamic Entities

Had we drawn Figure G-3 before Columbus made his voyages from 1492 (and assuming we had the relevant geographical knowledge), the map would have looked different: indigenous states and peoples would have determined the boundaries in the Americas; Australia and New Guinea would have constituted a single realm, and New Zealand would have been part of the Pacific Realm. The colonization, Europeanization, and Westernization of the world changed that map dramatically. Since World War II, the world map has been redrawn as a result of decolonization and the rise and then demise of the Cold War. That Cold War division between western and eastern Europe has now given way to far-reaching European integration across that geographic realm. Realms and regions are dynamic entities, and geography is always subject to change.

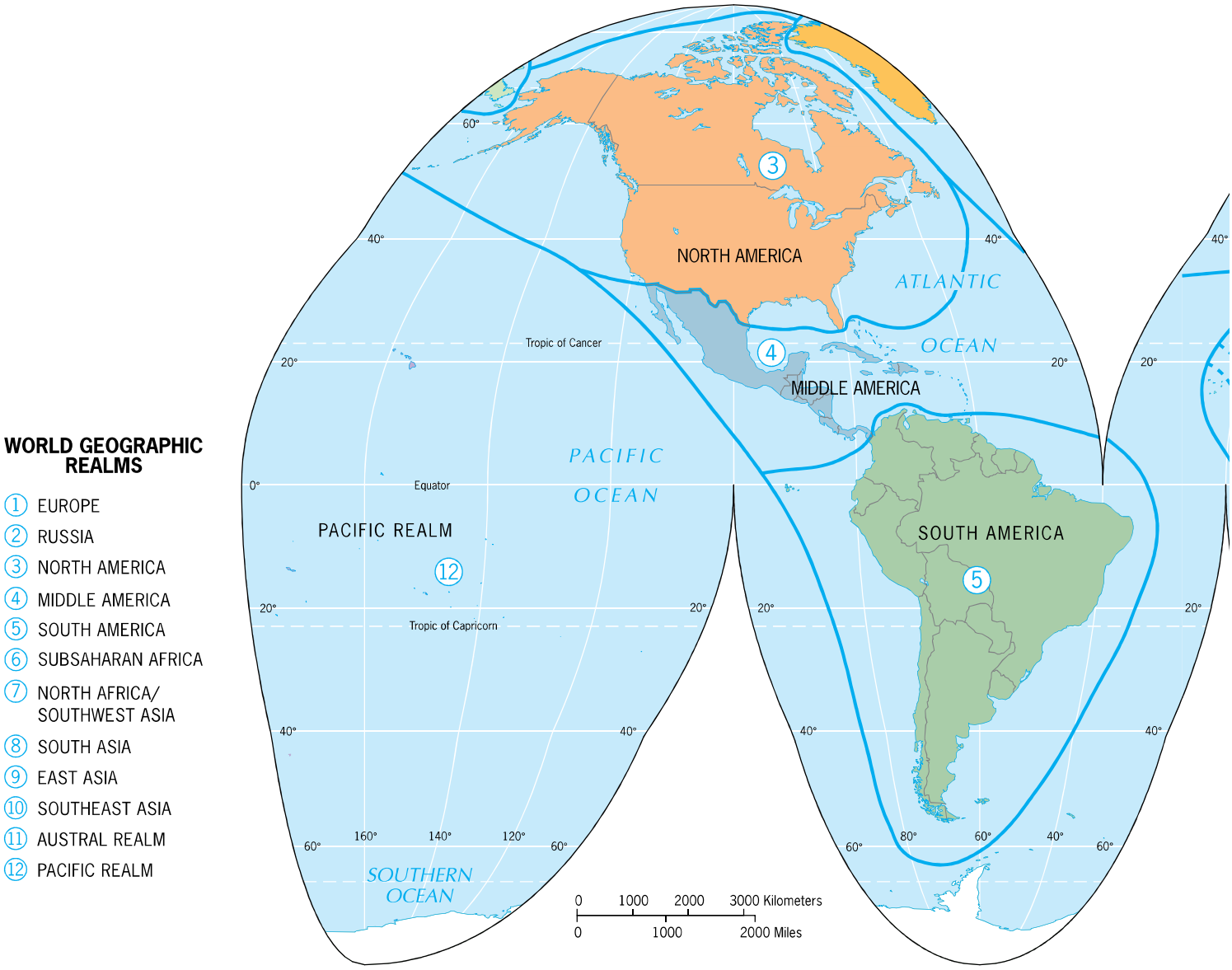


FIGURE G-3

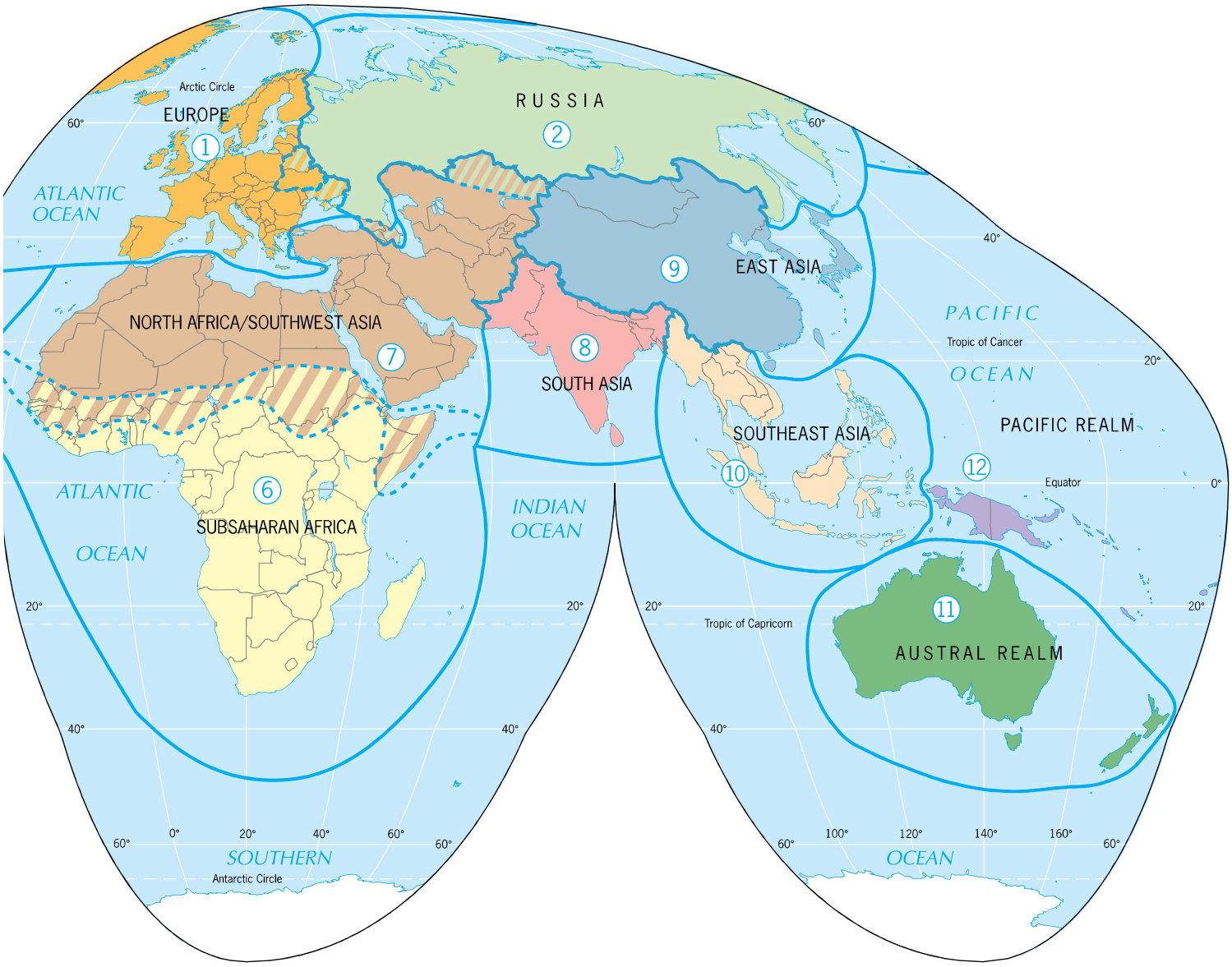
Two Varieties of Realms

The world's geographic realms can be divided into two categories. The first are *monocentric* realms that are dominated by a single major political entity, in terms of territory and/or population. North America (United States), Middle America (Mexico), East Asia (China), South Asia (India), Russia, and the Austral Realm (Australia) are all monocentric realms. They are, in their entirety, heavily influenced by the presence of that one country. It is as if the realm is organized around them.

