

PREFACE

“If you build it, they will come” was the message that inspired the character played by Kevin Costner in the movie *Field of Dreams* to create a baseball field in his Iowa cornfield. A similar hope encouraged us when we first began to think about writing *Introduction to Geography* in 1975. At that time, very few departments of geography in the United States and Canada offered a general introductory course for students—that is, one that sought to acquaint students with the breadth of the entire field. Instead, most departments offered separate courses in physical and human or cultural geography.

Recognizing that most students will have only a single college course and textbook in geography, we wanted to develop a book that covers all of the systematic topics that geographers study. Our hope, of course, was that the book would so persuasively identify and satisfy a disciplinary instructional need that more departments would begin to offer a general introductory course to the discipline, a dream that has been realized.

APPROACH

Our purpose is to convey concisely and clearly the nature of the field of geography, its intellectual challenges, and the logical interconnections of its parts. Even if students take no further work in geography, we are satisfied that they will have come into contact with the richness and breadth of our discipline and have at their command new insights and understandings for their present and future roles as informed adults. Other students may have the opportunity and interest to pursue further work in geography. For them, we believe, this text will make apparent the content and scope of the subfields of geography, emphasize its unifying themes, and provide the foundation for further work in their areas of interest.

The content is structured around the major research traditions of the discipline. Chapter 1 introduces students to the four organizing traditions that have emerged through the long history of geographic thought and writing: earth science, culture-environment, locational, and area analysis. Each of the four parts of this book centers on one of these

geographic perspectives. Within each of the first three parts are chapters devoted to the subfields of geography, each placed with the tradition to which we think it belongs. Thus, the study of weather and climate is part of the earth science tradition; population geography is considered under the culture-environment tradition; and urban geography is included with the locational perspective. The tradition of area analysis—of regional geography—is presented in a single final chapter, which draws on the preceding traditions and themes and is integrated with them by cross-references. A fuller discussion of the book’s organization is offered in Chapter 1, pp. 17 to 19.

Of course, our assignment of a topic may not seem appropriate to all users, since each tradition contains many emphases and themes. Some subfields could logically be attached to more than one of the recognized traditions. The rationale for our clustering of chapters is given in the brief introduction to each part of the text.

A useful textbook must be flexible enough in its organization to permit an instructor to adapt it to the time and subject matter constraints of a particular course. Although designed with a one-quarter or one-semester course in mind, this text may be used in a full-year introduction to geography when employed as a point of departure for special topics and amplifications introduced by the instructor or when supplemented by additional readings and class projects.

Moreover, the chapters are reasonably self-contained and need not be assigned in the sequence presented here. The “traditions” structure may be dropped and the chapters rearranged to suit the emphases and sequences preferred by the instructor or found to be of greatest interest to the students. The format of the course should properly reflect the joint contribution of instructor and book, rather than be dictated by the book alone.

NEW TO THIS EDITION

Although the text’s established framework of presentation has been retained in this ninth edition, we have added and deleted materials to reflect new research findings in the

different topical areas of geography and the spatial consequences of continuing changes in established economic, political, social, and environmental structures and relationships. In addition to the necessary chapter revisions and updating of facts, analyses, and viewpoints mandated by current events, we have made every effort to incorporate in this revision many of the helpful suggestions offered by users. Nearly every chapter contains at least brief text additions or modifications, and three have been altered significantly.

- Extensive text changes in Chapter 6, Population Geography, include an expanded discussion of HIV/AIDS and other disease and mortality matters; revision and expansion of "A Divided World Converging"; inclusion of a new "agricultural density" segment; and extensive revision and updating of most boxed discussions. All population data and projections have been updated, all world maps revised, and a new table added.
- The title and focus of Chapter 8 have been changed from Spatial Behavior to Spatial Interaction. In place of the content that has been deleted are a new chapter-opening vignette; a new box, "DOSCapital"; and a lengthy new section on globalization, including as subtopics economic, political, and cultural integration.

