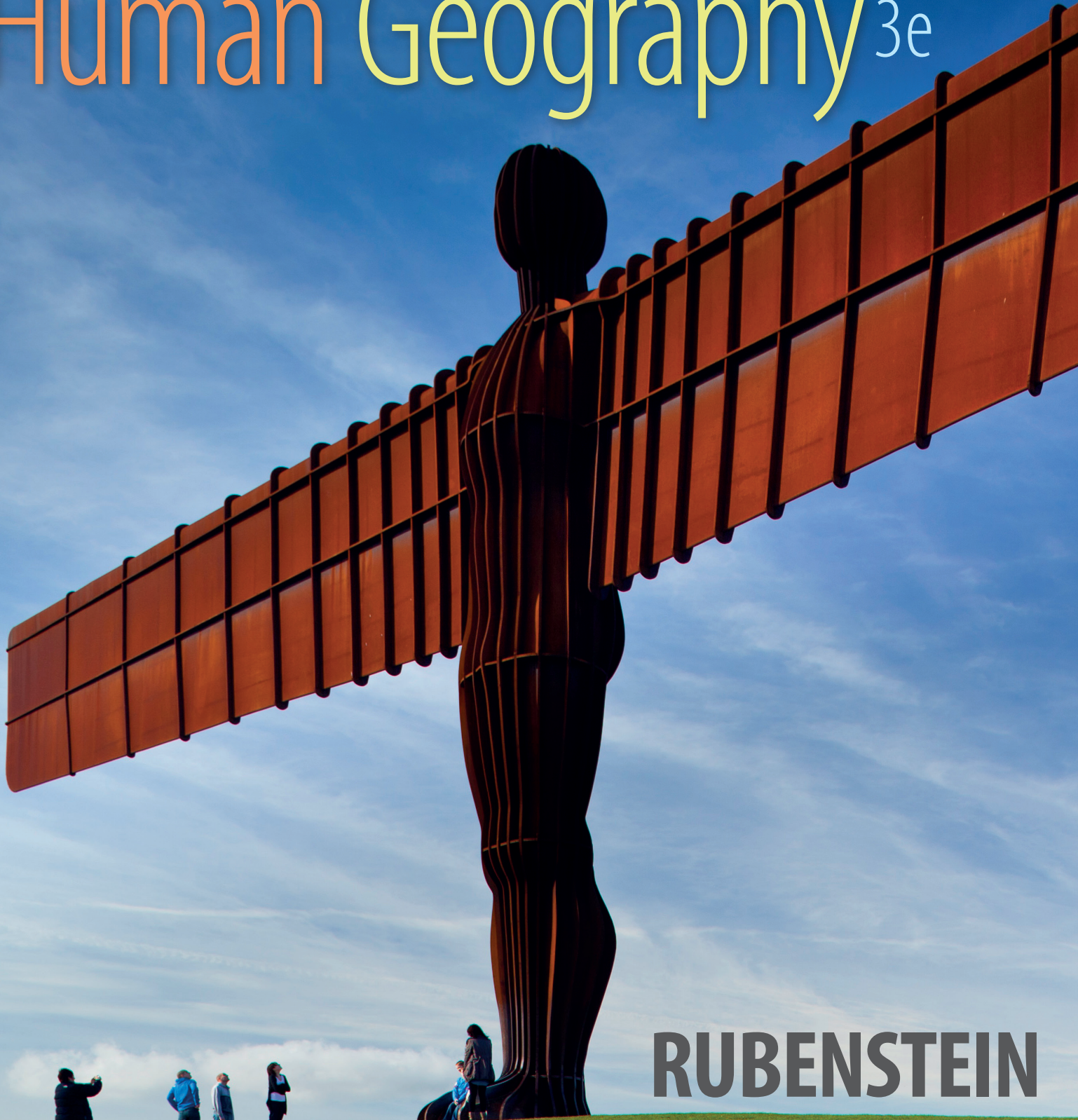


Contemporary Human Geography^{3e}



RUBENSTEIN

Earth at Night, City Lights

The Americas



These images of Earth at night from NASA's Suomi-NPP "Marble" series use a collection of satellite-based observations, stitched together in a seamless mosaic of our planet. This view is based on instrumentation that observes light emanating from the ground. Notice how strongly major cities show up in the image.

Africa, Europe, and the Middle East



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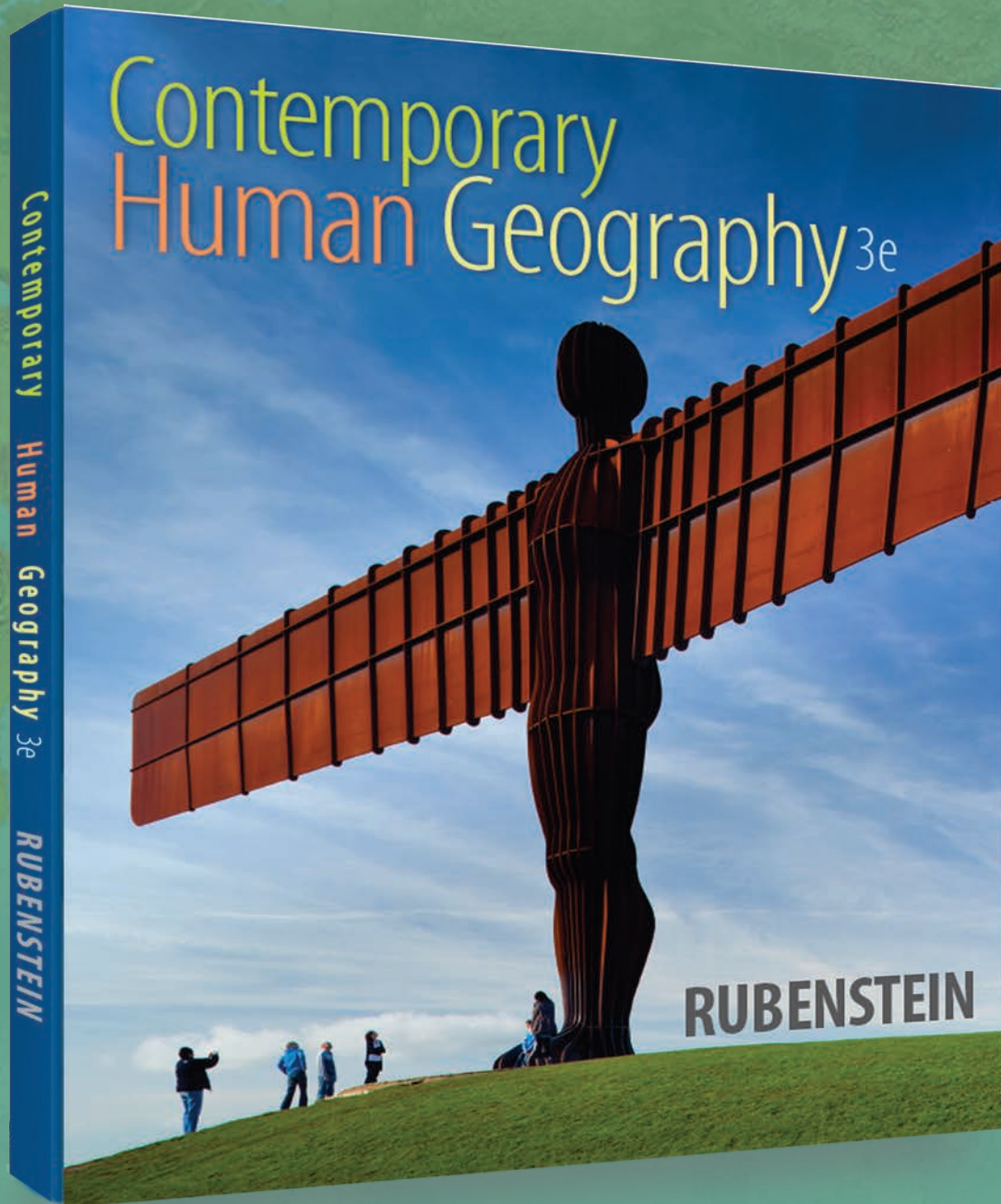
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A Contemporary Approach

Contemporary Human Geography is a highly visual, modular springboard into essential human and cultural geography concepts, designed for the modern student.



A Brief, Modular Introduction

The modular organization consists of self-contained two-page spreads, a clear presentation of core concepts and data that give the instructor flexibility when assigning material to students.

2.1

KEY ISSUE 1 Where are people distributed?

Chapter 2 Population and Health

Population Concentrations

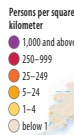
- Two-thirds of the world's inhabitants are clustered in four regions.
- Regions with harsh environments have relatively low populations.

Human beings are not distributed uniformly across Earth's surface. World maps depict this distribution in several ways:

- **Population concentrations.** Two-thirds of the world's inhabitants live in four regions—East Asia, South Asia, Southeast Asia, and Europe (Figure 2.1.1). The four population concentrations occupy generally low-lying areas, with temperate climate and soil suitable for agriculture. Physical environments that are too dry, too cold, too wet, or too mountainous tend to have fewer inhabitants (Figures 2.1.2 and 2.1.3).
- **Population cartogram.** A cartogram depicts the size of countries according to population rather than land area, as is the case with most maps (Figure 2.1.4).
- **Population clusters.** The world can be divided into seven regions, each containing approximately 1 billion people (Figure 2.1.5). The small size of the Asia regions shows the large number of the world's inhabitants living there.

2.1.1 POPULATION DISTRIBUTION

Two-thirds of the world's inhabitants live in four regions—East Asia, South Asia, Southeast Asia, and Europe (see Figures 2.1.1a, 2.1.1b, 2.1.1c, and 2.1.1d). In addition to these four regions, the largest population concentrations are in eastern North America and western Africa.



2.1.2 SPARSELY POPULATED REGIONS

Humans do not live in large numbers in certain physical environments (see Figures 2.1.2a, 2.1.2b, 2.1.2c, and 2.1.2d).

2.1.2a COLD LANDS
Much of the land near the North and South poles is perpetually covered with ice or the ground is permanently frozen (permafrost). The polar regions are unsuitable for planting crops, and few animals can survive the extreme cold.

2.1.2b WET LANDS
Lands that receive very high levels of precipitation, located primarily near the equator, may also be inhospitable for human occupation. The combination of rain and heat rapidly depletes nutrients from the soil and thus hinders agriculture.

2.1.2c HIGH LANDS
The highest mountains in the world are steep, snow covered, and sparsely settled. However, some high-altitude plateaus and mountain regions are more densely populated, especially at low latitudes (near the equator), where agriculture is possible at high elevations.

2.1.1a EUROPE

Europe includes four dozen countries, ranging from Monaco, with 1 square kilometer (0.7 square miles) and a population of 33,000, to Russia, the world's largest country in land area when its Asian part is included. In contrast to the three Asian concentrations, three-fourths of Europe's inhabitants live in cities, and fewer than 10 percent are farmers. The highest population concentrations in Europe are near the major rivers and coalfields of Germany and Belgium, as well as historic capital cities such as London and Paris.

2.1.1b EAST ASIA

Nearly one-fourth of the world's people live in East Asia. The region, bordering the Pacific Ocean, includes eastern China, the islands of Japan, the Korean peninsula, and the island of Taiwan. The People's Republic of China is the world's most populous country and the fourth-largest country in land area. The Chinese population is clustered near the Pacific Coast and in several fertile river valleys that extend inland, though much of China's interior is sparsely inhabited mountains and deserts. More than one-half of the people live in rural areas, where they work as farmers. In sharp contrast, more than three-fourths of all Japanese and Koreans are clustered in urban areas and work at industrial or service jobs.

