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FIFTH EDITION

HUMAN GEOGRAPHY

LANDSCAPES OF HUMAN ACTIVITIES

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LIST OF MAPS

Chapter One

- Figure 1.2 The world map of Ptolemy, 4
 Figure 1.4 The latitude and longitude of Singapore, 9
 Figure 1.5 The reality of relative location on globe from polar perspective, 10
 Figure 1.6 The site of Philadelphia, 10
 Figure 1.7 The situation of Chicago, 11
 Figure 1.8 Lines of equal travel time in Los Angeles, 11
 Figure 1.9 Midwestern and Illinois population density and map scale, 12
 Figure 1.13 The routes of 5 million automobile trips, 15
 Figure 1.16 The Middle West as seen by different geographers, 17
 Figure 1.17 Aachen, Germany, in 1649, 18
 Figure 1.18 A hierarchy of regions, 18
 Figure 1.19 Functional regions based on banking linkages, 19
 Figure 1.20 The effect of scale on area and detail for Boston, 20
 Figure 1.23 A cartogram of the United States, 22
 Figure 1.26 A portion of the Santa Barbara, California, topographic quadrangle, 23
 Figure 1.30 Four mental maps of Los Angeles, 26

Chapter Two

- Figure 2.4 Culture realms of the modern world, 37
 Figure 2.8 Maximum extent of glaciation, 40
 Figure 2.9 Late Paleolithic environments of Europe, 41
 Figure 2.10 Settlement of the Americas and the Pacific basin, 42
 Figure 2.13 Chief centers of plant and animal domestication, 45
 Figure 2.14 Migration of first farmers out of Middle East into Europe, 45
 Figure 2.16 Early culture hearths of the Old World and the Americas, 47

Chapter Three

- Figure 3.2 Interregional trade in oil, 1994, 65
 Figure 3.12 Travel patterns for purchases of clothing and yard goods, 74
 Figure 3.18 The hierarchy of newspaper coverage in Kansas in the 1970s, 77
 Figure 3.20 Residential preferences of Canadians, 78
 Figure 3.21 Areas with potential
 Figure 3.24 Fulani movement pa
 Figure 3.25 International labor f
 Figure 3.26 Westward shift of po
 Figure 3.27 Forced migrations: T
 Figure 3.29 Channelized migrati

Chapter Four

- Figure 4.5 Total fertility rate, 10
 Figure 4.6 Crude death rates, 10
 Figure 4.10 Percentage of popula
 Figure 4.13 Annual rates of natur
 Figure 4.20 Principal migrations
 Figure 4.21 World population den
 Figure 4.22 The population domi
 Hemisphere, 118
 Figure 4.25 Carrying capacity and
 Africa, 121
 Figure 4.26 Percentage of nationa

Chapter Five

- Figure 5.4 World language families, 138
 Figure 5.5 Amerindian language families of North America, 140
 Figure 5.6 Bantu advance, Khoisan retreat in Africa, 141
 Figure 5.8 Old English dialect regions, 143
 Figure 5.9 International English, 144
 Figure 5.10 Dialect boundaries, 146
 Figure 5.11 Dialect areas of the eastern United States, 147
 Figure 5.12 Speech regions and dialect diffusion in the United States, 148
 Figure 5.13 Bundled isoglosses in the Midwest, 148
 Figure 5.14 Lingua francas of Africa, 150
 Figure 5.15 Europe in Africa through official languages, 150
 Figure 5.16 Bilingualism and diversity in Canada, 151
 Figure 5.17 Migrant Andover, 154
 Figure 5.18 Pattern of swine production, 157
 Figure 5.19 Principal world religions, 158
 Figure 5.20 Religious regions of Lebanon, 159
 Figure 5.21 Innovation areas and diffusion routes of major world religions, 160
 Figure 5.22 Jewish dispersals, A.D. 70-1500, 161
 Figure 5.23 Diffusion paths of Christianity, A.D. 100-1500, 162
 Figure 5.25 Religious affiliation in the conterminous United States and Canada, 164
 Figure 5.26 Major religious regions of the United States, 165
 Figure 5.29 Spread and extent of Islam, 167
 Figure 5.33 Diffusion paths, times, and "vehicles" of Buddhism, 172

Chapter Six

- Figure 6.6 Ethnicity in former Yugoslavia and Afghanistan, 186
 Figure 6.8 Ethnic islands in the United States, 189
 Figure 6.9 Ethnic diversity in the Prairie Provinces of Canada, 190
 Figure 6.10 The Mormon culture region, 190
 Figure 6.11 Four North American ethnic groups and their provinces, 191
 Figure 6.12 African American concentration, 1850, 191
 Figure 6.13 Evidence of African American concentration, 192
 Figure 6.16 Ethnic patterns in Los Angeles, 1990, 196
 Figure 6.17 A "safety map" of Manhattan, 199
 Figure 6.20 Outward expansion of racial and nationality groups in Chicago, 202
 Figure 6.24 Wethersfield, Connecticut: 1640-1641, 205
 Figure 6.25 Amish communities, 215
 Figure 6.26 Amish hearths, 217
 Figure 6.27 "Invent" about 1750, 221
 Figure 6.28 and diffusion of building
 Figure 6.29 1950s, 232
 Figure 6.30 stern United States, 232
 Figure 6.31 s, 234
 Figure 6.32 te spirituals, 234
 Figure 6.33 ths and diffusions, 236
 Figure 6.34 s of the eastern United
 Figure 6.35 rs of a single national
 Figure 6.36 is, 243

382571

LIST OF MAPS

Chapter One

- Figure 1.2 The world map of Ptolemy, 4
 Figure 1.4 The latitude and longitude of Singapore, 9
 Figure 1.5 The reality of relative location on globe from polar perspective, 10
 Figure 1.6 The site of Philadelphia, 10
 Figure 1.7 The situation of Chicago, 11
 Figure 1.8 Lines of equal travel time in Los Angeles, 11
 Figure 1.9 Midwestern and Illinois population density and map scale, 12
 Figure 1.13 The routes of 5 million automobile trips, 15
 Figure 1.16 The Middle West as seen by different geographers, 17
 Figure 1.17 Aachen, Germany, in 1649, 18
 Figure 1.18 A hierarchy of regions, 18
 Figure 1.19 Functional regions based on banking links, 18
 Figure 1.20 The effect of scale on area, 19
 Figure 1.23 A cartogram of the United States, 23
 Figure 1.26 A portion of the Santa Barbara topographic quadrangle, 23
 Figure 1.30 Four mental maps of Los Angeles, 24

Chapter Two

- Figure 2.4 Culture realms of the modern world, 24
 Figure 2.8 Maximum extent of glaciation, 28
 Figure 2.9 Late Paleolithic environments, 29
 Figure 2.10 Settlement of the Americas and the Pacific, 30
 Figure 2.13 Chief centers of plant and animal domestication, 33
 Figure 2.14 Migration of first farmers out of the Near East into Europe, 45
 Figure 2.16 Early culture hearths of the Old World, 47

Chapter Three

- Figure 3.2 Interregional trade in oil, 1994, 64
 Figure 3.12 Travel patterns for purchases of goods, 74
 Figure 3.18 The hierarchy of newspaper circulation in the 1970s, 77
 Figure 3.20 Residential preferences of Canadian immigrants, 80
 Figure 3.21 Areas with potential for agricultural development, 81
 Figure 3.24 Fulani movement patterns in West Africa, 84
 Figure 3.25 International labor flows, 85
 Figure 3.26 Westward shift of population, 86
 Figure 3.27 Forced migrations: The case of the Vietnamese, 87
 Figure 3.29 Channelized migration, 88

Chapter Four

- Figure 4.5 Total fertility rate, 100
 Figure 4.6 Crude death rates, 100
 Figure 4.10 Percentage of population under 15, 101
 Figure 4.13 Annual rates of natural increase, 102
 Figure 4.20 Principal migrations of the world, 103
 Figure 4.21 World population density, 104
 Figure 4.22 The population dominance of the Eastern Hemisphere, 118
 Figure 4.25 Carrying capacity and population density in Africa, 121
 Figure 4.26 Percentage of national population in urban areas, 122

Chapter Five

- Figure 5.4 World language families, 138
 Figure 5.5 Amerindian language families of North America, 140
 Figure 5.6 Bantu advance, Khoisan retreat in Africa, 141
 Figure 5.8 Old English dialect regions, 143
 Figure 5.9 International English, 144
 Figure 5.10 Dialect boundaries, 146
 Figure 5.11 Dialect areas of the eastern United States, 147
 Figure 5.12 Speech regions and dialect diffusion in the United States, 148
 Figure 5.13 Bundled isoglosses in the Midwest, 148
 Figure 5.14 Lingua francas of Africa, 150
 Figure 5.15 Europe in Africa through official languages, 150
 Figure 5.16 Bilingualism and diversity in Canada, 151
 Figure 5.17 Migrant Andover, 154
 Figure 5.18 Pattern of swine production, 157
 Figure 5.19 Principal world religions, 158
 Figure 5.20 Religious regions of Lebanon, 159
 Figure 5.21 Innovation areas and diffusion routes of major world religions, 160
 Figure 5.22 Jewish dispersions, A.D. 70-1500, 161
 Figure 5.23 Diffusion paths of Christianity, A.D. 100-1500, 162
 Figure 5.25 Religious affiliation in the conterminous United States and Canada, 164
 Figure 5.26 Major religious regions of the United States, 165
 Figure 5.29 Spread and extent of Islam, 167
 Figure 5.33 Diffusion paths, times, and "vehicles" of Buddhism, 172

Chapter Six

- Figure 6.6 Ethnicity in former Yugoslavia and Afghanistan, 186
 Figure 6.8 Ethnic islands in the United States, 189
 Figure 6.9 Ethnic diversity in the Prairie Provinces of Canada, 190
 Figure 6.10 The Mormon culture region, 190
 Figure 6.11 Four North American ethnic groups and their provinces, 191
 Figure 6.12 African American concentration, 1850, 191
 Figure 6.13 Evidence of African American concentration, 192
 Figure 6.16 Ethnic patterns in Los Angeles, 1990, 196
 Figure 6.17 A "safety map" of Manhattan, 199
 Figure 6.18 Outward expansion of racial and nationality groups in Chicago, 202
 Figure 6.19 Wethersfield, Connecticut: 1640-1641, 205
 Figure 6.20 Amish communities, 215
 Figure 6.21 Amish culture hearths, 217
 Figure 6.22 "Invention" about 1750, 221
 Figure 6.23 Amish and diffusion of building techniques, 222
 Figure 6.24 Amish in the 1950s, 232
 Figure 6.25 Amish in the western United States, 232
 Figure 6.26 Amish, 234
 Figure 6.27 Amish spirituals, 234
 Figure 6.28 Amish and diffusions, 236
 Figure 6.29 Amish of the eastern United States, 237

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LANDSCAPES OF HUMAN ACTIVITIES

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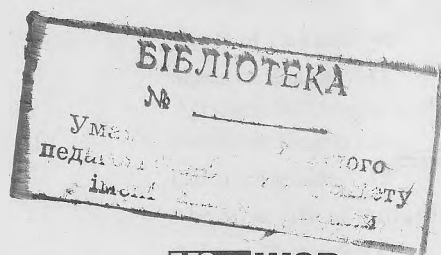
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CONTENTS

Preface xi

INTRODUCTION:

SOME BACKGROUND
BASICS 1

GETTING STARTED 2

Evolution of the Discipline 2

Geography and Human Geography 3

Human Geography 4

The Structure of This Book 7

BACKGROUND BASICS 8

Basic Geographic Concepts 8

Location, Direction, and Distance 9

Location 9

Direction 10

Distance 11

Size and Scale 11

Physical and Cultural Attributes 12

The Changing Attributes of Place 13

Interaction among Places 14

The Structured Content of Place 15

Density 15

Dispersion 15

Pattern 16

Place Similarity and Regions 16

The Characteristics of Regions 17

Types of Regions 17

Maps 18

Map Scale 19

The Globe Grid 20

How Maps Show Data 21

Mental Maps 23

Systems, Maps, and Models 27

SUMMARY 27

KEY WORDS 28

FOR REVIEW 28

SELECTED REFERENCES 28

THEMES AND FUNDAMENTALS OF HUMAN GEOGRAPHY 31

ROOTS AND MEANING OF CULTURE 33

Components of Culture 35

Interaction of People and
Environment 36

Environments as Controls 37

Human Impacts 38

Roots of Culture 40

Seeds of Change 43

Agricultural Origins and Diffusions 44

Neolithic Innovations 46

Culture Hearths 47

The Structure of Culture 51

Culture Change 52

Innovation 54

Diffusion 55

Contact between Regions 57

Cultural Modification and Adoption 60

SUMMARY 60

KEY WORDS 61

FOR REVIEW 61

SELECTED REFERENCES 61

SPATIAL INTERACTION AND SPATIAL BEHAVIOR 63

Bases for Interaction 64

A Summarizing Model 65

Complementarity 65

Transferability 65

Intervening Opportunity 66

Measuring Interaction 66

Distance Decay 67

The Gravity Concept 68

Interaction Potential 68

Movement Biases 69

Human Spatial Behavior 70

Individual Activity Space 70

The Tyranny of Time 72

Distance and Human Interaction 72

Spatial Interaction and the Accumulation
of Information 73

Information Flows 76

Information and Perception 77

Perception of Environment 77

Perception of Natural Hazards 79

Migration	82
Principal Migration Patterns	83
Types of Migration	83
Controls on Migration	85
SUMMARY	91
KEY WORDS	92
FOR REVIEW	92
SELECTED REFERENCES	92

PATTERNS OF DIVERSITY AND UNITY 131

11

Islam	166
Hinduism	168
Buddhism	170
East Asian Ethnic Religions	172
SUMMARY	174
KEY WORDS	174
FOR REVIEW	175
SELECTED REFERENCES	175

POPULATION:

4

WORLD PATTERNS, REGIONAL TRENDS	95
------------------------------------	----

LANGUAGE AND RELIGION:

5

MOOSAICS OF CULTURE	133
------------------------	-----

ETHNIC GEOGRAPHY:

6

THREADS OF DIVERSITY	177
-------------------------	-----

Population Growth	96
Some Population Definitions	98
Birth Rates	98
Fertility Rates	99
Death Rates	102
Population Pyramids	104
Natural Increase	107
Doubling Times	108
The Demographic Transition	109
The Western Experience	110
A World Divided	113
The Demographic Equation	113
Population Relocation	114
Immigration Impacts	114
World Population Distribution	116
Population Density	119
Overpopulation	120
Urbanization	122
Population Data and Projections	122
Population Data	123
Population Projections	124
Population Controls	125
Population Prospects	126
SUMMARY	127
KEY WORDS	128
FOR REVIEW	128
SELECTED REFERENCES	128

THE GEOGRAPHY OF LANGUAGE	135
Classification of Languages	135
World Pattern of Languages	136
Language Spread	137
Language Change	142
The Story of English	143
Standard and Variant Languages	144
Standard Language	144
Dialects	145
<i>Dialects in America</i>	147
Pidgins and Creoles	149
Lingua Franca	149
Official Languages	149
Language, Territoriality, and Identity	152
Language on the Landscape: Toponymy	154

PATTERNS OF RELIGION 156

Religion and Culture	156
Classification of Religion	156
Patterns, Numbers, and Flows	158
The World Pattern	158
The Principal Religions	159
Judaism	159
Christianity	160
<i>Regions and Landscapes of Christianity</i>	163

Ethnic Diversity and Separatism	179
Immigration Streams	181
Acculturation and Assimilation	184
Areal Expressions of Ethnicity	186
Charter Cultures	186
Ethnic Clusters	188
Black Dispersions	189
Hispanic Concentrations	191
Asian Contrasts	194
French Uniformity	195
Urban Ethnic Diversity and Segregation	196
External Controls	198
Internal Controls	198
Shifting Ethnic Concentrations	199
Typologies and Spatial Results	200
Native Born Dispersals	202
Cultural Transfer	202
The Ethnic Landscape	204
Land Survey	205
Settlement Patterns	206
Ethnic Regionalism	207
SUMMARY	209
KEY WORDS	209
FOR REVIEW	210
SELECTED REFERENCES	210

PATTERNS OF DEVELOPMENT AND CHANGE 331

- Development as a Cultural Variable** 333
- Dividing the Continuum: Definitions of Development** 333
 - Explanations of Underdevelopment 335
 - The Core-Periphery Argument 336
- Economic Measures of Development** 336
 - The Diffusion of Technology 338
 - The Complex of Development 340
 - Gross National Product and PPP Per Capita 340
 - Energy Consumption Per Capita 342
 - Percentage of the Workforce Engaged in Agriculture 344
 - Landlessness* 344
 - Poverty, Calories, and Nutrition 348
 - Composite Assessment of Economic Development 349
 - A Model for Economic Development 350
- Noneconomic Measures of Development** 352
 - Education 352
 - Public Services 354
 - Health 354
- Aggregate Measures of Development and Well-Being** 358
- The Role of Women** 360
 - SUMMARY 366
 - KEY WORDS 366
 - FOR REVIEW 366
 - SELECTED REFERENCES 367

LANDSCAPES OF FUNCTIONAL ORGANIZATION 369

URBAN SYSTEMS AND URBAN STRUCTURES 371

- The Urbanizing Century** 373
 - Merging Metropolises 373
- Settlement Roots** 377
- The Nature of Cities** 379
 - Some Definitions 380
 - The Location of Urban Settlements 380
- The Functions of Cities** 381
 - The Economic Base 381
 - Base Ratios 382
- Systems of Urban Settlements** 383
 - The Urban Hierarchy 383
 - Rank-Size and Primacy* 384
 - Urban Influence Zones* 385
 - Central Places 385
- Inside the City** 388
 - The Competitive Bidding for Land 388
 - Land Values and Population Density 390
 - Models of Urban Land Use Structure 392
- Social Areas of Cities** 393
 - Social Status* 393
 - Family Status* 394
 - Ethnicity* 394
- Institutional Controls** 396
- Suburbanization in the United States** 396
- Central City Change** 398
- World Urban Diversity** 400
 - The Anglo American City 400
 - The West European City 403
 - The East European City 404
 - Cities in the Developing World 406
 - The Asian City and African City* 408
 - The Latin American City* 410
 - SUMMARY 411
 - KEY WORDS 412
 - FOR REVIEW 412
 - SELECTED REFERENCES 412

THE POLITICAL ORDERING OF SPACE 415

- National Political Systems** 417
 - States, Nations, and Nation-States 417
 - The Evolution of the Modern State 419
 - Geographic Characteristics of States 419
 - Size* 420
 - Shape* 420
 - Location* 424
 - Cores and Capitals* 425
 - Boundaries: The Limits of the State** 425
 - Classification of Boundaries* 426
 - Boundary Disputes* 428
 - State Cohesiveness 429
 - Nationalism* 429
 - Unifying Institutions* 430
 - Organization and Administration* 431
 - Transportation and Communication* 431
 - Nationalism and Centrifugal Forces 433
 - The Projection of Power 434
 - Geopolitical Assessments* 435
- International Political Systems** 436
 - The United Nations and Its Agencies 437
 - Maritime Boundaries* 438
 - An International Law of the Sea* 438
 - Regional Alliances 439
 - Economic Alliances* 440
 - Military and Political Alliances* 443
- Local and Regional Political Organization** 443
 - The Geography of Representation: The Districting Problem 444
 - The Fragmentation of Political Power 445
 - Unified Government* 449
 - Predevelopment Annexation* 450
 - SUMMARY 450
 - KEY WORDS 451
 - FOR REVIEW 451
 - SELECTED REFERENCES 452

13

GLOBAL CON

Climates, Biomes, and Change 457

Global Warming 460

Acid Rain 464

The Trouble with Ozone 465

Land Use and Land Cover 467

Tropical Deforestation 468

Desertification 470

Soil Erosion 472

Water Supply and Water Quality 475

Patterns of Availability 476

Water Use and Abuse 476

Garbage Heaps and Toxic Wastes 478

Solid Wastes and Rubbish 480

Landfill Disposal 481

Incineration 481

Ocean Dumping 483

Toxic Wastes 483

Radioactive Wastes 483

Exporting Waste 484

SUMMARY 487

KEY WORDS 487

FOR REVIEW 487

SELECTED REFERENCES 488

A: MAP PROJECTIONS 491

B: 1996 WORLD POPULATION
DATA 501

C: NORTH AMERICAN
REFERENCE MAP 507

Glossary 509

CREDITS 525

INDEX 529

PREFACE



This fifth edition of *Human Geography* preserves the pattern set by its predecessors. Designed for students enrolled in a one-semester or one-quarter course, it seeks to introduce them to the scope and excitement of human geography while making clear the relevance of its content to their daily lives and roles as citizens of an increasingly interrelated world community. To that end, the current edition builds on the extensive revisions that marked the earlier ones, making selective, significant changes in text but not in basic subject matter or topical sequence.

Some of the alterations represent expansions or contractions of text coverage in response to user advice or requests. Others reflect data, research results, and interpretations newly available since the last edition. Finally, of course, rapidly changing world political, social, and economic events have made obsolete many of the patterns and interactions that were considered fundamental and controlling in the recent past. In consequence, corresponding alterations in text descriptions and maps have been required and made.

All textbook authors strive to be current in their data and relevant in their interpretations. The rapidity of late 20th-century changes in economic, political, social, and population structures and relationships makes those goals elusive and unrealistic. The time lapse between world events and the publication date of a book means inevitably that events will outpace analysis. The further delay between the time of book publication and actual class assignment means that at best, some of the text's content will be out of date and at worst, some may be glaringly wrong at the time of student use. Not since the post-World War II period of rapid decolonization and political and economic realignments has the partnership between geography textbook authors and classroom instructors been more essential and mutually supportive than it is now. We have done our best in the text of this fifth edition to reflect world events and patterns evident and in place at the time of its final editing. We—and most importantly, the students—rely on the instructor to provide the currency of information and the interpretation of new patterns of human geographic substance essential to correct a text overtaken by events.

These concerns with current events do not diminish the importance we place on the basic content and enduring values we attempt to incorporate in the book. We recognize, for example, that for many of its readers their course in human geography may be their first or only work in geography and this their first or only textbook in the discipline. For those students particularly, we take seriously the obligation not only to convey the richness and breadth of human geography but also to give insight into the nature and intellectual challenges of the field of geography itself.

Chapter 1 addresses that goal of disciplinary overview, introducing geography as an enduring and meaningful orientation of intellect and action and identifying the place of human geography within the larger field of study. It reviews the scope, methods, and “background basics” of geography, including the unifying questions, themes, and concepts that structure all geographic inquiry and the tools—especially maps—that all geographers employ. It is supplemented by Appendix A that gives a more detailed treatment of map projections than is appropriate in a general introductory chapter. We realize, of course, that not all instructors will find either this chapter or the projections appendix necessary to the course as they teach it. Both are designed to be helpful, with content supportive of, not essential to, the later chapters of the text.

The arrangement of those chapters reflects our own sense of logic and teaching experiences and follows the ordering of material in earlier editions of *Human Geography*. The chapters are unevenly divided among five parts, each with a brief orienting introduction. We begin by examining the basis of culture, culture change, and cultural regionalism. We then proceed to a review of concepts and models of spatial interaction and spatial behavior, and complete Part I with a consideration of population structures, patterns, and change. Parts II through IV (Chapters 5 through 12) build on the fundamentals of the early chapters to examine the landscapes of culture and organization resulting from human occupancy of the earth and from spatial similarities and differences that occupation has engendered. These include cultural patterns of linguistic, religious, ethnic, folk, and popular geographic differentiation of peoples and societies and those of economic, urban, and political organization of space.

INTRODUCTION:

SOME BACKGROUND BASICS

GETTING STARTED 2

Evolution of the Discipline 2

Geography and Human Geography 3

Human Geography 4

The Structure of This Book 7

BACKGROUND BASICS 8

Basic Geographic Concepts 8

Location, Direction, and Distance 9

Location 9

Direction 10

Distance 11

Size and Scale 11

Physical and Cultural Attributes 12

The Changing Attributes of Place 13

Interaction Among Places 14

The Structured Content of Place 15

Density 15

Dispersion 15

Pattern 16

Place Similarity and Regions 16

The Characteristics of Regions 17

Types of Regions 17

Maps 18

Map Scale 19

The Globe Grid 20

How Maps Show Data 21

Mental Maps 23

Systems, Maps, and Models 27

SUMMARY 27

KEY WORDS 28

FOR REVIEW 28

SELECTED REFERENCES 28

CHAPTER

1



Amish farmers have created an intricate cultural landscape replacing the original natural landscape of Lancaster County, Pennsylvania.

GETTING STARTED

The fundamental question asked by geographers is "Does it make a difference where things are located?" If for any one thing or group of things the answer is "You bet it does," the geographer's interest is aroused and geographic investigation is appropriate. For example, it matters a great deal that languages of a certain kind are spoken in certain places. But knowledge of the location of a specific language group is not of itself particularly significant. Geographic study of a language requires that we try to answer questions about why and how the language shows different characteristics in different locations and how the present distribution of its speakers came about. In the course of our study, we would logically discuss such concepts as migration, acculturation, the diffusion of innovation, the effect of physical barriers on communication, and the relationship of language to other aspects of culture. As geographers, we are interested in how things are interrelated in different regions and give evidence of the existence of "spatial systems."