- Chapter 9, Political Geography, has seen the deletion of material on geopolitics. In its place are a substantially revised and expanded discussion of boundaries as sources of conflict, a new section on supranationalism, and the box "The Day the World Stopped Turning." Briefer text additions have been made to discussions of the evolution of the modern state, religion as a centrifugal force, regional economic alliances, and redistricting.
- Every table and figure has been reviewed for accuracy and currency and has been replaced, updated, or otherwise revised where necessary. This ninth edition contains more than 60 new pieces of line art (maps, graphs, and diagrams), 30 new photographs or satellite images, and several new tables. In addition, about 50 figures have been revised and redrawn. Two new maps inside the front cover of the book, "World Political Map" and "Topographic Regions of the World," replace earlier versions.
- Because of the frequency with which World Wide Web addresses change and the continual addition and deletion of individual websites, the On-Line boxes that were a feature of each chapter of the eighth edition have been removed. They now appear in the text's Online Learning Center, which can be accessed at www.mhhe.com/getis9e/.

FEATURES

Every effort has been made to gain and retain student attention, the essential first step in the learning process.

- An outline at the beginning of each chapter clarifies the organization of the chapter.
- Chapter-opening vignettes capture the reader's interest in preparation for the subject matter that follows.
- Figures: The text contains more than 450 full-color maps, charts, and photographs, with information and explanations that serve as extensions of the text, not just identification or documentation of the figure.



CHAPTER 8

Spatial Interaction

The Greenhouse
One of the most... simply, the theory is... atmosphere, where... trapping infrared... back into the... earthward. In other... gases admit incoming... back into space... house effect if you... day; the car's interior... The earth has a... mainly by water vap... or evapotranspired... constant, but during... times have increased... Many scientists fea... could result in a gra... face temperature, w... ecosystems, a proces... tance and Spatial I... house effect is far le... barriers to Interaction... Spatial Interaction and Innovation... Individual Activity Space... Stage in Life... Mobility... Opportunities... Diffusion and Innovation... Contagious Diffusion... Hierarchical Diffusion

Spatial Interaction and Technology
Automobiles
Telecommunications
Migration
The Decision to Migrate
Barriers to Migration
Patterns of Migration

Globalization
Economic Integration
International Banking
Transnational Corporations
Global Marketing
Political Integration
Cultural Integration
Summary
Key Words
For Review and Consideration
Selected References

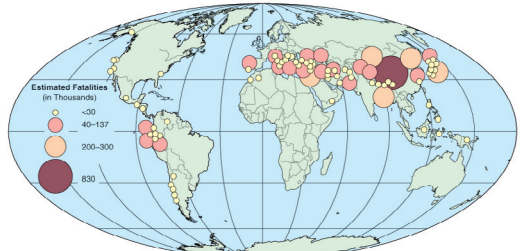
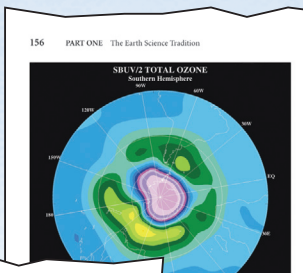


Figure 2.18 Deaths from earthquakes from A.D. May, 526, through February, 1991. On this map, the area of the circle is proportional to the estimated number of fatalities. The circles were placed over the approximate locations of cities, countries, or physiographic regions experiencing earthquake deaths. The scale to the left of the map helps the reader to interpret the map.

Boxed inserts, three to five per chapter, further develop ideas and are written so as to enhance student interest in the material. Except where noted, the authors have written all of the boxes. One box in most chapters explores gender-related issues. See, for example, "100 Million Women Are Missing" in Chapter 6 and "Legislative Women" in Chapter 9.

A special "Geography and Public Policy" box that appears in every chapter but the first and last highlights an important or controversial issue. The boxes are intended to encourage students to think about the relevance of geography to real-world concerns. Critical-thinking questions at the end of the box, designed to have students reflect on and form an opinion about the issue, can serve as catalysts for class discussion.