2.1.1c SOUTH ASIA

Nearly one-fourth of the world's people live in South Asia, which includes India, Pakistan, Bangladesh, and the island of Sri Lanka. The largest concentration of people within South Asia lives along a 1,500-kilometer (900-mile) corridor from Lahore, Pakistan, through India and Bangladesh to the Bay of Bengal. Much of this area's population is concentrated along the plains of the Indus and Ganges rivers. Population is also heavily concentrated near India's two long coastlines—the Arabian Sea to the west and the Bay of Bengal to the east. Like the Chinese, most people in South Asia are farmers living in rural areas.

2.1.1d SOUTHEAST ASIA

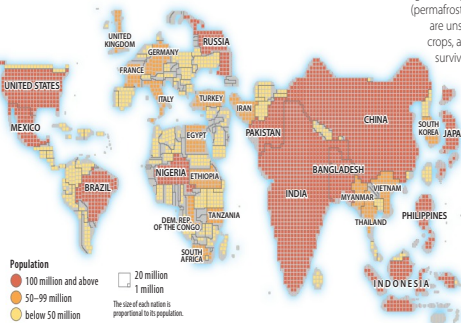
Around 600 million people live in Southeast Asia, mostly on a series of islands that lie between the Indian and Pacific oceans. Indonesia, which consists of 13,677 islands, is the world's fourth-most-populous country. The largest population concentration is on the island of Java, inhabited by more than 100 million people. Several islands that belong to the Philippines contain high population concentrations, and population is also clustered along several river valleys and deltas at the southeastern tip of the Asian mainland, known as Indochina. As in China and South Asia, the Southeast Asia concentration is characterized by a high percentage of people working as farmers in rural areas.

2.1.2d DRY LANDS

Areas too dry for farming cover approximately 20 percent of Earth's land surface. Deserts generally lack sufficient water to grow crops that could feed a large population, although some people survive there by raising animals, such as camels, that are adapted to the climate. Dry lands contain natural resources useful to people—notably, much of the world's oil reserves.

2.1.5 POPULATION CLUSTERS

Each of the seven clusters in this figure contains approximately 1 billion inhabitants.



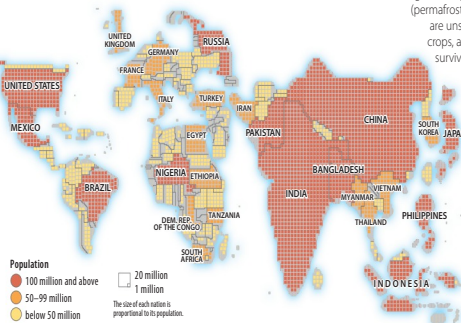
2.1.4 POPULATION CARTOGRAM

In a cartogram, countries are displayed by size of population rather than land area. Countries with populations over 100 million are labeled.



2.1.3 POLAR REGION

Angmagssalik, Greenland



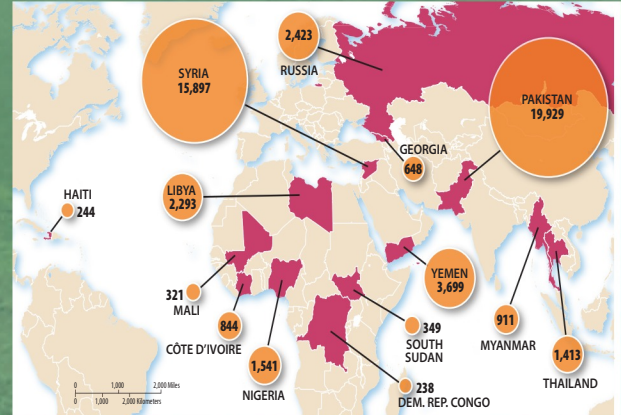
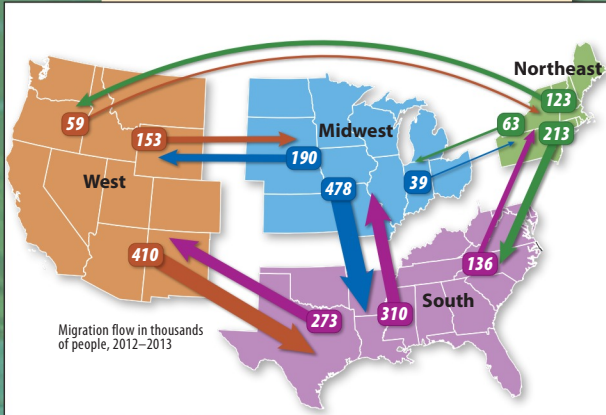
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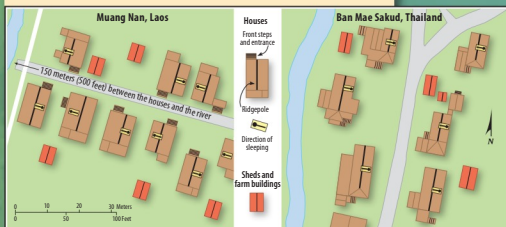
Visualizing Earth's People & Places

Spectacular visualizations of people, places, and data bring human geography to life through photos, maps, graphs, population pyramids, and charts.

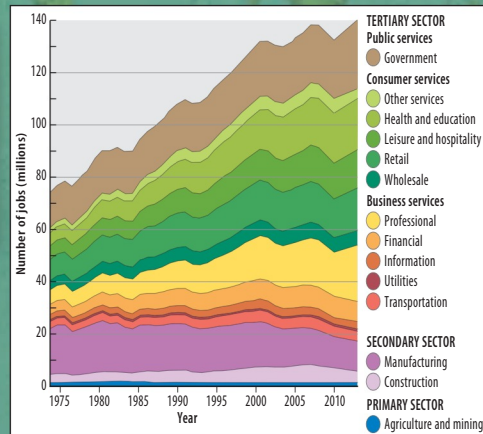
Dynamic cartography maps the critical spatial patterns of our human geography.



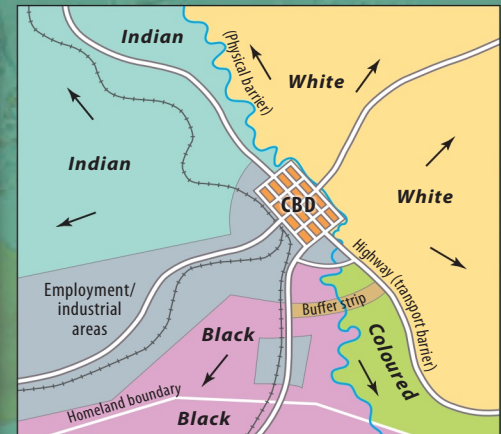
Graphs & illustrations illustrate the latest trends and fundamental processes driving our human geography.



CHANGES IN U.S. EMPLOYMENT



MULTIPLE NUCLEI IN PIETERMARITZBURG, SOUTH AFRICA, DURING APARTHEID



Stunning photos give a sense of place and applied examples of human geography in action.



Applying the Tools of Geography

New features of the Third Edition of *Contemporary Human Geography* facilitate a more active learning experience, empowering students to stop, practice, and apply their understanding through debate, research, visual analysis, mobile media, interactive mapping, and virtual tours of Earth's human geography.

NEW! Debate It features present two sides of a complex topic, in a two-column pro vs. con format, to engage students in active debate and decision-making. Debate It can be used as homework, group work, or discussion sections.



DEBATE it

Is sustainable development imperative or unnecessary?

Supporters maintain that sustainability is vital to humanity's future, while some critics argue that humans should not bother with making our daily lives more sustainable

SUSTAINABLE ACTIONS ARE IMPORTANT

- ▶ Humans have an obligation as stewards of the Earth to conserve and preserve it for future generations.
- ▶ A disproportionately large share of Earth's resources is being used by a small percentage of people, who by reducing their use could have a large impact on the conservation of resources.
- ▶ Renewable substitutes for nonrenewable resources are available, but people must make an effort to choose them.



▶ 14.11.6 GIR NATIONAL PARK, CHINA

SUSTAINABLE ACTIONS ARE IMPOSSIBLE OR UNNECESSARY

- ▶ It is too late to discuss sustainable development, because the world has already surpassed its sustainable level, according to the World Wildlife Fund (WWF).
- ▶ Humans are currently using 13 billion hectares of Earth's land area, but Earth has only 11.4 billion hectares of biologically productive land, according to WWF, so humans have none left to conserve for future growth.
- ▶ Earth's resources have no absolute limit because the definition of what is a resource changes dramatically and unpredictably over time.



▲ 14.11.7 AIR POLLUTION, BEIJING

NEW! Research & Reflect features connect students online to original data sources via QR links, where they examine data and respond to critical thinking questions.



RESEARCH & Reflect

What is your dialect?

Do you have a strong regional dialect? Take a quiz to determine your regional dialect. The quiz was constructed by a *New York Times* reporter, based on the Dialect Survey project undertaken at Harvard by Professors Bert Vaux and Scott Golder. Go to nytimes.com and search for either "Harvard Dialect Survey Quiz" or the article "How Y'all, Youse and You Guys." An example is the word used to identify a carbonated soft drink (Figure 5.5.2).

1. Did the quiz accurately identify where you are from?

2. Were any indicators of dialect especially important in identifying your distinctive use of language? Why or why not?



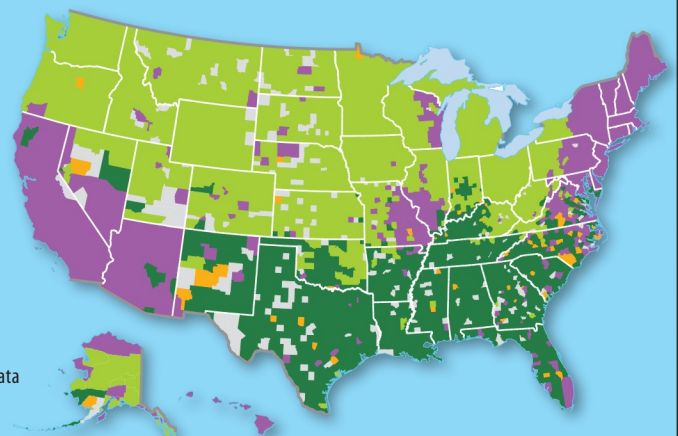
<http://goo.gl/0zP6pL>

▶ 5.5.2 U.S. DIALECTS

What to call a soft drink

Generic names for soft drinks

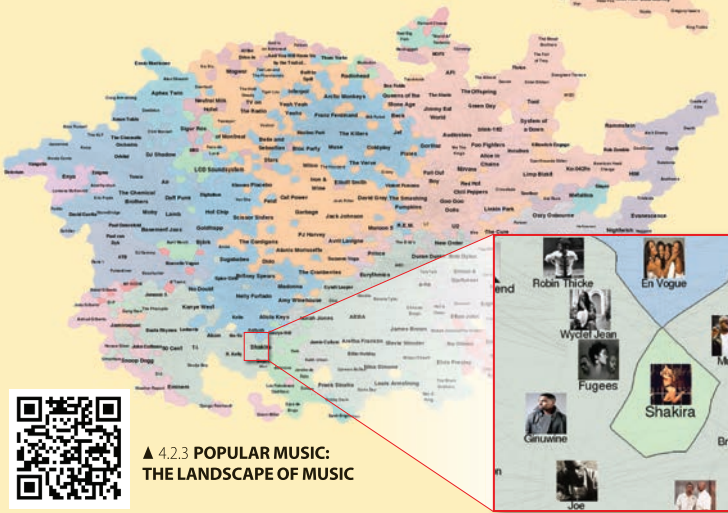
- Pop
- Soda
- no data
- Coke
- Other



NEW! Observe & Interpret features are included throughout the modules, enabling students to perform critical visual and data analysis as they read.