The second type of realm is *polycentric* in nature. In these, the appearance, functioning, and organization of the realm are dispersed among a number of more or less equally influential regions or countries. Europe, North Africa/Southwest Asia, Subsaharan Africa, and the Pacific Realm all fall into this category. Polycentric realms can be more volatile in some ways, their development determined by the sum of many different parts.

Two of the world's realms are a bit more difficult to categorize. Southeast Asia is a dynamic realm that contains almost a dozen countries, some of them regarded as emerging economies. Arguably, Indonesia is becoming the most influential power, but it may be premature to label this a monocentric realm. The other realm that seems to fall in-between is South America. Here it is Brazil that has the biggest population and increasingly the largest and most influential economy. South America, more emphatically than Southeast Asia, seems to be moving toward a monocentric reorganization of its realm.

Of course, some of the dominant powers in the monocentric realms influence events beyond their realm and demonstrate a truly global reach. The United States has dominated world events in an unprecedented manner since the



Second World War, but more recently it has had to make way for newly emergent powers. Nowadays, the rise of China is a hot topic of debate. We will see, for example, that China's role in South America has grown rapidly while that of the United States has waned. Our discussion of the various realms will give due consideration to the influence of global trends and outside powers.

REGIONS WITHIN REALMS

The compartmentalization of the world into geographic realms establishes a broad global framework, but for our purposes a more refined level of spatial classification is needed. This brings us to an important organizing concept in geography: the **regional concept [6]**. To establish regions within geographic realms, we need more specific criteria.

Let us use the North American realm to demonstrate the regional idea. When we refer to a part of the United States or Canada (e.g., the South, the Midwest, or the Prairie Provinces), we employ a regional concept—not scientifically but as part of everyday communication. We reveal our perception of local or distant space as well as our mental image of the region we are describing.

But what exactly is the Midwest? How would you draw this region on the North American map? Regions are easy to imagine and describe, but they can be difficult to outline on a map. One way to define the Midwest is to use the borders of States: certain States are part of this region, others are not. You could use agriculture as the principal criterion: the Midwest is where corn and/or soybeans occupy a certain percentage of the farmland. Look ahead to Figure 3B-6, where you will notice that a different name for this region is used—the Heartland—because of the differing (agricultural) criteria that define it. Each method results in a different delimitation; a Midwest based on States is different from a Midwest based on farm production or on

industrial activity. Therein lies an important principle: regions are devices that allow us to make spatial generalizations, and they are based on artificial criteria to help us construct them. If you were studying the geography behind politics, then a Midwest region defined by State boundaries would make sense. If you were studying agricultural distributions, you would need a different definition.

Criteria for Regions

Given these different dimensions of the same region, we can identify properties that all regions have in common:

- ***Area*** To begin with, all regions have *area*. This observation would seem obvious, but there is more to this idea than meets the eye. Regions may be intellectual constructs, but they are not abstractions: they exist in the real world, and they occupy space on the Earth's surface.
- ***Boundaries*** It follows that regions have *boundaries*. Occasionally, nature itself draws sharp dividing lines, for instance along the crest of a mountain range or the margin of a forest. More often, regional boundaries are not self-evident, and we must determine them using criteria that we establish for that purpose. For example, to define a citrus-growing agricultural region, we may decide that only areas where more than 50 percent of all farmland stands under citrus trees qualify to be part of that region.
- ***Location*** All regions also possess *location*. Often the name of a region contains a locational clue, as in Amazon Basin or Indochina (a region of Southeast Asia lying between India and China). Geographers refer to the **absolute location [7]** of a place or region by providing the latitudinal and longitudinal extent of the region with respect to the Earth's grid coordinates. A more useful measure is a region's **relative location [8]**, that is, its location with reference to other regions. Again, the names of certain regions reveal aspects of their relative locations, as in *Mainland* Southeast Asia and *Equatorial* Africa.
- ***Homogeneity*** Many regions are marked by a certain *homogeneity* or sameness. Homogeneity may lie in a region's human (cultural) properties, its physical (natural) characteristics, or both. Siberia, a vast region of northeastern Russia, is marked by a sparse human population that resides in widely scattered, small settlements of similar form, frigid climates, extensive areas of permafrost (permanently frozen subsoil), and cold-adapted vegetation. This dominant uniformity makes it one of Russia's natural and cultural regions, extending from the Ural Mountains in the west to the Pacific Ocean in the east. When regions display a measurable and often visible internal homogeneity, they are called **formal regions [9]**. But not all formal regions are visibly uniform. For instance, a region may be delimited by the area in which, say, 90 percent or more of the people speak a particular language. This cannot be seen in the landscape, but the region is a reality, and we can use that criterion to draw its boundaries accurately. It, too, is a formal region.
- ***Regions as Systems*** Other regions are marked not by their internal sameness but by their functional integration—that is, by the way they work. These regions are defined as **spatial systems [10]** and are formed by the areal extent of the activities that define them. Take the case of a large city with its surrounding zone of suburbs, urban-fringe countryside, satellite towns, and farms. The city supplies goods and services to this encircling zone, and it buys farm products and other commodities from it. The city is the heart, the ***core*** of this region, and we call the surrounding zone of interaction the city's **hinterland [11]**. But the city's influence wanes on the outer periphery of that hinterland, and there lies the boundary of the functional region of which the city is the focus. A **functional region [12]**, therefore, is usually forged by a structured, urban-centered system of interaction. It has a core and a periphery.

Interconnections

Even if we can easily demarcate a particular region and even if its boundaries are sharp, that does not mean it is isolated from other parts of the realm or even the world. All human-geographic regions are more or less interconnected, being linked to other regions. As we shall see, globalization is causing ongoing integration and connections among regions around the world. Trade, migration, education, television, computer linkages, and other interactions sometimes blur regional identities. Interestingly, globalization tends to have a seemingly paradoxical effect: in some ways, regions and places become more alike, more homogeneous (think of certain consumption patterns), but in other respects the contrasts can become stronger (for example, a reassertion of ethnic or religious identities).

THE PHYSICAL SETTING

This book focuses on the geographic realms and regions produced by human activity over thousands of years. But we must not overlook the natural environments in which all this activity took place because we can still recognize the role of those environments in how people make their living. Certain areas of the world, for example, presented opportunities for plant and animal domestication that other areas did not. The people who happened to live in those favored areas learned to grow wheat, rice, or root crops and to domesticate oxen, goats, or llamas. We can still discern those early patterns of opportunity on the map in the twenty-first century. From such opportunities came adaptation and invention, and thereby arose villages, towns, cities, and states. But people living in other kinds of environments found it much harder to achieve this organization. The Americas, for instance, had no large animals that could be domesticated except llamas. This meant that societies created agricultural systems that did not involve ploughing as there were no draught animals. When Europeans introduced cows, horses,

From the Field Notes . . .