Geography is often referred to as the *spatial* science, that is, the discipline concerned with the use of earth space. In fact, *geography* literally means "description of the earth," but that task is really the responsibility of nearly all the sciences. Geography might better be defined as the study of spatial variation, of how—and why—things differ from place to place on the surface of the earth. It is, further, the study of how observable spatial patterns evolved through time. If things were everywhere the same, if there were no spatial variation, the kind of human curiosity that we call "geographic" simply would not exist. Without the certain conviction that in some interesting and important way landscapes, peoples, and opportunities differ from place to place, there would be no discipline of geography.

But we do not have to deal in such abstract terms. You consciously or subconsciously display geographic awareness in your daily life. You are where you are, doing what you are doing, because of locational choices you faced and spatial decisions you made. You cannot be here reading this book and simultaneously be somewhere else—working, perhaps, or at the gym. And should you now want to go to work or take an exercise break, the time involved in going from here to there (wherever "there" is) is time not available for other activities in other locations. Of course, the act of going implies knowing where you are now, where "there" is in relation to "here," and the paths or routes you can take to cover the distance.

These are simple examples of the observation that "space matters" in a very personal way. You cannot avoid

the implications of geography in your everyday affairs. Your understanding of your hometown, your neighborhood, or your college campus is essentially a geographic understanding. It is based on your awareness of where things are, of their spatial relationships, and of the varying content of the different areas and places you frequent. You carry out your routine activities in particular places and move on your daily rounds within defined geographic areas, following logical paths of connection between different locations.

Just as geography matters in your personal life, so it matters on the larger stage as well. Decisions made by corporations about the locations of manufacturing plants or warehouses in relation to transportation routes and markets are spatially rooted. So, too, are those made by shopping center developers and locators of parks and grade schools. At an even grander scale, judgements about the projection of national power or the claim and recognition of "spheres of influence and interest" among rival countries are related to the implications of distance and area.

Geography, therefore, is about space and the content of space. We think of and respond to places from the standpoint not only of where they are but, rather more importantly, of what they contain or what we think they contain. Reference to a place or an area usually calls up images about its physical nature or what people do there and often suggests, without conscious thought, how those physical things and activities are related. "Colorado," "mountains," and "skiing" might be a simple example. The content of area, that is, has both physical and cultural aspects, and geography is always concerned with understanding both (Figure 1.1).

Evolution of the Discipline

Geography's combination of interests was apparent even in the work of the early Greek geographers, who first gave structure to the discipline. Geography's name was reputedly coined by the Greek scientist Eratosthenes over 2200 years ago from the words *geo*, "the earth" and *graphein*, "to write." From the beginning, that writing focused both on the physical structure of the earth and on the nature and activities of the people who inhabited the different lands of the known world. To Strabo (ca. 64 B.C.–A.D. 20) the task of geography was to "describe the several parts of the inhabited world . . . to write the assessment of the countries of the world [and] to treat the differences between countries."

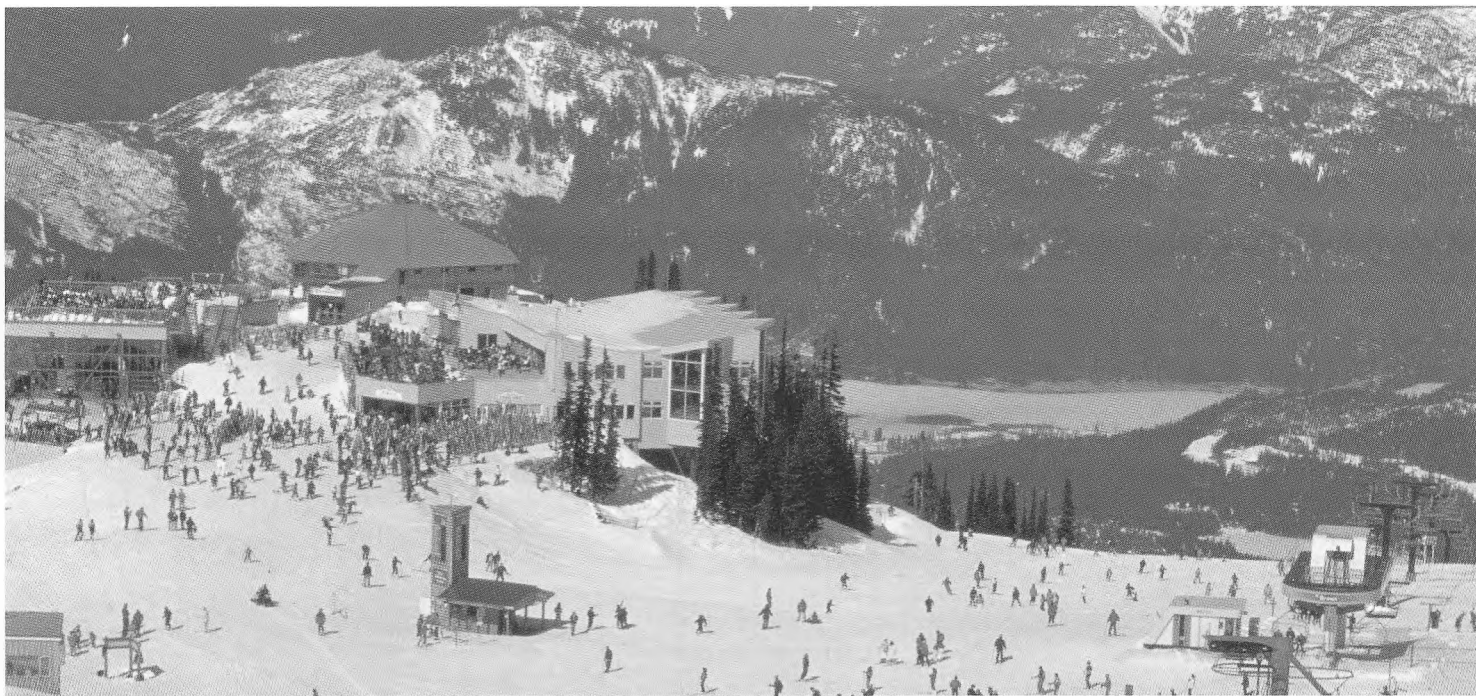


FIGURE 1.1 Ski development at Whistler Mountain, British Columbia: the interaction of physical environment and human activity. Climate and terrain have made specialized human use possible. Human development has placed a cultural landscape on the natural environment, thereby altering it.

Greek (and, later, Roman) geographers measured the earth, devised the global grid of latitudes and longitudes, and drew upon that grid surprisingly sophisticated maps (Figure 1.2). Employing nearly modern concepts, they discussed patterns and processes of climates, vegetation, and landforms and described areal variations in the natural landscape. Against that physical backdrop, they focused their attention on what humans did in home and distant areas—how they lived; what their distinctive similarities and differences were in language, religion, and custom; and how they used, altered, and perhaps destroyed the lands they inhabited.

These are enduring and universal interests. The ancient Chinese, for example, were as involved in geography as an explanatory viewpoint as were Westerners, though there was no exchange between them. Further, as Christian Europe entered its Dark and Middle Ages between A.D. 800 and 1400 and lost its knowledge of Greek and Roman geographical work, Muslim scholars—who retained that knowledge—undertook to describe and analyze their known world in its physical, cultural, and regional variation (see “Roger’s Book”).

Modern geography had its origins in the surge of scholarly inquiry that, beginning in the 17th century, gave rise to many of the traditional academic disciplines we know today. In its European rebirth, geography from the outset was recognized—as it always had been—as a broadly based integrative study. Patterns and processes of the physical landscape were early interests, as was concern with humans

as part of the earth’s variation from place to place. The rapid development of geology, botany, zoology, and other natural sciences by the end of the 18th century strengthened regional geographic investigation and increased scholarly and popular awareness of the intricate interconnections of things in space and between places. By that same time, accurate determination of latitude and longitude and scientific mapping of the earth made assignment of place information more reliable and comprehensive. During the 19th century, national censuses, trade statistics, and ethnographic studies gave firmer foundation to human geographic investigation.

By the end of the 19th century, geography had become a distinctive and respected discipline in universities throughout Europe and in other regions of the world where European academic examples were followed. The proliferation of professional geographers and geography programs resulted in the development of a whole series of increasingly specialized disciplinary subdivisions.

Geography and Human Geography

Geography’s specialized subfields are not divisive but are interrelated. Geography in all its subdivisions is characterized by three dominating interests. The first is in the areal variation of physical and human phenomena on the surface of the earth. Geography examines relationships between human societies and the natural environments that they occupy and modify. The second is a focus on the spa-

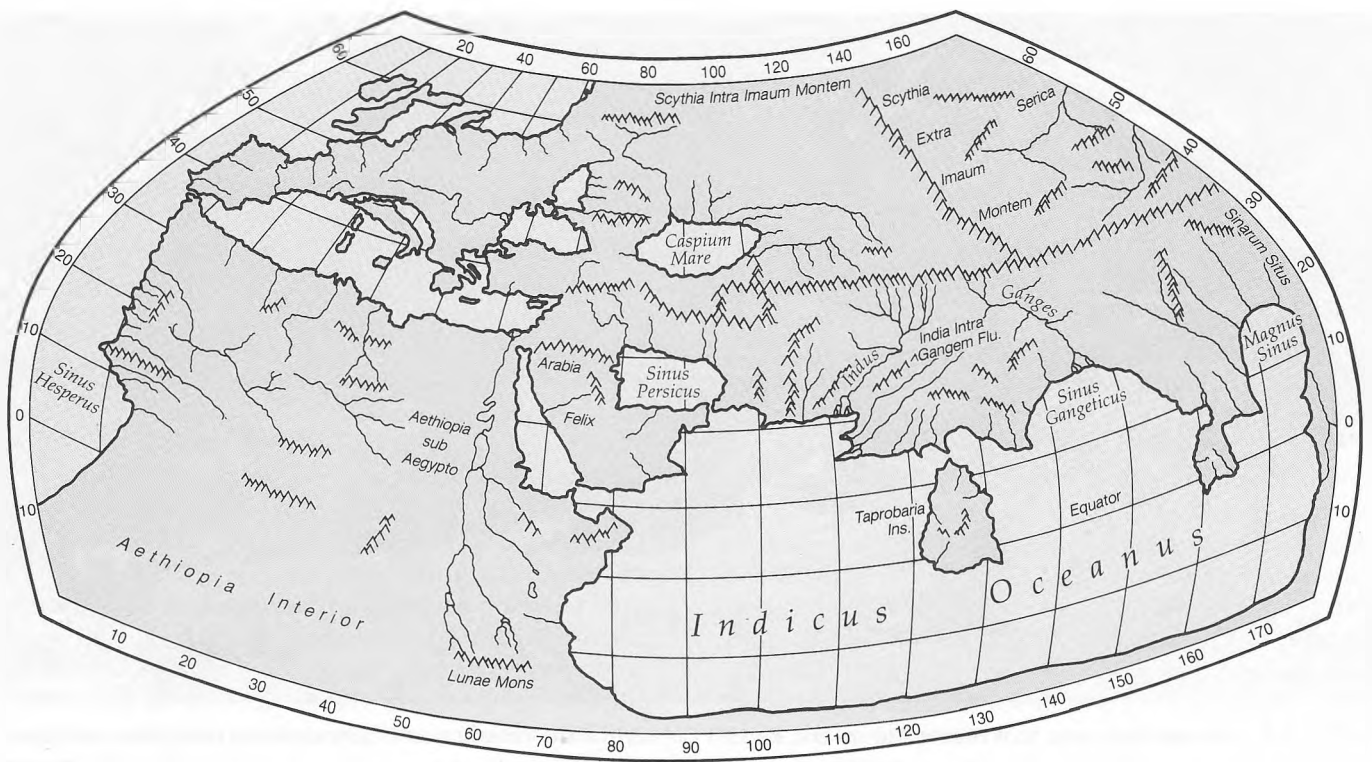


FIGURE 1.2 World map of the 2nd century A.D. Roman geographer-astronomer Ptolemy. Ptolemy (Claudius Ptolemaeus) adopted a previously developed map grid of latitude and longitude based on the division of the circle into 360°, permitting a precise mathematical location for every recorded place. Unfortunately, errors of assumption and measurement rendered both the map and its accompanying six-volume gazetteer inaccurate. Many variants of Ptolemy's map were published in the 15th and 16th centuries. The version shown here summarizes the extent and content of the original.

tial systems¹ that link physical phenomena and human activities in one area of the earth with other areas. Together, these interests lead to a third enduring theme, that of regional analysis: geography studies human-environmental—or ecological—relationships, and the systems of spatial interaction are studied in specific areal settings. This areal orientation pursued by some geographers is called *regional geography*.

Other geographers choose to identify particular classes of things, rather than segments of the earth's surface, for specialized study. These *systematic geographers* may focus their attention on one or a few related aspects of the physical environment or of human populations and societies. In each case, the topic selected for study is examined in its interrelationships with other spatial systems and areal patterns. *Physical geography* directs its attention to the natural environmental side of the human-environment

structure. Its concerns are with landforms and their distribution, with atmospheric conditions and climatic patterns, with soils or vegetation associations, and the like. The other systematic branch of geography—and the subject of this book—is *human geography*.

Human Geography

Human geography deals with the world as it is and with the world as it might be made to be. Its emphasis is on people: where they are, what they are like, how they interact over space, and what kinds of landscapes of human use they erect upon the natural landscapes they occupy. It encompasses all those interests and topics of geography that are not directly concerned with the physical environment or, like cartography, are technical in orientation. Its content provides integration for all of the social sciences, for it gives to those sciences the necessary spatial and systems viewpoint that they otherwise lack. At the same time, human geography draws upon other social sciences in the analyses identified with its subfields, such as *behavioral*, *political*, *social*, or *economic geography* (Figure 1.3).

¹ A "system" is simply a group of elements organized in a way that every element is to some degree directly or indirectly interdependent with every other element. For geographers, the systems of interest are those that distinguish or characterize different regions or areas of the earth.

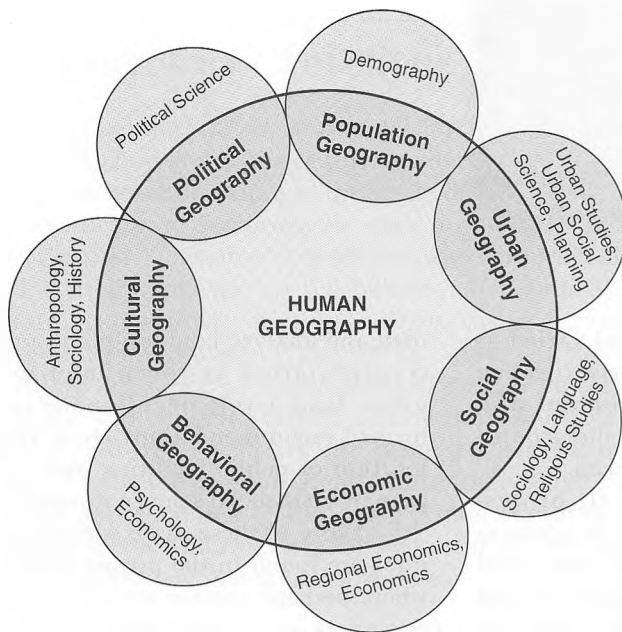


FIGURE 1.3 Some of the subdivisions of human geography and the allied fields to which they are related. Geography, “the mother of sciences,” initiated in antiquity the lines of inquiry that later led to the development of these and other separate disciplines. That geography retains its ties to them and shares their insights and data reinforces its role as an essential integrator of all data, concepts, and models that have integrative regional and spatial implications.

Human geography admirably serves the objectives of a liberal education. It helps us to understand the world we occupy and to appreciate the circumstances affecting peoples and countries other than our own. It clarifies the contrasts in societies and cultures and in the human landscapes they have created in different regions of the earth. Its models and explanations of how things are interrelated in earth space give us a clearer understanding of the economic, social, and political systems within which we live and operate. Its analyses of those spatial systems make us more aware of the realities and the prospects of our own society in an increasingly troubled and competitive world. Our study of human geography, therefore, can help make us better-informed citizens, more able to understand the important issues facing our communities and our countries and better prepared to contribute to their solutions. Importantly, it can also help open the way to wonderfully rewarding and diversified careers as professional geographers (see “Working in Geography”).

ROGER'S BOOK



The Arab geographer Idrisi, or Edrisi (c. A.D. 1099–1154), a descendant of the Prophet Mohammed, was directed by Roger II, the Christian King of Sicily in whose court he served, to collect all known geographical information and assemble it in a truly accurate representation of the world. An academy of geographers and scholars was gathered to assist Idrisi in the project. Books and maps of classical and Islamic origins were consulted, mariners and travelers interviewed, and scientific expeditions dispatched to foreign lands to observe and record. Data collection took 15 years before the final world map was fabricated on a silver disc some 200 centimeters (80 inches) in diameter and

weighing over 135 kilograms (300 pounds). Lost to looters in 1160, the map is survived by “Roger’s Book,” containing the information amassed by Idrisi’s academy and including a world map, 71 part maps, and 70 sectional itinerary maps.

Idrisi’s “inhabited earth” is divided into the seven “climates” of Greek geographers, beginning at the equator and stretching northward to the limit at which, it was supposed, the earth was too cold to be inhabited. Each climate was then subdivided by perpendicular lines into 11 equal parts beginning with the west coast of Africa on the west and ending with the east coast of Asia. Each of the resulting 77 square compartments was then discussed in sequence in “Roger’s Book.”

Though Idrisi worked in one of the most prestigious courts of Europe, there is little evidence that his work had any impact on European geographic thought. He was strongly influenced by Ptolemy’s work and misconceptions and shared the then common Muslim fear of the unknown western ocean. Yet Idrisi’s clear understanding of such scientific truths as the roundness of the earth, his grasp of the scholarly writings of his Greek and Muslim predecessors, and the faithful recording of information on little-known portions of Europe, the Near East, and North Africa set his work far above the mediocre standards of contemporary Christian geography.

FOR YOUR CONSIDERATION

WORKING IN GEOGRAPHY

Recognizing geography's role in a rounded liberal education leads logically to a further interest: Can it, as well, be a pathway to employment for those who wish to specialize in the discipline? The answer is "yes," in a number of various types of jobs. One broad cluster is concerned with supporting the field itself, through teaching and research. Teaching opportunities exist at all levels, from elementary to university post-graduate. Teachers with some training in geography are increasingly in demand at the elementary and high school level in the United States, reflecting geography's inclusion as a core subject in the federally adopted *Goals 2000: Educate America Act* (Public Law 103-227) and the national determination to create a geographically literate society. At the college level, specialized teaching and research in all branches of geography have long been established, and geographically trained scholars are prominently associated with urban, community, and environmental studies, regional science, locational economics, and other interdisciplinary programs.

Because of the breadth and diversity of this field, training in geography involves the acquisition of skills and approaches applicable to a wide variety of jobs outside the academic world. Modern geography is both a physical and social science and fosters a wealth of technical skills. The employment possibilities

it presents are as many and varied as are the agencies and enterprises dealing with the natural environment and human activities and with the acquisition and analysis of spatial data.

About a quarter of all professional geographers work in government, either at the state or local level or in a variety of federal agencies and international organizations. Although many positions do not carry a geography title, physical geographers serve as water and natural resource analysts, weather and climate experts, soil scientists, and the like. An area of recent high demand is for environmental managers and technicians. Geographers who have specialized in environmental studies find jobs in both public and private agencies. Their work may include assessing the environmental impact of proposed development projects on such things as air and water quality and endangered species; and also includes preparing the environmental impact statements required before construction can begin.

Human geographers work in many different roles in the public sector. Jobs include data acquisition and analysis in health care, transportation, population studies, economic development, and international economics. Many geography graduates find positions as planners in local and state governmental agencies concerned with housing and community development, park and recreation planning, and urban and regional planning. They

map and analyze land use plans and transportation systems, monitor urban land development, make informed recommendations about the location of public facilities, and engage in basic social science research.

Many of these same specializations are found in the private sector, where perhaps another quarter of geographers work. Geographic training is ideal for such tasks as business planning and market analysis; factory, store, and shopping center site selection; community and economic development programs for banks, public utilities, and railroads; and similar applications. Publishers of maps, atlases, news and travel magazines, and the like, employ geographers as writers, editors, and mapmakers.

The combination of traditional, broad-based liberal arts perspective with the technical skills required in geographic research and analysis gives geography graduates a competitive edge in the current labor market. These field-based skills include familiarity with geographic information systems (GIS), cartography and computer mapping, remote sensing and photogrammetry, and competence in data analysis and problem solving. In particular, students with expertise in GIS, who are knowledgeable about data sources, hardware, and software, are finding they have ready access to employment opportunities.

The Structure of This Book

By way of getting started, it is useful for you to know how the organization and topics of this text have been structured to help you reach the kinds of understandings we seek.

We begin by exploring the roots and meaning of culture (Chapter 2), establishing the observed ground rules of spatial interaction and spatial behavior (Chapter 3), and examining the areal variations in patterns of population distribution and change (Chapter 4). These set the stage for following separate discussions of spatial patterns of language and religion, ethnic distinctions, and folk and popular culture. These are the principal expressions of unity and diversity and of areal differentiation among the peoples and societies of the earth. Understanding their spatial patterns and interrelations goes far toward providing the world view that is our objective.

Beginning with Chapter 8, our focus shifts more to the economic and organizational landscapes humans have created. In turn, we look at economic geography and economic development, urban systems and structures, and patterns of the political ordering of space. Finally, in Chapter 13, dealing with human impacts, we return to the underlying concern of all geographic study: the relationship between human geographic patterns and processes and both the present conditions and the future prospects of the physical and cultural environments we occupy, create, or modify.

To help clarify the connections between the various topics of human geography, the chapters of this book are grouped by common theme and separately introduced. For students new to geography as a subject and for those who want a reminder of its unifying objectives and shared techniques of study, the remainder of this first chapter will serve as introduction and review.

Basic Geographic Concepts

The topics included in human geography are diverse, but that very diversity emphasizes the reality that all geographers—whatever their particular topical or regional specialties—are united by the similar questions they ask and the common set of concepts they employ to consider their answers. Of either a physical or cultural phenomenon they will inquire: What is it? Where is it? How did it come to be what and where it is? Where is it in relation to other things that affect it or are affected by it? How is it part of a functioning whole? How does its location affect people's lives and the content of the area in which it is found?

These questions are spatial in focus and systems analytical in approach and are derived from enduring central themes in geography. In answering them, geographers draw upon a common store of concepts, terms, and methods of study that together form the basic structure and vocabulary of geography. Collectively, they reflect the fundamental truths addressed by geography: that things are rationally organized on the earth's surface and that recognizing spatial patterns is an essential starting point for understanding how people live on and shape the earth's surface. That understanding is not just the task and interest of the professional geographer; it should be, as well, part of the mental framework of all informed persons. As the publication *Geography for Life* summarizes,

THE NATIONAL STANDARDS



geography is a core subject in the nationally adopted Goals 2000: Educate America

Act. Its inclusion reflects a national conviction that a grasp of the skills and understandings of geography are essential in an American educational system "tailored to the needs of productive and responsible citizenship in the global economy." The National Geography Standards 1994 were developed to help achieve that goal. They specify the essential subject matter, skills, and perspectives that students who have gone through the U.S. public school system should acquire and use. Although not all of the standards are relevant to our study of human geography, together they help frame the kinds of understanding we will seek in the following pages and suggest the purpose and benefit of further study of geography.

The 18 standards from *Geography for Life* tell us:

The geographically informed person knows and understands:

The World in Spatial Terms

1. How to use maps and other geographic tools and technologies to acquire, process, and report

information from a spatial perspective.

2. How to use mental maps to organize information about people, places, and environments in a spatial context.
3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Places and Regions

4. The physical and human characteristics of places.
5. That people create regions to interpret Earth's complexity.
6. How culture and experience influence people's perceptions of places and regions.

Physical Systems

7. The physical processes that shape the patterns of Earth's surface.
8. The characteristics and spatial distribution of ecosystems on Earth's surface.

Human Systems

9. The characteristics, distribution, and migration of human populations on Earth's surface.
10. The characteristics, distribution, and complexity of Earth's cultural mosaics.

11. The patterns and networks of economic interdependence on Earth's surface.
12. The processes, patterns, and functions of human settlement.
13. How the forces of cooperation and conflict among people influence the division and control of Earth's surface.

Environment and Society

14. How human actions modify the physical environment.
15. How physical systems affect human systems.
16. The changes that occur in the meaning, use, distribution, and importance of resources.

Uses of Geography

17. How to apply geography to interpret the past.
18. How to apply geography to interpret the present and plan for the future.

Source: *Geography for Life: National Geography Standards 1994*. Washington, D.C.: National Geographic Research and Exploration, 1994.

"There is now a widespread acceptance . . . that being literate in geography is essential . . . to earn a decent living, enjoy the richness of life, and participate responsibly in local, national, and international affairs." (See "The National Standards".)