Music “maps” at different scales



The Landscape of Music project, created by Yifan Hu, a researcher at AT&T Labs, depicts popular music as a world map, with different types of popular music represented as countries and musicians as places within the countries (Figure 4.2.3). “Countries” that are closer to each other have relatively similar musical styles. The most important musicians in each style are represented on the “world” map; the larger the size of the type, the more important the musician. Zooming in on a portion of the map reveals less important musicians within individual “countries.”

- Find one of your favorite musicians.
1. What other performers are considered part of the same “country”?
 2. Do you agree or disagree with the “country” to which as your favorite musician was assigned? Why?



▲ 4.2.3 POPULAR MUSIC: THE LANDSCAPE OF MUSIC

Explore features within the chapter and at the end of the chapter pose questions to be answered through Google Earth.



Aquaculture on Corfu

- Use Google Earth to fly to Kassiope, Corfu, Greece (Figure 10.7.7).
1. Based on the location of Kassiope, what sort of agriculture do you expect to be important here?
- Using the ruler, **draw** a line balloon exactly 1 mile to the northwest. Zoom in on the series of circles in the water.
- Deselect** the ruler.
Click historical imagery.
Slide to the earliest date 5/16/2003.
Move the slide forward.
2. At what date do the circles first appear?
- Drag** to enter street view at the wide sandy roadside area immediately west of the circles. A tour bus is parked there.
- Exit** street view. Use the ruler to measure 0.07 miles down the street from the bus closer to town and drag to enter street view at that point.
3. What do you see in the water?
 4. What do you think is contained inside the circles?
 5. Why are birds hovering over the circles?
 6. How do these circles represent change in the way that people here undertook agriculture in the past?



Interactive Mapping features within and at the end of each chapter call for students to create maps using GIS-inspired MapMaster within MasteringGeography. Students learn basic operations of GIS first-hand, by integrating and analyzing multiple layers of data that address questions posed in the text.



Europe’s military & economic alliances

- The North Atlantic Treaty Organization and the European Union are currently the two principal alliances in Europe.
- Launch** MapMaster Europe in MasteringGeography.
- Select** Countries from the Political menu.
- Select** North Atlantic Treaty Organization (NATO) member from the Geopolitical Issues menu.
- Select** Former Warsaw Pact member from the Geopolitical Issues menu.
1. Which former Warsaw Pact members are now in NATO?
- Deselect** Geopolitical Issues, then Former Warsaw Pact member, from the Geopolitical Issues menu.
- Select** European Union, then Current members of the European Union (EU), from the Geopolitical menu.
2. Which four countries are in the European Union but not in NATO?
 3. Which five countries are in NATO but not in the European Union?
 4. What is the only country in the western part of Europe that is in neither NATO nor the European Union? What are the advantages and disadvantages of not being in these organizations?



▲ 8.10.3 NATO MEMBERS IN EUROPE

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BEFORE CLASS

Mobile Media and Reading Assignments Ensure Students Come to Class Prepared



NEW! Dynamic Study Modules personalize each student's learning experience. Created to allow students to acquire knowledge on their own and be better prepared for class discussions and assessments, this mobile app is available for iOS and Android devices.

Pearson eText in MasteringGeography gives students access to the text whenever and wherever they can access the internet. eText features include:

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- Configurable reading settings, including resizable type and night reading mode.
- Instructor and student note-taking, highlighting, bookmarking, and search.



Pre-Lecture Reading Quizzes are easy to customize & assign

NEW! Reading Questions ensure that students complete the assigned reading before class and stay on track with reading assignments. Reading Questions are 100% mobile ready and can be completed by students on mobile devices.

DURING CLASS

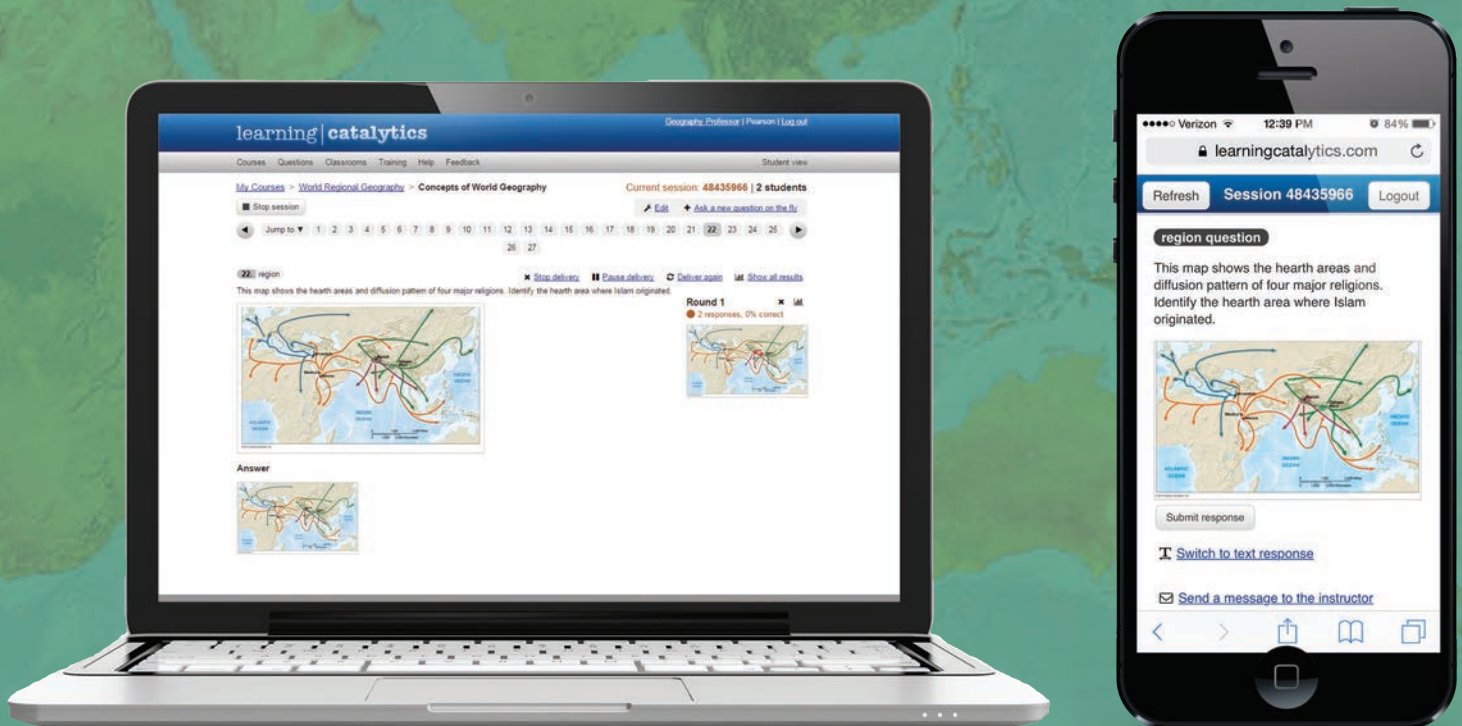
Learning Catalytics and Engaging Media

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Declan De Paor,
Old Dominion University

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- Automatically create groups for peer instruction based on student response patterns, to optimize discussion productivity.



Enrich Lecture with Dynamic Media

Teachers can incorporate dynamic media into lecture, such as Videos, MapMaster Interactive Maps and Geoscience Animations.

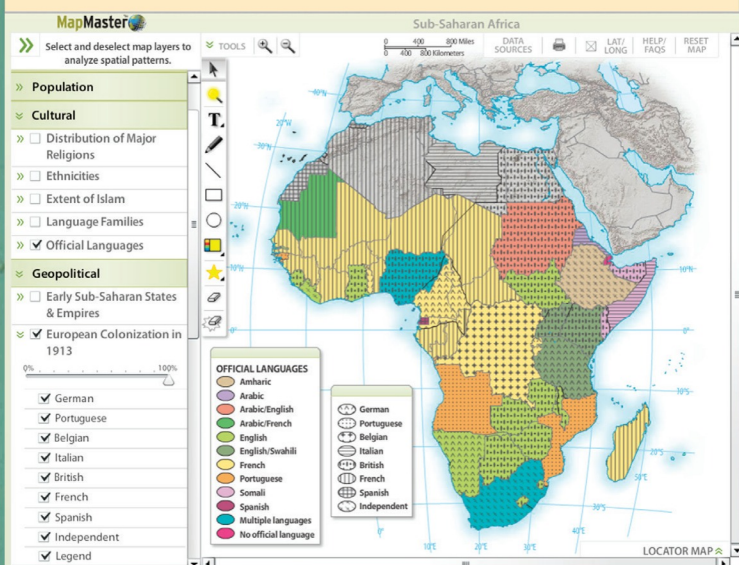
MasteringGeography

MasteringGeography delivers engaging, dynamic learning opportunities—focusing on course objectives and responsive to each student’s progress—that are proven to help students absorb human geography course material and understand challenging geography processes and concepts.

AFTER CLASS

Easy to Assign, Customizable, Media-Rich, and Automatically Graded Assignments

MapMaster Interactive Map Activities are inspired by GIS, allowing students to layer various thematic maps to analyze spatial patterns and data at regional and global scales. This tool includes zoom and annotation functionality, with hundreds of map layers leveraging recent data from sources such as NOAA, NASA, USGS, United Nations, and the CIA.



NEW! Geography Videos from such sources as the BBC and *The Financial Times* are now included in addition to the videos from Television for the Environment’s Life and Earth Report series in MasteringGeography. Approximately 200 video clips for over 25 hours of video are available to students and teachers and MasteringGeography.



NEW! GeoVideo features at the end of each chapter integrate BBC and FT videos into the book, encouraging students to login to MasteringGeography to view the videos and answer questions, which can also be assigned for credit.



GeoVideo

Log in to the MasteringGeography Study Area to view this video.

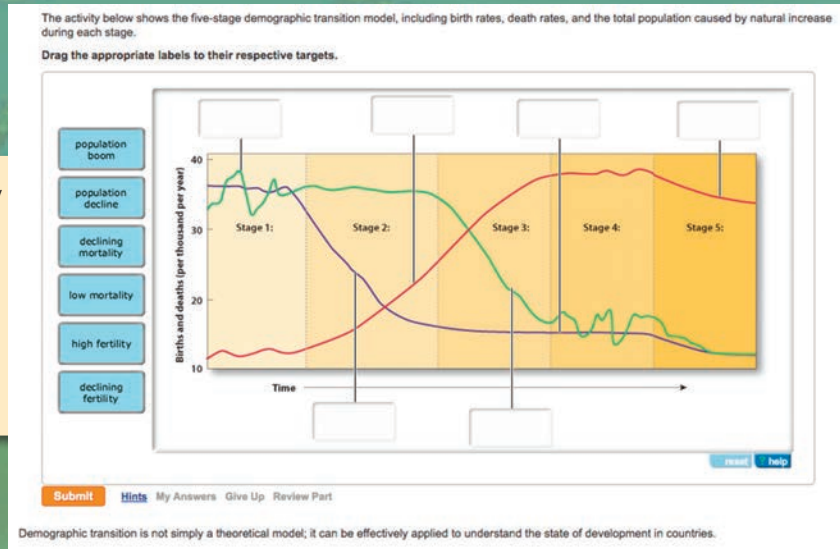
Zambia Farm Land

As demand for food increases worldwide, the fertile soils of African countries such as Zambia are being developed for commercial farming for exports, affecting the lives of subsistence farmers.