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AP/Wide World Photos

"Flying over Iceland's volcanic topography (left photo) is to see our world in the making: this is some of the youngest rock on the planet, and even at rest you can sense its impermanence. Here nature shows us what mostly goes on deep below the surface along the mid-oceanic ridges, where tectonic plates pull apart and lava pours out of fissures and vents. When that happens on dry land, the results can be catastrophic. In the 1780s, an Icelandic volcano named Laki, in a series of eruptions, killed tens of thousands and caused a global ecological crisis. In 2010, the eruption of this far smaller volcano, Eyjafjallajökull (right photo), disrupted air travel for weeks across much of the Northern Hemisphere."

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and other livestock, this change completely revolutionized the environments and cultural systems of the Western Hemisphere. The modern map carries many such imprints of the past.

Natural (Physical) Landscapes

The landmasses of Planet Earth present a jumble of **natural landscapes [13]** ranging from rugged mountain chains to smooth coastal plains (Fig. G-1). Certain continents are readily linked with a dominant physical feature—for instance, North America and its Rocky Mountains, South America with its Andes and Amazon Basin, Europe with its Alps, Asia with its Himalaya Mountains and numerous river basins, and Africa with its Sahara and Congo Basin. Physical features have long influenced human activity and movement. Mountain ranges form barriers to movement but have also channeled the spread of agricultural and technological innovations. Large deserts similarly form barriers as do rivers, although rivers also permit accessibility and connectivity between people. River basins in Asia still contain several of the planet's largest population concentrations: the advantages of fertile soils and ample water supplies that first enabled clustered human settlement now sustain hundreds of millions in crowded South and East Asia.

As we study each of the world's geographic realms, we will find that physical landscapes continue to play significant roles in this modern world. That is one reason why the study of world regional geography is so important: it puts the human map in environmental as well as regional perspective.

Geology and Natural Hazards

Our planet may be 4.5 billion years old, but it is far from placid. As you read this chapter, Earth tremors are shaking the still-thin crust on which we live, volcanoes are erupting, storms are raging. Even the continents themselves are moving measurably, pulling apart in some areas, colliding in others. Hundreds of thousands of human lives are lost to natural calamities of this sort in almost every decade (over 350,000 in the 2010–2012 period alone), and such events have at times altered the course of history.

About a century ago a geographer named Alfred Wegener, a German scientist, used spatial analysis to explain something that is obvious even from a small-scale map like Figure G-1: the apparent jigsaw-like fit of the landmasses, especially across the South Atlantic Ocean. He concluded that the landmasses on the map are actually pieces of a supercontinent that existed hundreds of millions of years ago (he called it ***Pangaea***) that drifted away when, for some reason, that supercontinent broke up. His hypothesis of **continental drift [14]** set the stage for scientists in other disciplines to search for a mechanism that might make this possible, and much of the answer to that search proved to lie in the crust beneath the ocean surface. Today we know that

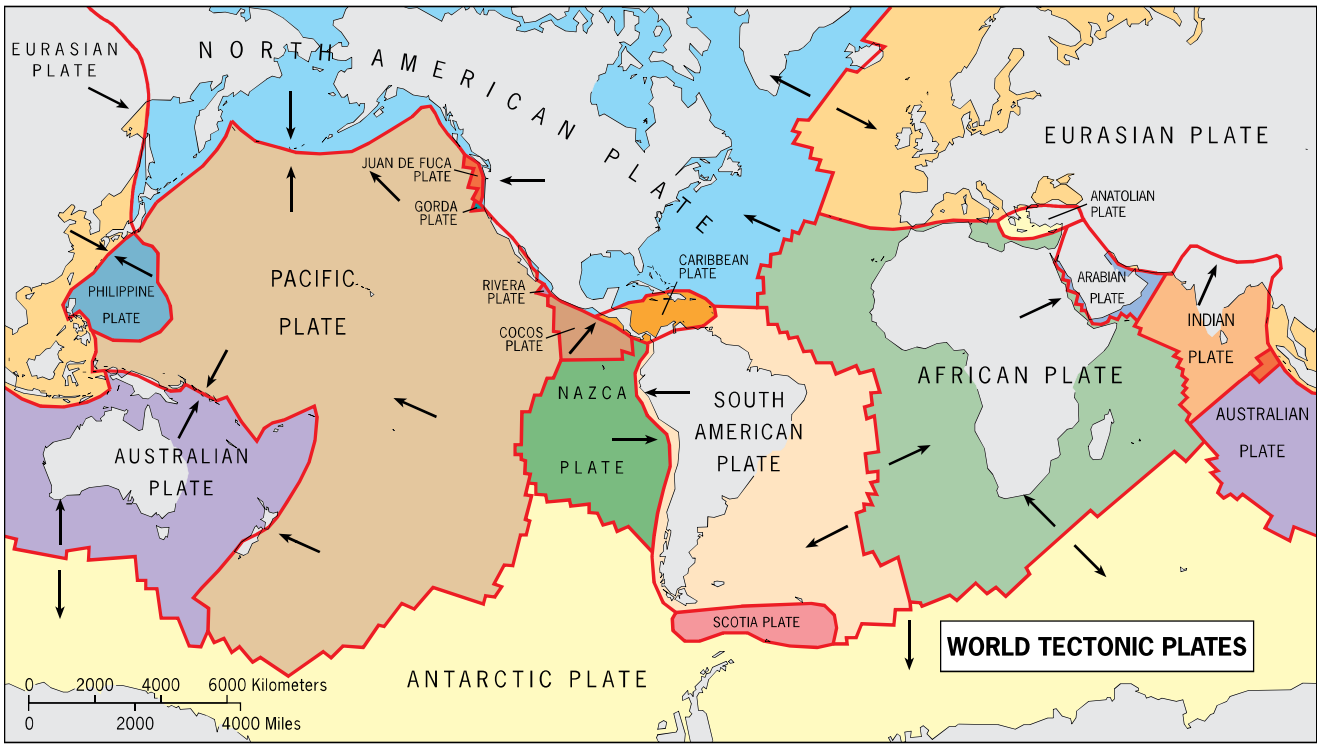


FIGURE G-4

the continents are "rafts" of relatively light rock that rest on slabs of heavier rock known as **tectonic plates [15]** (Fig. G-4) whose movement is propelled by giant circulation cells in the red-hot magma below (when this molten magma reaches the surface through volcanic vents, it is called lava).