Geographers use the word *spatial* as an essential modifier in framing their questions and forming their concepts. Geography, they say, is a *spatial* science. It is concerned with *spatial behavior* of people, with the *spatial relationships* that are observed between places on the earth's surface, and with the *spatial processes* that create or maintain those behaviors and relationships. The word *spatial* comes, of course, from *space*, and to geographers it always carries the idea of the way things are distributed, the way movements occur, and the way processes operate over the whole or a part of the surface of the earth. The geographer's space, then, is earth space, the surface area occupied or available to be occupied by humans. Spatial phenomena have locations on that surface, and spatial interactions occur between places, things, and people within the earth area available to them. The need to understand those relationships, interactions, and processes helps frame the questions that geographers ask.

Those questions have their starting point in basic observations about the location and nature of places and about how places are similar to or different from one another. Such observations, though simply stated, are profoundly important to our comprehension of the world we occupy.

- **Places have location, direction, and distance with respect to other places.**
- **A place may be large or small; scale is important.**
- **A place has both physical structure and cultural content.**
- **The characteristics of places develop and change over time.**
- **Places interact with other places.**
- **The content of places is rationally structured.**
- **Places may be generalized into regions of similarities and differences.**

These are basic notions understandable to everyone. They also are the means by which geographers express fundamental observations about the earth spaces they examine and put those observations into a common framework of reference. Each of the concepts is worth further explanation, for they are not quite as simple as they at first seem.

Location, Direction, and Distance

Location, direction, and distance are everyday ways of assessing the space around us and identifying our position in relation to other things and places of interest. They are also essential in understanding the processes of spatial interaction that figure so importantly in the study of human geography.

Location

The location of places and things is the starting point of all geographic study as well as of all our personal movements and spatial actions in everyday life. We think of and refer to location in at least two different senses, *absolute* and *relative*.

Absolute location is the identification of place by some precise and accepted system of coordinates; it therefore is sometimes called *mathematical location*. We have several such accepted systems of pinpointing positions. One of them is the global grid of latitude and longitude (discussed later on page 20). With it the absolute location of any point on the earth can be accurately described by reference to its degrees, minutes, and seconds of *latitude* and *longitude* (Figure 1.4).

Other coordinate systems are also in use. Survey systems such as the township, range, and section description of property in much of the United States give mathematical locations on a regional level, while street address precisely defines a building according to the reference system of an individual town. Absolute location is unique to each described place, is independent of any other characteristic or observation about that place, and has obvious value in the legal description of places, in measuring the distance separating places, or in finding directions between places on the earth's surface.

When geographers—or real estate agents—remark that "location matters," however, their reference is usually not to absolute but to **relative location**—the position of a

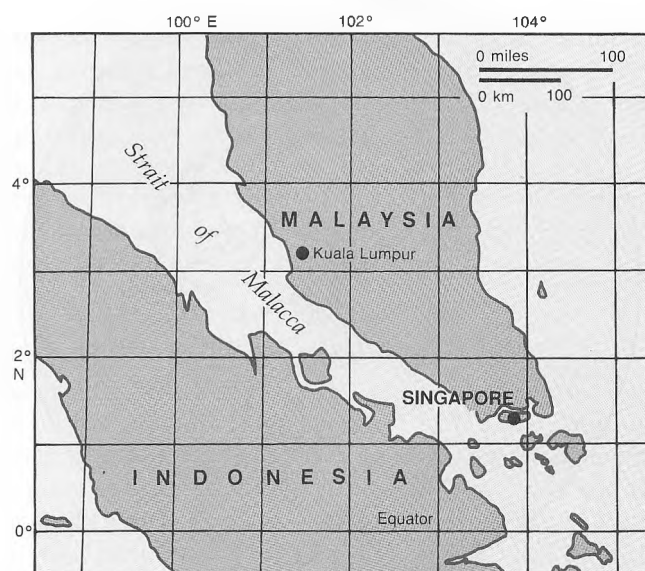


FIGURE 1.4 The latitude and longitude of Singapore is $1^{\circ} 20' N$, $103^{\circ} 57' E$ (read as 1 degree, 20 minutes north; 103 degrees, 57 minutes east). The circumference of the earth measures 360 degrees; each degree contains 60 minutes and each minute has 60 seconds of latitude or longitude. What are the coordinates of Kuala Lumpur?

place in relation to that of other places or activities. Relative location expresses spatial interconnection and interdependence. On an immediate and personal level, we think of the location of the school library not in terms of its street address or room number but where it is relative to our classrooms, or the cafeteria, or some other reference point. On the larger scene, relative location tells us that people, things, and places exist not in a spatial vacuum but in a world of physical and cultural characteristics that differ from place to place (Figure 1.5).

New York City, for example, may in absolute terms be described as located at (approximately) latitude $40^{\circ} 43' N$ and longitude $73^{\circ} 58' W$. We have a better understanding of the *meaning* of its location, however, when reference is made to its spatial relationships: to the continental interior through the Hudson-Mohawk lowland corridor or to its position on the eastern seaboard of the United States. Within the city, we gain understanding of the locational significance of Central Park or the Lower East Side not solely by reference to the street addresses or city blocks they occupy but by their spatial and functional relationships to the total land use, activity, and population patterns of New York City.

In view of these different ways of looking at location, geographers make a distinction between the *site* and the *situation* of a place. **Site** refers to the physical and cultural characteristics and attributes of the place itself. It is more than mathematical location, for it tells us something about

the internal features of that place. The site of Philadelphia, for example, is an area bordering and west of the Delaware River north of its intersection with the Schuylkill River in southeast Pennsylvania (Figure 1.6). **Situation**, on the other hand, refers to the external relations of a locale. It is an expression of relative location with particular reference to items of significance to the place in question. The situation of Chicago might be described as at the deepest penetration of the Great Lakes system into the interior of the United States, astride the Great Lakes-Mississippi waterways, and near the western margin of the manufacturing belt, the northern boundary of the corn belt, and the southeastern reaches of a major dairy region. Reference to railroads, coal deposits, and ore fields would amplify its situational characteristics (Figure 1.7).

Direction

Direction is a second universal spatial concept. Like location, it has more than one meaning and can be expressed in absolute or relative terms. **Absolute direction** is based on the cardinal points of north, south, east, and west. These appear uniformly and independently in all cultures, derived from the obvious "givens" of nature: the rising and setting of the sun for east and west, the sky location of the noontime sun and of certain fixed stars for north and south.

We also commonly use **relative** or *relational directions*. In the United States we go "out West," "back East," or "down South"; we worry about conflict in the "Near East" or economic competition from the "Far Eastern countries." These directional references are culturally based and locationally variable, despite their reference to cardinal compass points. The Near and the Far East locate



FIGURE 1.5 The reality of relative location on the globe may be strikingly different from the impressions we form from flat maps. The position of Russia with respect to North America when viewed from a polar perspective emphasizes that relative location properly viewed is important to our understanding of spatial relationships and interactions between the two world areas.

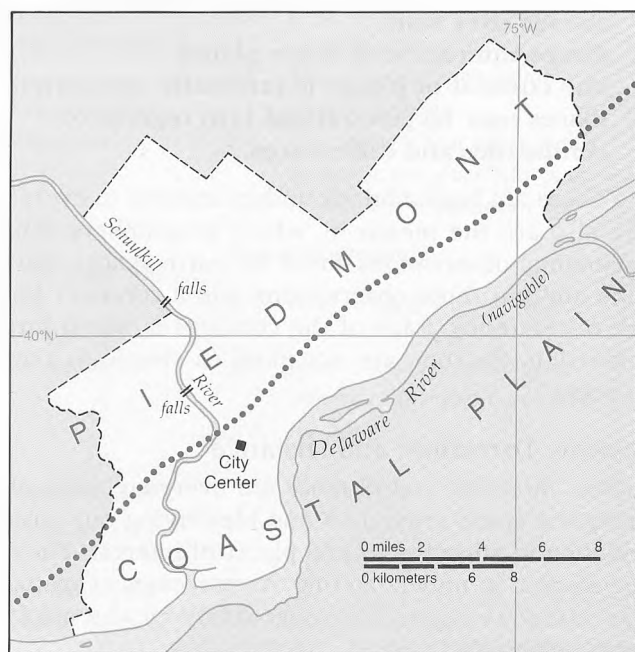


FIGURE 1.6 The site of Philadelphia.

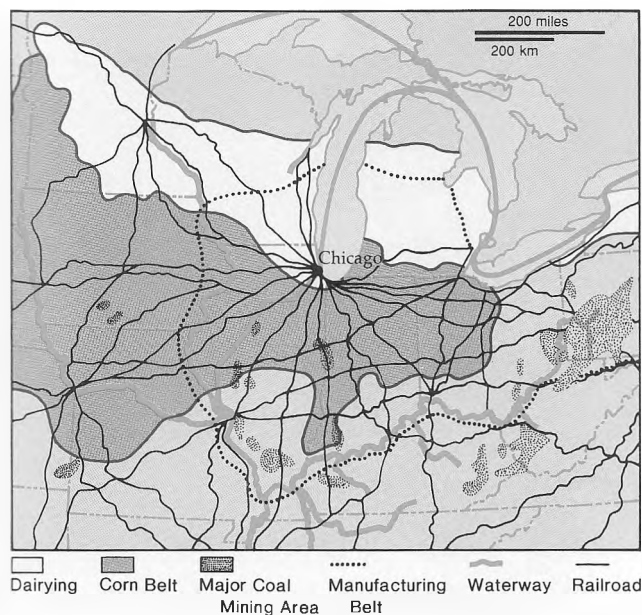


FIGURE 1.7 The situation of Chicago helps suggest the reasons for its functional diversity.

parts of Asia from the European perspective; they are retained in the Americas by custom and usage, even though one would normally travel westward across the Pacific, for example, to reach the "Far East" from California, British Columbia, or Chile. For many Americans, "back East" and "out West" are reflections of the migration paths of earlier generations for whom home was in the eastern part of the country, to which they might look back. "Up North" and "down South" reflect our accepted custom of putting north at the top and south at the bottom of our maps.

Distance

Distance joins location and direction as a commonly understood term that has dual meanings for geographers. Like its two companion spatial concepts, distance may be viewed in both an absolute and a relative sense.

Absolute distance refers to the spatial separation between two points on the earth's surface measured by some accepted standard unit such as miles or kilometers for widely separated locales, feet or meters for more closely spaced points. **Relative distance** transforms those linear measurements into other units more meaningful for the space relationship at question.

To know that two competing malls are about equidistant in miles from your residence is perhaps less important in planning your shopping trip than is knowing that because of street conditions or traffic congestion one is 5 minutes and the other 15 minutes away (Figure 1.8). Most people, in fact, think of time distance rather than linear distance in their daily activities; downtown is 20 minutes by bus, the library is a 5-minute walk. In some instances, money rather than time may be the



FIGURE 1.8 Lines of equal travel time (*isochrones*) mark off different linear distances from a given starting point, depending on the condition of the route and terrain and changes in the roads and traffic flows over time. On this map, the areas within 30 minutes' travel time from downtown Los Angeles are recorded for the period 1953 to 1971.

distance transformation. An urban destination might be estimated to be a \$5 cab ride away, information that may affect either the decision to make the trip at all or the choice of travel mode to get there.

A *psychological* transformation of linear distance is also frequent. The solitary late-night walk back to the car through an unfamiliar or dangerous neighborhood seems far longer than a daytime stroll of the same distance through familiar and friendly territory. A first-time trip to a new destination frequently seems much longer than the return trip over the same path. Distance relationships, their measurement, and their meaning for human spatial interaction are fundamental to our understanding of human geography. They are a subject of Chapter 3, and reference to them recurs throughout this book.

Size and Scale

When we say that a place may be large or small, we speak both of the nature of the place itself and of the generalizations that can be made about it. In either instance, geographers are concerned with **scale**, though we may use that term in different ways. We can, for example, study a problem—say, population or agriculture—at the local scale, the regional scale, or on a global scale. Here the reference is purely to the size of unit studied. More technically, scale tells us the relationship between the size of an area on a map and the actual size of the mapped area on the surface of the earth. In this sense, scale is a feature of every map and essential to recognizing the areal meaning of what is shown on that map.

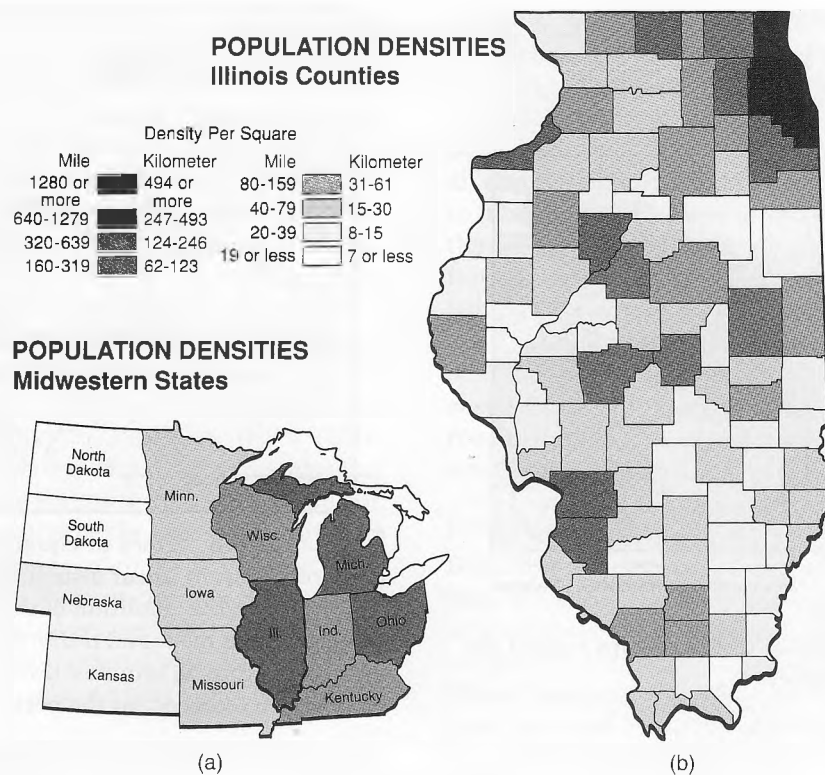


FIGURE 1.9 Population density and map scale. “Truth” depends on one’s scale of inquiry. Map (a) reveals that the maximum population density of Midwestern states is no more than 123 people per square kilometer (319 per sq. mi.). From map (b), however, we see that population densities in two Illinois counties exceed 494 people per square kilometer (1280 per sq. mi.). Were we to reduce our scale of inquiry even further, examining individual city blocks in Chicago, we would find densities as high as 2000 people per square kilometer (5200 per sq. mi.). Scale matters!

In both senses of the word, *scale* implies the degree of generalization represented (Figure 1.9). Geographic inquiry may be broad or narrow; it occurs at many different size scales. Climate may be an object of study, but research and generalization focused on climates of the world will differ in degree and kind from study of the microclimates of a city. Awareness of scale is of great importance because in geographic work, concepts, relationships, and understandings that are found to have meaning at one scale may not be applicable when the same problem is examined at another scale. For example, the study of world agricultural patterns may refer to global climatic regimes, cultural food preferences, levels of economic development, and patterns of world trade. These large-scale relationships are of little concern in the study of crop patterns within single counties of the United States, where topography, soil and drainage conditions, farm size, ownership, and capitalization, or even personal management preferences may be of greater explanatory significance.

Physical and Cultural Attributes

All places have physical and cultural traits that distinguish them from other places. Their attributes give them character, potential, and meaning. Geographers are concerned with identifying and analyzing the details of those attrib-

utes and, particularly, with recognizing the interrelationship between the physical and cultural components of area—the human–environmental interface.

Physical characteristics refer to such natural aspects of a locale as its climate and soil, the presence or absence of water supplies and mineral resources, its terrain features, and the like. These **natural landscape** attributes provide the setting within which human action occurs. They help shape—but do not dictate—how people live. The resource base, for example, is physically determined, though how resources are perceived and utilized is culturally conditioned.

People modify the environmental conditions of a given place simply by occupying it. The existence of the U.S. Environmental Protection Agency (and its counterparts elsewhere) is a reminder that humans are the active and frequently harmful agents in the continuing spatial interplay between the cultural and physical worlds (Figure 1.10). Virtually every human activity leaves its imprint on an area’s soils, water, vegetation, animal life, and other resources and on the atmosphere common to all earth space. The impact of humans has been so universal and so long exerted that essentially no “natural landscape” any longer exists. The visible expression of that human activity is the **cultural landscape**. It, too, exists at different scales and dif-



FIGURE 1.10 Sites (and sights) such as this devastation of ruptured barrels and petrochemical contamination near Texas City, Texas, are all-too-frequent reminders of the adverse environmental impacts of humans and their waste products. Many of those impacts are more subtle, hidden in the form of soil erosion, water pollution, increased stream sedimentation, plant and animal extinctions, deforestation, and the like.

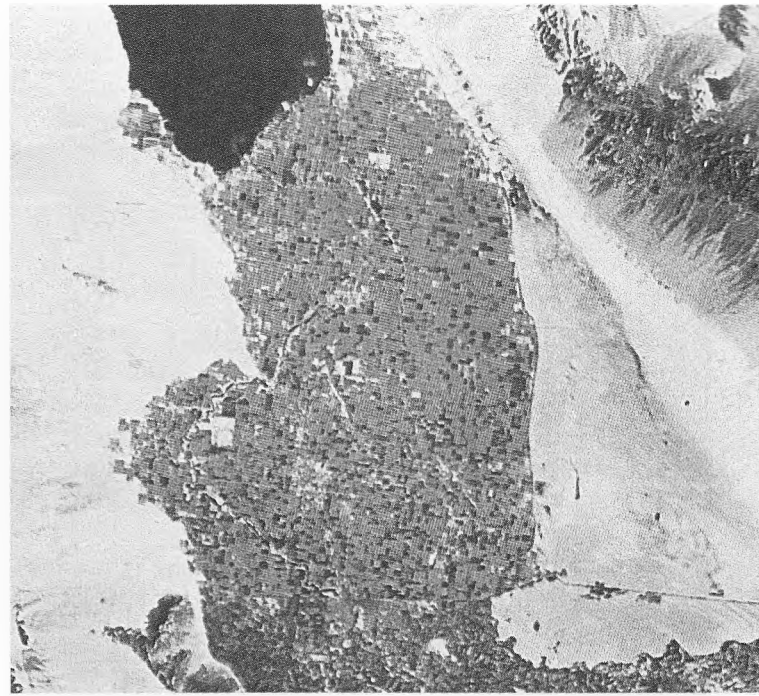


FIGURE 1.11 This Landsat image reveals contrasting cultural landscapes along the Mexico-California border. Move your eyes from the Salton Sea (the dark patch at the top of the image) southward to the agricultural land extending to the edge of the picture. Notice how the regularity of the fields and the bright colors (representing growing vegetation) give way to a marked break, where irregularly shaped fields and less prosperous agriculture are evident. Above the break is the Imperial Valley of California; below the border is Mexico.

ferent levels of visibility. Differences in agricultural practices and land use between Mexico and Southern California are evident in Figure 1.11, while the signs, structures, and people of, for instance, Los Angeles's Chinatown, leave a smaller, more confined imprint within the larger cultural landscape of the metropolitan area itself.

Although the focus of this book is on the human characteristics of places, geographers are ever aware that the physical content of an area is also important in understanding the activity patterns of people and the interconnections between people and the environments they occupy and modify. Those interconnections and modifications are not static or permanent, however, but are subject to continual change.

The Changing Attributes of Place

The physical environment surrounding us seems eternal and unchanging but, of course, it is not. In the framework of geologic time, change is both continuous and pronounced. Islands form and disappear; mountains rise and are worn low to swampy plains; vast continental glaciers form, move, and melt away, and sea levels fall and rise in

response. Geologic time is long, but the forces that give shape to the land are timeless and relentless.

Even within the short period of time since the most recent retreat of continental glaciers—some 10,000 or 11,000 years ago—the environments occupied by humans have been subject to change. Glacial retreat itself marked a period of climatic alteration, extending the area habitable by humans to include vast reaches of northern Eurasia and North America formerly covered by thousands of feet of ice. With moderating climatic conditions came associated changes in vegetation and fauna. On the global scale, these were natural environmental changes; humans were as yet too few in number and too limited in technology to alter materially the course of physical events. On the regional scale, however, even early human societies exerted an impact on the environments they occupied. Fire was used to clear forest undergrowth, to maintain or extend grassland for grazing animals and to drive them in the hunt, and, later, to clear openings for rudimentary agriculture.

With the dawn of civilizations and the invention and spread of agricultural technologies, humans accelerated their management and alteration of the now no longer

“natural” environment. Even the classical Greeks noted how the landscape they occupied differed—for the worse—from its former condition. With growing numbers of people and particularly with industrialization and the spread of European exploitative technologies throughout the world, the pace of change in the content of area accelerated. The built landscape—the product of human effort—increasingly replaced the natural landscape. Each new settlement or city, each agricultural assault on forests, each new mine, dam, or factory changed the content of regions and altered the temporarily established spatial interconnections between humans and the environment.

Characteristics of places today, therefore, are the result of constantly changing past conditions. They are, as well, the forerunners of differing human–environmental balances yet to be struck. Geographers are concerned with places at given moments of time. But to understand fully the nature and development of places, geographers must view them as the present result of past operation of distinctive physical and cultural processes (Figure 1.12).

You will recall that one of the questions geographers ask of a place or thing is: How did it come to be what and where it is? This is an inquiry about process and about becoming. The forces and events shaping the physical and explaining the cultural environment of places today are an important focus of geography. They are, particularly in their human context, the subjects of most of the separate chapters of this book. To understand them is to appreciate more fully the changing human spatial order of our world.

Interaction among Places

The concepts of relative location and distance that we earlier introduced lead directly to a fundamental spatial reality: Places interact with other places in structured and comprehensible ways. In describing the processes and patterns of that **spatial interaction**, geographers add *accessibility* and *connectivity* to the ideas of location and distance.

A basic law of geography tells us that in a spatial sense, everything is related to everything else but that relationships are stronger when things are near one another. Our observation, therefore, is that interaction between places diminishes in intensity and frequency as distance between them increases—a statement of the idea of *distance decay*, which we explore in Chapter 3.

Consideration of distance implies assessment of **accessibility**. How easy or difficult is it to overcome the “friction of distance”? That is, how easy or difficult is it to surmount the barrier of the time and space separation of places? Distance isolated North America from Europe until the development of ships (and aircraft) reduced the effective distance between the continents. All parts of the ancient and medieval city were accessible by walking; they were “pedestrian cities,” a status lost as cities expanded in area and population with industrialization. Accessibility between city districts could only be maintained by the development of public transit systems whose fixed lines of travel increased ease of movement between connected points and reduced it between areas not on the transit lines themselves.

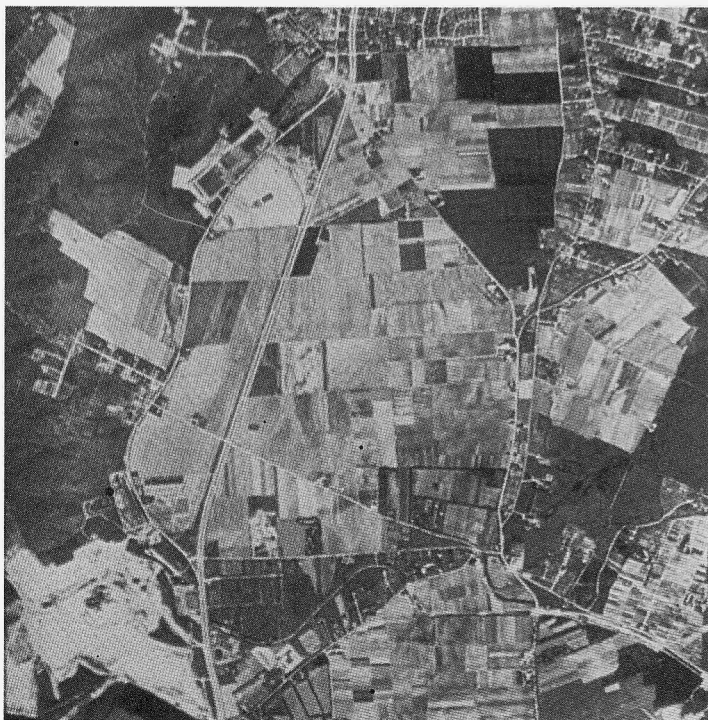


FIGURE 1.12 The process of change in a cultural landscape. Before the advent of the freeway, this portion of suburban Long Island, New York, was largely devoted to agriculture (left). The construction of the freeway and cloverleaf interchange ramps altered nearby land use patterns (right) to replace farming with housing developments and new commercial and light industrial activities.

Accessibility therefore suggests the idea of **connectivity**, a broader concept implying all the tangible and intangible ways in which places are connected: by physical telephone lines, street and road systems, pipelines and sewers; by unrestrained walking across open countryside; by radio and TV broadcasts beamed outward uniformly from a central source. Where routes are fixed and flow is channelized, *networks*—the patterns of routes connecting sets of places—determine the efficiency of movement and the connectedness of points.

There is, inevitably, interchange between connected places. **Spatial diffusion** is the process of dispersion of an idea or an item from a center of origin to more distant points with which it is directly or indirectly connected. The rate and extent of that diffusion are affected by the distance separating the originating center of, say, a new idea or technology from other places where it is eventually adopted. Diffusion rates are also affected by population densities, means of communication, obvious advantages of the innovation, and importance or prestige of the originating *node*. These ideas of diffusion are further explored in Chapter 2.