1. Describe the form of agriculture that Zambian farmers have traditionally practiced. What are its advantages and disadvantages?
2. What are the characteristics of commercial farming in Zambia and how does it affect local subsistence farmers?
3. Should the government of Zambia continue leasing land to foreign agribusiness companies? Explain why or why not.

NEW! GeoTutors. Highly visual coaching items with hints and specific wrong answer feedback help students master the toughest topics in geography.



UPDATED! Encounter (Google Earth) activities provide rich, interactive explorations of human geography concepts, allowing students to visualize spatial data and tour distant places on the virtual globe.

Map Projections

interactive tutorial media helps reinforce and remediate students on the basic yet challenging Chapter 1 map projection concepts.

Map Projections

Map Projection Properties: Spatial Relationships and Characteristics

Introduction Earth's Graticule Map Projection Properties Map Projection Classes Using Map Projections

Spatial Relationships and Characteristics Distortion on Projections Equal Area Projections Conformal Projections Compromise Projections

Equal Area (Equivalent)

Preserves area.
Does not preserve shape or angles.

Townsville
78°
Brisbane
Adelaide

Conformal

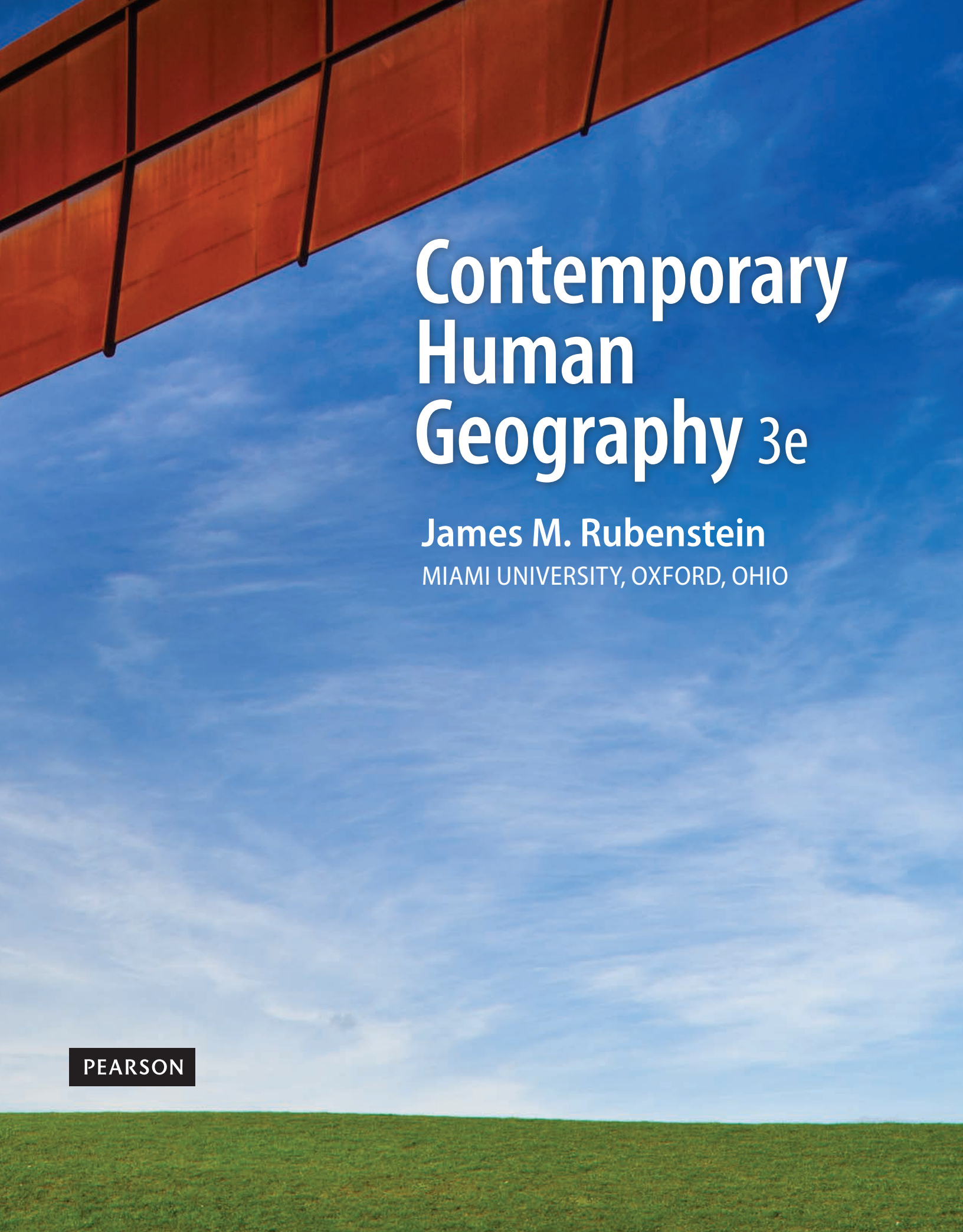
Townsville
78°
Brisbane
Adelaide

Preserves shape and angles.
Does not preserve area.

00:58 01:11

REPLAY PREVIOUS PLAY NEXT





Contemporary Human Geography 3e

James M. Rubenstein

MIAMI UNIVERSITY, OXFORD, OHIO

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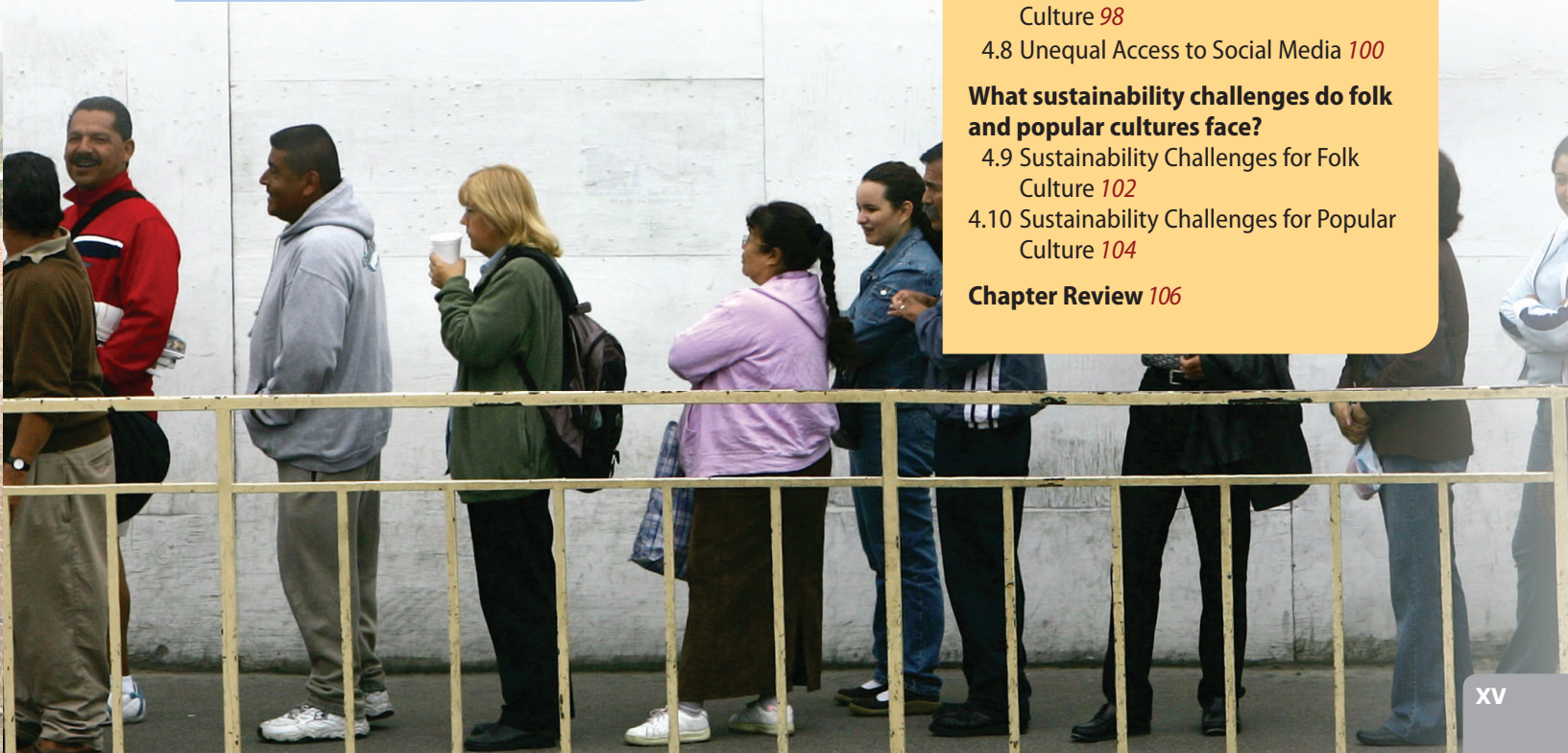
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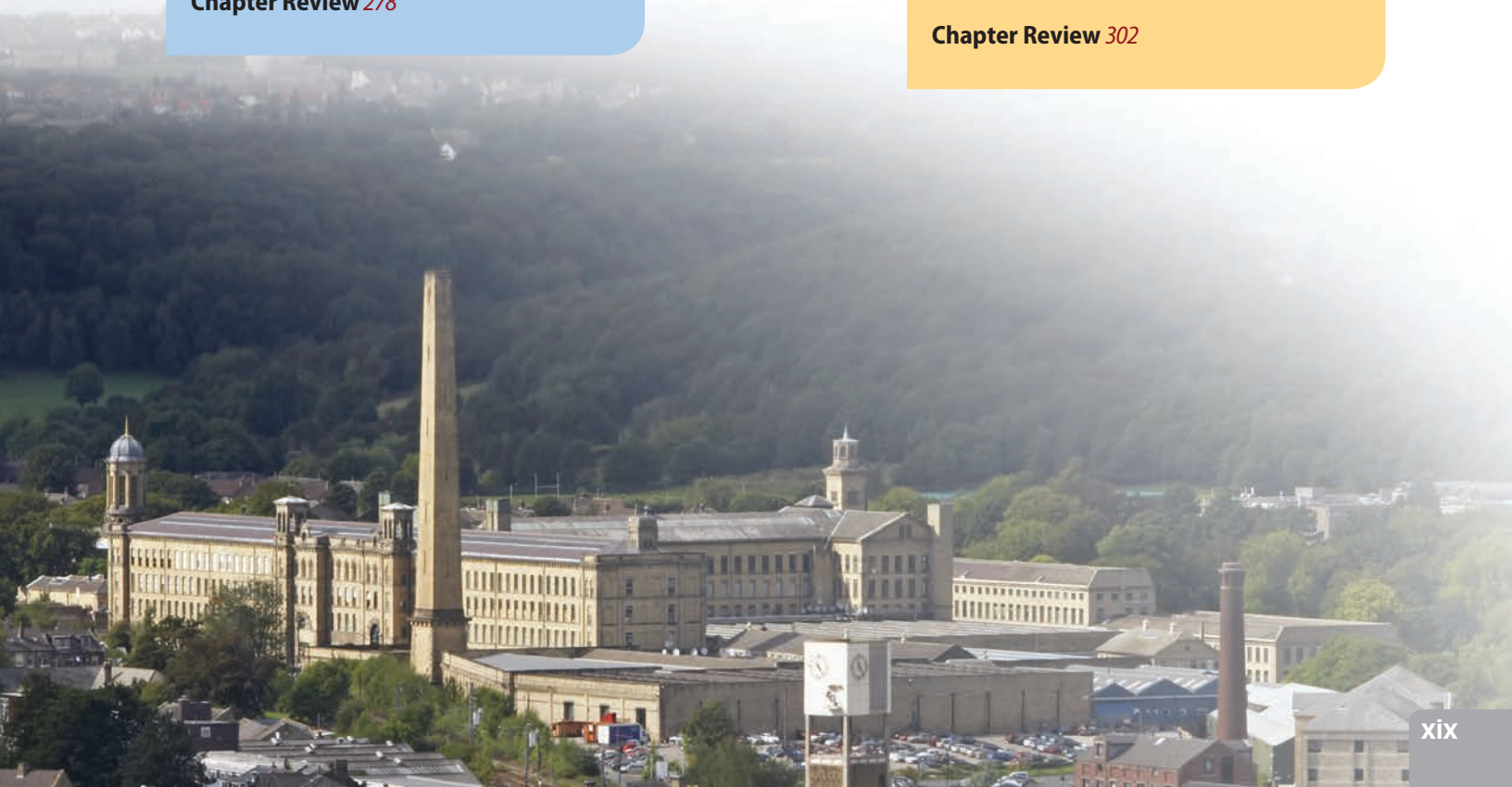
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Preface

Welcome to a new kind of geography textbook! We live in a visual age, and geography is a highly visual discipline, so Pearson—the world’s leading publisher of geography textbooks—invites you to study human geography as a visual subject.