Inevitably, moving tectonic plates collide. When they do, earthquakes and volcanic eruptions result, and the physical landscape is thrown into spectacular relief. Compare Figures G-4 and G-5, and you can see the outlines of the tectonic plates in the distribution of these hazards to human life. The 2010 earthquake adjacent to Port-au-Prince, Haiti measured 7.0 on the Richter scale. Although a shallow quake, its epicenter was located in a very densely populated area. Nearly 300,000 people died, a similar

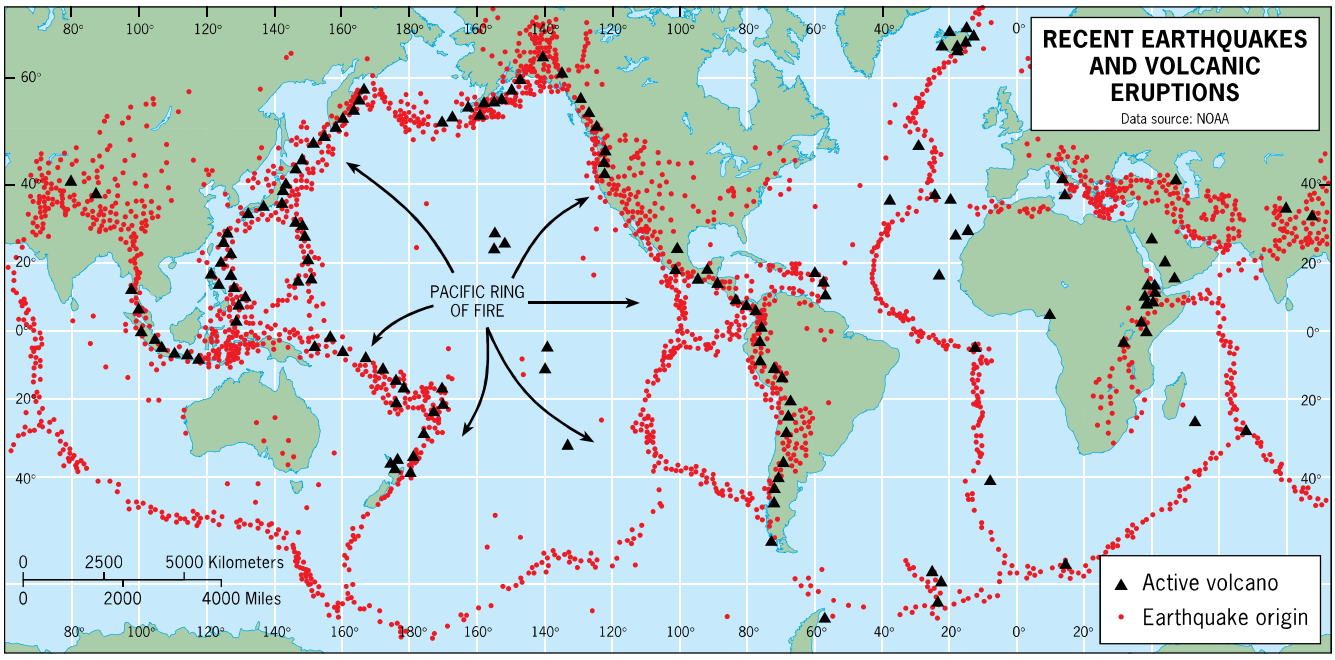


FIGURE G-5

number were injured, and 1.3 million were made homeless and destitute. The Earth's largest ocean is almost completely encircled by active volcanoes and earthquake epicenters. Appropriately, this is called the **Pacific Ring of Fire [16]**.

It is useful to compare Figure G-5 to Figure G-3 to see which of the world's geographic realms are most susceptible to the hazards inherent in crustal instability. Russia, Europe, Africa, and Australia are relatively safe; in other realms the risks are far greater in one sector than in others (western as opposed to eastern North and South America, for instance). As we shall discover, for certain parts of the world the activity mapped in Figure G-5 presents a clear and present danger. Some of the world's largest cities (e.g., Tokyo, Mexico City) lie in zones that are highly vulnerable to sudden disaster—as indeed occurred with Japan's huge 2011 earthquake and tsunamis not very far north of Tokyo.

Climate

The prevailing **climate [17]** constitutes a key factor in the geography of realms and regions (in fact, some regions are essentially defined by climate). But climates change: those dominating in certain regions today may not have prevailed there several thousand years ago. Thus any map of climate, including the maps in this chapter, is but a still-picture of our always-changing world.

Climatic conditions have swung back and forth for as long as the Earth has had an atmosphere. Periodically, an **ice age [18]** lasting tens of millions of years chills the planet and causes massive ecological change. One such ice age occurred while Pangaea was still in one piece, between 250 and 300 million years ago. Another started about 35 million years ago, and we are still experiencing it. The current epoch of this ice age, on average the coldest yet, is called the ***Pleistocene*** and has been going on for nearly 2 million years.

In our time of global warming this may come as a surprise, but we should remember that an ice age is not a period of unbroken, bitter cold. Rather, an ice age consists of surges of cold, during which glaciers expand and living space shrinks, separated by warmer phases when the ice recedes and life spreads poleward again. The cold phases are called **glaciations [19]**, and they tend to last longest, although milder spells create some temporary relief. The truly warm phases, when the ice recedes poleward and mountain glaciers melt away, are known as **interglacials [20]**. We are living in one of these interglacials today. It even has a geologic name: the ***Holocene***.

Imagine this: just 18,000 years ago, great icesheets had spread all the way south to the Ohio River Valley, covering most of the Midwest; this was the zenith of a glaciation that had lasted about 100,000 years, the ***Wisconsinan Glaciation*** (Fig. G-6). The Antarctic Icesheet was bigger