Geographers study the dynamics of spatial relationships. Movement, connection, and interaction are part of the social and economic processes that give character to places and regions (Figure 1.13). Geography's interest in those relationships recognizes that spatial interaction is not just an awkward necessity but a fundamental organizing principle of human life on earth.

The Structured Content of Place

A starting point for geographic inquiry is how things are distributed in area—for example, the placement of churches or supermarkets within a town. That interest distinguishes geography from other sciences, physical or social, and underlies many of the questions geographers ask: Where is a thing located? How is that location related to other items? How did the location we observe come to exist? Such questions carry the conviction that the contents of an area are comprehensibly arranged or structured. The arrangement of things on the earth's surface is called **spatial distribution** and may be analyzed by the elements common to all spatial distributions: *density*, *dispersion*, and *pattern*.

Density

The measure of the number or quantity of anything within a defined unit of area is its **density**. It is therefore not simply a count of items but of items in relation to the space in which they are found. When the relationship is absolute, as in population per square kilometer, for example, or dwelling units per acre, we are defining *arithmetic density* (see Figure 1.9). Sometimes it is more meaningful to relate item numbers to a specific kind of area. *Physiological density*, for example, is a measure of the number of persons per unit area of arable land. Density defined in population terms is discussed in Chapter 4.

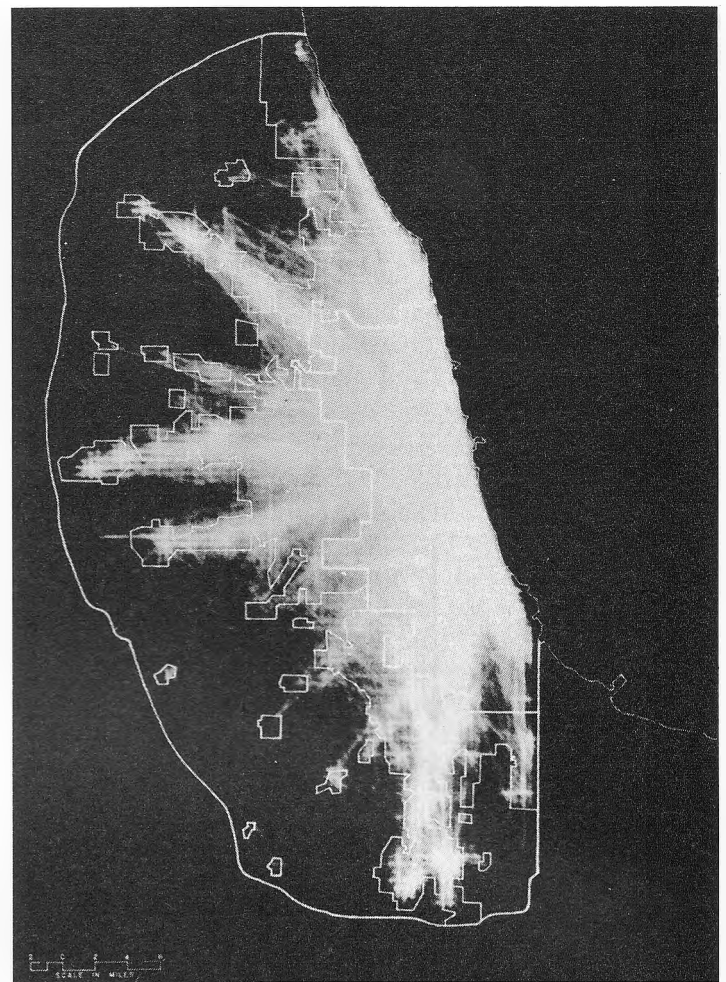


FIGURE 1.13 The routes of the 5 million automobile trips made each day in Chicago during the late 1950s are recorded on this light-display map. The boundaries of the region of interaction that they created are clearly marked. Those boundaries (and the dynamic region they defined) were subject to change as residential neighborhoods expanded or developed, as population relocations occurred, and as the road pattern was altered over time.

A density figure is a statement of fact but not necessarily one useful in itself. Densities are normally employed comparatively, relative to one another. High or low density implies a comparison with a known standard, with an average, or with a different area. Ohio, with (1994) 105 persons per square kilometer (271 per sq. mi.) might be thought to have a high density compared to neighboring Michigan at 64 per square kilometer (167 per sq. mi.), and a low one in relation to New Jersey at 411 (1065 per sq. mi.).

Dispersion

Dispersion (or its opposite, **concentration**) is a statement of the amount of *spread* of a phenomenon over an area. It tells us not how many or how much but how far things are spread out. If they are close together spatially,

they are considered *clustered* or *agglomerated*. If they are spread out, they are *dispersed* or *scattered* (Figure 1.14).

If the entire population of a metropolitan county were all located within a confined central city, we might say the population was clustered. If, however, that same population redistributed itself, with many city residents moving to the suburbs and occupying a larger portion of the county's territory, it would become more dispersed. In both cases, the *density* of population (numbers in relation to area of the county) would be the same, but the distribution would have changed. Since dispersion deals with separation of things one from another, a distribution that might be described as *clustered* (closely spaced) at one scale of reference might equally well be considered *dispersed* (widely spread) at another scale.

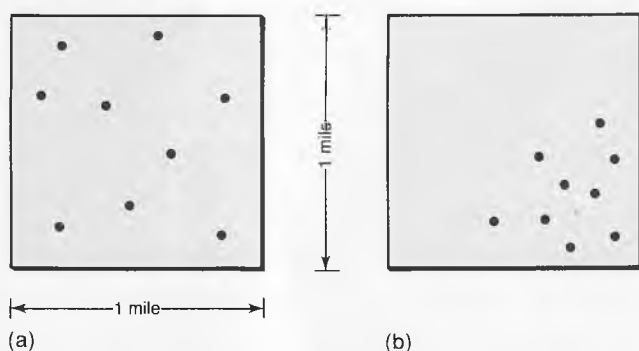


FIGURE 1.14 Density and dispersion each tell us something different about how items are distributed in an area. *Density* is simply the number of items or observations within a defined area; it remains the same no matter how the items are distributed. The density of houses per square mile, for example, is the same in both (a) and (b). *Dispersion* is a statement about nearness or separation. The houses in (a) are more *dispersed* than those shown *clustered* in (b).

Pattern

The geometric arrangement of things in space is called **pattern**. Like dispersion, pattern refers to distribution, but that reference emphasizes design rather than spacing (Figure 1.15). The distribution of towns along a railroad or houses along a street may be seen as *linear*. A *centralized* pattern may involve items concentrated around a single node. A *random* pattern may be the best description of an unstructured irregular distribution.

The rectangular system of land survey adopted in much of the United States under the Ordinance of 1785 creates a checkerboard rural pattern of "sections" and "quarter-sections" of farmland (see Figure 6.25). As a result, in most American cities, streets display a *grid* or *rectilinear* pattern. The same is true of cities in Canada, Australia, New Zealand, and South Africa, which adopted similar geometric survey systems. The *hexagonal* pattern of service areas of farm towns is a mainstay of central place theory discussed in Chapter 11. These references to

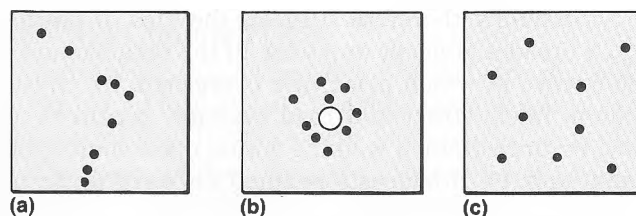


FIGURE 1.15 Pattern describes spatial arrangement and design. The *linear* pattern of towns in (a) perhaps traces the route of a road or railroad or the course of a river. The central city in (b) with its nearby suburbs represents a *centralized* pattern, while the dots in (c) are *randomly* distributed.

the geometry of distribution patterns help us visualize and describe the structured arrangement of things in space. They help us make informed comparisons between areas and use the patterns we discern to ask further questions about the interrelationship of things.

Place Similarity and Regions

The distinctive characteristics of places in content and structure immediately suggest two geographically important ideas. The first is that no two places on the surface of the earth can be *exactly* the same. Not only do they have different absolute locations, but—as in the features of the human face—the precise mix of physical and cultural characteristics of a place is never exactly duplicated.

Since geography is a spatial science, the inevitable uniqueness of place would seem to impose impossible problems of generalizing spatial information. That this is not the case results from the second important idea: The physical and cultural content of an area and the dynamic interconnections of people and places show patterns of spatial similarity. Often the similarities are striking enough for us to conclude that spatial regularities exist. They permit us to recognize and define **regions**—earth areas that display significant elements of internal uniformity and external difference from surrounding territories. Places are, therefore, both unlike and like other places, creating patterns of areal differences and of coherent spatial similarity.

The problem of the historian and the geographer is similar: each must generalize about items of study that are essentially unique. The historian creates arbitrary but meaningful and useful historical periods for reference and study. The "Roaring Twenties" and the "Victorian Era" are shorthand summary names for specific time spans, internally quite complex and varied but significantly distinct from what went before or followed after. The region is the geographer's equivalent of the historian's epoch. It is a device of areal generalization, an attempt to separate the otherwise overwhelming diversity and complexity of the earth's surface into recognizable component parts. In both the time and the space need for generalization, attention is focused on key unifying elements or similarities of the

era or area selected for study. In both the historical and geographical cases, the names assigned to those times and places serve to identify the time span or region and to convey a complex set of interrelated attributes.

All of us have a general idea of the meaning of region, and all of us refer to regions in everyday speech and action. We visit "the old neighborhood" or "go downtown"; we plan to vacation or retire in the "Sunbelt"; or we speculate about the effects of weather conditions in the "corn belt" on next year's food prices. In each instance we have mental images of the areas mentioned, and in each we have engaged in an informal place classification to pass along quite complex spatial, organizational, or content ideas. We have applied the **regional concept** to bring order to the immense diversity of the earth's surface.

What we do informally as individuals, geography attempts to do formally as a discipline—define and explain regions (Figure 1.16). The purpose is clear: to make the infinitely varying world around us understandable through spatial summaries. That world is only rarely subdivided into neat, unmistakable "packages" of uniformity. Neither the environment nor human areal actions present us with a compartmentalized order, any more than the sweep of human history has predetermined "eras" or all plant specimens come labeled in nature with species names. We all must classify to understand, and the geographer classifies in regional terms.

Regions are spatial expressions of ideas or summaries useful to the analysis of the problem at hand. Although as many possible regions exist as there are physical, cultural, or organizational attributes of area, the geographer studies selected areal variables that contribute to the understanding of a specific topic or areal problem. All other variables are disregarded as irrelevant. Regional boundaries are assumed to be marked where the region's internal unifying characteristics change so materially that different regional summaries are required.

The Characteristics of Regions

The regional concept tells us that all regions share certain common characteristics related to earth space.

- **Regions have location**, often expressed in the regional name selected, such as the Middle West, the Near East, North Africa, and the like. This form of regional name underscores the importance of *relative location*.
- **Regions have spatial extent**. They define territories across which uniform sets of physical, cultural, or organizational features are found.
- **Regions have boundaries** based on the areal spread of the features selected for study. Since regions are the recognition of the features defining them, their boundaries are drawn where those features no longer occur or dominate (Figure 1.17). Regional boundaries are rarely as sharply defined as those suggested by Figure 1.17 or by the regional maps in this and other geography texts. More frequently, broad zones of transition from one distinctive core area to another exist, as the dominance of the defining regional features gradually diminishes outward from the core to the regional periphery. Linear boundaries are arbitrary divisions made necessary by the scale of world regional maps and by the summary character of most regional discussions.
- **Regions are hierarchically arranged**. Although regions vary in scale, type, and degree of generalization, none stands alone as the ultimate key to areal understanding. Each defines a part of spatial reality (Figure 1.18) and at the same time exists as a part of a larger, equally valid regional unit.

Types of Regions

Regions may be either *formal*, *functional*, or *perceptual*. **Formal** or **uniform regions** are areas of essential uniformity in one or a limited combination of physical or

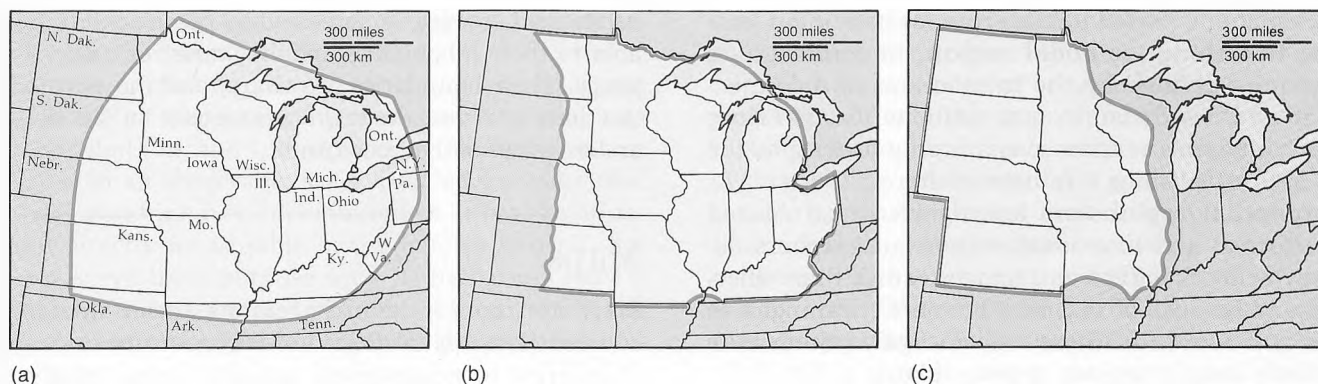
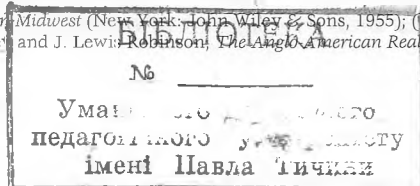


FIGURE 1.16 The Middle West as seen by different professional geographers. Agreement on the need to recognize spatial order and to define regional units does not imply unanimity in the selection of boundary criteria. All the sources concur in the significance of the Middle West as a regional entity in the spatial structure of the United States and agree on its core area. These sources differ, however, in their assessment of its limiting characteristics.

Sources: (a) John H. Garland, ed., *The North American Midwest* (New York: John Wiley & Sons, 1955); (b) John R. Borchert and Jane McGuigan, *Geography of The New World* (Chicago: Rand McNally, 1961); and (c) Otis P. Starke and J. Lewis Robinson, *The Anglo-American Realm* (New York: McGraw-Hill, 1969).



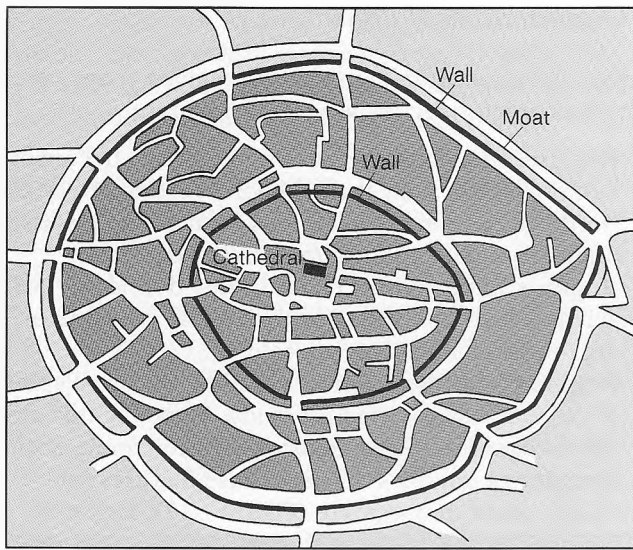


FIGURE 1.17 Aachen, Germany, in 1649. The acceptance of regional extent implies the recognition of regional boundaries. At some defined point, *urban* is replaced by *nonurban*, the Midwest ends and the Plains begin, or the rain forest ceases and the savanna emerges. Regional boundaries are, of course, seldom as precisely and visibly marked as were the limits of the walled medieval city. Its sprawling modern counterpart may be more difficult to define, but the boundary significance of the concept of *urban* remains.

cultural features. Your home state is a precisely bounded formal political region within which uniformity of law and administration is found. Later in this book we will encounter formal (homogeneous) cultural regions in which standardized characteristics of language, religion, ethnicity, or economy exist. The foldout maps of landform regions and country units show other formal regional patterns. Whatever the basis of its definition, the formal region is the largest area over which a valid generalization of attribute uniformity may be made. Whatever is stated about one part of it holds true for its remainder.

The **functional** or **nodal region**, in contrast, is a spatial system defined by the interactions and connections that give it a dynamic, organizational basis (Figure 1.19). Its boundaries remain constant only as long as the interchanges establishing it remain unaltered.

Perceptual regions are less rigorously structured than the formal and functional regions geographers devise. They reflect feelings and images rather than objective data and because of that may be more meaningful in the lives and actions of those who recognize them than are the more abstract regions of geographers.

Ordinary people have a clear idea of spatial variation and employ the regional concept to distinguish between territorial entities. People individually and collectively agree on where they live. The *vernacular regions* they recognize have reality in their minds and are reflected in regionally based names employed in businesses, by sports teams, or in

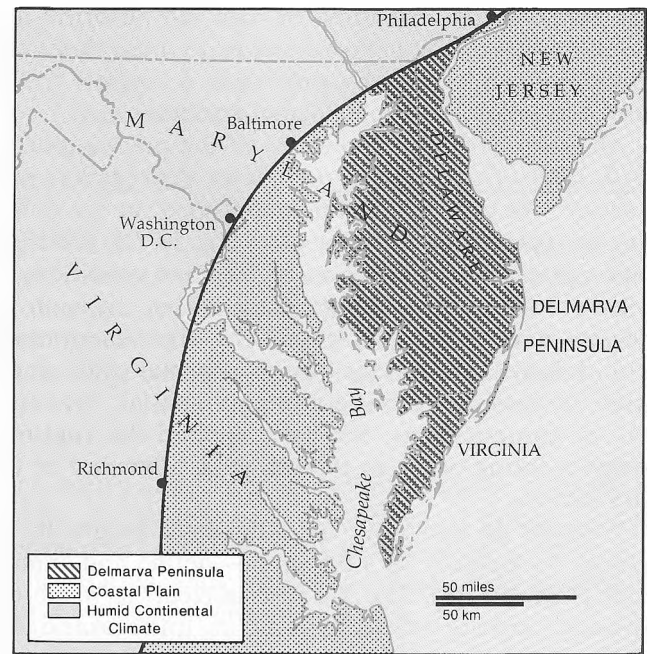


FIGURE 1.18 A hierarchy of regions. One possible nesting of regions within a regional hierarchy defined by differing criteria. On a formal regional scale of size progression, the Delmarva Peninsula of the eastern United States may be seen as part of the Atlantic Coastal Plain, which is in turn a portion of the eastern North American humid continental climatic region. Each regional unit has internal coherence. The recognition of its constituent parts aids in understanding the larger composite areal unit.

advertising slogans. The frequency of references to "Dixie" in the southeastern United States represents that kind of regional consensus and awareness. Such vernacular regions reflect the way people view space, assign their loyalties, and interpret their world. At a different scale, such urban ethnic enclaves (see Chapter 6) as "Little Italy" or "Chinatown" have comparable regional identity in the minds of their inhabitants. Less clearly perceived by outsiders but unmistakable to their inhabitants are the "turfs" of urban clubs or gangs. Their boundaries are sharp, and the perceived distinctions between them are paramount in the daily lives and activities of their occupants.

Maps

Maps are tools to identify regions and to analyze their content. The spatial distributions, patterns, and relations of interest to geographers usually cannot easily be observed or interpreted in the landscape itself. Many, such as landform or agricultural regions or major cities, are so extensive spatially that they cannot be seen or studied in their totality from one or a few vantage points. Many, such as regions of language usage or religious belief, are spatial phenomena but are not tangible or visible. Many

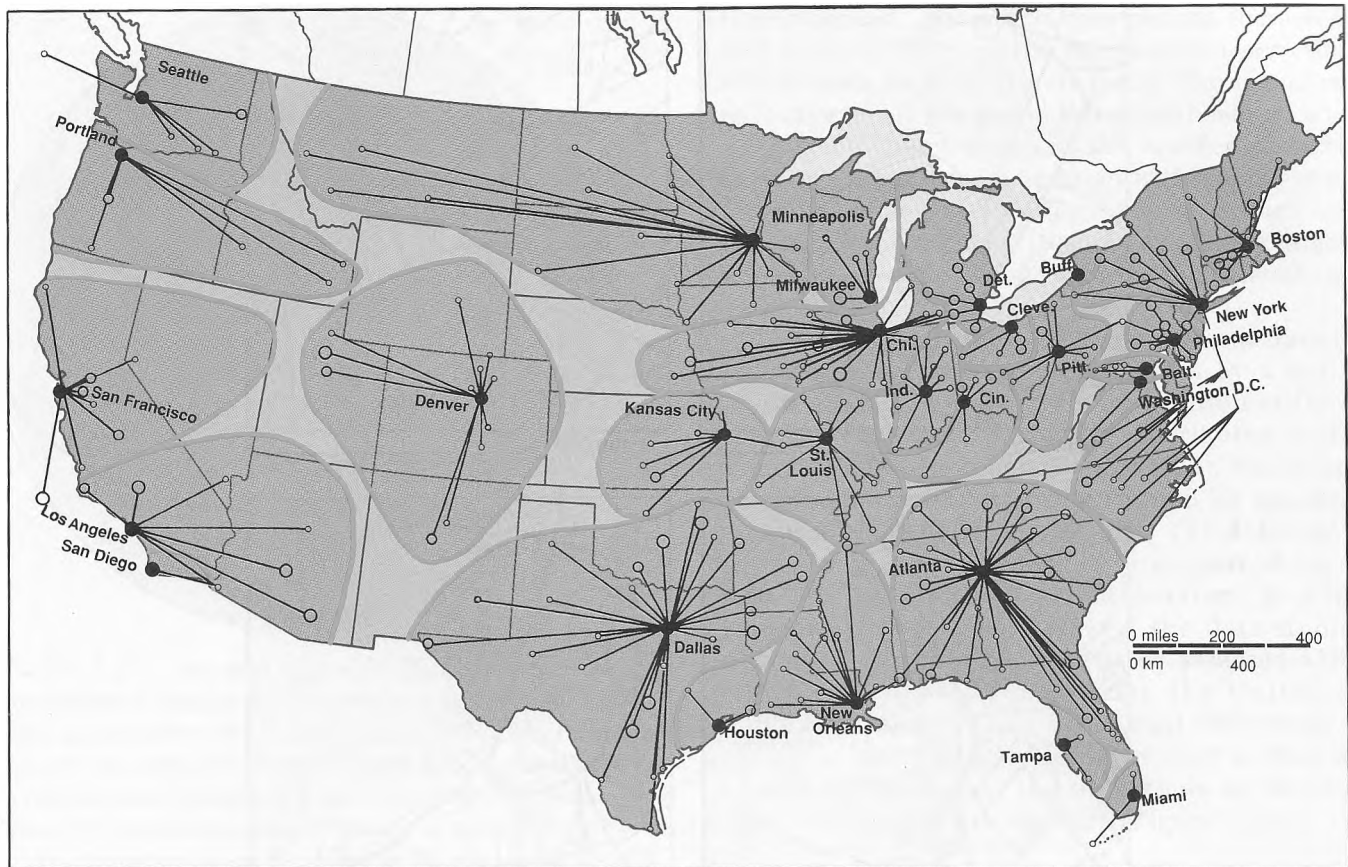


FIGURE 1.19 The *functional regions* shown on this map are based on linkages between large banks of major central cities and the “correspondent” banks they serve in smaller towns. The regions suggest one form of *connectivity* between principal cities and locales beyond their own immediate metropolitan area.

interactions, flows, and exchanges imparting the dynamic quality to spatial interaction may not be directly observable at all. And even if all things of geographic interest could be seen and measured through field examination, the infinite variety of tangible and intangible content of area would make it nearly impossible to isolate for study and interpretation the few matters of regional interest selected for special investigation.

Therefore, the map has become the essential and distinctive tool of geographers. Only through the map can spatial distributions and interactions of whatever nature be reduced to an observable scale, isolated for individual study, and combined or recombined to reveal relationships not directly measurable in the landscape itself. But maps can serve their purpose only if their users have a clear idea of their strengths, limitations, and diversity and of the conventions observed in their preparation and interpretation.

Map Scale

We have already seen that scale (page 11) is a vital element of every map. Because it is a much reduced version of the reality it summarizes, a map generalizes the data it displays. *Scale*—the relationship between size or length of

a feature on the map and the same item on the earth's surface—determines the amount of that generalization. The smaller the scale of the map, the larger is the area it covers and the more generalized are the data it portrays. The larger the scale, the smaller is the depicted area and the more accurately can its content be represented (Figure 1.20). It may seem backward, but large-scale maps show small areas, and small-scale maps show large areas.

