

Introduction to Geography

Tenth Edition

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Tenth Edition



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INTRODUCTION TO GEOGRAPHY, TENTH EDITION

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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. 19 to 21.

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.

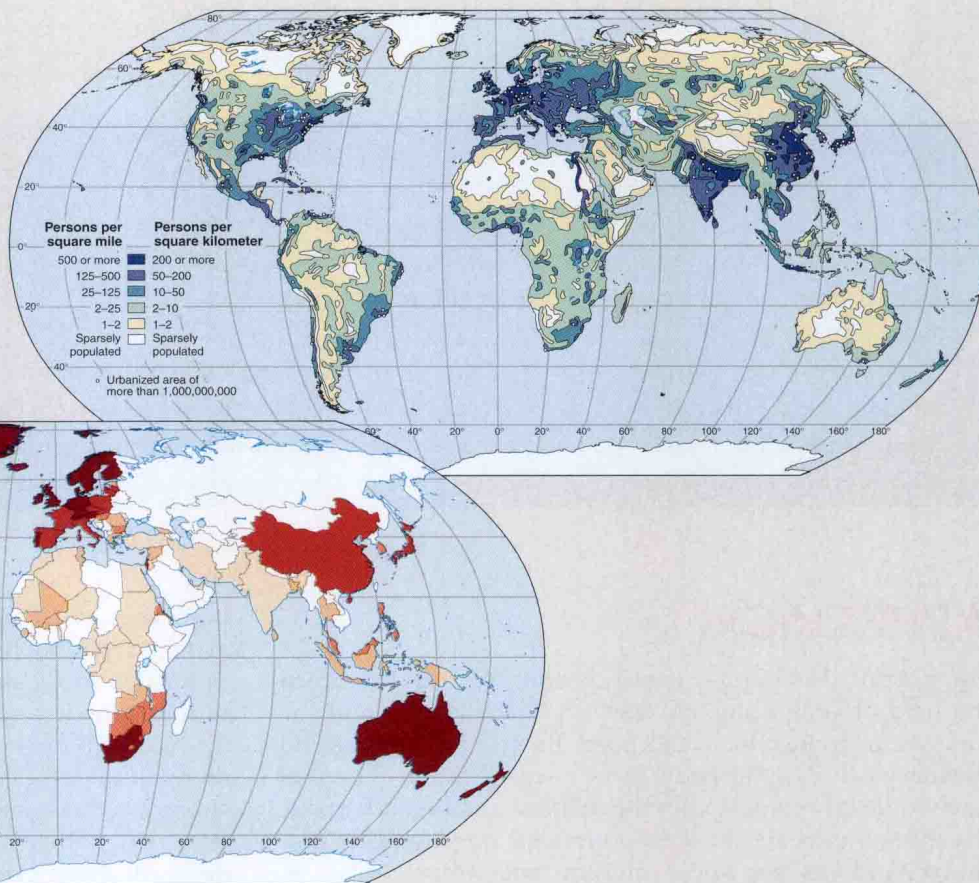
Moreover, the chapters are reasonably self-contained and need not be assigned in the sequence presented here. The “traditions” structure may be dropped and the chapters rearranged to suit the emphases and sequences preferred by the instructor or found to be of greatest interest to the students. The format 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

For the tenth edition, we have made three changes that affect the entire textbook.

- In response to suggestions from reviewers of past editions, we have altered the ordering of the chapters. “The Geography of Natural Resources” is now Chapter 5, in Part One, “The Earth Science Tradition.” “Urban Geography” has become Chapter 11. “Human Impact on the Environment” is now Chapter 12, detailing how all the processes, both physical and human, discussed in earlier chapters affect our planet.

- All of the world maps have been put on the Robinson projection, which was designed to show the world in a visually satisfactory manner. It permits some exaggeration of size in the high latitudes in order to improve the shapes of landmasses. Size and shape are most accurate in the temperate and tropical zones, where most people live.



- The colors on the maps have been chosen specifically in order to accommodate colorblind readers. Most of them should be able to distinguish the hues from one another.