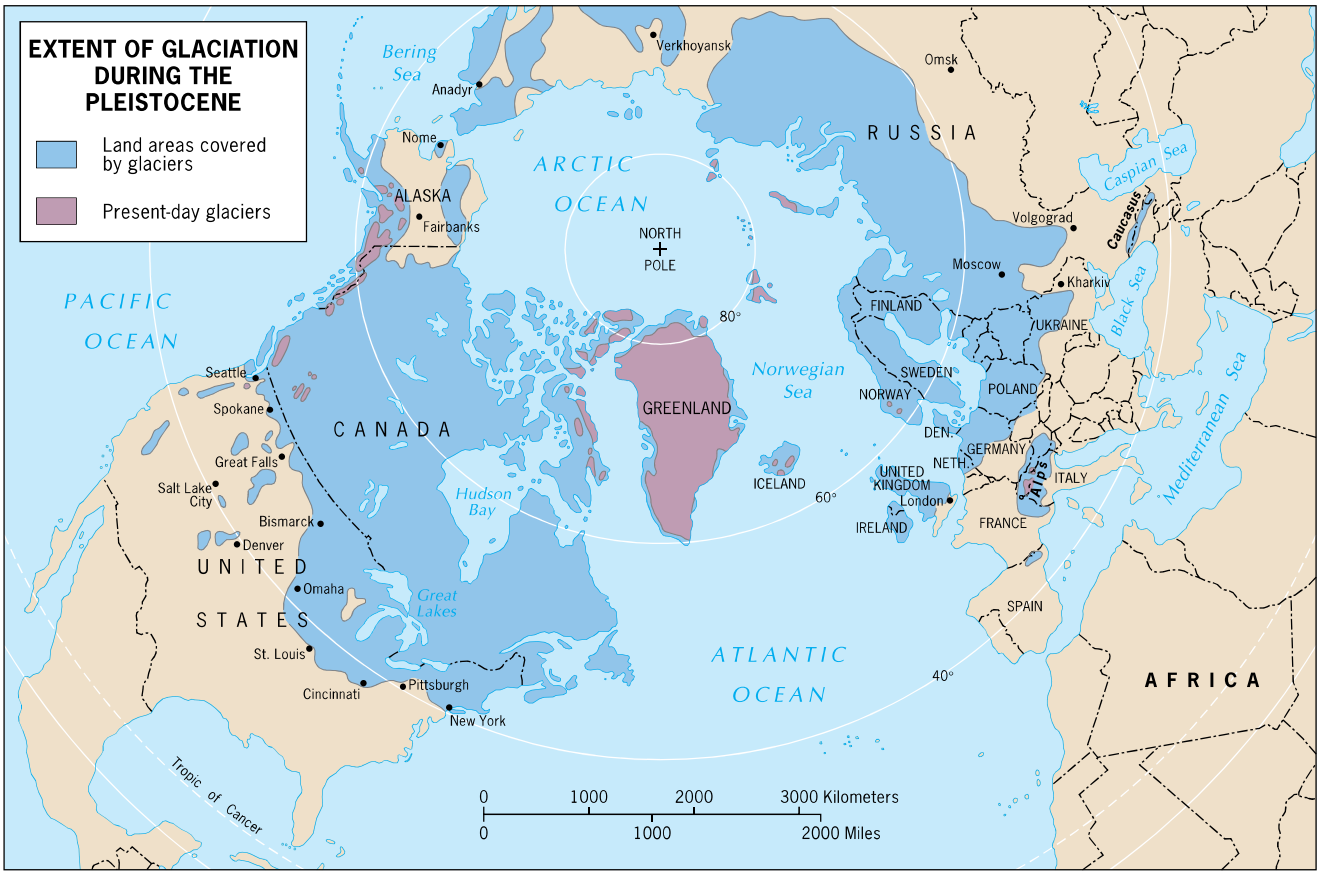


FIGURE G-6

than ever, and even in the tropics, great mountain glaciers pushed down valleys and onto plateaus. But then Holocene warming began, the continental and mountain glaciers receded, and ecological zones that had been squeezed between the advancing icesheets now spread north and south. In Europe particularly, where humans had arrived from Africa via Southwest Asia during one of the milder phases of the Wisconsinan Glaciation, living space expanded and human numbers grew.

Global Climate Change

Today we are living in an era of **global climate change** [21], particularly natural global warming that has been accelerated by anthropogenic (human-source) causes. Since the Industrial Revolution, we have been emitting gases that have enhanced nature's ***greenhouse effect*** whereby the sun's radiation becomes trapped in the Earth's atmosphere. This is leading to a series of climate changes, especially the overall warming of the globe. One important international organization of experts, the Intergovernmental Panel on Climate Change (IPCC), predicts an increase of 2–3°C (3.6–5.4°F) overall for the globe, but with significant regional variability (e.g., more at higher latitudes, less at lower latitudes). Precipitation patterns are predicted to become more variable, particularly in regions where they are already seasonal.

This change in temperature may seem small but is expected to have significant impacts on global climate patterns, agricultural zones, and the quality of human lives. The full ramifications are not known, but scenarios

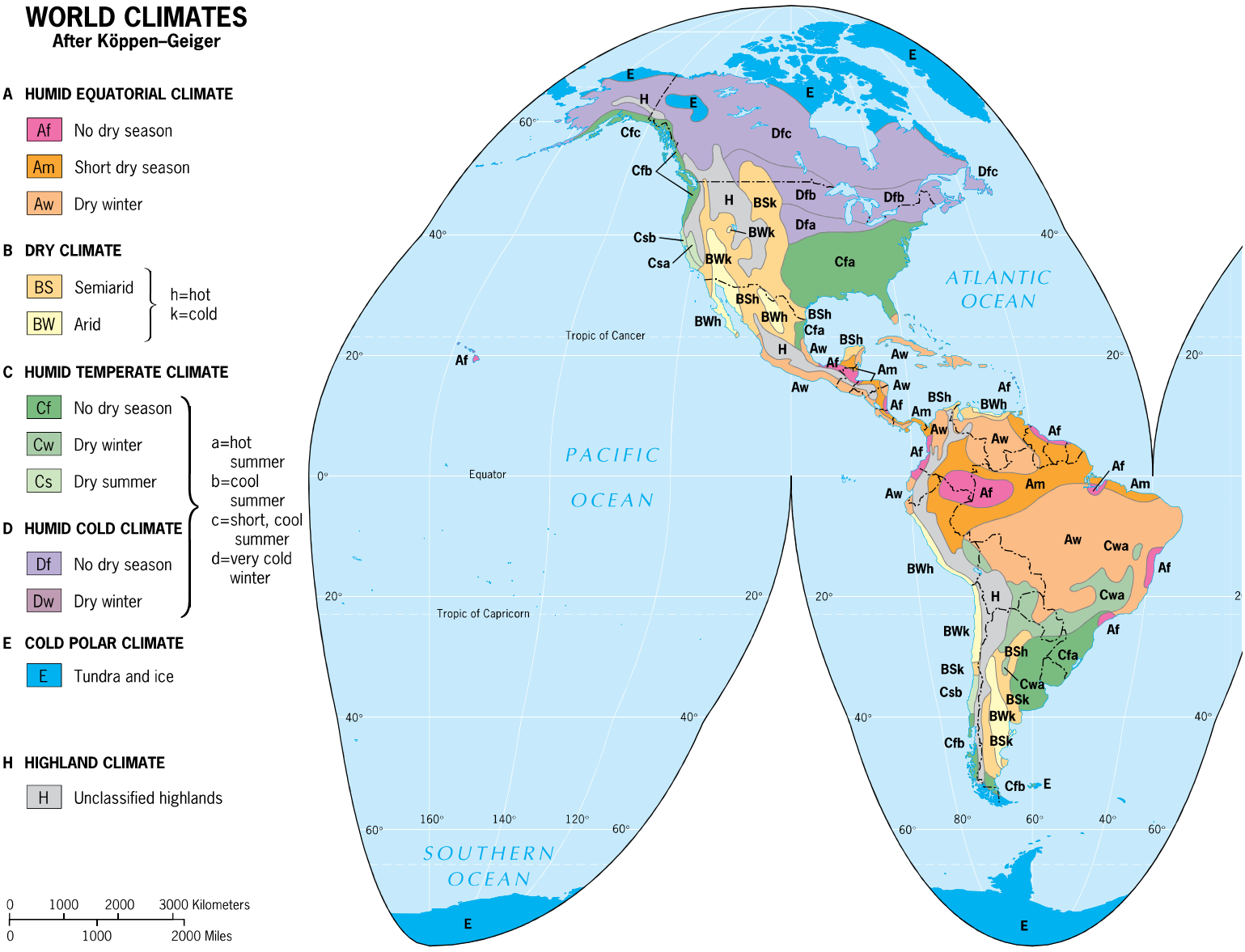


FIGURE G-7

are being modeled so that societies can confront the changes that are coming. Leaders of some countries are more skeptical than others, and some have already made greater adjustments than others. One of the most significant consequences of global climate change is that the icecap atop the Arctic Ocean is melting faster than even recent models predicted, with environmental and geopolitical implications. We pick up this issue in Chapters 2A and 12.

Climate Regions

We have just learned how variable climate can be, but in a human lifetime we see little evidence of this variability. We talk about the ***weather*** (the immediate state of the atmosphere) in a certain place at a given time, but as a technical term ***climate*** defines the aggregate, total record of weather conditions at a place or in a region over the entire period during which records have been kept.

Figure G-7 may appear very complicated, but this map is useful even at a glance. Devised long ago by Wladimir Köppen and subsequently modified by Rudolf Geiger, it represents climatic regions through a combination of colors and letter symbols. In the legend, note that the ***A*** climates (rose, orange, and peach) are equatorial and tropical; the ***B*** climates (tan, yellow) are dry; the ***C*** climates (shades of green) are temperate, that is, moderate and neither hot nor cold; the ***D*** climates (purple) are cold; the ***E*** climates (blue) are frigid; and the similar ***H*** climates (gray) prevail in highlands like the Tibetan Plateau and the upper reaches of the Andes.