GEOGRAPHY and PUBLIC POLICY

PUBLIC LAND, PRIVATE PROFIT

When President Ulysses S. Grant signed the Mining Act of 1872, the presidential and congressional goal was to encourage Western settlement and development by allowing any "hard-rock" miners (including prospectors for silver, gold, copper, and other metals) to mine federally owned land without royalty payment. It further permitted mining companies to gain clear title to publicly owned land and all subsurface minerals for no more than \$12 a hectare (\$5 an acre). Under those liberal provisions, mining firms have bought 1.3 million hectares (3.2 million acres) of federal land since 1872 and each year remove some \$1.2 billion worth of minerals from government property. In contrast to the royalty-free extraction privileges granted to metal miners, oil, gas, and coal companies pay royalties of as much as 12.5% of their gross revenues for exploiting federal lands.

Whatever the merits of the 1872 law in encouraging economic development of lands otherwise unattractive to homesteaders, modern-day mining companies throughout the Western states have secured enormous actual and potential profits from the law's generous provisions. In Montana, a company claim to 810 hectares (2000 acres) of land would cost it less than \$100 for an estimated \$4 billion worth of platinum and palladium. In California, a gold mining company in 1994 sought title to 93 hectares (230 acres) of federal land containing a potential of \$320 million of gold for less than \$1200. Foreign as well as domestic firms may be beneficiaries of the 1872 law. In 1994, a South African firm arranged to buy 411 hectares (1016 acres) of Nevada land with a prospective \$1.1 billion in gold from the government for \$5100. And a Canadian firm in 1994 received title to 800 hectares (nearly 2000 acres) near Elko, Nevada, that cover a likely \$10 billion worth of gold—a transfer that Interior Secretary Bruce Babbitt dubbed "the biggest gold heist since the days of Butch Cassidy." And in 1995, Mr. Babbitt conveyed about \$1 billion worth of traverine (a mineral used in whitening paper) under 45 hectares (110 acres) of Idaho to a Danish-owned company for \$275.

The "gold heist" characterization summarized a growing administration and congressional feeling that what was good in 1872 and today for metal mining companies was not necessarily beneficial to the American public that owns the land. In part, that feeling results from the fact that mining companies commit environmental sins that require public funding to repair or public tolerance to accept. The mining firms may destroy whole mountains to gain access to low-grade ores and leave toxic mine tailings, surface water contamination, and open-pit scarring of the landscape as they move on or disappear. Projected public costs of cleaning up more than 50,000 abandoned mine sites, thousands of miles of damaged or dead streams, and several billion tons of contaminated waste are estimated at a minimum of \$35 billion.

A congressional proposal introduced, but defeated, in 1993 would require mining companies to pay royalties of 8% on gross revenues for all hard-rock ores extracted and prohibit them from outright purchase of federal land. The royalty provision alone would have yielded nearly \$100 million annually at 1994 levels of company income. Mining

The reverse flow carried manufactured goods processed in the industrialized states back to the developing countries. That two-way trade presumably benefited the developed states by providing access to a continuing supply of industrial raw materials and by providing a market for their own goods. Less developed countries needed capital to invest in their own development or to spend on the importation of manufactured goods, food supplies, or commodities—such as petroleum—they did not themselves produce.

By the start of the 21st century, however, world trade flows and export patterns of the emerging economies had radically changed. Raw materials greatly decreased and

manufactured goods correspondingly increased in the export flows from developing states as a group. In 1990, manufactured (unprocessed) goods accounted for 60% of their exports; by 2000 that share had been cut in half and, in a reversal, manufactured goods made up 60% of the export flows from the developing to the industrialized world. Even with that overall decline in raw material exports, however, trade in unprocessed goods remains dominant in the economic well-being of many of the world's poorer economies. Increasingly, the terms of the traditional trade flows they depend on have been criticized as unequal and damaging to commodity-exporting countries.

End-of-Chapter Material. Chapter summaries bring together and reinforce the major ideas of the chapter. A Key Words list contains page references to important terms introduced in the chapter, making it easy for students to verify their understanding of each term. For Review and Consideration questions enable readers to check their grasp of chapter material. A limited Selected References listing cites important recent or classic considerations of the subject matter of each chapter. We have included both widely available recent books and articles and a few more specialized titles useful to students who want to delve more deeply into particular subfields of geography.