Map scale is selected according to the amount of generalization of data that is acceptable and the size of area that must be depicted. The user must consider map scale in evaluating the reliability of the spatial data that are presented. Regional boundary lines drawn on the world maps in this and other books or atlases would cover many kilometers or miles on the earth's surface. They obviously distort the reality they are meant to define, and on small-scale maps major distortion is inevitable. In fact, a general rule of thumb is that the larger the earth area depicted on a map, the greater is the distortion built into the map.

This is so because a map has to depict the curved surface of the three-dimensional earth on a two-dimensional sheet of paper. The term **projection** designates the method chosen to represent the earth's curved surface as a flat map. Since absolutely accurate representation is

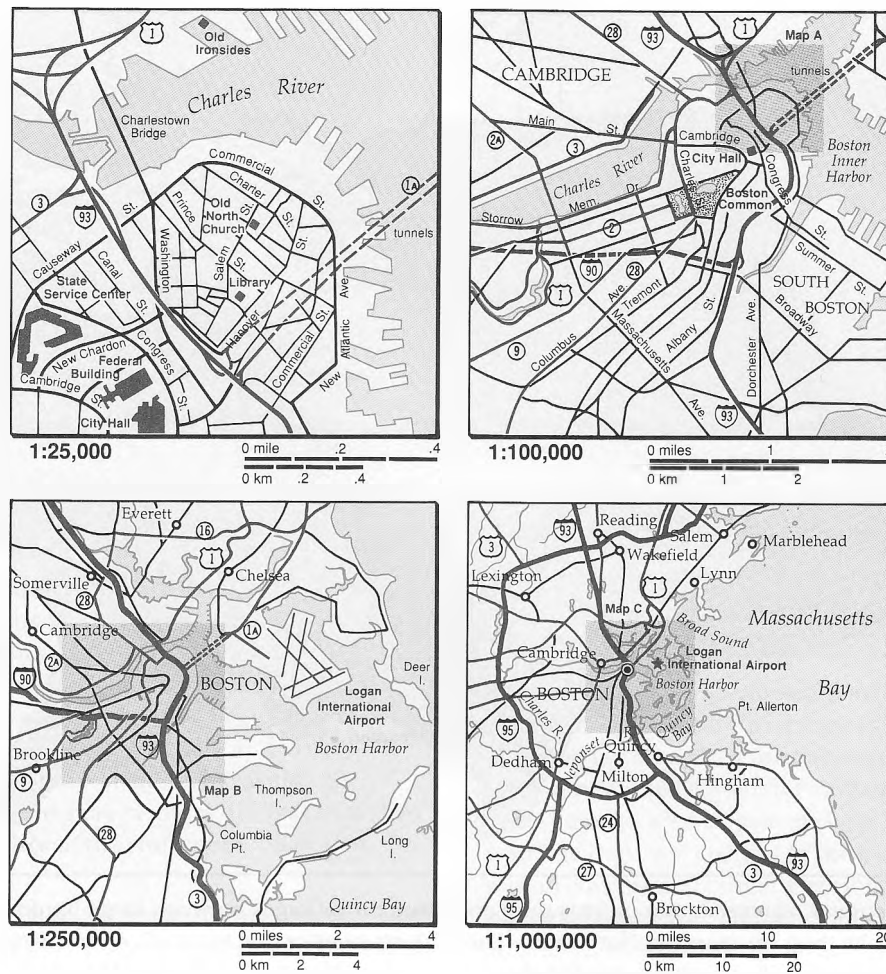


FIGURE 1.20 The effect of scale on area and detail. The larger the scale, the greater the number and kinds of features that can be included. Scale may be reported to the map user in one (or more) of three ways. A *verbal* scale is given in words (“1 centimeter to 1 kilometer” or “1 inch to 1 mile”). A *representative fraction* (such as that placed at the left and below each of the four maps shown here) is a statement of how many linear units on the earth’s surface are represented by one unit on the map. A *graphic* scale (such as that placed at the right and below each of these maps) is a line or bar marked off in map units but labeled in ground units.

impossible, all projections inevitably distort. Specific projections may be selected, however, to minimize the distortion of at least one of the four main map properties—area, shape, distance, and direction.²

The Globe Grid

Maps are geographers’ primary tools of spatial analysis. All spatial analysis starts with locations, and all locations are related to the global grid of latitude and longitude. Since these lines of reference are drawn on the spherical earth, their projection onto a map distorts their grid relationships. The extent of variance between the globe grid and a map grid helps tell us the kind and degree of distortion the map will contain.

² A more complete discussion of map projections, including examples of their different types and purposes, may be found in Appendix A, beginning on page 491.

The key reference points in the *grid system* are the North and South poles and the equator, which are given in nature, and the *prime meridian*, which is agreed on by cartographers. Because a circle contains 360 degrees, the distance between the poles is 180 degrees and between the equator and each pole, 90 degrees (Figure 1.21). *Latitude* measures distance north and south of the equator (0°), and *parallels* of latitude run due east-west. *Longitude* is the angular distance east or west of the prime meridian and is depicted by north-south lines called *meridians*, which converge at the poles. The properties of the globe grid the mapmaker tries to retain and the map user should look for are as follows:

1. All meridians are of equal length; each is one-half the length of the equator.
2. All meridians converge at the poles and are true north-south lines.

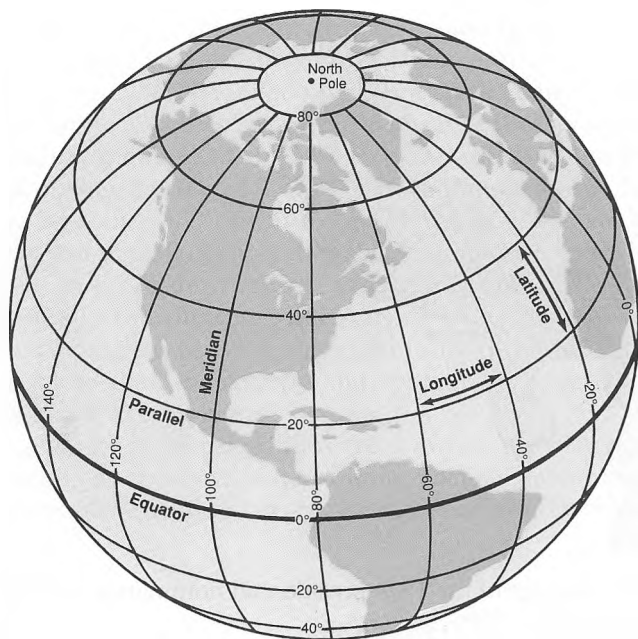


FIGURE 1.21 The grid system of parallels of latitude and meridians of longitude. Since the meridians converge at the poles, parallels become increasingly shorter away from the equator. On the globe, the 60th parallel is only one-half as long as the equator, and a degree of longitude along it measures only about 55½ kilometers (about 34½ miles) compared to about 111 kilometers (about 69 miles) at the equator (0°).

3. All lines of latitude (parallels) are parallel to the equator and to each other.
4. Parallels decrease in length as one nears the poles.
5. Meridians and parallels intersect at right angles.
6. The scale on the surface of the globe is everywhere the same in every direction.

Only the globe grid itself retains all of these characteristics. To project it onto a surface that can be laid flat is to distort some or all of these properties and consequently to distort the reality the map attempts to portray.

How Maps Show Data

The properties of the globe grid and of various projections are the concern of the cartographer. The geographer is more interested in the depiction of spatial data and in the analysis of the patterns and interrelationships those data present. Out of the myriad items comprising the content of an area, the geographer must, first, select those that are of concern to the problem at hand and, second, decide on how best to display them for study or demonstration.

A *thematic map* is the general term applied to a map of any scale that presents a specific spatial distribution or a single category of data. The way the information is shown on such a map may vary according to the type of information to be conveyed and the level of generalization

that is desired. A *statistical map* records the actual numbers or occurrences of the mapped item per established unit area or location (Figure 1.22). The actual count of each state's colleges and universities shown on an outline map of the United States or the number of traffic accidents at each street intersection within a city are examples of statistical maps. A *cartogram* uses such statistical data to transform territorial space so that the largest areal unit on the map is the one showing the greatest statistical value (Figure 1.23).

A *dot map* gives a different view of data by representing quantities or occurrences by a dot placed on the map in the approximate location of the occurrence or, perhaps, uniformly distributed within the unit area of occurrence (Figure 1.24). The numerical value of a single dot is determined by the compiler and recorded in the map legend. The dot map serves not only to record data but to suggest their spatial pattern, distribution, and dispersion. A *choropleth map* presents average value of the data studied per unit area—dwelling unit rents or assessed values by city block, for example, or (in the United States) population densities by individual townships within counties. Each unit area on the map is then shaded or colored to suggest the magnitude of the event or item found within its borders (Figure 1.25).

4	9	13	11	9	4
8	13	15	17	12	10
6	19	18	12	7	3
9	15	12	10	8	3
8	9	10	8	5	2
5	6	7	6	1	1

FIGURE 1.22 The starting point of quantitative thematic maps is the location and magnitude of things or events. Here observations are assigned to their areas of occurrence. The spatial arrangement of events is recorded, but their pattern of occurrence is difficult to see.

McCarty/Lindberg, *A Preface to Economic Geography*, © 1966, p. 31. Redrawn by permission of Prentice-Hall, Inc., Upper Saddle River, NJ.

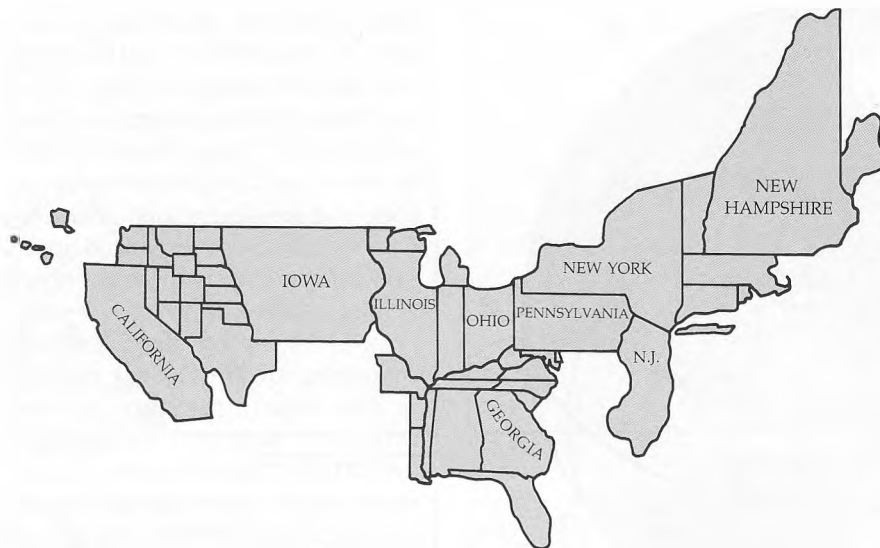


FIGURE 1.23 A cartogram with states drawn in proportion to news coverage of the 1984 presidential nomination contests.

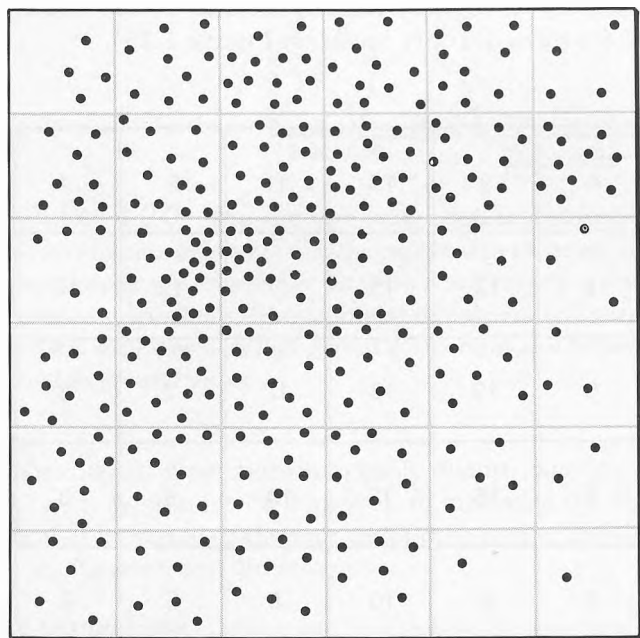


FIGURE 1.24 A dot map example. In this dot map the data of Figure 1.22 are represented by dots placed randomly within the areal statistical units.

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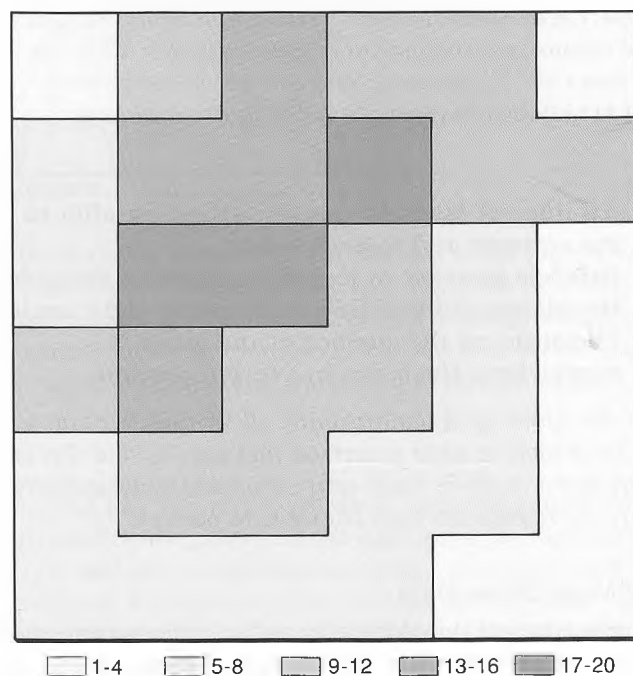


FIGURE 1.25 A choropleth map example. This choropleth map is derived from Figure 1.22. Data are assigned to class intervals, and colors are used to distinguish magnitudes of occurrences. The selection of data intervals and choice of colors can alter the message and impact of the map.

McCarty/Lindberg, *A Preface to Economic Geography*, © 1966, p. 35. Redrawn by permission of Prentice-Hall, Inc., Upper Saddle River, NJ.

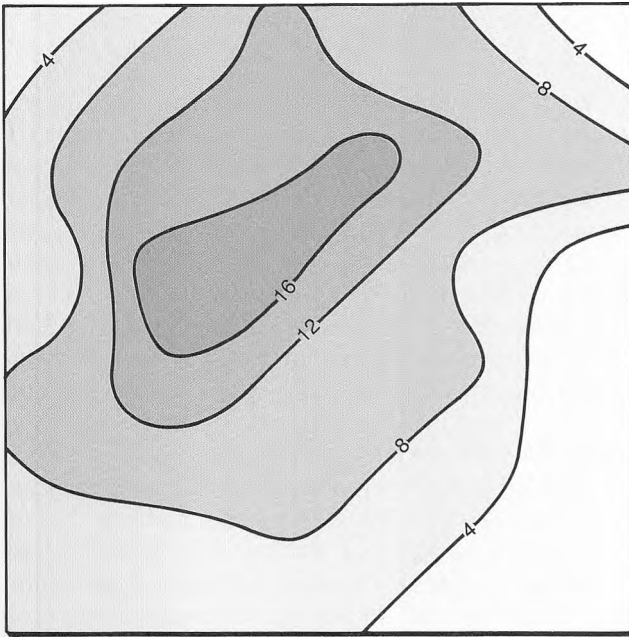


FIGURE 1.28 An isoline generalization of areal data. The basic assumptions of such a map are that (1) events occur at the central point of the statistical unit they represent and (2) events occur continuously across the map in smooth gradients. The isolines are drawn by estimating values between actual numerical amounts. The shadings applied to areas between the isolines on this map are those of Figure 1.25 class intervals.

McCarty/Lindberg, *A Preface to Economic Geography*, © 1966, p. 35. Redrawn by permission of Prentice-Hall, Inc., Upper Saddle River, NJ.

are images about an area or an environment developed by an individual on the basis of information or impressions received, interpreted, and stored. We use this information—this mental map—in organizing our daily activities: selecting our destinations and the sequence in which they will be visited, deciding on our routes of travel, recognizing where we are in relation to where we wish to be.

Such maps are every bit as real to their creators (and we all have them) as are the street maps or highway maps commercially available and they are a great deal more immediate in their impact on our spatial decisions. We may choose routes or avoid neighborhoods not on objective grounds but on emotional or perceptual ones. Whole sections of a community may be voids on our mental maps, as unknown as the interiors of Africa and South America were to Western Europeans two centuries ago. Our areas of awareness generally increase with the increasing mobility that comes with age (Figure 1.29), affluence, and education and may be enlarged or restricted for different social groups within the city (Figure 1.30).

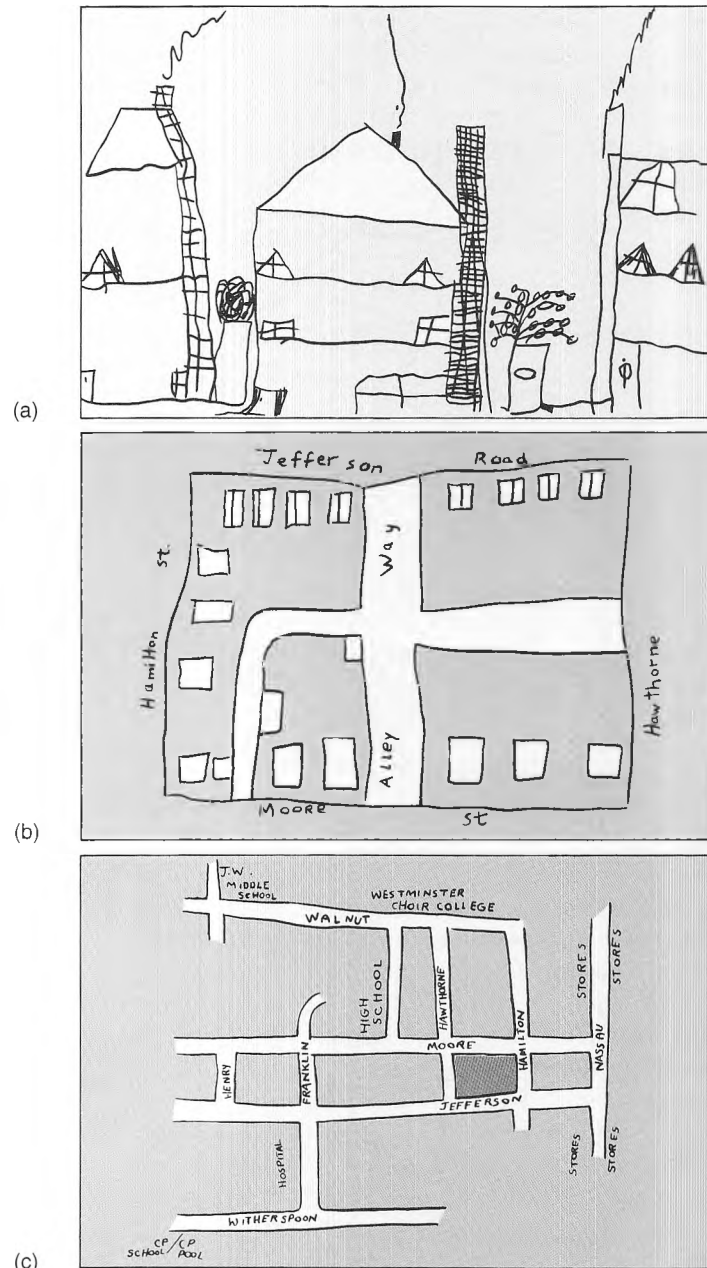


FIGURE 1.29 Three children, aged 6, 10, and 13, who lived in the same house, were asked to draw maps of their neighborhood. They received no further instructions. Notice how perspectives broaden and neighborhoods expand with age. (a) For the 6-year-old, the “neighborhood” consists of the houses on either side of her own. (b) The square block on which she lives is the neighborhood for the 10-year-old. (c) The wider horizons of the 13-year-old are reflected in her drawing. The square block the 10-year-old drew is shaded in this sketch.

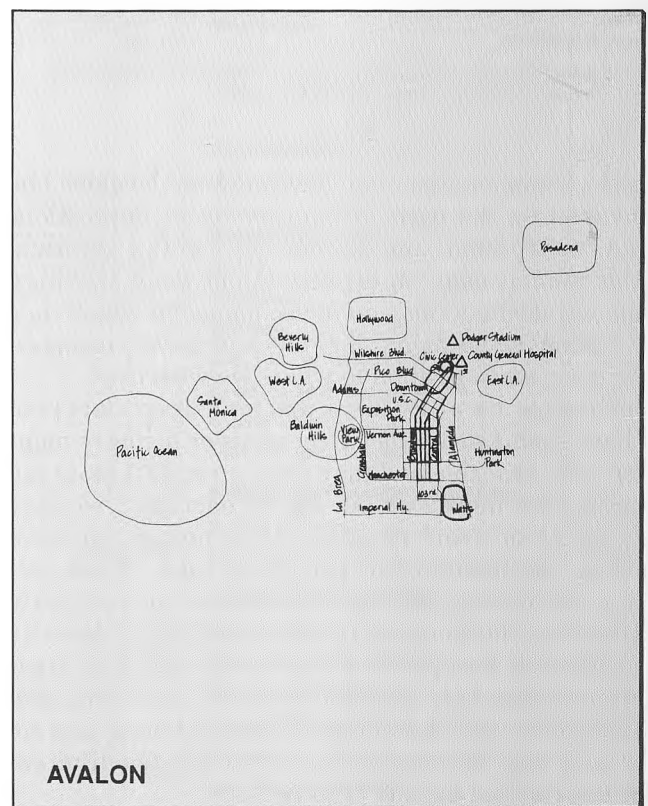
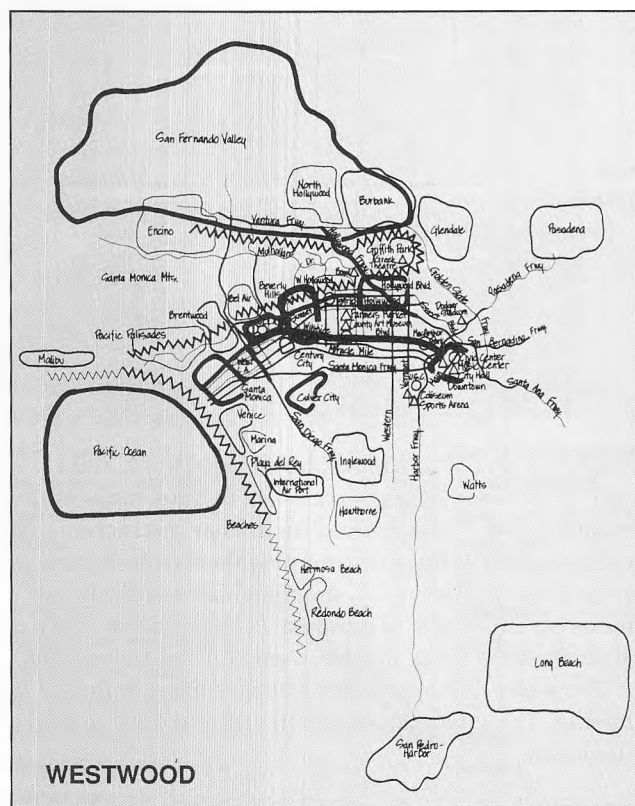
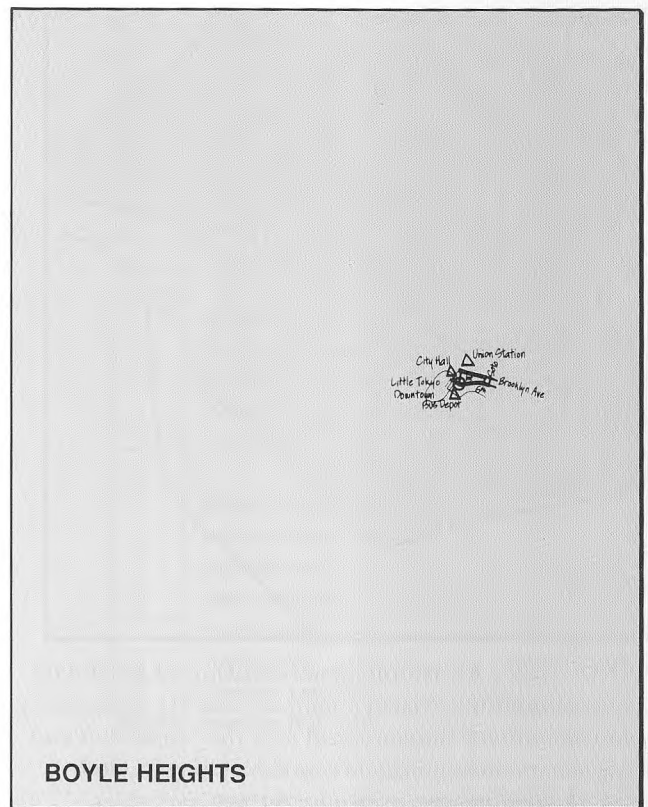
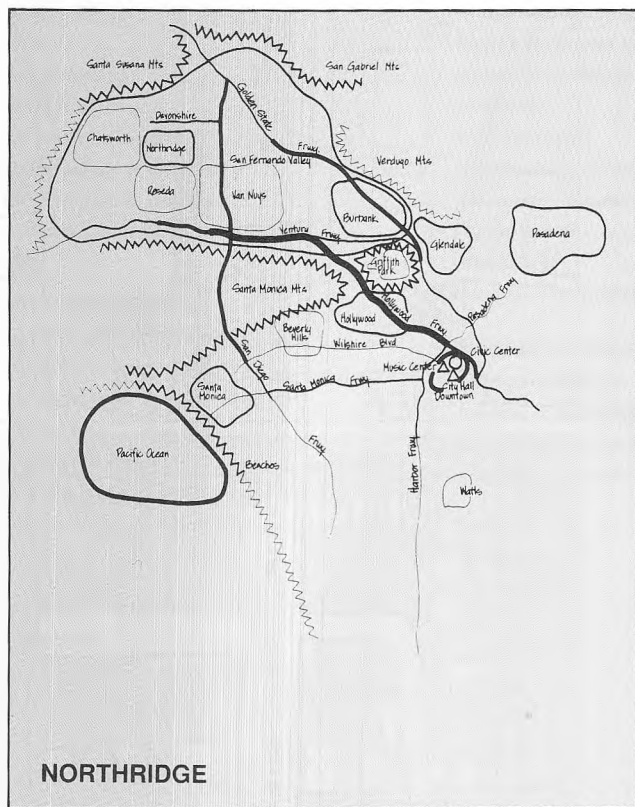


FIGURE 1.30 Four mental maps of Los Angeles. The upper-middle-income residents of Northridge and Westwood have expansive views of the metropolis, reflecting their mobility and area of travel. Residents of Boyle Heights and Avalon, both minority districts, have a much more restricted and incomplete mental image of the city. Their limited mental maps reflect and reinforce their spatial isolation within the metropolitan area.