As with each new 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 four have been altered significantly.

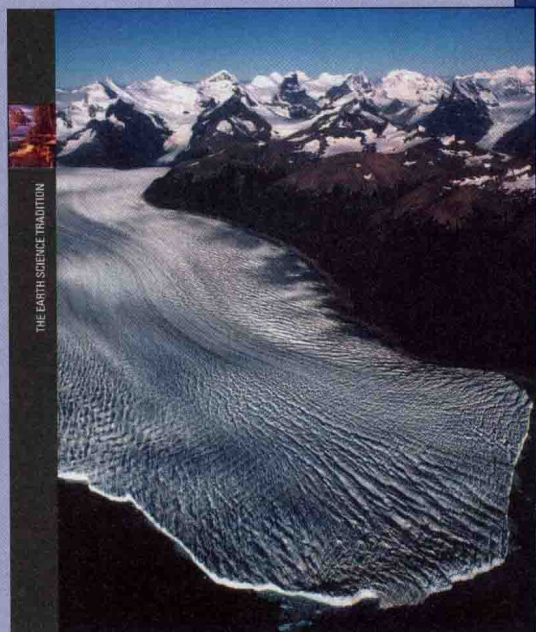
- In response to reviewers who, over the years, have suggested that the topic of map projections is not appropriate for their students, we have moved most of that material to the new Appendix 1. In recognition of the increasing role of the Global Positioning System in our lives, an earlier boxed discussion has been made part of the regular text and expanded upon. The chapter ends with a new section, "Applications of Geographic Information Systems."

- Chapter 4, "Physical Geography: Weather and Climate," concludes with a significantly revised and lengthened discussion of climatic change, with long-term climate changes, short-term climate changes, and the greenhouse effect and global warming as subtopics.
- Extensive text changes in Chapter 10, "Economic Geography," include the addition of material on food resources and nutrition; a new section on expanding crop production with revised "Intensification and the Green Revolution" material; and a consideration of fishing as a primary economic activity. The section on trade in primary products has been completely revised.
- Changes to Chapter 11, "Urban Geography," involve a reorganization and revision of the section "Systems of Urban Settlements" and the addition of a new boxed discussion, "Women in the City." The chapter ends with a new section, "Cities in the Developing World."
- Every table and figure has been reviewed for accuracy and currency and has been replaced, updated, or otherwise revised where necessary. This tenth edition contains 35 new pieces of line art (maps, graphs, and diagrams), 70 new photographs or satellite images, and several new tables. In addition, about 60 figures have been revised and redrawn.

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.
- 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.



Physical Geography: Landforms

Earth Materials

Igneous Rocks
Sedimentary Rocks
Metamorphic Rocks

Geologic Time

Movements of the Continents

Tectonic Forces

Diastrophism
Block Warming
Folding
Faulting
Volcanism

Gradational Processes

Weathering
Mechanical Weathering
Chemical Weathering

Mass Movement

Erosional Agents
and Deposition

Running Water
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Groundwater
Glaciers
Waves, Currents,
and Coastal Landforms
Wind

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Summary

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Chapter 3

EARTH MATERIALS

The rocks of the earth's crust vary according to mineral composition. Rocks are composed of particles that contain various combinations of such common elements as oxygen, silicon, aluminum, iron, and calcium, together with less abundant elements. A particular chemical combination that has a hardness, density, and definite crystal structure of its own is called a mineral. Some well-known minerals are quartz, feldspar, and mica. Depending on the nature of the minerals that form them, rocks are hard or soft, more or less dense, one color or another, of chemically stable or not. While some rocks resist decomposition, others are very easily broken down. Among the more common varieties of rock are granites, basalts, limestones, sandstones, and slates.

Although one can classify rocks according to their physical properties, the more common approach is to classify them by the way they formed. The three main groups of rocks are igneous, sedimentary, and metamorphic.