The third edition of *Contemporary Human Geography* builds on the strengths of the first two editions, while responding to user feedback to make important changes and improvements, and incorporating technology, innovative features, current data, and new information.

NEW TO THIS EDITION

- **Debate It.** Two sides of a complex topic are presented in each chapter in a new feature called *Debate It*. A two-column pro vs. con format helps engage students in active debate and decision-making. *Debate It* can be used for homework, group work, and discussions.
- **Observe & Interpret.** Each chapter has an *Observe & Interpret* feature that promotes an active learning experience. To understand a particular concept, students are expected to watch a video, access a report, view images, or undertake another form of active learning.
- **Research & Reflect.** Students examine data and respond to critical thinking questions through accessing authoritative up-to-date online data sources, such as the U.S. Census, the UN Food and Agriculture Organization, the Population Reference Bureau, and leading sources of language and religion statistics. Access is through a choice of Quick Response (QR) links, URL addresses, and Google.
- **GeoVideos.** Short, recently produced videos in MasteringGeography from the BBC and *The Financial Times* explore chapter topics in more detail.
- **Explore.** Features within the chapter and at the end of the chapter pose questions to be answered through Google Earth, the leader in desktop geospatial imagery.
- **Interactive Mapping.** Features within and at the end of each chapter call for students to create maps using GIS-inspired MapMaster within MasteringGeography. Students learn basic operations of GIS first-hand, by integrating and analyzing multiple layers of data that address questions posed in the text.
- **Dynamic Study Modules** personalize each student’s learning experience. Created to allow students to study on their own and be better prepared to achieve higher scores on their tests, this mobile app is available for iOS and Android devices, and is also integrated within MasteringGeography.
- **Learning Catalytics** is a “bring your own device” student engagement, assessment, and classroom intelligence system. With Learning Catalytics you can:
 - o Assess students in real time, using open-ended tasks to probe student understanding.
 - o Understand immediately where students are and adjust your lecture accordingly.
 - o Improve your students’ critical-thinking skills.
 - o Access rich analytics to understand student performance.
 - o Add your own questions to make Learning Catalytics fit your course exactly.
- **The latest science, statistics, and associated imagery.** Data sources include the 2014 Population Reference Bureau World Population Data and the 2014 United Nations Human Development Report. World political events of 2014 are covered, including the rise of Islamic State and Russia’s takeover of the Crimea.
- **New and Revised Cartography.** All maps have been thoroughly updated and optimized for maximum accuracy and clear presentation of current data. New projections are used with fewer distortions. New cartograms and other graphic devices have been added.
- **Integration of Photos and Text.** The best possible images have been carefully chosen to complement content and concepts. The third edition features more than 400 new photos.

CHAPTER ORGANIZATION

Each chapter is organized into 9 to 13 two-page modular “spreads” that follow a consistent pattern:

- **Introductory module.** The first spread includes a short introduction to the chapter, as well as an outline of 9 to 13 topics that will be addressed in the chapter. The key issues are grouped into four overarching Key Questions for that chapter. A Word Cloud introduces key words and phrases that appear in the chapter. A QR code links to a key source of data about the chapter. A world map presents a listing of places discussed in the chapter.
- **Topic modules.** Between 9 and 13 modules cover the principal topics of the chapter. Each of these two-page spreads is self-contained and organized around one of four Key Questions. A numbering system facilitates finding material on a particular spread.
- **Topic features.** Embedded in the modules are these five features:
 - **Debate It.** Key arguments on two sides of an issue debated by geographers.
 - **Observe & Interpret.** In-depth understanding of a particular concept through accessing original material.
 - **Research & Reflect.** Examine authoritative up-to-date data online and respond to questions about the data.
 - **Explore.** Answer questions about a particular place through accessing Google Earth.
 - **Interactive Mapping.** Work with multiple layers of mapping data.
- **Chapter review.** Elements of the chapter review include:
 - **Summary.** The four Key Questions presented on the introductory spread are revisited, along with an outline summary of the main points made in the chapter that address the questions.
 - **Interactive Mapping.** Using Pearson’s GIS-inspired MapMaster interactive mapping media, students create maps and answer questions about spatial relationships of different data.
 - **Thinking Geographically.** Three thought-provoking ideas are introduced, based on concepts and themes developed in the chapter, along with “essay-style” questions.
 - **Explore.** Using Google Earth, students inspect imagery from places around the world and answer questions based on their observations.
 - **GeoVideos.** Links are provided to short, recently produced videos in MasteringGeography that explore topics raised in the text.
 - **Key Terms.** The key terms in each chapter are indicated in bold type when they are introduced. These terms are defined both at the end of the chapter and at the end of the book.

- **Looking Ahead.** This feature provides a bridge from the chapter just concluded to the one just ahead.

WHAT MAKES THIS BOOK CONTEMPORARY?

Titling this book “contemporary” is a bold claim. All credible geography books—including this one—contain up-to-date statistics, recent world events, and current geographic concepts. This book claims to be more contemporary—not merely up-to-date—for three reasons.

1. **We live in a visual age.** This book was written in the reverse order of traditional textbooks. A traditional book has the text written first and the graphic material is added later. Instead of beginning with an author’s complete manuscript, this book starts with a sketch of a visual concept for each two-page module in the book. What would be the most important geographic idea presented on the spread, and what would be the most effective visual way to portray that idea? The maps, graphs, and photos are placed on the page first, and then the text is written around the graphics. The production of this book does not have a traditional manuscript; from the outset, the text is written to complement the graphics.
2. **We live in a sound byte age.** This book replaces the narrative style of traditional books. Each page of this book is self-contained. Material doesn’t carry over to the next page. More of the material is placed in short feature boxes. This places more of a premium on clear concise outlining as an important pedagogical feature. The captions under maps, graphs, and photos typically repeat material already presented in the text. Not so with this book—the graphic material stands on its own.
3. **We live in an electronic age.** The book expects that some of the learning will take place through accessing information on the Internet. QR codes, URLs, Google searches—these are the tools of contemporary teaching. I ask students to keep their electronic devices turned on in class, much to their pleasant surprise. I have them use their devices to search for answers to questions I pose, to find up-to-date information, and to complete in-class projects. I know that many teachers regard electronic devices as an unwanted distraction, but before computers students had plenty of other ways to not pay attention if they were so inclined. On balance, using their electronic devices keeps them more engaged.

The main purpose of this book is to introduce you to the study of geography as a social science by emphasizing the relevance of geographic concepts to human problems. It is intended for use in college-level introductory human or cultural geography courses. The book is written for students who have not previously taken a college-level geography course.

A central theme in this book is a tension between two important realities of the twenty-first-century world—globalization and cultural diversity. In many respects we are living in a more unified world economically, culturally, and environmentally. The actions of a particular corporation or country affect people around the world. In the second decade of the twenty-first century, we continue to face wars in unfamiliar places and experience economic struggles unprecedented in the lifetimes of students or teachers. Geography's spatial perspectives help to relate economic change to the distributions of cultural features such as languages and religions, demographic patterns such as population growth and migration, and natural resources such as energy, water quality, and food supply.

This book argues that, after a period when globalization of the economy and culture has been a paramount concern in geographic analysis, local diversity now demands equal time. People are taking deliberate steps to retain distinctive cultural identities. They are preserving little-used languages, fighting fiercely to protect their religions, and carving out distinctive economic roles.

Since 2013, I have written a weekly column for our local newspaper on behalf of our local cooperatively owned grocery store. The column has come to extol the virtues of local here in Midwestern USA: the local food, the local farmers, the local seasons, and the locally owned coop. I admire the farmers and the agriculture from far away, but our local food is more nutritious, consumes less energy, and tastes better. In a world where we feel anger and helplessness at the plight of people in other places, it is at the local scale that we all can make a difference.

This book discusses the following main topics:

- **What basic concepts do geographers use?** Geographers employ several concepts to describe the distribution of people and activities across Earth, to explain reasons underlying the observed distribution, and to understand the significance of the arrangements. Chapter 1 provides an introduction to ways that geographers think about the world.
- **Where are people located in the world?** Why do some places on Earth contain large numbers of people or attract newcomers whereas other places are sparsely inhabited? Chapters 2 and 3 examine the distribution and growth of the world's population, as well as the movement of people from one place to another.
- **How are different cultural groups distributed?** Geographers look for similarities and differences in the cultural features at different places, the reasons for their distribution, and the importance of these differences for world peace. Chapters 4 through 8 analyze the distribution of different cultural traits and beliefs and the political challenges that result from those spatial patterns. Important cultural traits discussed in Chapter 4 include food, clothing, shelter, and leisure activities. Chapters 5

through 7 examine three main elements of cultural identity: language, religion, and ethnicity. Chapter 8 looks at political problems that arise from cultural diversity.

- **How do people earn a living in different parts of the world?** Human survival depends on acquiring an adequate food supply. One of the most significant distinctions among people globally is whether they produce their food directly from the land or buy it with money earned by performing other types of work. Chapters 9 through 12 look at the three main ways of earning a living: agriculture, manufacturing, and services. Chapter 13 discusses cities, where the world's economic and cultural activities are increasingly centered.
- **What issues result from using Earth's resources?** Geographers recognize that cultural problems result from the depletion, destruction, and inefficient use of the world's natural resources. Chapter 14 is devoted to a study of issues related to the use of Earth's natural resources.

HOW TO USE THIS BOOK'S MEDIA

Contemporary Human Geography 3rd edition features an innovative integration of media and connections to the MasteringGeography platform, giving students *and* instructors flexible self-study and assessment options to extend the book with current data, interactive mapping, and exciting geospatial tools.

- **Quick Response (QR) Codes.** Traditional books are challenged to provide students with quick and easy access to original sources and up-to-date data. *Quick Response codes*, integrated into the beginning of each chapter and into the *Research & Reflect* feature in each chapter, help solve this problem, enabling students to use their mobile devices to easily and instantly access websites with current data and information related to chapter topics.
- **MapMaster™ Interactive Maps.** Maps are an important part of the geographer's tool set, but traditional print maps are limited in their ability to allow students to dynamically isolate or compare different spatial data. Available in MasteringGeography both for student self-study and for teachers as assignable and automatically gradable assessment activities, GIS-inspired *MapMaster Interactive Maps* allow students to overlay, isolate, and examine different thematic data at regional and global scales.

Select chapter modules and all chapter review modules from the book present MapMaster maps, along with activities and questions, encouraging students to login to the MasteringGeography Study Area on their own to explore additional map data layers to complete the activities and extend their learning beyond the book's maps.