Systems, Maps, and Models

The content of area is interrelated and constitutes a **spatial system** that, in common with all systems, functions as a unit because its component parts are interdependent. Only rarely do individual elements of area operate in isolation, and to treat them as if they do is to lose touch with spatial reality. The systems of geographic concern are those in which the functionally important variables are spatial: location, distance, direction, density, and the other basic concepts we have reviewed. The systems that they define are not the same as regions, though spatial systems may be the basis for regional identification.

Systems have components, and the analysis of the role of components helps reveal the operation of the system as a whole. To conduct that analysis, individual system elements must be isolated for separate identification and, perhaps, manipulated to see their function within the structure of the system or subsystem. Maps and models are the devices geographers use to achieve that isolation and separate study.

Maps, as we have seen, are effective to the degree that they can segregate at an appropriate level of generalization those system elements selected for examination. By compressing, simplifying, and abstracting reality, maps record in manageable dimension the real-world conditions of interest. A **model** is a simplified abstraction of reality, structured to clarify causal relationships. Maps are a kind of model. They represent reality in an idealized form so that certain aspects of its properties may be more clearly seen. They are a special form of model—their abstractions are rendered visually and at a reduced scale so they may be displayed, for example, on the pages of this book.

The complexities of spatial systems analysis—and the opportunities for quantitative analysis of systems made possible by computers and sophisticated statistical techniques—have led geographers to use other kinds of models in their work. Model building is the technique social scientists use to simplify complex situations, to eliminate (as does the map) unimportant details, and to isolate for special study and analysis the role of one or more interacting elements in a total system.

An interaction model discussed in Chapter 3, for instance, suggests that the amount of exchange expected between two places depends on the distance separating them and on their population size. The model indicates that the larger the places and the closer their distance, the greater is the amount of interaction. Such a model helps us to isolate the important components of the spatial system, to manipulate them separately, and to reach conclusions concerning their relative importance. When a model satisfactorily predicts the volume of intercity interaction in the majority of cases, the lack of agreement between what is observed and what is expected in a particular case leads to an examination of the circumstances contributing to the disparity. The quality of connecting roads, political barriers, or other variables may affect the specific places examined, and these causative elements may be isolated for further study.

Indeed, the steady pursuit of more refined and definitive analysis of human geographic questions—the “further study” that continues to add to our understanding of how people occupy and utilize the earth, interact with each other, and organize and alter earth space—has led to the remarkably diversified yet coherent field of modern human geography. With the content of this introductory chapter as background to the nature, traditions, and tools of geography, we are ready to begin its exploration.

Summary

Geography is about earth space and its physical and cultural content. Throughout its long history, geography has remained consistent in its focus on human–environmental interactions, the interrelatedness of places, and the likenesses and differences in physical and cultural content of area that exist from place to place. The collective interests of geographers are summarized by the spatial and systems analytical questions they ask. The responses to those questions are interpreted through basic concepts of location, distance, direction, content evolution, spatial interaction, and regional organization.

Geographers employ maps and models to abstract the complex reality of space and to isolate its components for separate study. Maps are imperfect renderings of the three-dimensional earth and its parts upon a two-dimensional surface. In that rendering, some or all of the characteristics of the globe grid are distorted, but convenience and data manageability are gained. Spatial information may be depicted visually in a number of ways, each designed to simplify and to clarify the infinite complexity of spatial content. Geographers also use verbal and mathematical models for the same purpose, to abstract and analyze.

In their pursuit of the study of the earth's surface as the occupied and altered space within which humans operate, geographers may concentrate on the integration of physical and cultural phenomena in a specific earth area (regional geography). They may, instead, emphasize systematic geography through study of the earth's physical systems of spatial and human concern or, as here, devote primary attention to people. This is a text in *human geography*. Its focus is on human interactions both with the physical environments people occupy and alter and with the cultural environments they have created. We are concerned with the ways people perceive the landscapes and regions they occupy, act within and between them, make choices about them, and organize them according to the varying cultural, political, and economic interests of human societies. This is a text clearly within the social sciences, but like all geography, its background is the physical earth as the home of humans. As a human geography, its concern is with how that home has been altered by societies and cultures. Culture is the starting point, and in the next chapter we begin with an inquiry about the roots and nature of culture.

KEY WORDS

absolute direction 10
absolute distance 11
absolute location 9
accessibility 14
concentration 15
connectivity 15
cultural landscape 12
density 15
dispersion 15
formal region 17
functional region 18

mental map 23
model 27
natural landscape 12
nodal region 18
pattern 16
perceptual region 18
projection 19
region 16
regional concept 17
relative direction 10

relative distance 11
relative location 9
scale 11, 19
site 10
situation 10
spatial diffusion 15
spatial distribution 15
spatial interaction 14
spatial system 27
uniform region 17

FOR REVIEW

1. In what two meanings and for what different purposes do we refer to *location*?
2. Describe the *site* and the *situation* of the town where you live, work, or go to school.
3. What kinds of distance transformations are suggested by the term *relative distance*? How is the concept of *psychological distance* related to relative distance?
4. What are the common elements of *spatial distribution*? What different aspects of the spatial arrangement of things do they address?
5. What are the common characteristics of *regions*? How are *formal* and *functional* regions different in concept and definition? What is a *perceptual region*?
6. List at least four properties of the globe grid. Why are globe grid properties apt to be distorted on maps?
7. What does *prime meridian* mean? What happens to the length of a degree of longitude as one approaches the poles?
8. What different ways of displaying statistical data on maps can you name and describe?

SELECTED REFERENCES

- Abler, Ronald F., Melvin G. Marcus, and Judy M. Olson, eds. *Geography's Inner Worlds: Pervasive Themes in Contemporary American Geography*. New Brunswick, NJ: Rutgers University Press, 1992.
- Demko, George J., with Jerome Agel and Eugene Boe. *Why in the World: Adventures in Geography*. New York: Anchor Books/Doubleday, 1992.
- Dent, Borden D. *Cartography: Thematic Map Design*. 3d ed. Dubuque, IA: Wm. C. Brown, 1993.
- Dickinson, Robert E., and Osbert J. R. Howarth. *The Making of Geography*. Oxford: Clarendon Press, 1933.
- Fenneman, Nevin M. "The Circumference of Geography." *Annals of the Association of American Geographers* 9 (1919): 3-11.
- Gaile, Gary L., and Cort J. Willmott, eds. *Geography in America*. Columbus, OH: Merrill, 1989.
- Gersmehl, Phil. *The Language of Maps. NCGE Pathways in Geography P-1*. Indiana, PA: National Council for Geographic Education, 1991.
- Goodall, Brian. *The Facts on File Dictionary of Human Geography*. New York: Facts on File Publications, 1987.
- Gould, Peter, and Rodney White. *Mental Maps*. 2d ed. Boston: Allen & Unwin, 1986.
- Gritzner, Charles F., Jr. "The Scope of Cultural Geography." *Journal of Geography* 65 (1966): 4-11.
- Holt-Jensen, Arild. *Geography: Its History & Concepts*. 2d ed. Totowa, NJ: Barnes and Noble, 1988.
- Johnston, Ronald J., Derek Gregory, and David M. Smith. *The Dictionary of Human Geography*. 3d ed. Oxford: Blackwell Publishers, 1994.
- Johnston, Ronald J., J. Hauer, and G. A. Koekveld, eds. *Regional Geography: Current Developments and Future Prospects*. New York: Routledge, 1990.
- Lanegran, David A., and Risa Palm. *An Invitation to Geography*. 2d ed. New York: McGraw-Hill, 1978.
- Larkin, Robert P., and Gary L. Peters. *Dictionary of Concepts in Human Geography*. Westport, CN: Greenwood Press, 1983.
- Ley, David. "Cultural/Humanistic Geography." *Progress in Human Geography* 5 (1981): 249-257; 7 (1983): 267-275.
- Livingstone, David N. *The Geographical Tradition*. Cambridge, MA: Blackwell Publishers, 1992.
- Lobeck, Armin K. *Things Maps Don't Tell Us: An Adventure into Map Interpretation*. Chicago, IL: University of Chicago Press, 1993.
- Marshall, Bruce, ed. *The Real World: Understanding the Modern World through the New Geography*. Boston: Houghton Mifflin, 1991.
- Martin, Geoffrey J., and Preston E. James. *All Possible Worlds: A History of Geographical Ideas*. 3d ed. New York: John Wiley & Sons, 1993.
- Massey, Doreen. "Introduction: Geography Matters," in Doreen Massey and John Allen, eds., *Geography Matters! A Reader*. Pp. 1-11. New York: Cambridge University Press, 1984.
- McDonald, James R. "The Region: Its Conception, Design and Limitations." *Annals of the Association of American Geographers* 56 (1966): 516-528.

- Monmonier, Mark. *Mapping It Out: Expository Cartography for the Humanities and Social Sciences*. Chicago: University of Chicago Press, 1993.
- Morrill, Richard L. "The Nature, Unity and Value of Geography." *Professional Geographer* 35 (1983): 1-9.
- Muehrcke, Phillip C., and Juliana O. Muehrcke. *Map Use: Reading, Analysis, and Interpretation*. 3d ed. Madison, WI: J. P. Publications, 1992.
- Pattison, William D. "The Four Traditions of Geography." *Journal of Geography* 63 (1964): 211-216.
- Robinson, J. Lewis. "A New Look at the Four Traditions of Geography." *Journal of Geography* 75 (1976): 520-530.
- Rogers, Ali, Heather Viles, and Andrew Goudie. *The Student's Companion to Geography*. Cambridge, MA: Blackwell Publishers, 1992.
- Rowntree, Lester. "Cultural/Humanistic Geography." *Progress in Human Geography* 10 (1986): 580-586.
- Sobel, Dava. *Longitude. The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time*. New York: Walker & Company, 1995.
- Thomson, J(ames) Oliver. *History of Ancient Geography*. New York: Biblo and Tannen, 1965.
- Tuan, Yi-fu. "Humanistic Geography." *Annals of the Association of American Geographers* 66 (1976): 266-276.
- Wheeler, James O. "Notes on the Rise of the Area Studies Tradition in U.S. Geography, 1910-1929." *Professional Geographer* 38 (1986): 53-61.
- White, Gilbert F. "Geographers in a Perilously Changing World." *Annals of the Association of American Geographers* 75 (1985): 10-15.
- Whittlesey, Derwent. "The Regional Concept and the Regional Method." Chapter 2 in *American Geography: Inventory and Prospect*, edited by Preston E. James and Clarence F. Jones. Syracuse, NY: Syracuse University Press, 1954.
- Wood, Denis. *The Power of Maps*. New York: Guilford Press, 1992.
- Wood, T. F. "Thinking in Geography." *Geography* 72 (1987): 289-299.

THEMES AND FUNDAMENTALS OF HUMAN GEOGRAPHY

PART



Rush hour in Jaipur, Rajasthan, India. People in spatial interaction are the starting point of human geography.

H

uman geography studies the ways in which people and societies are regionally different in their distinguishing characteristics. Additionally, it examines the ways that different societies perceive, use, and alter the landscapes they occupy. These interests would seem to imply an unmanageable range and variety of topics. The implication is misleading, however, for the diversified subject matter of human geography can be accommodated within two general themes connected by one continuing and unifying thread of concern.

One theme considers the traits of *culture* that characterize different social groups and comprise the individual pieces of the human geographic mosaic. These are matters of learned behaviors, attitudes, and group beliefs that are fundamental and identifying features of specific social groups and larger societies. They are cultural identifiers that are transmitted within the group by tradition, example, and instruction. A second theme has to do with the *systems* of production, livelihood, spatial organization, and administration—and the institutions appropriate to those systems—that a society erects in response to opportunity, technology, resources, conflict, or the need to adapt and change. This second theme recognizes what French geographers early in this century called *genre de vie*—the way of life—of a population that might be adopted or pursued no matter what the other intangible cultural traits of that social group might be. Interwoven with and unifying these primary themes is the continuing background concern of geographers: humans and environments in interaction.

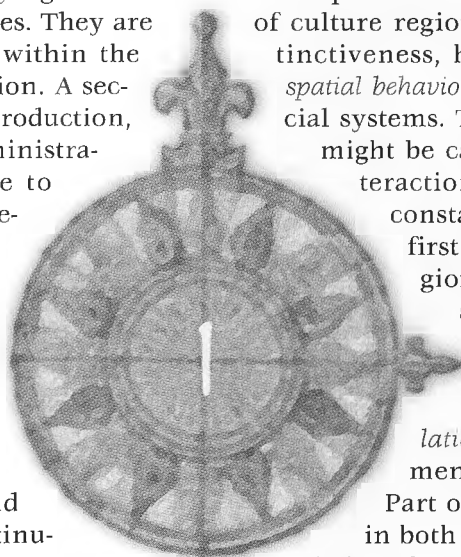
We shall pursue each of these themes in separate sections of this book and address the unifying interest in human impact on the earth surface both as an integral part of each chapter and as the topic of our concluding chapter. Throughout, we shall keep returning to a small number of basic observations that underlie

all of human geographic study: (1) People and the societies they form are differentiated by a limited set of identifying cultural characteristics and organizational structures; (2) Without regard to those cultural and organization differences, human spatial behavior has common and recurring motivations and patterns; (3) Cultural variations and spatial actions are rooted in the distribution, numbers, and movements of people.

These observations are the concerns of the following three chapters, which together make up this first part of our study of human geography. We begin by setting the stage in Chapter 2 with a review of the meaning, components, and structure of *culture* and of the processes of cultural change, diffusion, and divergence. Those processes underlie an observable world mosaic of culture regions and realms. Despite regional distinctiveness, however, common characteristics of *spatial behavior* affect and unify all peoples and social systems. These are the topics of Chapter 3 and might be called the “ground rules” of spatial interaction. They are physical and behavioral constants whose recognition is a necessary first step in understanding the world, regional, and local patterns of people and social systems that are so central to human geography.

To conclude the first section of our study, Chapter 4 focuses on *population*: people in their numbers, movements, distributions, and growth trends. Part of our understanding of those matters, in both their world and regional expressions, is based on the examination of cultural origins and diffusions and the principles of spatial interaction conducted in Chapters 2 and 3.

The first phase of our exploration of human geography, then, expresses a unifying concern with the cultural processes and spatial interactions of an unevenly distributed and expanding world population.



ROOTS AND MEANING OF CULTURE

CHAPTER

2

Components of Culture	35
Interaction of People and Environment	36
Environments as Controls	37
Human Impacts	38
Roots of Culture	40
Seeds of Change	43
Agricultural Origins and Diffusions	44
Neolithic Innovations	46
Culture Hearths	47
The Structure of Culture	51
Culture Change	52
Innovation	54
Diffusion	55
Contact between Regions	57
Cultural Modification and Adoption	60
SUMMARY	60
KEY WORDS	61
FOR REVIEW	61
SELECTED REFERENCES	61



Dogon dancers of Mali, West Africa. Cultural differences still remain in a world of increasing human geographic similarity.

They buried him there in the cave where they were working, less than 6 kilometers (4 miles) from the edge of the ice sheet. Outside stretched the tundra, summer feeding grounds for the mammoths whose ivory they had come so far to collect. Inside, near where they dug his grave, were stacked the tusks they had gathered and were cutting and shaping. They prepared the body carefully and dusted it with red ochre, then buried it in an elaborate grave with tundra flowers and offerings of food, a bracelet on its arm, a pendant about its throat, and 40 to 50 polished rods of ivory by its side. It rested there, in modern Wales, undisturbed for some 18,000 years until discovered early in the 19th century. The 25-year-old hunter had died far from the group's home some 650 kilometers (400 miles) away, near present-day Paris, France. He had been part of a routine annual summer expedition overland from the forested south across the as-yet-unflooded English Channel to the mammoths' grazing grounds at the edge of the glacier.

As always, they were well prepared for the trip. Their boots were carefully made. Their sewn skin leggings and tunics served well for travel and work; heavier fur parkas warded off the evening chill. They carried emergency food, fire-making equipment, and braided cord that they could fashion into nets, fishing lines, ropes, or thread. They traveled by reference to sun and stars, recognizing landmarks from past journeys and occasionally consulting a crude map etched on bone.

Although the hunters returned bearing the sad news of their companion's death, they also brought the ivory to be carved and traded among the scattered peoples of Europe from the Atlantic Ocean to the Ural Mountains.

As shown by their tools and equipment, their behaviors and beliefs, these Stone Age travelers displayed highly developed and distinctive characteristics, primitive only from the vantage point of our own different technologies and customs. They represented the culmination of a long history of development of skills, of invention of tools, and of creation of life-styles that set them apart from peoples elsewhere in Europe, Asia, and Africa who were the inheritors of still different cultural heritages.

To writers in newspapers and the popular press, "culture" means the arts (literature, painting, music, and the like). To a social scientist, **culture** is the specialized behavioral patterns, understandings, adaptations, and social systems that summarize a group of people's learned way of life. In this broader sense, culture is an ever-

present part of the regional differences that are the essence of human geography. The visible and invisible evidences of culture—buildings and farming patterns, language, political organization, and ways of earning a living, for example—are all parts of the spatial diversity human geographers study. Cultural differences over time may present contrasts as great as those between the Stone Age ivory hunters and modern urban Americans. Cultural differences in area result in human landscapes with variations as subtle as the differing "feel" of urban Paris, Moscow, or New York or as obvious as the sharp contrasts of rural Zimbabwe and the Prairie Provinces of Canada (Figure 2.1).



(a)



(b)

FIGURE 2.1 Visible cultural contrasts are clearly evident between (a) a subsistence maize plot in Zimbabwe and (b) the broad regularity of extensively farmed fields of the Canadian prairies.

Since such tangible and intangible cultural differences exist and have existed in various forms for thousands of years, human geography addresses the question, Why? Why, since humankind constitutes a single species, are cultures so varied? What and where were the origins of the different culture regions we now observe? How, from whatever limited areas individual culture traits developed, were they diffused over a wider portion of the globe? How did people who had roughly similar origins come to display significant areal differences in technology, social structure, ideology, and the other myriad expressions of human geographic diversity? In what ways and why are there distinctive cultural variations even in presumed "melting pot" societies such as the United States and Canada or in the outwardly homogeneous long-established countries of Europe? Part of the answer to these questions is to be found in the way separate human groups developed techniques to solve regionally varied problems of securing food, clothing, and shelter and, in the process, created areally distinctive customs and ways of life.

Components of Culture

Culture is transmitted within a society to succeeding generations by imitation, instruction, and example. In short, it is learned, not biological. It has nothing to do with instinct or with genes (see "The Question of Race," p. 180). As members of a social group, individuals acquire integrated

sets of behavioral patterns, environmental and social perceptions, and knowledge of existing technologies. Of necessity, each of us learns the culture in which we are born and reared. But we need not—indeed, cannot—learn its totality. Age, sex, status, or occupation may dictate the aspects of the cultural whole in which an individual becomes fully indoctrinated.

A culture, that is, despite overall generalized and identifying characteristics and even an outward appearance of uniformity, displays a social structure—a framework of roles and interrelationships of individuals and established groups. Each individual learns and adheres to the rules and conventions not only of the culture as a whole, but also of those specific to the subgroup to which he or she belongs. And that subgroup may have its own recognized social structure (Figure 2.2).

Culture is a complexly interlocked web of behaviors and attitudes. Realistically, its full and diverse content cannot be appreciated, and in fact may be wholly misunderstood, if we concentrate our attention only on limited, obvious traits. Distinctive eating utensils, the use of gestures, or the ritual of religious ceremony may summarize and characterize a culture for the casual observer. These are, however, individually insignificant parts of a much more complex structure that can be appreciated only when the whole is experienced.

Out of the richness and intricacy of human life we seek to isolate for special study those more fundamental cultural variables that give structure and spatial order to societies. We begin with *culture traits*, the smallest distinctive



(a)



(b)

FIGURE 2.2 (a) Both the traditional rice farmer of rural Japan and (b) the harried commuter of Tokyo are part of a common Japanese culture. They occupy vastly different positions in its social structure.

items of culture. **Culture traits** are units of learned behavior ranging from the language spoken to the tools used or the games played. A trait may be an object (a fishhook, for example), a technique (weaving and knotting of a fishnet), a belief (in the spirits resident in water bodies), or an attitude (a conviction that fish is superior to other animal protein). Such traits are the most elementary expression of culture, the building blocks of the complex behavioral patterns of distinctive groups of peoples.

Individual cultural traits that are functionally interrelated comprise a **culture complex**. The existence of such complexes is universal. Keeping cattle was a *culture trait* of the Masai of Kenya and Tanzania. Related traits included the measurement of personal wealth by the number of cattle owned, a diet containing milk and the blood of cattle, and disdain for labor unrelated to herding. The assemblage of these and other related traits yielded a culture complex descriptive of one aspect of Masai society (Figure 2.3). In exactly analogous ways, religious complexes, business behavior complexes, sports complexes, and others can easily be recognized in American or any other society.

Culture traits and complexes have areal extent. When they are plotted on maps, the regional character of the components of culture is revealed. Although human geographers are interested in the spatial distribution of these individual elements of culture, their usual concern is with the **culture region**, a portion of the earth's surface occupied by populations sharing recognizable and distinctive cultural characteristics. Examples include the political organizations societies devise, the religions they espouse, the form of economy they pursue, and even the type of clothing they wear, eating utensils they use, or kind of housing they occupy. There are as many such culture regions as there are culture traits and complexes recognized for population groups. Their recognition will be particularly important in discussions of ethnic, folk, and popular cultures in later chapters of this book.

Finally, a set of culture regions showing related culture complexes and landscapes may be grouped to form a **culture realm**. The term recognizes a large segment of the earth's surface having an assumed fundamental uniformity in its cultural characteristics and showing a significant difference in them from adjacent realms. Culture realms are, in a sense, culture regions at the broadest scale of recognition. In fact, the scale is so broad and the diversity within the recognized realms so great that the very concept of realm may mislead more than it informs. One of many possible divisions of human cultures into realms is offered in Figure 2.4. The spatial pattern and characteristics of these generalized realms will help us place the discussions and examples of human geography of later chapters in their regional context.

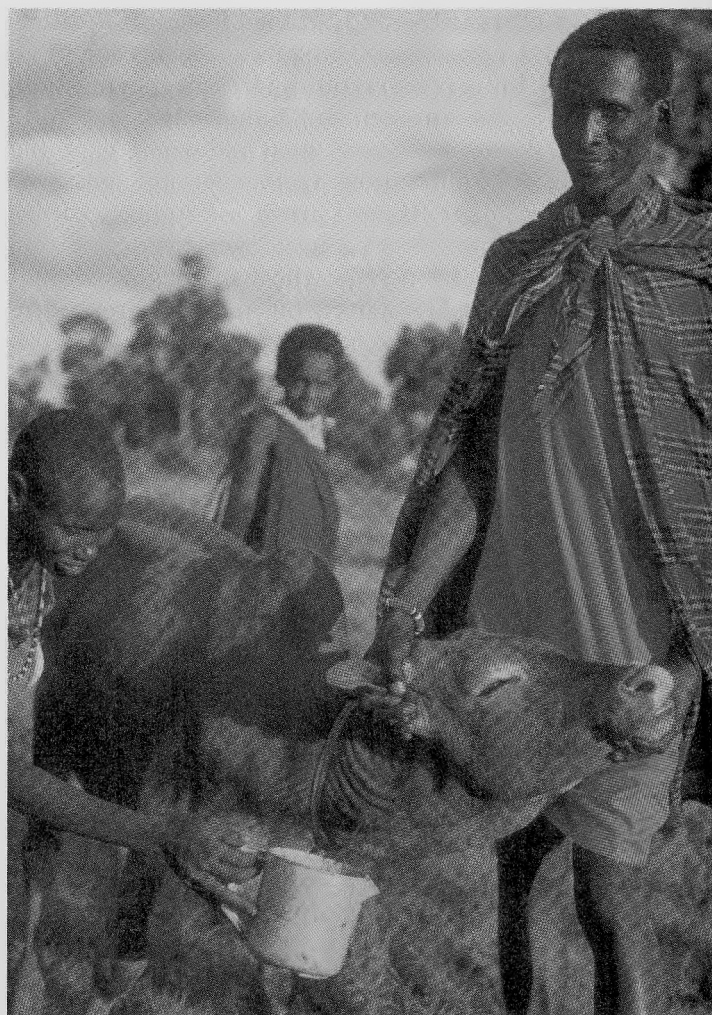


FIGURE 2.3 The formerly migratory Masai of Kenya are now largely sedentary, partially urbanized, and frequently owners of fenced farms. Cattle formed the traditional basis of Masai culture and were the evidence of wealth and social status. They provided, as well, the milk and blood important in the Masai diet. Here, a herdsman catches blood released from a small neck incision he has just made.