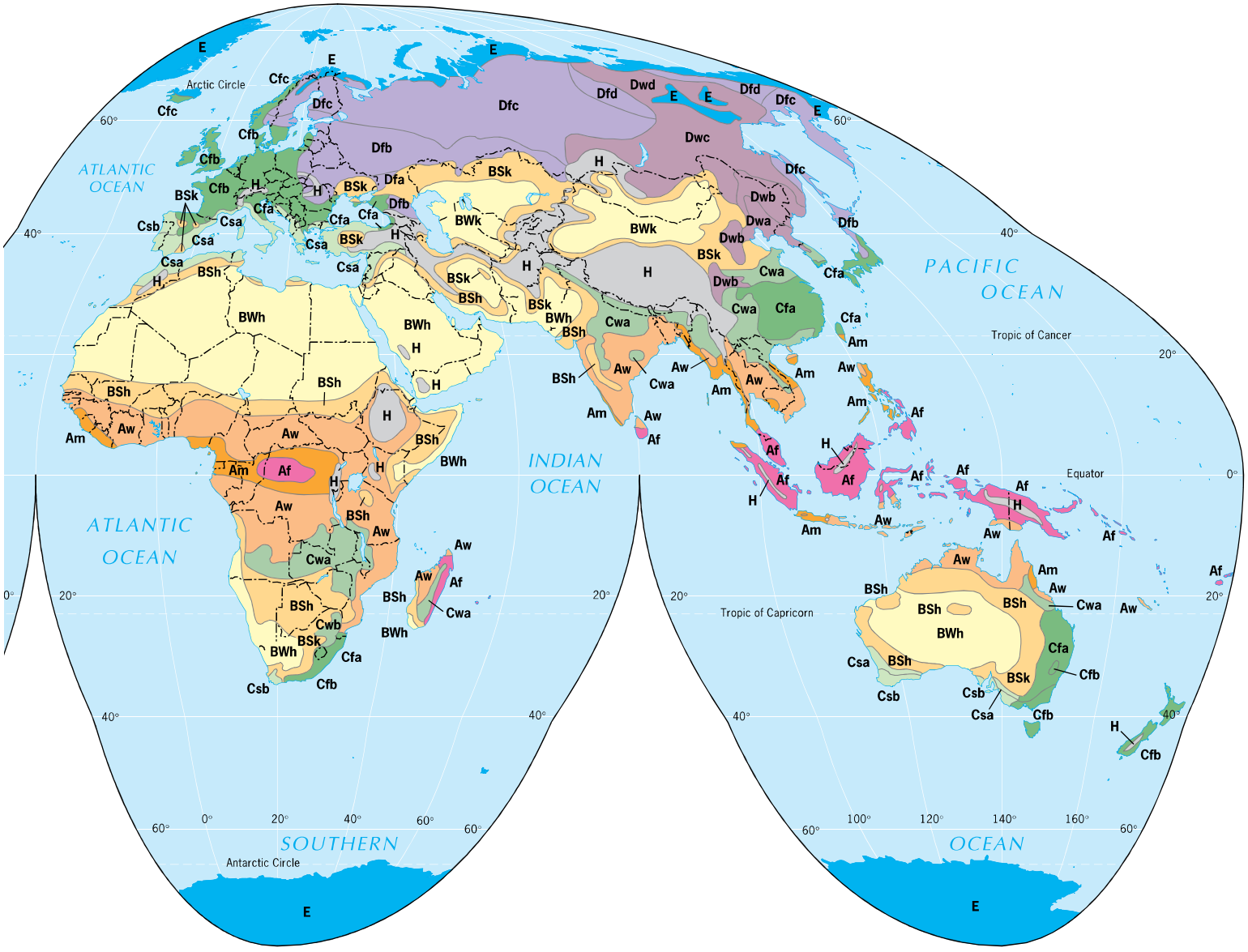


Figure G-7 merits your attention because familiarity with it will help you understand much of what follows in this book. The map has practical utility as well. Although it depicts climatic regions, daily weather in each color-coded region is relatively standard. If, for example, you are familiar with the weather in the large area mapped as ***Cfa*** in the southeastern United States, you will feel at home in Uruguay (South America), Kwazulu-Natal (South Africa), New South Wales (Australia), and Fujian Province (China). Let us look at the world's climatic regions in some detail.

Humid Equatorial (A) Climates The humid equatorial, or tropical, climates are characterized by high temperatures all year and by heavy precipitation. In the ***Af*** subtype, the rainfall arrives in substantial amounts every month; but in the ***Am*** areas, the arrival of the annual wet ***monsoon*** (the Arabic word for "season" [see Chapter 8A]) marks a sudden enormous increase in precipitation. The ***Af*** subtype is named after the vegetation that develops there—the tropical rainforest. The ***Am*** subtype, prevailing in part of peninsular India, in a coastal area of West Africa, and in sections of Southeast Asia, is appropriately referred to as the monsoon climate. A third tropical climate, the ***savanna*** (***Aw***), has a wider daily and annual temperature range and a more strongly seasonal distribution of rainfall.

Savanna rainfall totals tend to be lower than those in the rainforest zone, and savanna seasonality is often expressed in a "double maximum." Each year produces two periods of increased rainfall separated by pronounced dry spells. In many savanna zones, inhabitants refer to the "long rains" and the "short rains" to identify those seasons; a persistent problem is the unpredictability of the rain's arrival. Savanna soils are not among the most fertile, and when the rains fail hunger looms. Savanna regions are far more densely peopled than rainforest areas, and millions of residents of the savanna subsist on what they cultivate. Rainfall variability is their principal environmental problem.

Dry (B) Climates Dry climates occur in both lower and higher latitudes. The difference between the ***BW*** (true ***desert***) and the moister ***BS*** (semiarid ***steppe***) varies but may be taken to lie at about 25 centimeters (10 in) of annual precipitation. Parts of the central Sahara in North Africa receive less than 10 centimeters (4 in) of rainfall. Most of the world's arid areas have an enormous daily temperature range, especially in subtropical deserts (whose soils tend to be thin and poorly developed). In the Sahara, there are recorded instances of a maximum daytime shade temperature of more than 50°C (122°F) followed by a nighttime low of less than 10°C (50°F). But the highest temperature ever recorded on the Earth's surface is not in the Sahara: in 2013, the 56.7°C (134°F) measured in California's Death Valley a century earlier was officially recognized as the hottest.

Humid Temperate (C) Climates As the map shows, almost all these mid-latitude climate areas lie just beyond the Tropics of Cancer and Capricorn (23.5° North and South latitude, respectively). This is the prevailing climate in the southeastern United States from Kentucky to central Florida, on North America's west coast, in most of Europe and the Mediterranean, in southern Brazil and northern Argentina, in coastal South Africa, in eastern Australia, and in eastern China and southern Japan. None of these areas suffers climatic extremes or severity, but the winters can be cold, especially away from water bodies that moderate temperatures. These areas lie midway between the winterless equatorial climates and the summerless polar zones. Fertile and productive soils have developed under this regime, as we will note in our discussion of the North American and European realms.

The humid temperate climates range from moist, as along the densely forested coasts of Oregon, Washington, and British Columbia, to relatively dry, as in the so-called Mediterranean (dry-summer) areas that include not only coastal southern Europe and northwestern Africa but also the southwestern tips of Australia and Africa, central Chile, and Southern California. In these Mediterranean environments, the scrubby, moisture-preserving vegetation creates a natural landscape different from that of richly green western Europe.