Teachers have the option of assigning these questions for credit in MasteringGeography. Teachers also have access to a separate large suite of MapMaster activities for each chapter, including hundreds of multiple-choice questions that can be customized, assigned, and automatically graded by the MasteringGeography system, for a wide range of interactive mapping assessment activity options.

- **GeoVideos.** Available in MasteringGeography, close to 200 recent videos from the BBC and *The Financial Times* explore topics raised in each chapter. All chapter review modules refer to a video that can be viewed online in the MasteringGeography Study Area, for the students to view and answer the questions posed in the printed GeoVideo exercise. Teachers have the option of assigning automatically graded coaching activities with videos in MasteringGeography.
- **Google Earth™.** Geobrowser technology provides unparalleled opportunity for students to get a sense of place and explore Earth's physical and cultural landscapes with mashups of various data and digital media.

Select chapter modules and all chapter review modules of the 3rd edition present *Google Earth* imagery and activities, encouraging students to connect the print book to this exciting tool to browse the globe and explore different data, perform visual and spatial analysis tasks, and extend their learning beyond the book's photos and figures.

Teachers have the option of assigning these short answer questions for credit, and also have access to a separate large suite of *Google Earth Encounter* activities for each chapter, including hundreds of associated multiple-choice questions that can be customized, assigned, and automatically graded by the MasteringGeography system.

For classes not using MasteringGeography, the *Google Earth Encounter* activities are also available via a set of standalone workbooks and websites (see the Teaching and Learning Package section of this Preface for more information).

THE TEAM

The steps involved in creating most traditional textbooks haven't changed much. The book passes from one to another like a baton in a relay race. The author writes a manuscript, which then passes in turn through development, editing, and production specialists on the way to the printing press. The preface typically includes a perfunctorily litany of acknowledgments for the many fine people who contribute to the development, editing, and production of the book.

In contrast, this book starts as a genuine partnership among the key development, editorial, and production

teams. For this truly *contemporary* book, collaborative partnership better describes its creation. The traditional separation of development, editorial, and production personnel does not occur, and in fact the lines among these functions are deliberately blurred.

Christian Botting, Senior Editor at Pearson Education, is the captain of this ship. He has now led the team through five of my book projects. Christian knows when to let the team do its job and when to step in and make a tough decision. His instincts are infallible.

Because Pearson is the dominant publisher of college geography textbooks, the person in charge of geography wields considerable influence in shaping what is taught in the nation's geography curriculum. I have had the great fortune to work with only three editors for most of my three decades of association with Pearson and its predecessors. Christian's two predecessors have gone on to distinguished publishing careers. Paul F. Corey, now Managing Director of Pearson Education, is much grayer than when he was geography editor. Paul's successor Dan Kaveney continues to edit earth science books. I am eternally grateful to all three of my editors.

Stuart Jackman, Design Director at DK Education, is the creative genius responsible for the spectacular graphics. Stuart and the DK team deserve the lion's share of the credit for giving this book the best graphics in geography. The DK "style" is immediately recognizable as distinctive from traditional geography books. You can tell that the graphics are the central element of the book, not an afterthought.

Kevin Lear, Senior Project Manager at International Mapping, and his team produce the outstanding maps for this book. Back in the 1980s, Kevin was the first cartographer to figure out how to produce computer-generated full-color maps that are more accurate and more attractive than hand-drawn ones, and he has stayed ahead of the technology curve ever since.

Jonathan Cheney, Executive Development Editor at Pearson Education, plays a key role at the start of the project by reviewing and collating the many reviews and sorting out what needs to be preserved and what needs to be improved. Jonathan reviews the rough drafts of each spread of each chapter that Stuart and I prepare.

Anton Yakovlev, Program Manager at Pearson, serves as ringmaster. Anton oversees the unusually complex task of managing this book's extremely untraditional work flow.

Sean Hale, Project Manager at Pearson, is the assistant ringmaster. Sean ably takes care of the day-to-day movement of materials and ideas among many actors.

Rachel Youdelman is Manager of Rights & Permissions at Pearson. This is an ever-more complicated job, and is an especially challenging one given the unusual complexity of this book's collaborative process.

Jeanine Furino, at Cenveo Publisher Services, smoothly manages the flow of copyediting and other production tasks for this project.

Jacqueline McKenzie (Medgar Evers College, CUNY) has authored the *Instructor Resource Manual* for the book, and Neusa Hildalgo-Monroy McWilliams (University of Toledo) has created the TestGen Computerized *Test Bank* for this edition.

Many others have contributed to the success of this project. At DK, Sophie Mitchell, Publisher at DK Education, provided the strategic vision for the design team. At Pearson, Editorial Assistant Amy De Genaro organized the substantial reviewing process for the project. Executive Marketing Manager Neena Bali expertly created the marketing package for this unique book. Media Producer Mia Sullivan managed the production of the MasteringGeography program.

REVIEWERS

I would like to extend a special thanks to my colleagues who served as reviewers on the first, second, and third editions, as well as on overlapping material from *Introduction to Contemporary Geography*:

Roger Balm, Rutgers University
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Digital & Print Resources

FOR STUDENTS AND TEACHERS:

This edition provides a complete human geography program for students and teachers.

MasteringGeography™ with Pearson eText for Contemporary Human Geography

The Mastering platform is the most widely used and effective online homework, tutorial, and assessment system for the sciences. It delivers self-paced tutorials that provide individualized coaching, focus on course objectives, and are responsive to each student's progress. The Mastering system helps teachers maximize class time with customizable, easy-to-assign, and automatically graded assessments that motivate students to learn outside of class and arrive prepared for lecture. MasteringGeography offers:

- o Assignable activities that include GIS-inspired MapMaster™ interactive maps, *Encounter Human Geography* Google Earth™ Explorations, GeoVideos, GeoTutors, Thinking Spatially & Data Analysis activities, end-of-chapter questions, reading quizzes, Test Bank questions, maps, and more.
- o Student study area with GIS-inspired MapMaster interactive maps, Geoscience Animations, web links, geography videos, glossary flash cards, “In the News” RSS feeds, reference maps, an optional Pearson eText and more. www.masteringgeography.com

Teaching College Geography: A Practical Guide for Graduate Students and Early Career Faculty (0136054471)

This two-part resource provides a starting point for becoming an effective geography teacher from the very first day of class. Divided in two parts, Part One addresses

“nuts-and-bolts” teaching issues. Part Two explores being an effective teacher in the field, supporting critical thinking with GIS and mapping technologies, engaging learners in large geography classes, and promoting awareness of international perspectives and geographic issues.

Aspiring Academics: A Resource Book for Graduate Students and Early Career Faculty (0136048919)

Drawing on several years of research, this set of essays is designed to help graduate students and early career faculty start their careers in geography and related social and environmental sciences. *Aspiring Academics* stresses the interdependence of teaching, research, and service—and the importance of achieving a healthy balance of professional and personal life—while doing faculty work. Each chapter provides accessible, forward-looking advice on topics that often cause the most stress in the first years of a college or university appointment.

Practicing Geography: Careers for Enhancing Society and the Environment (0321811151)

This book examines career opportunities for geographers and geospatial professionals in business, government, nonprofit, and educational sectors. A diverse group of academic and industry professionals share insights on career planning, networking, transitioning between employment sectors, and balancing work and home life. The book illustrates the value of geographic expertise and technologies through engaging profiles and case studies of geographers at work.

FOR STUDENTS:***Goode's World Atlas, 23rd edition***

(0133864642)0

Goode's World Atlas has been the world's premiere educational atlas since 1923, and for good reason. It features over 250 pages of maps, from definitive physical and political maps to important thematic maps that illustrate the spatial aspects of many important topics. The 23rd edition includes digitally produced reference maps, as well as new thematic maps on demography, global climate change, sea level rise, CO₂ emissions, polar ice fluctuations, deforestation, extreme weather events, infectious diseases, water resources, and energy production.

Television for the Environment Earth Report Geography Videos on DVD

(0321662989)

This three-DVD set is designed to help students visualize how human decisions and behavior have affected the environment and how individuals are taking steps toward recovery. With topics ranging from the poor land management promoting the devastation of river systems in Central America to the struggles for electricity in China and Africa, these 13 videos from *Television for the Environment's* global *Earth Report* series recognize the efforts of individuals around the world to unite and protect the planet.

Encounter Human Geography Workbook & Website by Jess C. Porter (0321682203)

For classes that do not use MasteringGeography, *Encounter Human Geography* provides rich, interactive explorations of human geography concepts through Google Earth. Students explore the globe through themes such as population, sexuality and gender, political geography, ethnicity, urban geography, migration, human health, and language. All chapter explorations are available in print format as well as online quizzes, accommodating different classroom needs. All worksheets are accompanied with corresponding Google Earth KMZ media files, available for download for those who do not use MasteringGeography, from <http://www.mygeoscienceplace.com>.

Dire Predictions: Understanding Global Climate Change, 2nd edition

by Michael Mann and Lee R. Kump (0133909778)

Periodic reports from the Intergovernmental Panel on Climate Change (IPCC) evaluate the risk of climate change brought on by humans. But the sheer volume of scientific

data remains inscrutable to the general public, particularly to those who may still question the validity of climate change. In just over 200 pages, this practical text presents and expands upon the essential findings of the IPCC's 5th Assessment Report in a visually stunning and undeniably powerful way to the lay reader. Scientific findings that provide validity to the implications of climate change are presented in clear-cut graphic elements, striking images, and understandable analogies.

FOR TEACHERS:***Instructor Resource DVD*** (0134040570)

The *Instructor Resource DVD* provides high-quality electronic versions of photos and illustrations from the book in JPEG, pdf, and PowerPoint formats, as well as customizable PowerPoint lecture presentations, Classroom Response System questions in PowerPoint, and the *Instructor Resource Manual* and *Test Bank* in MS. Word and TestGen formats. For easy reference and identification, all resources are organized by chapter.

Instructor Resource Manual (download only) (0134040589)

Updated for the third edition, by Jacqueline McKenzie (Medgar Evers College, CUNY) the *Instructor Resource Manual*, is intended as a resource for both new and experienced instructors. It includes lecture outlines, additional source materials, teaching tips, advice about how to integrate visual supplements (including the Web-based resources), and various other ideas for the classroom. <http://www.pearsonhighered.com/irc>.

TestGen® Computerized Test Bank (download only) (0134040600)

TestGen is a computerized test generator that lets instructors view and edit *Test Bank* questions, transfer questions to tests, and print the test in a variety of customized formats. This *Test Bank*, authored by Neusa Hildalgo-Monroy McWilliams (University of Toledo), includes over 1,000 multiple choice and short answer/essay questions. Questions are correlated to the revised U.S. National Geography Standards and Bloom's Taxonomy to help instructors better map the assessments against both broad and specific teaching and learning objectives. The questions are also tagged to chapter specific learning outcomes. The *Test Bank* is available in Microsoft Word, and is importable into Blackboard. <http://www.pearsonhighered.com/irc>

About the Author



Dr. James M. Rubenstein received his B.A. from the University of Chicago in 1970, M.Sc. from the London School of Economics and Political Science in 1971, and Ph.D. from Johns Hopkins University in 1975. He is Professor of Geography at Miami University, where he teaches urban and human geography. Dr. Rubenstein also conducts research in the automotive industry and has published three books on the subject—*The Changing U.S. Auto Industry: A Geographical Analysis* (Routledge); *Making and Selling Cars: Innovation and Change in the U.S. Auto Industry* (The Johns Hopkins University Press); and *Who Really Made Your Car? Restructuring and Geographic Change in the Auto Industry* (W.E. Upjohn Institute, with Thomas Klier). Dr. Rubenstein is also the author of *The Cultural Landscape*, the bestselling textbook for college and high school human geography, as well as *Introduction to Contemporary Geography*. He also writes a weekly column about local food for the *Oxford Press*. Winston, a lab-husky mix with one brown eye and one blue eye, takes Dr. Rubenstein for long walks in the woods every day.