Interaction of People and Environment

Culture develops in a physical environment that, in its way, contributes to differences among people. In primitive societies, the acquisition of food, shelter, and clothing, all parts of culture, depends on the utilization of the natural resources at hand. The interrelations of people to the environment of a given area, their perceptions and utilization of it, and their impact on it are interwoven themes of **cultural ecology**—the study of the relationship between a culture group and the natural environment it occupies.

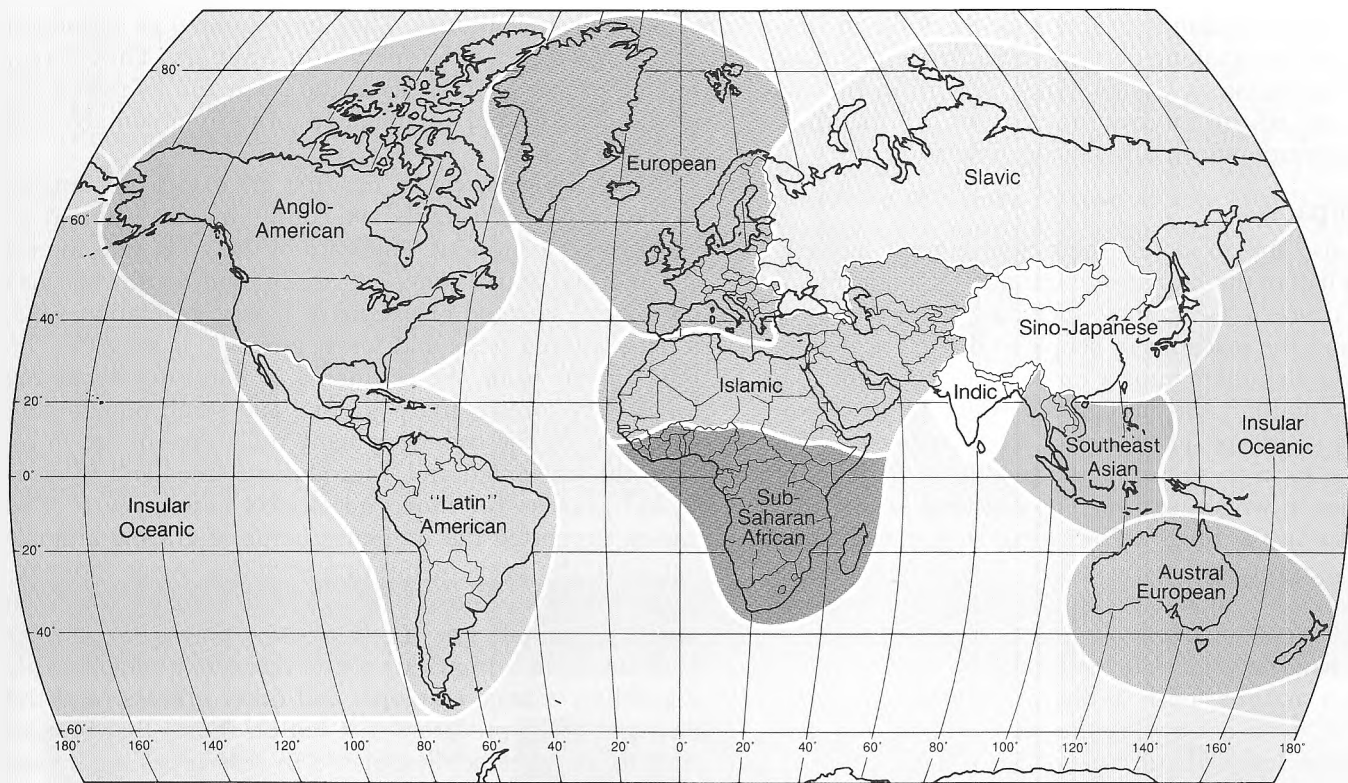


FIGURE 2.4 Culture realms of the modern world. This is just one of many possible subdivisions of the world into multifactor cultural regions.

Environments as Controls

Geographers have long dismissed as intellectually limiting and demonstrably invalid the ideas of **environmental determinism**, the belief that the physical environment exclusively shapes humans, their actions, and their thoughts. Environmental factors alone cannot account for the cultural variations that occur around the world. Levels of technology, systems of organization, and ideas about what is true and right have no obvious relationship to environmental circumstances.

The environment does place certain limitations on the human use of territory. Such limitations, however, must be seen not as absolute, enduring restrictions but as relative to technologies, cost considerations, national aspirations, and linkages with the larger world. Human choices in the use of landscapes are affected by group perception of the feasibility and desirability of their settlement and exploitation. These are not circumstances inherent in the land. Mines, factories, and cities were (and are being) created in the formerly nearly unpopulated tundra and forests of Siberia as a reflection of Russian developmental programs, not in response to recent environmental improvement. **Possibilism** is the viewpoint that people, not environments, are the dynamic forces of cultural development. The needs, traditions, and level of technology of a culture affect how that culture assesses the possibilities of an area and shape what choices the culture makes regarding them. Each society uses natural resources in accordance with its circumstances.

Changes in a group's technical abilities or objectives bring about changes in its perceptions of the usefulness of the land. Simply put, the impact of the environment appears inversely related to the level of development of a culture, while perception of environmental opportunities increases directly with growth in economic and cultural development.

Map evidence suggests the nature of some environmental limitations on use of area. The vast majority of the world's population is differentially concentrated on less than one-half of the earth's land surface, as Figure 4.21 suggests. Areas with relatively mild climates that offer a supply of fresh water, fertile soil, and abundant mineral resources are densely settled, reflecting in part the different potentials of the land under earlier technologies to support population. Even today, the polar regions, high and rugged mountains, deserts, and some hot and humid lowland areas contain very few people. If resources for feeding, clothing, or housing ourselves within an area are lacking, or if we do not recognize them there, there is no inducement for people to occupy the territory.

Environments that do contain such resources provide the framework within which a culture operates. Coal, oil, and natural gas have been in their present locations throughout human history, but they were of no use to preindustrial cultures and did not impart any recognized advantage to their sites of occurrence. Not until the Industrial Revolution did these deposits gain importance and come to influence the location of such great industrial

complexes as the Midlands in England, the Ruhr in Germany, and the steelmaking districts formerly so important in parts of northeastern United States. American Indians made one use of the environment around Pittsburgh, while 19th-century industrialists made quite another.

Human Impacts

People are also able to modify their environment, and this is the other half of the human–environment relationship of geographic concern. Geography, including cultural geography, examines the reactions of people to the physical environment and also their impact on that environment. We modify our environment through the material objects we place on the landscape: cities, farms, roads, and so on (Figure 2.5). The form these take is the product of the kind of culture group in which we live. The **cultural landscape**, the earth's surface as modified by human action, is the tangible physical record of a given culture. House types, transportation networks, parks and cemeteries, and the size and distribution of settlements are among the indicators of the use that humans have made of the land.

Human actions, both deliberate and inadvertent, modifying or even destroying the environment are perhaps as old as humankind itself. People have used, altered, and replaced the vegetation in wide areas of the

tropics and midlatitudes. They have hunted to extinction vast herds and whole species of animals. They have, through overuse and abuse of the earth and its resources, rendered sterile and unpopulated formerly productive and attractive regions.

Fire has been called the first great tool of humans, and the impact of its early and continuing use is found on nearly every continent. Poleward of the great rain forests of equatorial South America, Africa, and South Asia lies the *tropical savanna* of extensive grassy vegetation separating scattered trees and forest groves (Figure 2.6). The trees appear to be the remnants of naturally occurring tropical dry forests, thorn forests, and scrub now largely obliterated by the use, over many millennia, of fire to remove the unwanted and unproductive trees and to clear off old grasses for more nutritious new growth. The grasses supported the immense herds of grazing animals that were the basis of hunting societies. After independence, the government of Kenya in East Africa sought to protect its national game preserves by prohibiting the periodic use of fire. It quickly found that the immense herds of gazelles, zebras, antelope, and other grazers (and the lions and other predators that fed on them) that tourists came to see were being replaced by less-appealing browsing species—rhinos, hippos, and elephants. With fire prohibited, the forests began to reclaim their natural habitat and the grassland fauna was replaced.

The same form of vegetation replacement occurred in midlatitudes. The grasslands of North America were greatly extended by Native Americans who burned the forest margin to extend grazing areas and to drive animals in the hunt. The control of fire in modern times has resulted in the advance of the forest once again in formerly grassy areas (“parks”) of Colorado, northern Arizona, and other parts of the United States West.



FIGURE 2.5 The physical and cultural landscapes in juxtaposition. Advanced societies are capable of so altering the circumstances of nature that the cultural landscapes they create become the controlling environment. The city of Cape Town, South Africa, is a “built environment” largely unrelated to its physical surroundings.



FIGURE 2.6 The parklike landscape of grasses and trees characteristic of the tropical savanna is seen in this view from Kenya, Africa.

Examples abound. The *Pleistocene overkill*—the Stone Age loss of whole species of large animals on all inhabited continents—is often ascribed to the unrestricted hunting to extinction carried on by societies familiar with fire to drive animals and hafted (handled) weapons to slaughter them. With the use of these, according to one estimate, about 40% of African large-animal genera passed to extinction. In North America, most of the original large-animal species had disappeared by 10,000 years ago under pressure from the hunters migrating to and spreading across the continent. Although some have suggested that climatic changes were at least partially responsible, human action seems the more likely explanation for the abrupt faunal losses. No uncertainty exists in the record of faunal destruction by the Maoris of New Zealand or of

Polynesians who had exterminated some 80% to 90% of South Pacific bird species—as many as 2000 in all—by the time Captain Cook arrived in the 18th century.

Not only destruction of animals but of the life-supporting environment itself has been a frequent consequence of human misuse of area (see “Chaco Canyon Desolation”). North Africa, the “granary of Rome” during the empire, became wasted and sterile in part because of mismanagement. Roman roads standing high above the surrounding barren wastes give testimony to the erosive power of wind and water when natural vegetation is unwisely removed and farming techniques are inappropriate. Easter Island in the South Pacific was covered lushly with palms and other trees when Polynesians settled there about A.D. 400. By the beginning of

CHACO CANYON DESOLATION

It is not certain when they first came, but by A.D. 1000 the Anasazi people were building a flourishing civilization in present-day Arizona and New Mexico. In the Chaco Canyon alone, they erected as many as 75 towns, all centered around pueblos, huge stone-and-adobe apartment buildings as tall as five stories and with as many as 800 rooms. These were the largest and tallest buildings of North America prior to the construction of iron-framed “cloudscrapers” in major cities at the end of the 19th century. An elaborate network of roads and irrigation canals connected and supported the pueblos. About A.D. 1200, the settlements were abruptly abandoned. The Anasazi, advanced in their skills of agriculture and communal dwelling, were forced to move by the ecological disaster their pressures had brought to a fragile environment.

They needed forests for fuel and for the hundreds of thousands of logs used as beams and bulwarks in their dwellings. The pinyon-juniper woodland of the canyon was quickly depleted. For larger timbers needed for construction, the Anasazi first harvested stands of ponderosa pine found some 40 kilometers (25 miles)



away. As early as A.D. 1030 these, too, were exhausted, and the community switched to spruce and Douglas fir from mountaintops surrounding the canyon. When they were gone by 1200, the Anasazi fate was sealed—not only by the loss of forest but by the irreversible ecological changes deforestation and agriculture had occasioned. With forest loss came erosion that destroyed the topsoil. The surface water channels that had been built for irrigation were deepened by accelerated erosion, converting

them into enlarging arroyos useless for agriculture.

The material roots of their culture destroyed, the Anasazi turned upon themselves; warfare convulsed the region. Smaller groups sought refuge elsewhere, recreating on reduced scale their pueblo way of life but now in nearly inaccessible, highly defensible mesa and cliff locations. The destruction they had wrought destroyed the Anasazi in turn.

the 18th century, Easter Island had become the barren wasteland it remains today. Deforestation increased soil erosion, removed the supply of timbers needed for the vital dugout fishing canoes, and made it impossible to move the massive stone statues that were significant in the islanders' religion (Figure 2.7). With the loss of livelihood resources and the collapse of religion, warfare broke out and the population was decimated. A similar tragic sequence is occurring on Madagascar in the Indian Ocean today. Despite current romantic notions, not all primitive societies lived in harmony with their environment.

The more technologically advanced and complex the culture, the more apparent is its impact on the natural landscape. In sprawling urban-industrial societies, the cultural landscape has come to outweigh the natural physical environment in its impact on people's daily lives. It interposes itself between "nature" and humans, and residents of the cities of such societies—living and working in climate-controlled buildings, driving to enclosed shopping malls—can go through life with very little contact with or concern about the physical environment.



FIGURE 2.7 Now treeless, Easter Island once was lushly forested. The statues (some weighing up to 85 tons) dotting the island were rolled to their locations and lifted into place with logs.

Roots of Culture

Earlier humans found the physical environment more immediate and controlling than we do today. Some 11,000 years ago, the massive glaciers—moving ice sheets of great depth—that had covered much of the land and water of the Northern Hemisphere (Figure 2.8) began to retreat. Animal, plant, and human populations that had been spatially confined by both the ice margin and the harsh climates of middle-latitude regions, began to spread, colonizing newly opened territories. The name *Paleolithic* (Old Stone Age) is used to describe the period near the end of glaciation during which small and scattered groups like the ivory hunters at this chapter's start began to develop regional variations in their ways of life and livelihood.

All were **hunter-gatherers**, preagricultural people dependent on the year-round availability of plant and animal foodstuffs they could secure with the limited variety of rudimentary stone tools and weapons at their disposal. Even during the height of the Ice Age, the unglaciated sections of western, central, and northeastern Europe (the continent with the best-documented evidence of Paleolithic culture) were covered with tundra vegetation, the mosses, lichens, and low shrubs typical of areas too cold to support forests. Southeastern Europe and southern Russia had forest, tundra, and grasslands, and the

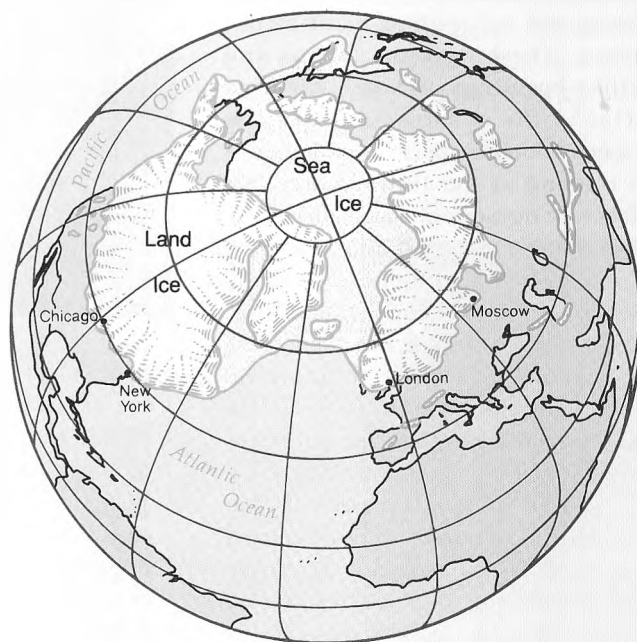


FIGURE 2.8 Maximum extent of glaciation. In their fullest development, glaciers of the most recent Ice Age covered large parts of Eurasia and North America. Even areas not covered by ice were affected as ocean levels dropped and rose and climate and vegetation regions changed with glacial advance and retreat.

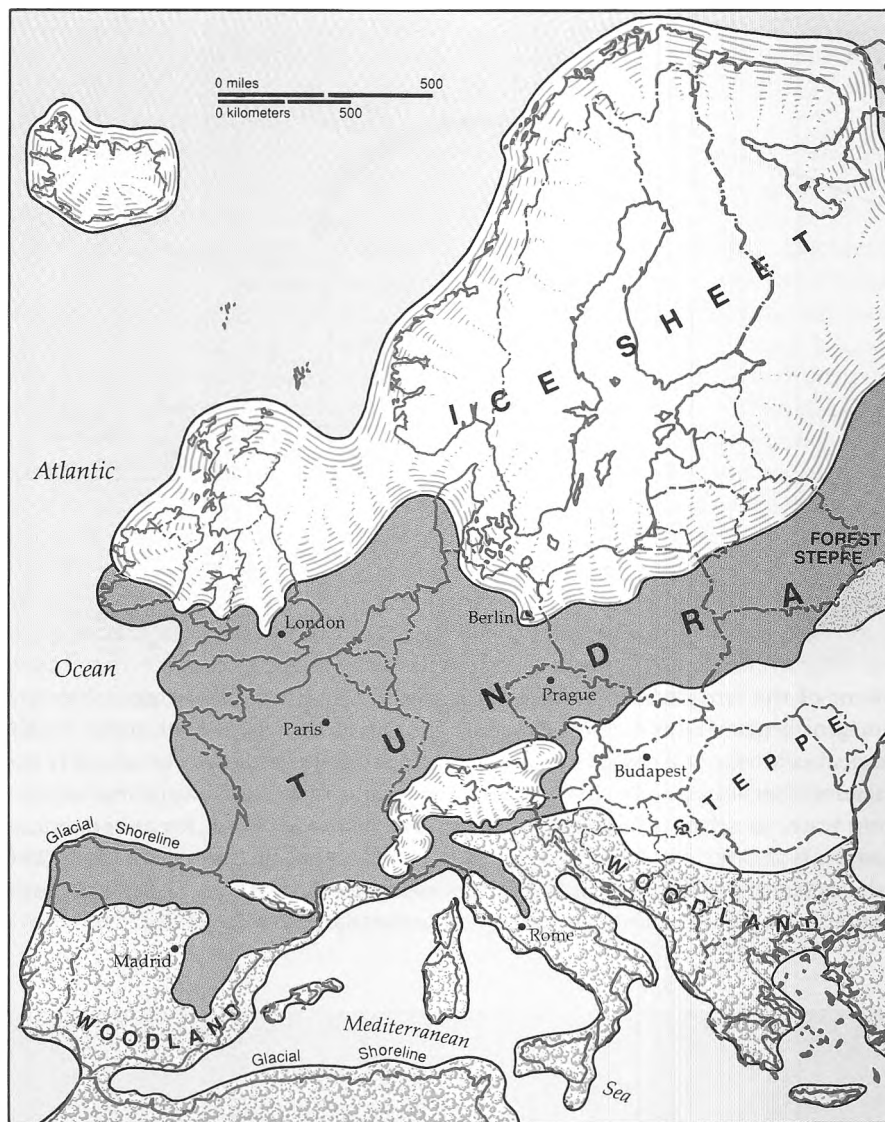


FIGURE 2.9 Late Paleolithic environments of Europe. During the late Paleolithic period new food-gathering, shelter, and clothing strategies were developed to cope with harsh and changing environments, so different from those in Europe today.

Mediterranean areas had forest cover (Figure 2.9). Gigantic herds of herbivores—reindeer, bison, mammoth, and horses—browsed, bred, and migrated throughout the tundra and the grasslands. An abundant animal life filled the forests.

Human migration northward into present-day Sweden, Finland, and Russia demanded a much more elaborate set of tools and provision for shelter and clothing than had previously been required. It necessitated the crossing of a number of ecological barriers and the occupation of previously avoided difficult environments. By the end of the Paleolithic period, humans had spread to all the continents but Antarctica, carrying with them their common hunting-gathering culture and social organization. The settlement of the lands bordering the Pacific Ocean is suggested in Figure 2.10.

While spreading, the total population also increased. But hunting and foraging bands require considerable territory to support a relatively small number of individuals. There were contacts between groups and, apparently, even planned gatherings for trade, socializing, and selecting spouses from outside the home group. Nevertheless, the bands tended to live in isolation. Estimates place the Paleolithic population of the entire island of Great Britain, which was on the northern margin of habitation, at only some 400–500 persons living in widely separated families of 20–40 people. Total world population at about 9000 B.C. probably ranged from 5 to 10 million. Variations in the types of tools characteristic of different population groups steadily increased as people migrated and encountered new environmental problems (Figure 2.11).

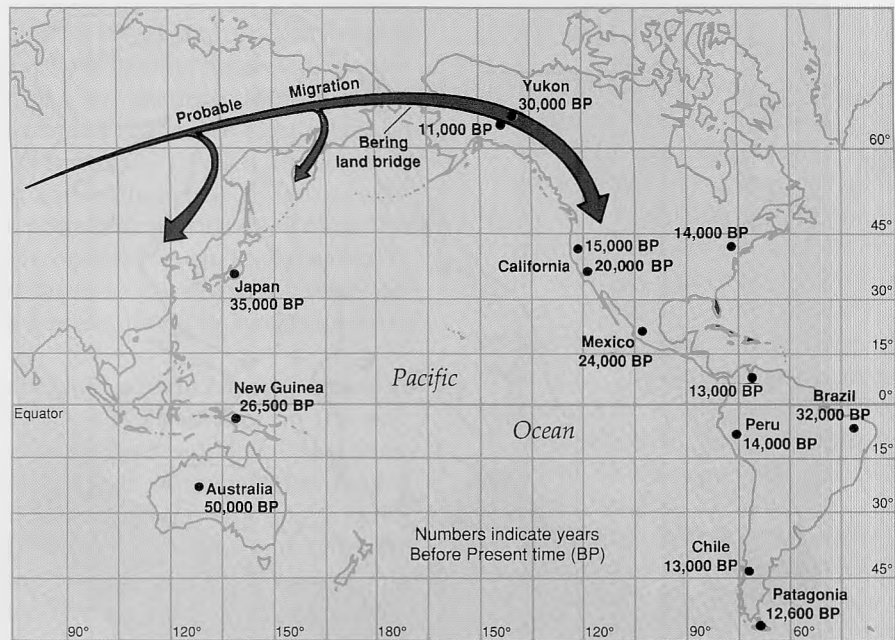


FIGURE 2.10 Settlement of the Americas and the Pacific basin. Genetic studies suggest humans spread around the globe from their Old World origins beginning some 100,000 years ago. Their time of arrival in the Western Hemisphere, however, is uncertain. Geological evidence indicates that the Bering Strait land bridge—over which it is speculated migrants from northern China and northeastern Siberia passed in three different migration waves—disappeared about 14,000 years ago when glacier melt released sufficient water to raise sea levels several hundred feet worldwide. Recent genetic and linguistic research suggests that the first Asian arrivals in America came no later than 22,000 years ago and more likely 29,000 years ago. Disputed radiocarbon dates from northeastern Brazil indicate cave dwellers were there as early as 32,000 and perhaps even 45,000 years ago. A Pennsylvania rock shelter is thought to have been occupied some 14,000 years ago.

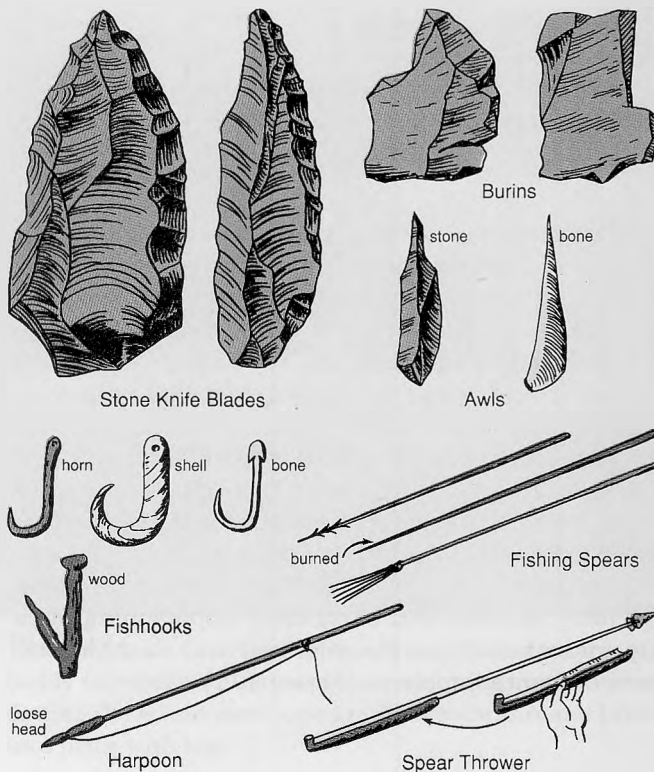


FIGURE 2.11 Representative tools of the Paleolithic period in Europe. The basis of many Stone Age tools was the stone blade, formed by new techniques of flaking stone that permitted efficient manufacture of special-purpose implements. Among these was the *burin*, a chisel-edged blade for working wood, bone, and antlers. The wooden or bone spear-thrower (called the *atlatl* after its Aztec name) permitted more reliable harvesting of large game. Development of bone and antler fishhooks and harpoons made possible a sedentary life based on fishing. Clothing and tents could be fashioned with bone awls, needles, and fasteners.