Humid Cold (D) Climates The humid cold (or "snow") climates may be called the continental climates, for they seem to develop in the interior of large landmasses, as in the heart of Eurasia or North America. No equivalent land areas at similar latitudes exist in the Southern Hemisphere; consequently, no ***D*** climates occur there. Great annual temperature ranges mark these humid continental climates, and cold winters and relatively cool summers are the rule. In a ***Dfa*** climate, for instance, the warmest summer month (July) may average as high as 21°C (70°F), but the coldest month (January) might average only −11°C (12°F). Total precipitation, much of it snow, is not high, ranging from about 75 centimeters (30 in) to a steppe-like 25 centimeters (10 in). Compensating for this paucity of precipitation are cool temperatures that inhibit the loss of moisture from evaporation and evapotranspiration (moisture loss to the atmosphere from soils and plants).

Some of the world's most productive soils lie in areas under humid cold climates, including the U.S. Midwest, parts of southwestern Russia and Ukraine, and northeastern China. The winter dormancy (when all water is frozen) and the accumulation of plant debris during the fall balance the soil-forming and enriching processes. The soil differentiates into well-defined, nutrient-rich layers, and substantial organic humus accumulates. Even where the annual precipitation is light, this environment sustains extensive coniferous forests.

Cold Polar (E) and Highland (H) Climates Cold polar (***E***) climates are differentiated into true icecap conditions,

where permanent ice and snow keep vegetation from gaining a foothold, and the tundra, which may have average temperatures above freezing up to four months of the year. Like rainforest, savanna, and steppe, the term ***tundra*** is vegetative as well as climatic, and the boundary between the ***D*** and ***E*** climates in Figure G-7 corresponds closely to that between the northern coniferous forests and the tundra.

Finally, the ***H*** climates—the unclassified highlands mapped in gray (Fig. G-7)—resemble the ***E*** climates. High elevations and the complex topography of major mountain systems often produce near-Arctic climates above the tree line, even in the lowest latitudes such as the equatorial section of the high Andes of South America.

Let us not forget an important qualification concerning Figure G-7: this is a still-picture of a changing scene, a single frame from an ongoing film. Climate continues to change, and only a few decades from now climatologists are likely to be modifying the climate maps to reflect new data. Who knows: we may even have to redraw those familiar coastlines. Environmental change is a never-ending challenge.

You will find larger-scale maps of climate in several of the regional chapters that follow, but it is useful to refer back to this Köppen-Geiger map whenever the historical or economic geography of a region or country is under discussion. The world climatic map reflects agricultural opportunities and limitations as well as climatic regimes, and as such helps explain some enduring patterns of human distribution on our planet. We turn next to this crucial topic.

REALMS OF POPULATION

Earlier we noted that population numbers by themselves do not define geographic realms or regions. Population distributions, and the functioning society that gives them common ground, are more significant criteria. That is why we can identify one geographic realm (the Austral) with less than 30 million people and another (South Asia) with more than 1.7 billion inhabitants. Neither population numbers nor territorial size alone can delimit a geographic realm. Nevertheless, the map of world population distribution shows some major clusters that are part of some specific realms (Fig. G-8).

Before we examine these clusters in some detail, remember that the world's human population now rounds off at 7.2 billion (see Appendix B for a detailed breakdown)—confined to the landmasses that constitute less than 30 percent of our planet's surface, much of which is arid desert, inhospitable mountain terrain, or frigid tundra. (Remember too that Fig. G-8 is another still-picture of an ever-changing scene: the rapid growth of humankind continues.) After thousands of years of slow growth, world population during the nineteenth and twentieth centuries grew at an increasing rate. That rate has recently been slowing down, even imploding in some parts of the world. But consider this: it took about 17 centuries following the birth of Christ for the world to add 250 million people to its numbers; now we are adding 250 million about every three years. While the *rate* of population growth has come down in some parts of the world, in absolute terms the global population continues to grow apace and is expected to reach 9.6 billion by 2050.

This raises the important question as to whether there are limits to the Earth's carrying capacity—will there be enough food to go around? That question has become more and more pressing over the past decade due to rapidly rising food prices resulting from increased demand in China and India, a dietary shift from grains to meat and vegetables, and the use of agricultural resources for the production of biofuels. The actual increase of population is only part of the problem; our growing appetite for certain

From the Field Notes . . .

"One early January morning in northern Vietnam, just outside the city of Ninh Binh, a girl came by on her bicycle, pulling an ox on a long rope. When I asked, through an interpreter, where she was taking the ox she replied that she had to take it to her uncle who still worked his land. The girl's own family was moving on to more urban lifestyles, with jobs in manufacturing or services. Vietnam has been changing and modernizing in recent years. Some sectors of the economy are growing vigorously and urbanization has proceeded apace. Sometimes people move to the cities, and sometimes the city comes to them (see the high-rise of the encroaching city in the left background). To the girl, it all seemed for the better. 'I like the city,' she said. She did not have much eye for the ox, but she proudly pointed to her new bicycle. To her, the future looked good."