On Becoming Mussel-Bound

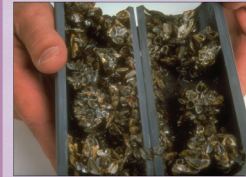
Zebra mussels appear to be harmless, even attractive creatures, with their tiny striped shells. But ecologists view their recent entry into North America as nothing but a disaster. Native to the Caspian and Black Seas, zebra mussels (Dreissena polymorpha) were first detected in North America in 1988. They are believed to have been stowed away on an East European freighter that dumped ballast water into Lake St. Clair, near Detroit.

In just a few years, the mussels had spread to the rest of the Great Lakes. The floods of 1993 carried the mussel larvae into the Mississippi River system, extending their range as far south as New Orleans.

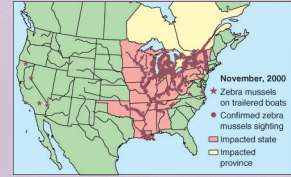
The rapid advance of the mussels is due both to a scarcity of natural predators, such as diving ducks and crawfish, and to the mussels' prodigious reproductive

capacity. Adult females produce from 30,000 to 40,000 eggs a year, and males contribute a like amount of sperm. The mussels have an unfortunate tendency to attach themselves to anything hard, including water intake pipes. Colonies of mussels now clog the underwater intake pipes of power plants, water treatment plants, and industrial plants in the Great Lakes. A square meter (about 10 sq ft) of wall at one utility plant was found to contain over 700,000 mussels, and a single intake pipe at an Ontario water plant was clogged by 30 tons of the shellfish.

The zebra mussels also endanger the Great Lakes fisheries, the largest freshwater fisheries in the world. Because they devour phytoplankton, the microscopic plants at the base of the aquatic food chain, the mussels compete with algae-eating fish for both food and oxygen. Accidentally introduced into the region, the zebra mussel might significantly alter the ecosystem of the entire Great Lakes.



Severely clogged freshwater intake pipe clogged with zebra mussels.



© Peter Vukob/TonyPhoto

erosion. Small colonies of these plants are scattered throughout the islands, and there is a massive eradication program underway in an attempt to curb its spread. The fear is that miconia might do to Hawaii what it has done in Tahiti, where it has displaced 70% of the native rain forest and is threatening 25% of the island's native wildlife species.

As this discussion indicates, introduced plants, as well as animals, can alter vegetative patterns. Some 300 species of invasive plants now threaten native ecosystems in the mainland United States and Canada. At least half were deliberately imported, including purple loosestrife, the melaleuca tree, Norway maple, and water hyacinth. These

and other imports have arrived without their natural enemies and spread uncontrolled, driving out native species.

The Asiatic chestnut blight has destroyed most of the native American chestnut trees in the United States, trees with significant commercial as well as aesthetic value. The cause was the importation of some chestnut trees from China to the United States. They carried a fungus that was fatal to the American chestnut tree but not to the Asiatic variety, which is largely immune to it.

An aquatic vine, hydrilla, imported into Florida from Sri Lanka for use in aquariums, was dumped into a canal in Tampa in 1951. Also known as water thyme, it has over-

Summary

Birth, death, fertility, and growth rates are important in understanding the numbers, composition, distribution, and spatial trends of population. Recent "explosive" increases in human numbers and the prospects of continuing population expansion may be traced to sharp reductions in death rates, increases in longevity, and the impact of demographic momentum on a youthful population largely concentrated in the developing world. Control of population numbers historically was accomplished through a demographic transition first experienced in European societies that adjusted their fertility rates downward as death rates fell and life expectancies increased. The introduction of advanced technologies of preventive and curative medicine, pesticides, and famine relief have reduced mortality rates in developing countries without, until recently, always a compensating reduction in birth rates. Recent fertility declines in many developing regions suggest the demographic transition is no longer limited to the advanced industrial countries and promise world population stability earlier and at lower numbers than envisioned just a few years ago.

Even with the advent of more widespread fertility declines, the 6 billion human beings present at the end of the 20th century will still likely grow to about 9 billion by the middle of the 21st century. That growth will largely reflect increases unavoidable because of the size and youth of populations in developing countries. Eventually, a new balance between population numbers and carrying capacity of the world will be reached, as it has always been following past periods of rapid population increase.