Igneous Rocks

Igneous rocks are formed by the cooling and solidification of molten rock. Depending on the rate at which molten rock cools, it solidifies in one of two ways. When the molten rock cools slowly, it solidifies and becomes igneous rock. The name for underground molten rock is magma; above ground, it is lava. Intrusive igneous rocks are formed below ground level by the solidification of magma, whereas extrusive igneous rocks are formed above ground level by the solidification of lava (Figure 3.1).

The composition of magma and lava and, to a limited extent, the rate of cooling determine the minerals that form. The rate of cooling is mainly responsible for the size of the crystals. Large crystals of quartz—a hard, dense mineral—form slowly beneath the surface of the earth, where cool air is not available. When combined with other minerals, quartz forms the intrusive igneous rock called granite.

The lava that cools out onto the earth's surface and makes up a large part of the ocean basins becomes the extrusive igneous rock called basalt. The most common rock on the earth's surface. If, instead of cooling, the lava erupts

Although too early for sunbathers and swimmers, the Hawaiian Islands will face a new island to add to their collection, which contains such spots as Oahu, Maui, and Kauai. It is Loihi, 0.8 kilometers (0.5 mi) below sea level, just 27 kilometers (17 mi) from the big island of Hawaii. Because the speed of its ascent must be measured in geologic time, it probably will not appear above the water surface for another million or so years. It is a good example, however, of the ceaseless changes that take place on the earth's surface. At the westernmost of the islands erode and sink below sea level, new islands arise at the eastern end. In Loihi's most recent eruption in 1996, scientists feared that a giant wave would be set off at the surface that could devastate the islands, including the city of Honolulu and popular Waikiki Beach. Fortunately, this was not the case.

The Cairo Plan

After a sometimes rancorous 9-day meeting in Cairo in September 1994, the United Nations International Conference on Population and Development endorsed a strategy for stabilizing the world's population at 7.27 billion by no later than 2015. The 20-year program of action accepted by over 150 signatory countries sought to avoid the environmental consequences of excessive population growth. Its proposals were therefore linked to discussions and decisions of the UN Conference on Environment and Development held in Rio de Janeiro in June 1992.

The Cairo plan abandoned several decades of top-down governmental programs that promoted "population control" (a phrase avoided by the conference) based on targets and quotas and, instead, embraced for the first time policies giving women greater control over their lives, greater economic equality and opportunity, and a greater voice in reproduction decisions. It recognized that limiting population growth depends on programs that lead women to want fewer children and make them partners in economic development. In that recognition, the conference accepted the documented link between increased educational access and economic opportunity for women and falling birth rates and smaller families. Earlier population conferences—1974 in Bucharest and 1984 in Mexico City—had not fully addressed these

issues of equality, opportunity, education, and political rights: their adopted goals had failed to achieve hoped-for changes in births, in large part because women in many traditional societies had no power to enforce contraception and feared their other alternative, sterilization.

The earlier conferences had carefully avoided or specifically excluded abortion as an acceptable family planning method. It was the more open discussion of abortion in Cairo that elicited much of the spirited debate that registered religious objections by the Vatican and many Muslim and Latin American states to the inclusion of legal abortion as part of health care, and to language suggesting approval of sexual relations outside marriage. Although the final text of the conference declaration did not promote a universal right to abortion and excluded it as a means of family planning, some delegations still registered reservations to its wording on both sex and abortion. At the conference's close, however, the Vatican endorsed the declaration's underlying principles, including the family as "the basic unit of society" and the need to stimulate economic growth and to promote "gender equality, equity, and the empowerment of women."

A special United Nations "Cairo-15" session in 1999 recommended some adjustments to the earlier agreements. It urged emphasis on measures ensuring safe and accessible abortion in countries where it is legal, called for schoolchildren at all levels to be instructed in sexual and reproductive health issues, and told governments to provide special family

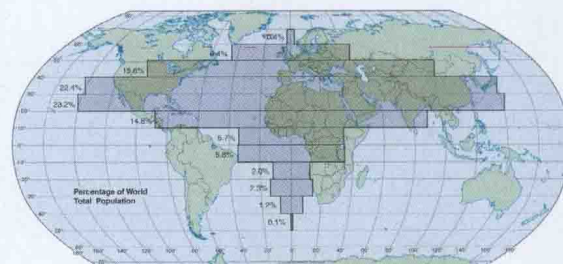


FIGURE 6.23 The population dominance of the Northern Hemisphere is strikingly evident from this bar chart. Because the Southern Hemisphere is mainly water, only one out of nine people lives south of the equator.