This book is dedicated to my wife Bernadette Unger, the love of my life, and my companion through life.

About Our Sustainability Initiatives

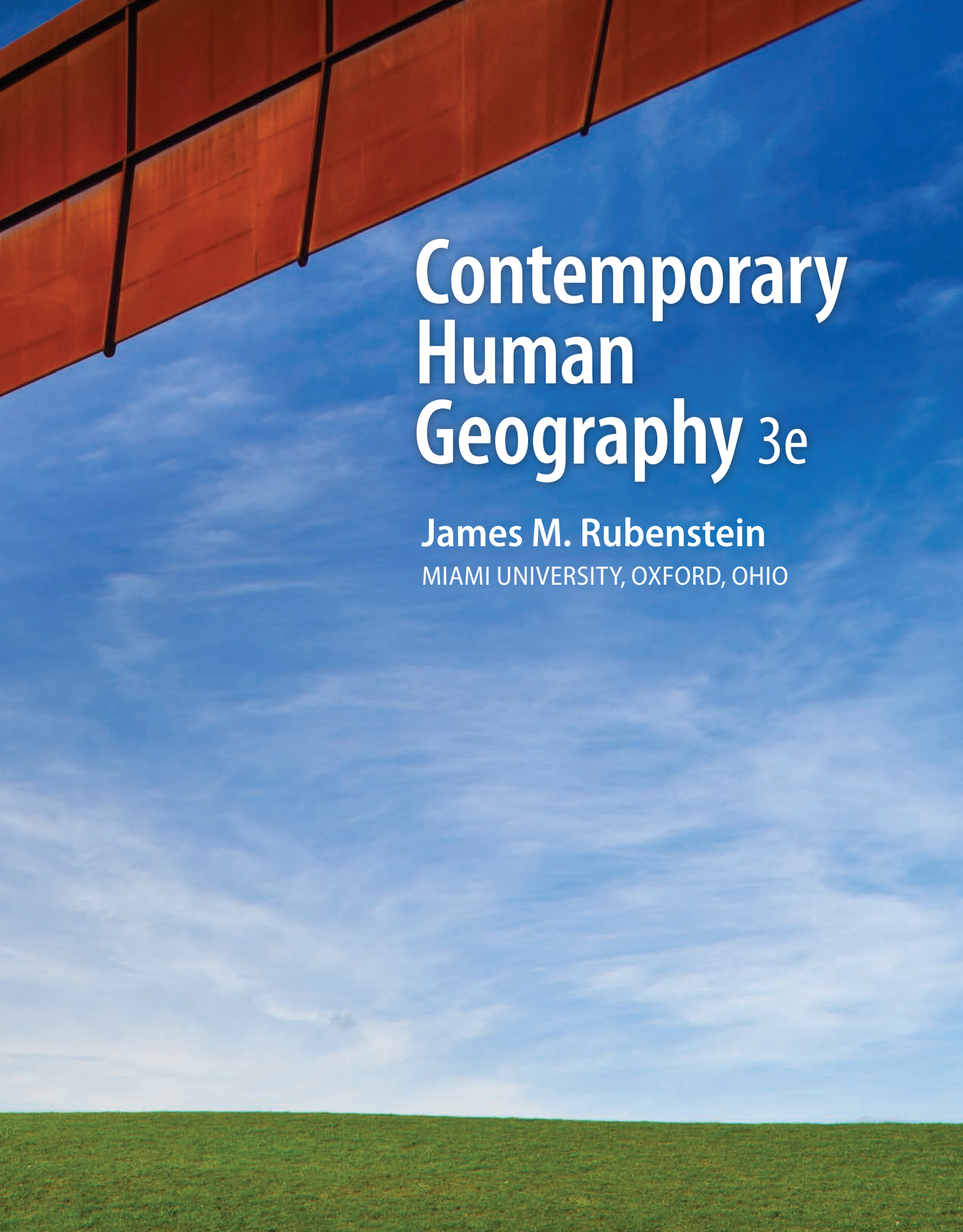
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The background of the book cover features a low-angle shot of a building's facade with a rust-colored metal finish and a black structural grid. The building is set against a clear blue sky with wispy white clouds. At the bottom of the frame, a flat, green grassy field extends to the horizon.

Contemporary Human Geography 3e

James M. Rubenstein

MIAMI UNIVERSITY, OXFORD, OHIO

THIS IS GEOGRAPHY

Contemporary geography is much more than memorizing capitals and admiring exotic photos. Geography studies the cultural, economic, political, and natural environments in which people live and act.



Why is geography a science?

- 1.1 Welcome to Geography
- 1.2 Ancient & Medieval Geography
- 1.3 Reading Maps
- 1.4 The Geographic Grid
- 1.5 Contemporary Geographic Tools



Why is every place unique?

- 1.6 Place: A Unique Location
- 1.7 Region: A Unique Area



Why are places similar?

- 1.8 Scale: From Global to Local
- 1.9 Space: Distribution of Features
- 1.10 Space: Cultural Identity



Why are places connected?

- 1.11 Interaction Between Places
- 1.12 Sustainability
- 1.13 Humans & Their Environment

SCAN TO ENTER
THE WORLD OF
GEOGRAPHY



aag.org



Manarola, one of five Cinque Terre villages along Italy's west coast, a UNESCO World Heritage Site



Welcome to Geography

- Geographers explain *where* things are and *why* they are there.
- Geography can be compared with history.

The word *geography*, invented by the ancient Greek scholar Eratosthenes (ca. 276–ca. 194 B.C.), is based on two Greek words. *Geo* means “Earth” and *graphy* means “to write.” Human geographers ask two questions: Where are people and activities found on Earth? Why are those particular people and activities located where they are?

Geography and History

In his framework of all scientific knowledge, the German philosopher Immanuel Kant (1724–1804) compared geography and history:

| Geographers . . . | Historians . . . |
|-------------------------------------------------------|-----------------------------------------------------------|
| identify the location of important places. | identify the dates of important events. |
| explain why one human activity is found near another. | explain why one activity follows another chronologically. |
| ask where and why. | ask when and why. |

History and geography differ in one especially important manner. A geographer can take a plane or car to another place on Earth, but a historian cannot travel back to another time in the past. This ability to reach other places lends excitement and immediacy to the discipline of geography.

Geographers Explain *Where* and *Why*

To explain *where* things are, one of geography’s most important tools is a map. Ancient and medieval geographers created maps to describe what they knew about Earth. Today, accurate maps are generated from electronic data. See sections 1.2 through 1.5.

Geographers employ several basic concepts to explain why every place on Earth is in some ways unique and in other ways related to other locations. Manarola, Italy, can be used to illustrate these basic concepts (Figure 1.1.1).

To explain why every place is unique, geographers have two basic concepts:

- A **place** is a specific point on Earth, distinguished by a particular characteristic.

Every place occupies a unique location, or position, on Earth’s surface (Figure 1.1.2).

- A **region** is an area of Earth defined by one or more distinctive characteristics (Figure 1.1.3).

To explain why different places are interrelated, geographers have three basic concepts:

- **Scale** is the relationship between the portion of Earth being studied and Earth as a whole. Geographers are increasingly concerned with the global scale (Figure 1.1.4).
- **Space** refers to the physical gap or interval between two objects. Geographers observe that many objects are distributed across space in a regular manner, for discernible reasons (Figure 1.1.5).
- **Connection** refers to relationships among people and objects across the barrier of space. Geographers are concerned with the various means by which connections occur (Figure 1.1.6).

▲ 1.1.1 MANAROLA, ITALY



▲ 1.1.2 PLACE

The village of Manarola, Italy, nestles in a hillside overlooking the Mediterranean Sea.



▲ 1.1.3 **REGION**

Manarola is located in Europe, one of the major world regions.



▲ 1.1.4 **SCALE**

Manarola has unique local-scale shops, but many of the souvenirs are produced in other countries by large global corporations.



▲ 1.1.5 **SPACE**

Manarola is one of five villages, known as the Cinque Terre, which are arranged in a linear pattern along the coast of Italy.



▲ ► 1.1.6 **CONNECTION**

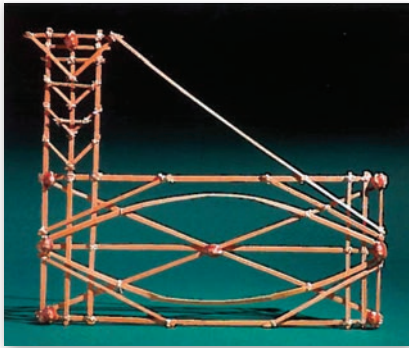
Manarola is connected to other Cinque Terre villages by (a) a train and (b) a footpath along the sea.



Ancient & Medieval Geography

- Geographic thought about Earth began in the ancient world.
- Increasingly accurate maps were developed beginning in the Middle Ages.

Thinking geographically is one of the oldest human activities (Figure 1.2.1). The earliest surviving maps were drawn in the eastern Mediterranean in the seventh or sixth century B.C. (Figure 1.2.2). Through the centuries, explorers acquired knowledge of Earth's surface, and philosophers explained the significance of this information for understanding Earth's size and shape and the distribution of its continents.



▲ 1.2.1 POLYNESIAN STICK CHART

A stick chart is a type of ancient map created by people living in the present-day Marshall Islands in the South Pacific Ocean. The palm strips depict patterns of waves, and the shells along the edges depict islands.

Geography in the Ancient World

Major contributors to geographic thought in the ancient eastern Mediterranean included:

- Thales of Miletus (ca. 624–ca. 546 B.C.), who applied principles of geometry to measuring land area.
- Anaximander (610–ca. 546 B.C.), a student of Thales, who made a world map based on information from sailors and argued that the world was shaped like a cylinder.
- Pythagoras (ca. 570–ca. 495 B.C.), who may have been the first to propose a spherical world, arguing that the sphere was the most perfect form.
- Hecateus (ca. 550–ca. 476 B.C.), who may have produced the first geography book, called *Ges Periodos* (“Travels Around the Earth”).
- Aristotle (384–322 B.C.), who was the first to demonstrate that Earth was spherical on the basis of evidence.
- Eratosthenes (ca. 276–ca. 195 B.C.), the inventor of the word *geography*, who accepted that Earth was round (as few others did in his day), calculated its circumference within 0.5 percent accuracy, accurately divided Earth into five climatic regions, and described the known world in one of the first geography books.
- Strabo (ca. 63 B.C.–ca. A.D. 24), who described the known world in a 17-volume work titled *Geography*.
- Ptolemy (ca. A.D. 100–ca. 170), who wrote the eight-volume *Guide to Geography*, codified basic principles of mapmaking, and prepared numerous maps that were not improved upon for more than 1,000 years (Figure 1.2.3).



▲ 1.2.2 THE OLDEST KNOWN MAP

A map of the town of Çatalhöyük, located in present-day Turkey, dates from approximately 6200 B.C. Archaeologists found the map on the wall of a house that was excavated in the 1960s. The map is now in the Konya Archaeology Museum.

China was another center of early geographic thought. Ancient Chinese geographic contributions included:

- *Yu Gong* (“Tribute of Yu”), a chapter of the book *Shu Jing* (“Classic of History”), which was the earliest surviving Chinese geographical writing, by an unknown author from the fifth century B.C., described the economic resources of the country's different provinces.
- Pei Xiu, the “father of Chinese cartography,” who produced an elaborate map of the country in A.D. 267.