People are unevenly distributed over the earth. The ecumene, or permanently inhabited portion of the globe, is discontinuous and marked by pronounced differences in population concentrations and numbers. East Asia, South Asia, Europe, and northeastern United States/southeastern Canada represent the world's greatest concentrations, though smaller areas in the world's smaller areas, regions and continent and population doublings outside the new patterns of population taking form.

A respected geographic point of view is that the essential nature of the human population is not numerical units, but through statistical analysis, which collectively call for a more diverse that we

Key Words

- agricultural density 214
arithmetic density 214
carrying capacity 212
cohort 188
crude birth rate (CBR) 189
crude death rate (CDR) 193
crude density 212
demographic equation 208
demographic (population) momentum 222
demographic transition 203
density 186
dependency ratio 197
doubling time 200
ecumene 211
homoeostatic plateau 220
J-curve 205
Malthus 220
mortality rate 193
natural increase 200
neo-Malthusianism 221
nonrecurrence 212
overpopulation 214
physiological density 213
population density 212
population geography 186
population projection 218
population pyramid 197
rate of natural increase 200
rates 188
replacement level 194
S-curve 220
total fertility rate (TFR) 190
zero population growth (ZPG) 195

For Review and Consideration

- 1. How do the crude birth rate and the fertility rate differ? Which measure is the more accurate statement of the amount of reproduction occurring in a population?
2. How is the crude death rate calculated? What factors account for the worldwide decline in death rates since 1945?
3. How is a population pyramid constructed? What shape of "pyramid" reflects the structure of a rapidly growing country? Of a population with a slow rate of growth? What can you learn about a country's population projections? In which world areas are the implications of demographic momentum most serious in calculating population growth, stability, or decline?

Selected References

Websites

The World Wide Web has a tremendous variety of sites pertaining to geography. Websites relevant to the subject matter of this chapter appear in the "Web Links" section of the Online Learning Center associated with this book. Access it at www.mhhe.com/getis9e/.

Ashford, Lori S. "New Perspectives on Population: Lessons from Cairo." Population Bulletin 50, no. 1. Washington, D.C.: Population Reference Bureau, 1995.
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Roby, Bryant, Shea O. Rubenstein, and Leo Morris. "The Fertility Decline in Developing Countries." Science 269, no. 5207, 1999.

■ A special Appendix, a modified version of the 2002 World Population Data Sheet of the Population Reference Bureau, includes basic demographic data and projections for countries, regions, and continents as well as selected economic and social statistics helpful in national and regional comparisons. The Appendix data provide a wealth of useful comparative information for student projects, regional and topical analyses, and study of world patterns.

SUPPLEMENTS

The Introduction to Geography Learning/Teaching Package

The ninth edition provides a complete geography program for the student and teacher.

For the Student

Online Learning Center with PowerWeb: *Geography at* www.mhhe.com/getis9e

This site gives you the opportunity to further explore topics presented in the book using the Internet. The site contains interactive quizzing with immediate feedback, base maps, animations, flashcards, and critical thinking questions. We've integrated *PowerWeb: Geography's* informative and timely world news, web links, and much more into the site to make these valuable resources easily accessible to students.