- **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.

- Websites relevant to the subject matter of each chapter appear in the “Web Links” section of the Online Learning Center associated with this book. It can be accessed at www.mhhe.com/getis10e/.
- As its title indicates, the new Appendix 1, “Map Projections,” is a discussion of that topic. It includes a consideration of methods of projection, globe properties and map distortion, and classes of projections.
- Appendix 2, a modified version of the 2004 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.

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Map Projections

rather, is to construct or project on a flat surface the network of parallels and meridians of the globe grid, or *graticule*. This can be done in a number of ways. Before discussing the various methods, we note that there are two types of circles appearing on a globe's spherical grid. A **great circle** is formed on the surface of a sphere by a plane that passes through the center of the sphere. Thus, the equator is a great circle, and each meridian is half of a great circle. Every great circle bisects the globe, dividing it equally into hemispheres. An arc segment of the great circle joining them is the shortest distance between any two points on the earth's surface. A **small circle** is the line created by the intersection of a spherical surface with a plane that does not pass through its center. Examples for the equator, all parallels of latitude are small circles. Different projections will represent great and small circles in different ways.

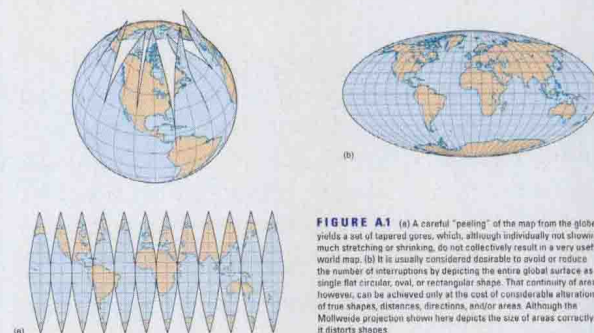


FIGURE A1 (a) A careful “peeling” of the map from the globe yields a set of tapered gores, which, although individually not showing much stretching or shrinking, do not collectively result in a very useful world map. (b) It is usually considered desirable to avoid or reduce the number of interruptions by depicting the entire global surface as a single flat circular, oval, or rectangular shape. That continuity of area, however, can be achieved only at the cost of considerable alteration of true shapes, distances, directions, and/or areas. Although the Mollweide projection shown here depicts the size of areas correctly, it distorts shapes.

SUPPLEMENTS

The Introduction to Geography Learning/Teaching Package

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

For the Student

Online Learning Center at www.mhhe.com/getis10e

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, interactive activities, base maps, animations, flashcards, and critical thinking questions. We have 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.

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.

For the Instructor

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Take advantage of the classroom activities, PowerPoint slides, and access to PageOut—McGraw-Hill's course management tool. *PowerWeb: Geography* is also available and will provide you with current news updates and articles that are great tools for stimulating class discussion.