▲ 1.2.3 WORLD MAP BY PTOLEMY, CA. A.D. 150

The map shows the known world at the height of the Roman Empire, surrounding the Mediterranean Sea and Indian Ocean.

Geography's Revival

During the first millennium A.D., maps became less mathematical and more fanciful, showing Earth as a flat disk surrounded by fierce animals and monsters. Scientific mapmaking resumed during the Middle Ages. Leading medieval contributors to geography included:

- Muhammad al-Idrisi (1100–ca. 1165), a Muslim geographer who prepared a world map and geography text in 1154, building on Ptolemy's long-neglected work (Figure 1.2.4).
- Abu Abdullah Muhammad Ibn-Battuta (1304–ca. 1368),

a Moroccan scholar, who wrote *Ribla* (“Travels”) based on three decades of journeys covering more than 120,000 kilometers (75,000 miles) through the Muslim world of northern Africa, southern Europe, and much of Asia.

- Martin Waldseemuller (ca. 1470–ca. 1521), a German cartographer who was credited with producing the first map to use the label “America;” he wrote on the map (translated from Latin) “from Amerigo the discoverer . . . as if it were the land of Americus, thus America.”
- Abraham Ortelius (1527–1598), a Flemish cartographer, created the first modern atlas and was the first to hypothesize that the continents were once joined together before drifting apart (Figure 1.2.5).

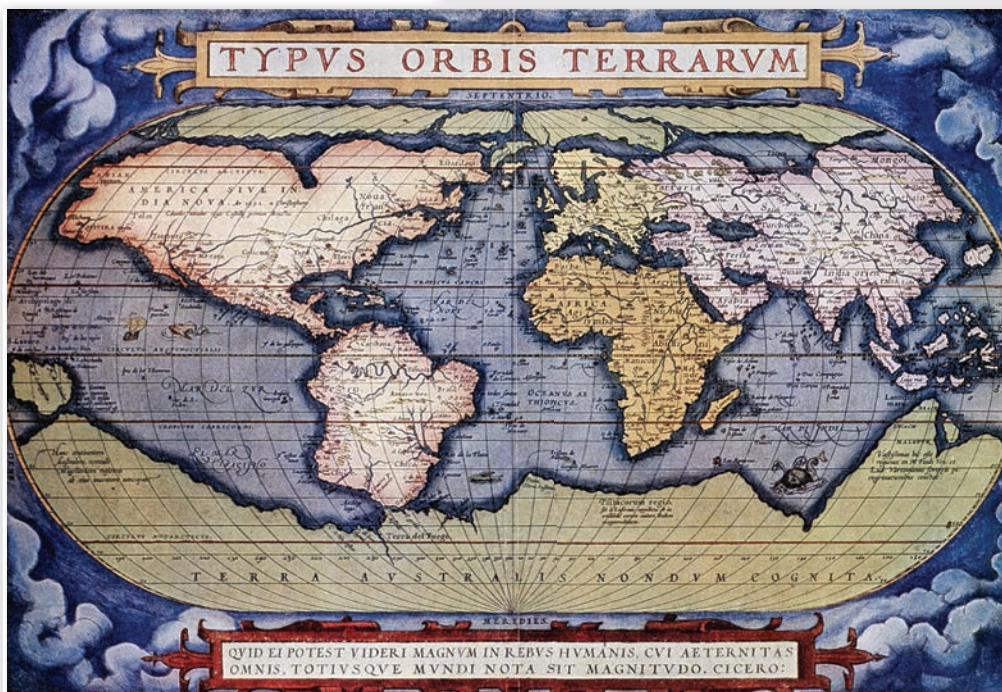


▲ 1.2.4 WORLD MAP BY AL-IDRISI, 1154

Al-Idrisi built on Ptolemy's map, which had been neglected for nearly a millennium.

▲ 1.2.5 WORLD MAP BY ORTELIUS, 1571

This was one of the first maps to show the considerable extent of the Western Hemisphere, as well as the Antarctic land mass.



Reading Maps

- A map is a scale model of all or a portion of Earth.
- The round Earth is transferred to a flat map through projection.

For centuries, geographers have worked to perfect the science of mapmaking, called **cartography**. A **map** is a scale model of the real world, made small enough to work with on a desk or computer. Maps serve two purposes:

- **As a reference tool.** A map helps us to find the shortest route between two places and to avoid getting lost along the way.
- **As a communications tool.** A map is often the best means for depicting the distribution of human activities or physical features, as well as for thinking about reasons underlying a distribution.

To make a map, a cartographer must make two decisions:

- How much of Earth's surface to depict on the map (map scale).
- How to transfer a spherical Earth to a flat map (projection).

▲ 1.3.1 MAP SCALE OF DUBAI

If you zoom in on Dubai in Google Earth, map scale changes.

Map Scale

Should a map show the entire globe, or a country, or a city? To make a scale model of the entire world, many details must be omitted. Conversely, a map showing only a small portion of Earth's surface can provide a wealth of detail about a particular place.

The level of detail and the amount of area covered on a map depend on its **map scale**, which is the relationship of a feature's size on a map to its actual size on Earth. Compare the amount of detail shown in Figures 1.3.1 and 1.3.2. Map scale is presented in three ways:

- **A ratio or fraction** shows the numerical ratio between distances on the map and Earth's surface. A scale of 1:1,000,000 means that 1 unit (for example, inch, centimeter, foot, finger length) on the map represents 1 million of the same unit on

the ground. The 1 on the left side of the ratio always refers to a unit of distance on the map, and the number on the right always refers to the same unit of distance on Earth's surface.

- **A written scale** describes the relationship between map and Earth distances in words. For example, in the statement "1 centimeter equals 10 kilometers," the first number refers to map distance and the second to distance on Earth's surface.
- **A graphic scale** usually consists of a bar line marked to show distance on Earth's surface. To use a bar line, first determine with a ruler the distance on the map in inches or centimeters. Then hold the ruler against the bar line and read the number on the bar line opposite the map distance on the ruler. The number on the bar line is the equivalent distance on Earth's surface.

► 1.3.2 MAP SCALE

The three images show the city of Dubai, in the United Arab Emirates, at three scales.



Projection

Earth is very nearly a sphere and is therefore accurately represented with a globe.

However, a globe is an extremely limited tool with which to communicate information about Earth's surface. A small globe does not have enough space to display detailed information, whereas a large globe is too bulky and cumbersome to use. And a globe is difficult to write on, photocopy, display on a computer screen, or carry in the glove box of a car. Consequently, most maps—including those in this book—are flat.

Earth's spherical shape poses a challenge for cartographers because drawing Earth on a flat piece of paper unavoidably produces some distortion. Cartographers have invented hundreds of clever methods of producing flat maps, but none has produced perfect results (Figures 1.3.3, 1.3.4, and 1.3.5). The scientific method of transferring locations on Earth's surface to a flat map is called **projection**.

The problem of distortion is especially severe for maps depicting the entire world.

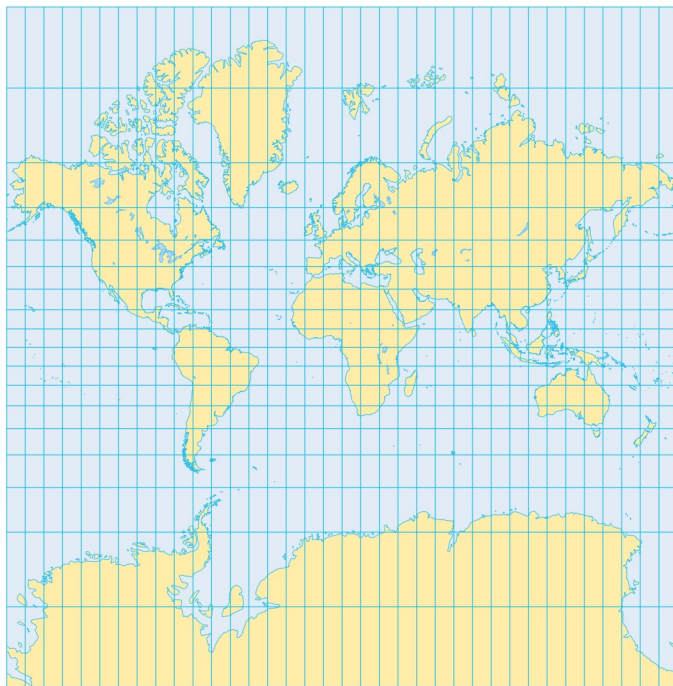
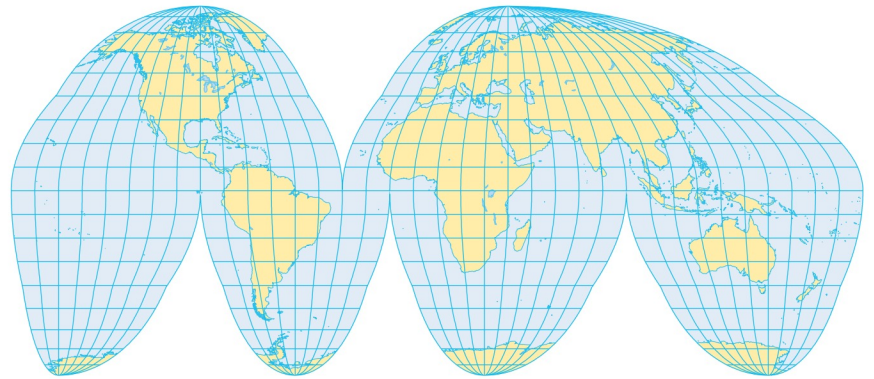
Four types of distortion can result:

1. The **shape** of an area can be distorted, so that it appears more elongated or squat than in reality.
2. The **distance** between two points may become increased or decreased.
3. The **relative size** of different areas may be altered, so that one area may appear larger than another on a map but is in reality smaller.
4. The **direction** from one place to another can be distorted.



Animation
Map Projections

<http://goo.gl/ZuvD2l>

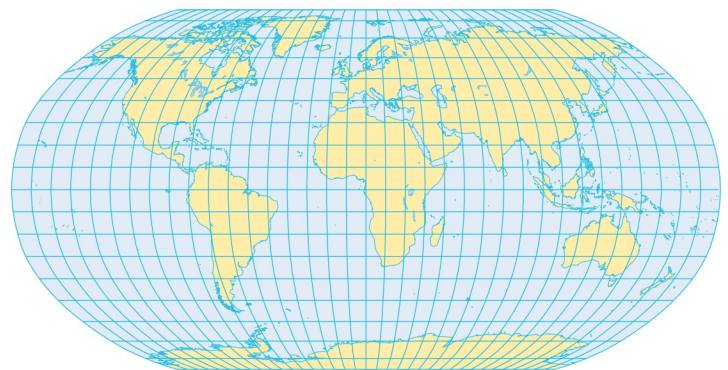


▲ 1.3.3 MERCATOR PROJECTION

The Mercator projection has little distortion of shape and direction. Its greatest disadvantage is that relative size is grossly distorted, making high-latitude places near the North and South poles look much larger than they actually are.

▲ 1.3.4 GOODE HOMOLOSINE PROJECTION

This projection separates the Eastern and Western hemispheres into two pieces, a characteristic known as interruption. The meridians (the vertical lines), which in reality converge at the North and South poles, do not converge at all on the map. Also, they do not form right angles with the parallels (the horizontal lines).



▲ 1.3.5 ROBINSON PROJECTION

The Robinson projection is useful for displaying information across the oceans. Its major disadvantage is that allocating space to the oceans causes the land areas to be smaller than on interrupted maps of the same size.