APPENDIX															
2002 World Population Data															
	Population Mid-2002 (millions)	Births per 1,000 Pop.	Deaths per 1,000 Pop.	Rate of Natural Increase (%)	Projected Pop. Change 2002-2005 (%)	Projected Population for 2025 (millions)	Projected Population for 2050 (millions)	Infant Mortality Rate ^a	Total Fertility Rate ^b	Percent of Population of Age <15/65+	Life Expectancy at Birth (years) Total	Percent Urban	Percent Pop. 15-49 With HIV/AIDS Exposed 2001	% with Access to Improved Water Source	Per-Capita GNP 2000 (US\$)
WORLD	6,215	21	9	1.3	46	7,859	9,104	54	2.8	30/7	67	47	1.2	81	—
MORE DEVELOPED	1,197	11	10	0.1	3	1,249	1,231	7	1.6	18/15	76	75	0.4	100	—
LESS DEVELOPED	5,018	24	8	1.6	57	6,610	7,873	60	3.1	33/5	65	40	1.5	78	—
LESS DEVELOPED (Excl. China)	3,737	27	9	1.8	73	5,156	6,478	64	3.5	36/4	63	41	1.9	—	—
AFRICA	840	38	14	2.4	120	1,281	1,815	86	5.2	43/3	53	33	6.6	—	—
SUB-SAHARAN AFRICA	693	40	15	2.5	132	1,081	1,606	91	5.6	44/3	49	30	9.0	54	480
NORTHERN AFRICA	180	27	7	2.0	68	249	302	55	3.5	36/4	66	45	0.5	94	1,590
Algeria	31.4	23	5	1.8	63	43.0	51.3	54	2.8	35/4	70	49	0.1	94	1,590
Egypt	71.2	27	7	2.0	62	96.1	115.4	44	3.5	36/4	66	43	—	95	1,490
Libya	5.4	28	4	2.4	101	8.3	10.8	30	3.7	36/4	75	86	0.2	72	—
Morocco	29.7	25	6	1.9	63	40.5	48.4	50	3.1	32/5	69	55	0.1	82	1,180
Sudan	32.6	36	12	2.4	95	49.6	63.5	82	4.9	40/3	56	27	2.6	75	310
Tunisia	9.8	17	6	1.2	24	11.6	12.2	26	2.1	30/6	72	63	—	—	1,080
Western Sahara	0.3	46	17	2.9	123	0.4	0.6	140	6.8	—/—	—	95	—	—	—
WESTERN AFRICA	247	42	15	2.7	145	403	605	87	5.8	45/3	51	35	5.0	—	—
Benin	6.6	41	12	2.9	173	12.0	18.1	85	5.6	46/3	54	39	3.6	63	380
Burkina Faso	12.6	47	17	3.0	172	21.6	34.3	105	6.8	49/3	47	15	6.5	—	230
Cape Verde	0.5	37	7	3.0	81	0.7	0.8	31	4.7	—/—	69	53	—	74	1,320
Côte d'Ivoire	16.8	36	16	2.0	112	25.6	35.7	95	5.2	47/2	45	46	9.7	77	660
Gambia	1.5	42	13	2.9	186	2.7	4.2	82	5.8	45/3	53	37	1.6	62	330
Ghana	20.2	32	10	2.2	58	26.5	32.0	56	4.3	43/3	58	37	3.0	64	350
Guinea	8.4	45	18	2.7	117	14.1	20.7	119	5.5	44/3	48	26	1.5	48	450
Guinea-Bissau	1.3	45	20	2.5	161	2.2	3.3	126	6.0	44/4	45	22	2.8	49	180
Liberia	3.3	49	17	3.1	204	6.0	10.0	139	6.6	43/3	50	45	2.8	—	—
Mali	11.3	49	19	3.0	221	21.6	36.4	113	6.8	47/3	47	26	1.7	65	240

Interactive World Issues CD-ROM

Your instructor may require the *Interactive World Issues* CD-ROM. This CD allows you to have hands-on exercises and to see videos of different case studies. The five case studies include Chicago, Oregon, Mexico, China, and South Africa. Since most of us are unable to visit different world regions, this is a good way to understand the issues facing different parts of the world.