Online Instructor's Manual

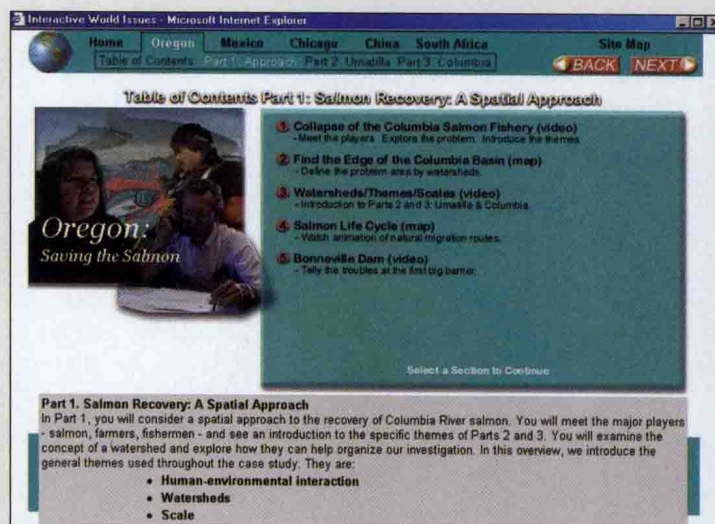
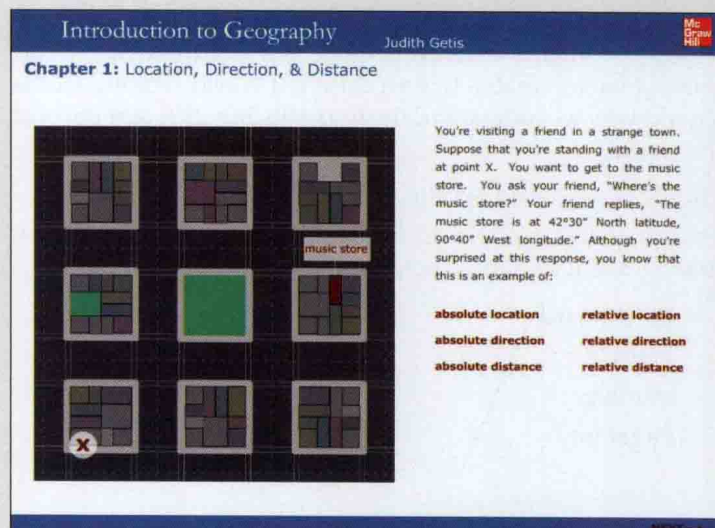
Included in this password-protected section of the Online Learning Center are chapter overviews, key terms, and discussion topics.

Digital Content Manager CD-ROM

This CD-ROM contains all of the figures and photographs from the text. The software makes customizing your multimedia presentation easy. You can organize figures in any order you want; add labels, lines, and your own artwork; integrate materials from other sources; edit and annotate lecture notes; and then have the option of placing your multimedia lecture into another presentation program, such as PowerPoint.

Instructor's Testing and Resource CD-ROM

This cross-platform CD-ROM provides a wealth of resources for the instructor. Supplements featured on this CD-ROM include computerized testing software that allows instructors to quickly create customized exams. This user-friendly program allows you to sort questions by format; edit exist-



ing questions or add new ones; and scramble questions for multiple versions of the same test.

Other assets on the Instructor's Testing and Resource CD-ROM are grouped within easy-to-use folders. The Instructor's Manual and Test Item File are available in both Word and PDF formats. Word files of the test bank are included for those instructors who prefer to work outside of the test-generator software.

Transparencies

Included are 100 illustrations from the text, all enlarged for excellent visibility in the classroom.

Videotape Library

An extensive array of videotapes is available to qualified adopters. Check with your sales representative for details.

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.

Course Management Systems

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- WebCT
- eCollege
- PageOut

PACKAGES

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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
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Meet the Authors

Arthur Getis

Arthur Getis received his B.S. and M.S. degrees from The Pennsylvania State University and his Ph.D. from the University of Washington. He is the co-author of several geography textbooks as well as two books dealing with map pattern analysis. He has also published widely in the areas of urban geography, spatial analysis, and geographic information systems. He is co-editor of *Journal of Geographical Systems* and for many years served on the editorial boards of *Geographical Analysis* and *Papers in Regional Science*. He has held administrative appointments at Rutgers University, the University of Illinois, and San Diego State University (SDSU), as well as the Birch Chair of Geographical Studies at SDSU. In 2002, he received the Association of American Geographers Distinguished Scholarship Award. Professor Getis is a member of many professional organizations and has served as an officer in, among others, the Western Regional Science Association and the University Consortium for Geographic Information Science.