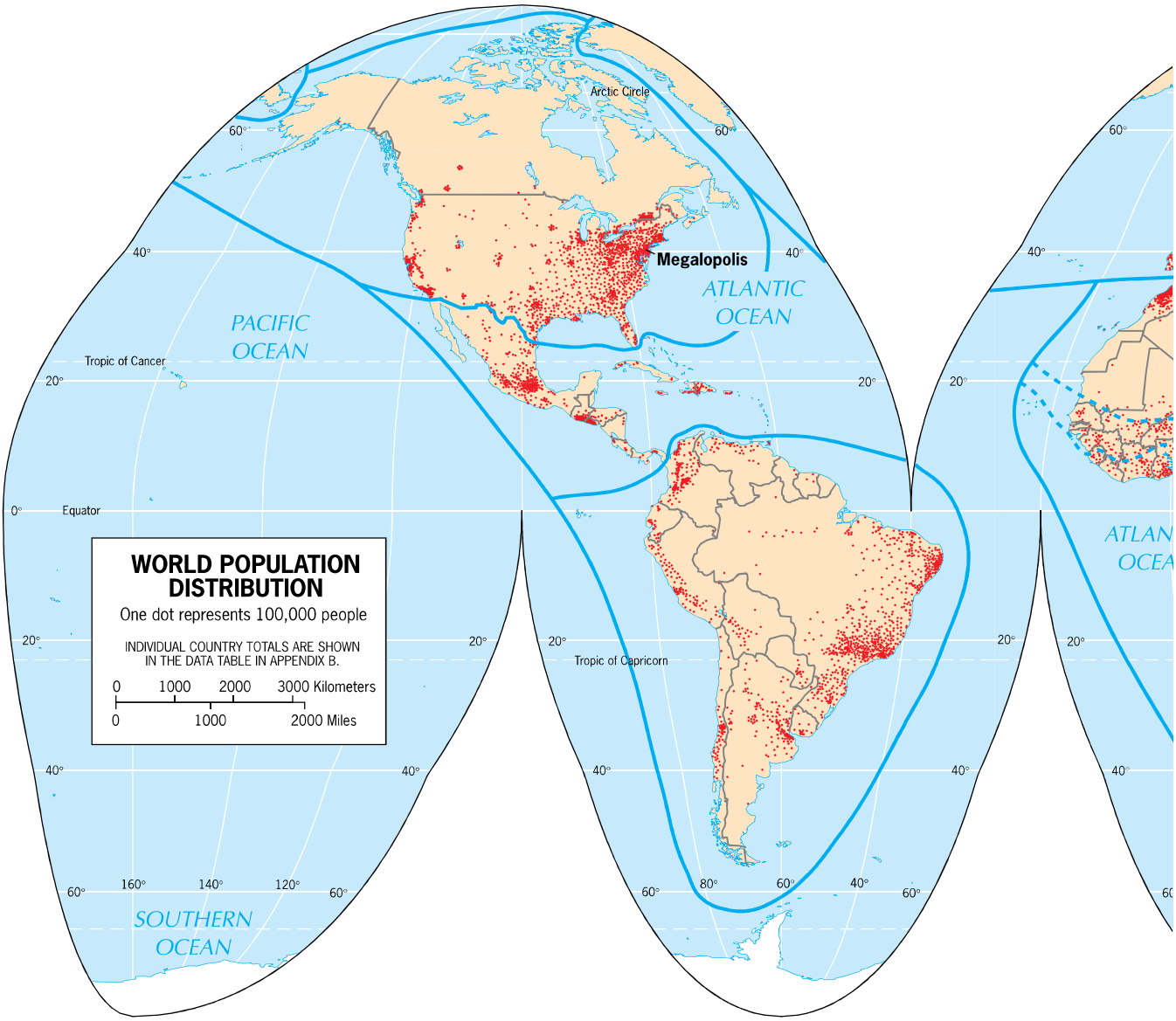


FIGURE G-8

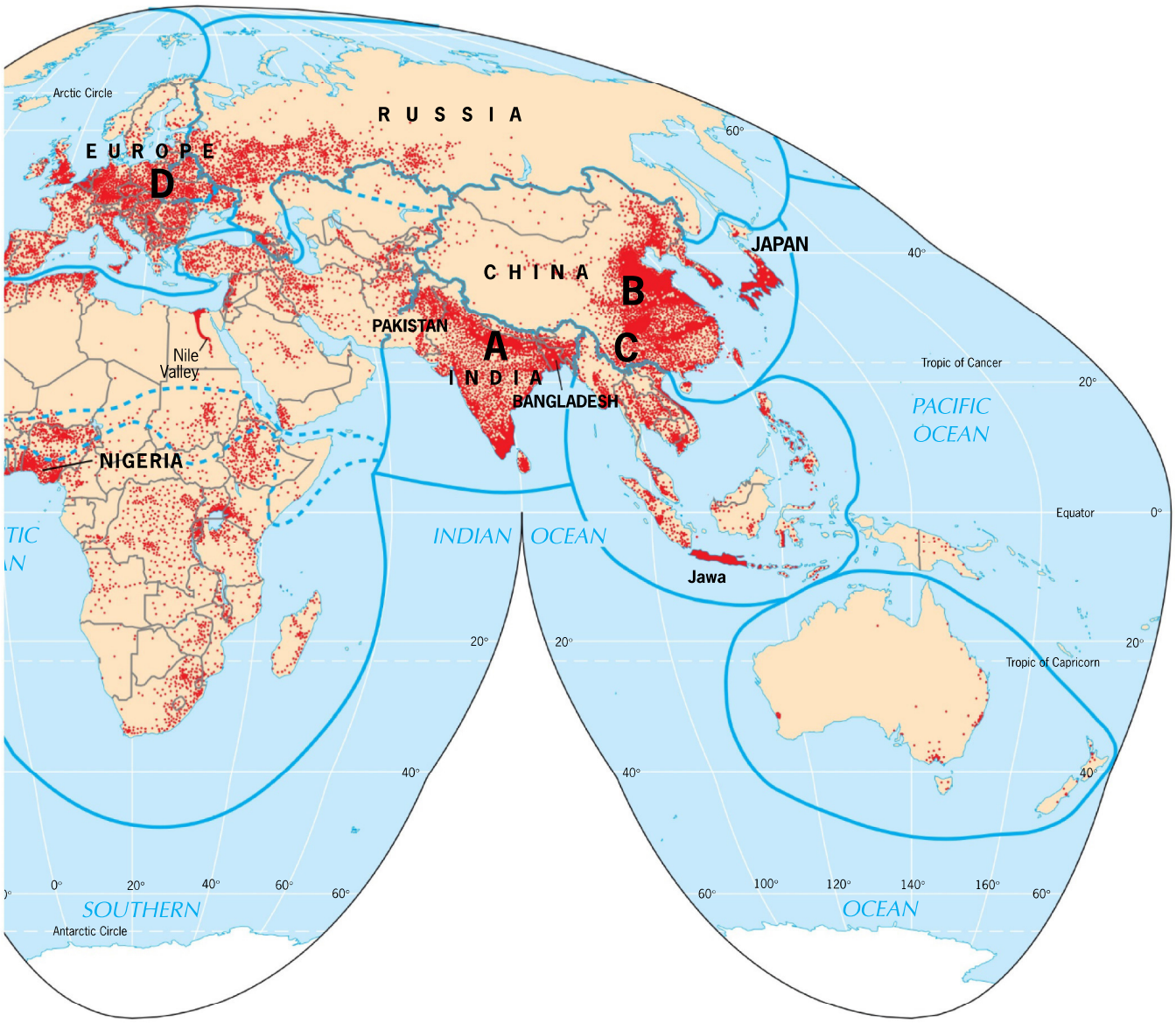
products is another. And we are not just talking about food—think drinking water, fossil fuels, and minerals as well. Thus it seems inconceivable that 10 billion people by mid-century could be consuming the way we do today in the developed world.

Major Population Clusters

One way to present an overview of the location of people on the planet is to create a map of **population distribution [22]** (Fig. G-8). As you can see in the map's legend, each dot represents 100,000 people, and the clustering of large numbers of them in certain areas as well as the near-emptiness of others is readily evident. There is a technical difference between population distribution and ***population density***, which is another way of showing where people live. Density maps reveal the number of persons per unit area, requiring a different cartographic technique.

- ***South Asia*** The *South Asia* population cluster lies centered on India and includes its populous neighbors, Pakistan and Bangladesh. This huge agglomeration of humanity focuses on the wide plain of the Ganges River (**A** in Fig. G-8). South Asia recently became the world's largest population cluster, overtaking East Asia in 2010. A larger percentage of the people remain farmers here, although pressure on the land is greater, whereas agriculture is less efficient than in East Asia.

- ***East Asia*** Now surpassed by South Asia, the second-ranked *East Asia* population cluster lies centered on China and includes the Pacific-facing Asian coastal zone from the Korean Peninsula to Vietnam. Not long ago, we



would have reported this as a dominantly rural, farming population, but rapid economic growth and associated urbanization have changed the picture. In China's interior river basins of the Huang (Yellow) and Chang/Yangzi (**B** and **C** on the map), and in the Sichuan Basin between these two letters, most of the people remain farmers. But the booming cities of coastal and increasingly interior China are attracting millions of new inhabitants, and in 2011 the Chinese urban population surpassed the 50-percent milestone.

- ***Europe*** The third-ranking population cluster, *Europe*, also lies on the Eurasian landmass but at the opposite end from China. The European cluster, including western Russia, counts more than 700 million inhabitants, which puts it in a class with the two larger Eurasian concentrations—but there the similarity ends. In Europe, the key to the linear, east-west orientation of the axis of population (**D** in Fig. G-8) is not a fertile river basin but a zone of raw materials for industry. Europe is among the world's most highly urbanized and industrialized realms, its human agglomeration sustained by factories and offices rather than paddies and pastures.

The three world population concentrations just discussed (South Asia, East Asia, and Europe) account for just about 4 billion of the world's 7.2 billion people. No other cluster comes close to these numbers. The next-ranking cluster, Eastern North America, is only about one-quarter the size of the smallest Eurasian concentrations. As in Europe, the population in this zone is concentrated in major metropolitan complexes; the rural areas are now relatively sparsely settled. Geographic realms and regions, therefore, display varying levels of **urbanization [23]**, the percentage of the total population residing in cities and towns. Some regions are urbanizing far more rapidly than others, a phenomenon we will explain as we examine each realm.