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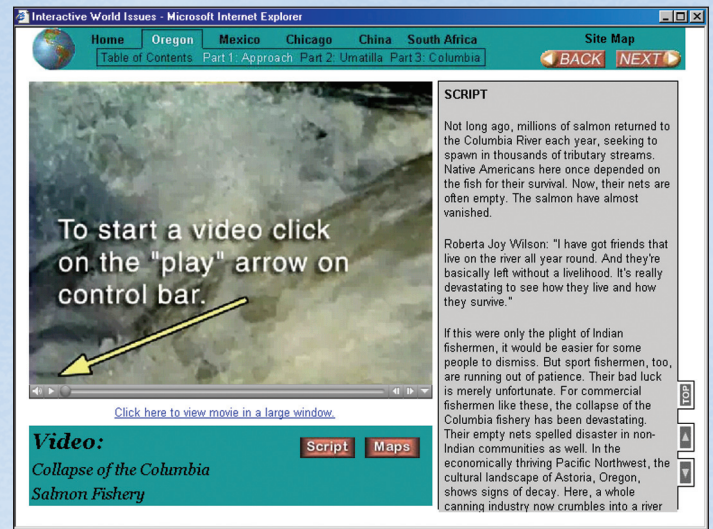
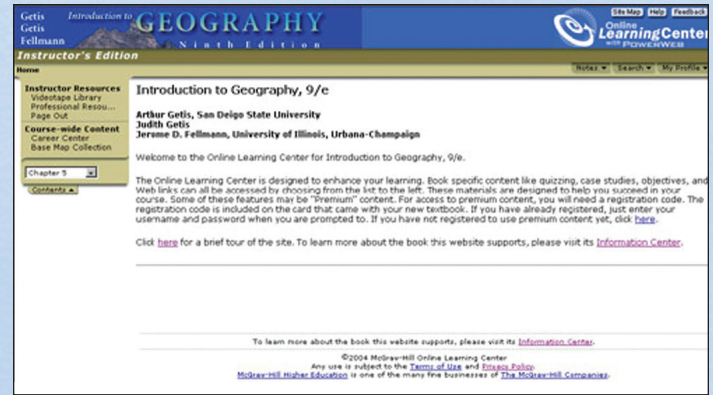
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Interactive World Issues CD-ROM

This CD allows you to have hands-on exercises and to see videos of different case studies. The five case studies include Chicago, Oregon, Mexico, China, and South Africa. Since most of us are unable to visit different world regions, this is a good way to understand the issues facing different parts of the world.

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- New York Times* subscription—special 20-week subscription
- Global Studies* series
- Student Atlas* series
- Taking Sides* series
- Annual Editions* series



ACKNOWLEDGMENTS

A number of reviewers have greatly improved the content of this and earlier editions of *Introduction to Geography* by their critical comments and suggestions. Although we could not act on every helpful suggestion or adopt every useful observation, all were carefully and gratefully considered. In addition to those acknowledgments of assistance detailed in previous editions, we note the thoughtful advice recently provided by

Donald P. Albert
Sam Houston State University

Ed Babin
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We gratefully express appreciation to these and unnamed others for their help and contributions and specifically absolve them of responsibility for decisions on content and for any errors of fact or interpretation that users may detect.

We are also indebted to W. D. Brooks and C. E. Roberts, Jr., formerly of Indiana State University, for the projection used for many of the world maps in this book: a modified van der Grinten. Most of the maps, graphs, and charts in this edition still reflect the cartographic and design skills of James A. Bier, our close collaborator for many previous editions of the book. We remain grateful for his past contributions.

Finally, we note with deep appreciation and admiration the efforts of the publisher's "book team," separately named on the copyright page, who collectively shepherded this revision to completion. We are grateful for their highly professional interest, guidance, and support.

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Judith Getis earned her B.A. and a teaching credential from the University of Michigan and her M.A. from Michigan State University. She has co-authored several geography textbooks and wrote the environmental handbook *You Can Make a Difference*. In addition to numerous articles in the fields of urban geography and geography education, she has written technical reports on topics such as solar power

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Jerome Fellmann received his B.S., M.S., and Ph.D. degrees from the University of Chicago. Except for visiting professorships at Wayne State University, the University of British Columbia, and California State University/Northridge, his professional career has been spent at the University of Illinois at Urbana-Champaign. His teaching and research interests have been concentrated in the areas of human geography in general, and urban and economic geography in particular, in geographic bibliography, the geography of Russia and the CIS, and geographic education. His varied interests have been reflected in articles published in the *Annals* of the Association of American Geographers, *Professional Geographer*, *Journal of Geography*, the *Geographical Review*, and elsewhere. He is the co-author of McGraw-Hill's *Human Geography: Landscapes of Human Activity*. In addition to teaching and research, he has held administrative appointments at the University of Illinois and has served as a consultant to private corporations on matters of economic and community development.