Judith Getis

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 and coal gasification. She and her husband, Arthur Getis, were

among the original unit authors of the High School Geography Project, sponsored by the National Science Foundation and the Association of American Geographers. In addition, Mrs. Getis was employed by the Urban Studies Center at Rutgers University; taught at Rutgers; was a social science examiner at Educational Testing Service, Princeton, New Jersey; developed educational materials for Edcom Systems, Princeton, New Jersey; and was a professional associate in the Office of Energy Research, University of Illinois.

Jerome D. Fellmann

Jerome D. 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.

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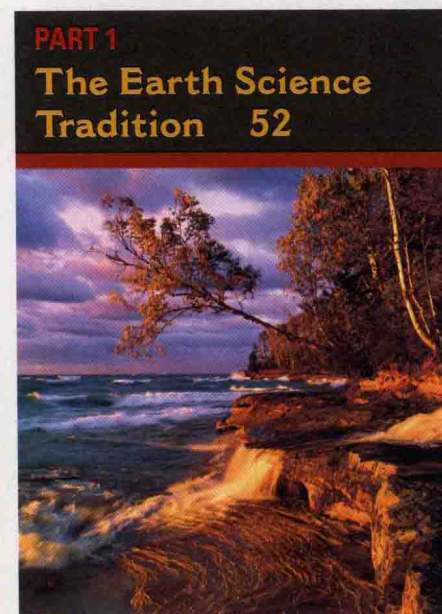
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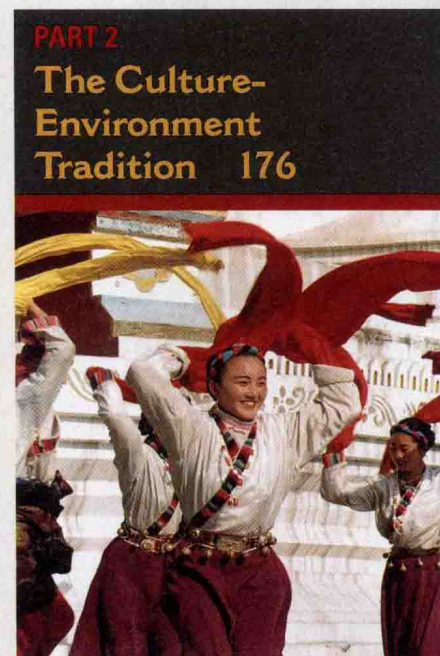
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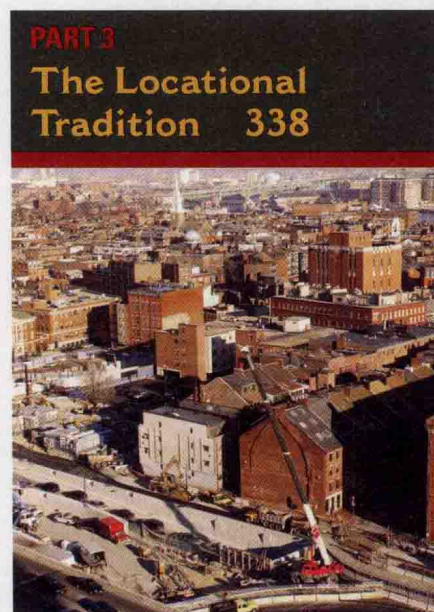
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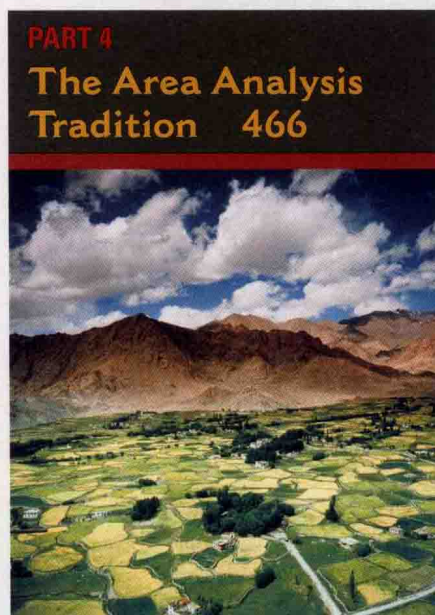
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