Improved tool technology greatly extended the range of possibilities in the use of locally available materials. The result was more efficient and extensive exploitation of the physical environment than earlier had been possible. At the same time, regional contrasts in plant and animal life and in environmental conditions accelerated the differentiation of culture between isolated groups who under earlier, less varied conditions had shared common characteristics.

Within many environments, even harsh ones, the hunting and foraging process was not particularly demanding of either time or energy. Recent studies of South African San people (Bushmen), for example, indicate that such bands survive well on the equivalent of a 2½-day workweek. Time was available for developing skills in working flint and bone for tools, in developing regionally distinctive art and sculpture, and in making decorative beads and shells for personal adornment and trade. By the end of the Ice Age (about 11,000 years ago), language, religion, long-distance trade, permanent settlements, and social stratification within groups appear to have been well developed in many European culture areas.

What was learned and created was transmitted within the cultural group. The increasing variety of adaptive strategies and technologies and the diversity of noneconomic creations in art, religion, language, and custom meant an inevitable cultural variation of humankind. That diversification began to replace the rough cultural uniformity among hunting and gathering people that had

been based on their similar livelihood patterns, informal leadership structures, small-band kinship groups, and the like (Figure 2.12).

Seeds of Change

The retreat of the last glaciers marked the end of the Paleolithic era and the beginning of successive periods of cultural evolution leading from primitive hunting and gathering economies at the outset through the development of agriculture and animal husbandry to, ultimately, the urbanization and industrialization of modern societies and economies. Since not all cultures passed through all stages at the same time, or even at all, **cultural divergence** between human groups became evident.

Glacial recession brought new ecological conditions to which people had to adapt. The weather became warmer, and forests began to appear on the open plains and tundras of Europe and northern China. In the Middle East, where much plant and animal domestication would later occur, savanna (grassland) vegetation replaced more arid landscapes. Populations grew and, through hunting depleted the large herds of grazing animals already retreating northward with the retreating glacial front.

Further population growth demanded new food bases and production techniques, for the **carrying capacity**—the number of persons supportable within a given area by the technologies at their disposal—of the earth for



FIGURE 2.12 Hunter-gatherers practiced the most enduring life-style in human history, trading it for the more arduous life of farmers under the necessity to provide larger quantities of less diversified foodstuffs for a growing population. For hunter-gatherers (unlike their settled farmer rivals and successors), age and sex differences, not caste or economic status, were and are the primary basis for the division of labor and of interpersonal relations. Here a San (Bushman) hunter of Botswana, Africa, stalks his prey. Men also help collect the gathered food that constitutes 80% of the San diet.

hunter-gatherers is low. The *Mesolithic* (Middle Stone Age) period, from about 11,000 to 5000 B.C. in Europe, marked the transition from the collection of food to its production. These stages of the "Stone Age"—occurring during different time spans in different world areas—mark distinctive changes in tools, tasks, and social complexities of the cultures that experience the transition from "Old" to "Middle" to "New."

Agricultural Origins and Diffusions

The population of hunter-gatherers rose slowly at the end of the glacial period. As rapid climatic fluctuation adversely affected their established plant and animal food sources, people independently in more than one world area experimented with the *domestication* of plants and animals. There is no agreement on whether the domestication of animals preceded or followed that of plants. The sequence may well have been different in different areas. What appears certain is that animal domestication—the successful breeding of species that are dependent on human beings—began during the Mesolithic, not as a conscious economic effort by humans but as outgrowths of the keeping of small or young wild animals as pets and the attraction of scavenger animals to the refuse of human settlements. The assignment of religious significance to certain animals and the docility of others to herding by hunters all strengthened the human-animal connections that ultimately led to full domestication.

Radiocarbon dates suggest the domestication of pigs in southeastern Turkey and of goats in the Near East as early as 8000 to 8400 B.C., of sheep in Turkey by about 7500 B.C., and of cattle and pigs in both Greece and the Near East about 7000 B.C. North Africa, India, and southeastern Asia were other Old World domestication sources, as were—less successfully—Meso-America and the Andean Uplands. Although there is evidence that the concept of animal domestication diffused from limited source regions, once its advantages were learned, numerous additional domestications were accomplished elsewhere. The widespread natural occurrence of species able to be domesticated made that certain. Cattle of different varieties, for example, were domesticated in India, north-central Eurasia, Southeast Asia, and Africa. Pigs and various domestic fowl are other examples.

The domestication of plants, like that of animals, appears to have occurred independently in more than one world region over a time span of between 10,000 and perhaps as long as 20,000 years ago. A strong case can be made that most widespread Eurasian food crops were first cultivated in the Near East beginning some 10,000 years ago and dispersed rapidly from there across the midlatitudes of the Old World. However, clear evidence also exists that African peoples were raising crops of wheat, barley, dates, lentils, and chickpeas on the floodplains of the Nile River as early as 18,500 years ago. In other world regions, farming began more recently.

Familiarity with plants of desirable characteristics is universal among hunter-gatherers. In those societies, females were assigned the primary food-gathering role and

thus developed the greatest familiarity with nutritive plants. Their fundamental role in initiating crop production to replace less reliable food gathering seems certain. Indeed, women's major contributions as innovators of technology—in food preparation and clothing production, for example—or as inventors of such useful and important items as baskets and other containers, baby slings, yokes for carrying burdens, and the like are unquestioned.

Agriculture itself, however, seems most likely to have been not an "invention" but the logical extension to food species of plant selection and nurturing habits developed for nonfood varieties. Plant poisons applied to hunting arrows or spread on lakes or streams to stun fish made food gathering easier and more certain. Plant dyes and pigments were universally collected or prepared for personal adornment or article decoration. Medicinal and mood-altering plants and derivatives were known, gathered, protected, and cultivated by all primitive cultures. Indeed, persuasive evidence exists to suggest that early gathering and cultivation of grains was not for grinding and baking as bread but for brewing as beer, a beverage that became so important in some cultures for religious and nutritional reasons that it may well have been a first and continuing reason for sedentary agricultural activities.

Nevertheless, full-scale domestication of food plants, like that of animals, can be traced to a limited number of origin areas from which its techniques spread (Figure 2.13). Although there were several source regions, certain uniformities united them. In each, domestication focused on plant species selected apparently for their capability of providing large quantities of storable calories or protein. In each, there was a population already well fed and able to devote time to the selection, propagation, and improvement of plants available from a diversified vegetation. Some speculate, however, that grain domestication in the Near East may have been a forced inventive response, starting some 12,000 years ago, to food shortages reflecting abrupt increases in summertime temperatures and aridity in the Jordan Valley. That environmental stress—reducing summer food supplies and destroying habitats of wild game—favored selection and cultivation of short-season annual grains and legumes, whose seeds could be stored and planted during cooler, wetter winter growing seasons.

In the tropics and humid subtropics, selected plants were apt to be those that reproduced vegetatively—from roots, tubers, or cuttings. Outside of those regions, wild plants reproducing from seeds were more common and the objects of domestication. Although there was some duplication, each of the origin areas developed crop complexes characteristic of itself alone, as Figure 2.13 summarizes. From each, there was dispersion of crop plants to other areas, slowly at first under primitive systems of population movement and communication, and then more rapidly and extensively with the onset of European exploration and colonization after A.D. 1500 (Figure 2.14).

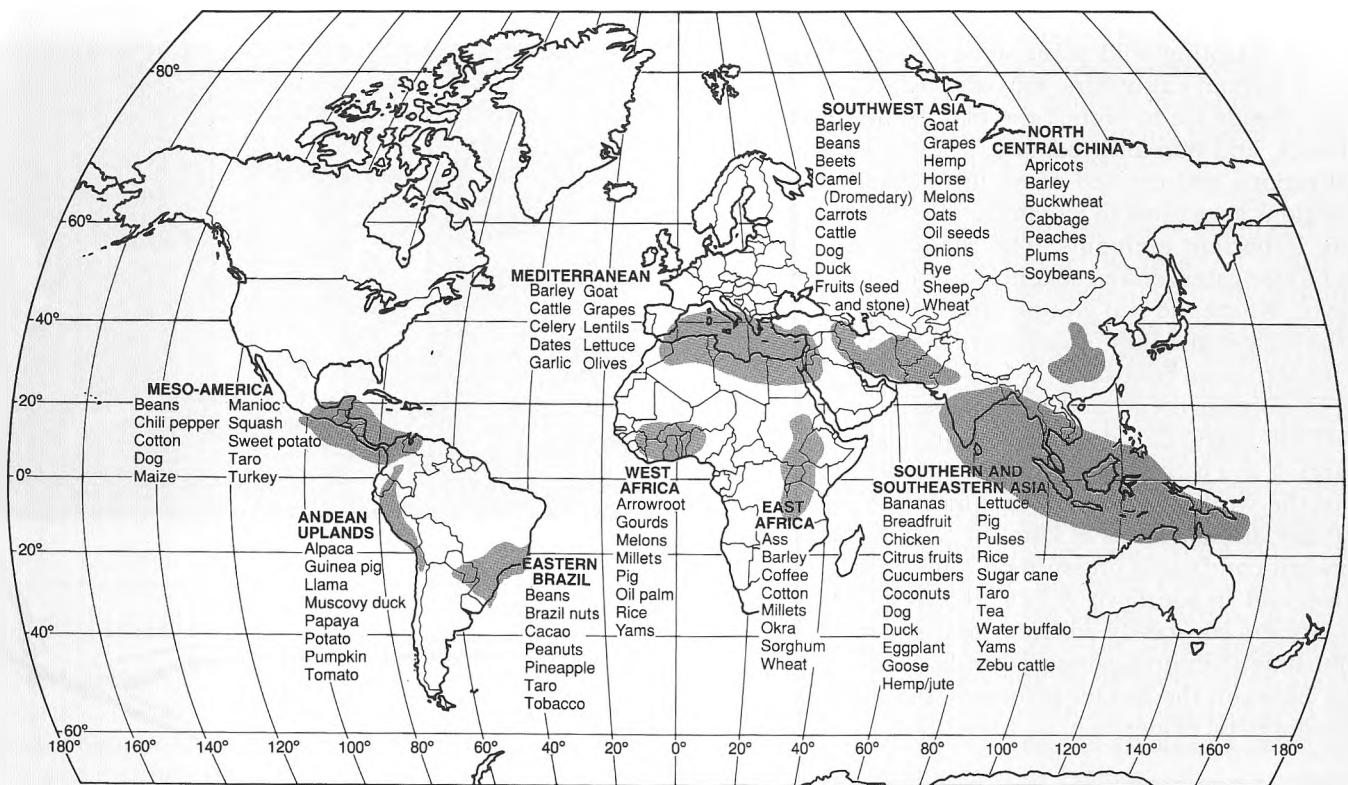


FIGURE 2.13 Chief centers of plant and animal domestication. The southern and southeastern Asian center was characterized by the domestication of plants such as taro, which are propagated by the division and replanting of existing plants (vegetative reproduction). Reproduction by the planting of seeds (e.g., maize and wheat) was more characteristic of Meso-America and the Near East. The African and Andean areas developed crops reproduced by both methods. The lists of crops and livestock associated with the separate origin areas are selective, not exhaustive.

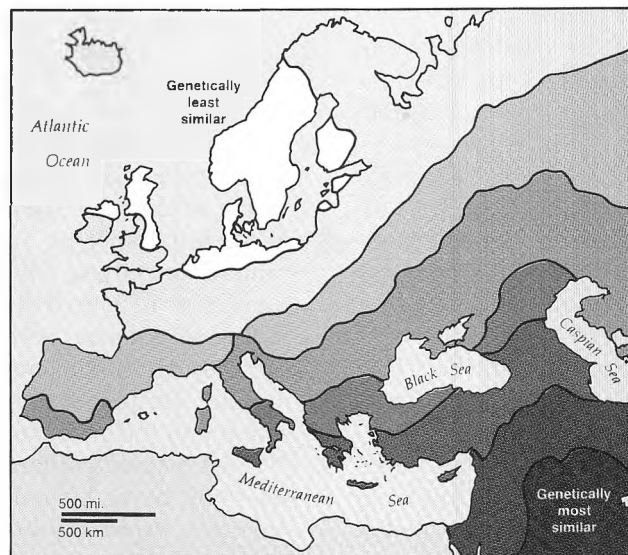


FIGURE 2.14 The migration of first farmers out of the Middle East into Europe starting about 10,000 years ago is presumably traced by blood and gene markers. If the gene evidence interpretation is valid, the migrants spread at a rate of about one kilometer (five-eighths of a mile) per year, gradually replacing the indigenous European hunter-gatherers throughout that continent.

TABLE 2.1 Emerging Culture Hearths: Periods and Features of Development

HEARTH REGION	BEFORE 10,000 B.C.	10,000– 8000 B.C.	8000– 6000 B.C.	6000– 4000 B.C.	4000– 2000 B.C.	2000 B.C.– A.D. 1	A.D. 1–1000
<i>Near East</i>	Earliest domestication of dog Early hunter-gatherer villages	Domestication of sheep and goats First permanent communities Long-distance trade	First farming villages Wheat, barley, legumes Sophisticated houses Metalworking Pottery, textiles	First irrigation Early records on clay tablets Potter's wheel	First cities Earliest writing Wheeled vehicles First legal codes Bronze Age Plow	First alphabet Glass Iron smelting Birth of Christ	Birth of Mohammed (A.D. 570) Arab/Muslim expansion
<i>Nile Valley</i>	Evidence of cultivation of wheat, barley, lentils, dates		Pottery Fishing villages	Domestication of cattle Metalworking Farming villages	Cattle herding Farming Cloth Sailing ships Cities Writing Long-distance trade		
<i>Indus Valley</i>					Village farming Rise of cities Long-distance trade	End of Indus Valley cities (1600 B.C.)	
<i>East Asia</i>			Cultivation of rice; root crops, beans, millet Pottery	Settled villages Wide range of crops, domestic animals Plow Irrigation	Metalworking (bronze) First Chinese city	Chinese walled cities Buddha (563–483 B.C.) Confucius (551–479 B.C.) Ideographic script Iron working (China)	First Southeast Asian cities

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All were urban centered, the indisputable mark of civilization first encountered in Mesopotamia 5500–6000 years ago, but the urbanization of each was differently arrived at and expressed (Figure 2.17). In some hearth areas, such as Mesopotamia and Egypt, the transition from settled agricultural village to urban form was gradual and prolonged. In Minoan Crete, urban life was less explicitly developed than in the Indus Valley, where early trade contacts with the Near East suggest the importance of exchange in fostering urban growth (see “Cities Brought Low”). Trade seems particularly important in the development of West African culture hearths, such as Ghana and Kanem. Coming later (from the 8th to the 10th centuries) than the Nile or Mesopotamian centers, their numerous stone-built towns seem to have been supported both by an extensive agriculture whose origins were probably as early as those of the Middle East and, particularly, by long-distance trade across the Sahara. The Shang kingdom

on the middle course of the Huang He (Yellow River) on the North China Plain had walled cities containing wattle-and-daub buildings but no monumental architecture.

Each culture hearth showed a rigorous organization of agriculture resulting in local productivity sufficient to enable a significant number of people to engage in non-farm activities. Therefore, each hearth region saw the creation of a stratified society that included artisans, warriors, merchants, scholars, priests, and administrators. Each also developed or adopted astronomy, mathematics, and the all-essential calendar. Each, while advancing in cultural diversity and complexity, exported technologies, skills, and learned behaviors far beyond its own boundaries.

Writing appeared first in Mesopotamia and Egypt at least 5000 years ago, as cuneiform in the former and as hieroglyphics in the latter. The separate forms of writing have suggested to some that they arose independently in

HEARTH REGION	BEFORE 10,000 B.C.	10,000– 8000 B.C.	8000– 6000 B.C.	6000– 4000 B.C.	4000– 2000 B.C.	2000 B.C.– A.D. 1	A.D. 1–1000
<i>Europe</i>	Cave art Ivory, stone figurines	Long-distance trade	First farming in Greece and Aegean	Megalithic tombs	Olive, grape domestication First European cities Copper working	Minoan civilization on Crete Mycenaean culture in Greece “Golden Age” of Greece and Rome	Fall of Roman Empire Dark Ages
<i>West Africa</i>				Pottery	Yam cultivation Farming	Village clusters	Ceramic art First cities Well- developed agriculture Iron smelting Long-distance trade Empire of Ghana
<i>Andean America</i>		Roots, tubers (potato) as food crops	Beans, pepper, other plant domestications		Pottery	Metalworking Ceramics Textiles	City formation City-state conquests
<i>Meso-America</i>			Maize domestication (Mexico)	Beans, squash, chili peppers	First farming villages	Olmec culture Early cities Early Mayan culture Astronomy Writing Raised field agriculture	Apex of Mayan culture

separate hearths. Others maintain that the idea of writing originated in Mesopotamia and diffused outward to Egypt, to the Indus Valley, to Crete, and perhaps even to China, though independent development of Chinese ideographic writing is usually assumed. The systems of record keeping developed in New World hearths were not related to those of the Old, but once created they spread widely in areas under the influence of Andean and Meso-American hearths. Skill in working iron, so important in Near Eastern kingdoms, was an export of sub-Saharan African hearths.

The anthropologist Julian Steward (1902–1972) proposed the concept of **multilinear evolution** to explain the common characteristics of widely separated cultures developed under similar ecological circumstances. He suggested that each major environmental zone—arid, high altitude, midlatitude steppe, tropical forest, and so on—tends to induce common adaptive traits in the cultures of those who

exploit it. Those traits were, at base, founded on the development of agriculture and the emergence of similar cultural and administrative structures in the several culture hearths. But *similar* does not imply *identical*. Steward simply suggested that since comparable sequences of developmental events cannot always or even often be explained on the basis of borrowing or exporting of ideas and techniques (because of time and space differences in cultures sharing them), they must be regarded as evidence of parallel creations based on similar ecologies. From similar origins, but through separate adaptations and innovations, distinctive cultures emerged.

Nonetheless, the common characteristics deriving from multilinear evolution and the diffusion of specific culture traits and complexes contained the roots of **cultural convergence**. That term describes the sharing of technologies, organizational structures, and even cultural traits and artifacts that is so evident among widely



FIGURE 2.17 Urbanization was invariably a characteristic of culture hearths of both the Old and the New Worlds. Pictured is the Pyramid of the Moon and Avenue of the Dead at Teotihuacán, a city that, at its height between A.D. 300 and 700, spread over nearly 18 square kilometers (7 square miles). Located some 50 kilometers (30 miles) northeast of Mexico City in the Valley of Mexico, the planned city of Teotihuacán featured broad, straight avenues and an enormous pyramid complex. The Avenue of the Dead, bordered with low stone-faced buildings, was some 3 kilometers (nearly 2 miles) in length.

CITIES BROUGHT LOW



ustainable development requires a long-term accommodation between human actions and environmental circumstances. When that accommodation is broken either through poor management of resources by an exploiting culture or through natural environmental alteration unrelated to human actions—such as the catastrophic drought between A.D. 800 and 1000 thought to have caused the collapse of Mayan culture in Meso-America—a society's use and development of a region are no longer "sustainable" in the form and patterns previously established. Just as

the activities of humans may alter or destroy their environment, that is, so may spontaneous changes in the environment bring low the works of organized society. Recent research suggests that one of the world's great early cultures, that of the Indus Valley of Pakistan, was destroyed not by fire or sword but by drowning in a sea of mud.

The great cities of the civilization, among them Harappa and Mohenjodaro, underwent an abrupt downfall about 2000 B.C. Excavations showing deep accumulations of mud, the erosional collapse of city walls, and recurring attempts to rebuild city structures document a losing battle against rising

water backed up behind a dam created by earthquakes, rock shifts, and mudslides. The Indus was converted from a free-flowing stream to a huge, swampy lake, trapping mud formerly carried to the sea. As the lake rose, it destroyed forests and ruined agriculture. Although people erected dikes and brick walls to shield the cities, their food bases and very life were choked. The dam was cut through by the river and replugged at least five times, each flood recurrence taking its toll of urban life. The degeneration of pottery and other evidences of cultural decline record the losing struggle with an altering environment.

separated societies in a modern world united by instantaneous communication and efficient transportation.

The Structure of Culture

Understanding a culture fully is, perhaps, impossible for one who is not part of it. For analytical purposes, however, the traits and complexes of culture—its building blocks and expressions—may be grouped and examined as subsets of the whole. The anthropologist Leslie White (1900–1975) suggested that for analytical purposes, a culture could be viewed as a three-part structure composed of subsystems that he termed *ideological*, *technological*, and *sociological*. In a similar classification, the biologist Julian Huxley (1887–1975) identified three components of culture: *mentifacts*, *artifacts*, and *sociofacts*. Together, according to these interpretations, the subsystems—identified by their separate components—comprise the system of culture as a whole. But they are integrated; each reacts on the others and is affected by them in turn.

The **ideological subsystem** consists of ideas, beliefs, and knowledge of a culture and of the ways in which these things are expressed in speech or other forms of communication. Mythologies and theologies, legend, literature, philosophy, and folk wisdom make up this category. Passed on from generation to generation, these abstract belief systems,

or **mentifacts**, tell us what we ought to believe, what we should value, and how we ought to act. Beliefs form the basis of the socialization process (see “The Gauda’s Son”). Often we know—or think we know—what the beliefs of a group are from their oral or written statements. Sometimes, however, we must depend on the actions or objectives of a group to tell us what its true ideas and values are. “Actions speak louder than words” or “Do as I say, not as I do” are commonplace recognitions of the fact that actions, values, and words do not always coincide. Two basic strands of the ideological subsystem—language and religion—are the subject of Chapter 5.

The **technological subsystem** is composed of the material objects, together with the techniques of their use, by means of which people are able to live. The objects are the tools and other instruments that enable us to feed, clothe, house, defend, transport, and amuse ourselves. We must have food, we must be protected from the elements, and we must be able to defend ourselves. Huxley termed the material objects we use to fill these basic needs **artifacts** (Figure 2.18). In Chapter 10 we will examine the relationship between technological subsystems and regional patterns of economic development.

The **sociological subsystem** of a culture is the sum of those expected and accepted patterns of interpersonal relations that find their outlet in economic, political, military, religious, kinship, and other associations. These **sociofacts**

THE GAUDA’S SON

The traditional belief system of an Indian village was embedded in—but of course only partially revealed by—the special treatment given to the son of the Gauda (the village headman). How many different elements of the technological, sociological, and ideological subsystems of the village can you detect in the following extract?

The Gauda’s son is eighteen months old. Every morning, a boy employed by the Gauda carries the Gauda’s son through the streets of Gopalpur. The Gauda’s son is clean; his clothing is elegant. When he is carried along the street, the old women stop their ceaseless grinding and pounding of grain and gather around. If the child wants something to play with, he is given it. If he cries, there is consternation.

If he plays with another boy, watchful adults make sure that the other boy does nothing to annoy the Gauda’s son.

Shielded by servants, protected and comforted by virtually everyone in the village, the Gauda’s son soon learns that tears and rage will produce anything he wants. At the same time, he begins to learn that the same superiority which gives him license to direct others and to demand their services places him in a state of danger. The green mangoes eaten by all of the other children in the village will give him a fever; coarse and chewy substances are likely to give him a stomachache. While other children clothe themselves in mud and dirt, he finds himself constantly being washed. As a Brahmin [a religious leader], he is taught to avoid all forms of pollution and to carry out complicated daily rituals of bathing,

eating, sleeping, and all other normal processes of life.

In time, the Gauda’s son will enter school. He will sit motionless for hours, memorizing long passages from Sanskrit holy books and long poems in English and Urdu. He will learn to perform the rituals that are the duty of every Brahmin. He will bathe daily in the cold water of the private family well, reciting prayers and following a strict procedure. The gods in his house are major deities who must be worshipped every day, at length and with great care.

Excerpt from *Gopalpur: A South Indian Village* by Alan R. Beals, copyright © 1962 by Holt, Rinehart and Winston, Inc. Renewed 1990 by Alan R. Beals, reprinted by permission of the publisher.



(a)

FIGURE 2.18 (a) This Balinese farmer working with draft animals uses tools typical of the lower technological levels of subsistence economies. (b) Cultures with advanced technological subsystems use complex machinery to harness inanimate energy for productive use.



(b)

define the social organization of a culture. They regulate how the individual functions, relative to the group—whether it be family, church, or state. There are no “givens” as far as the patterns of interaction in any of these associations are concerned, except that most cultures possess a variety of formal and informal ways of structuring behavior. Differing patterns of behavior are learned and are transmitted from one generation to the next (Figure 2.19).

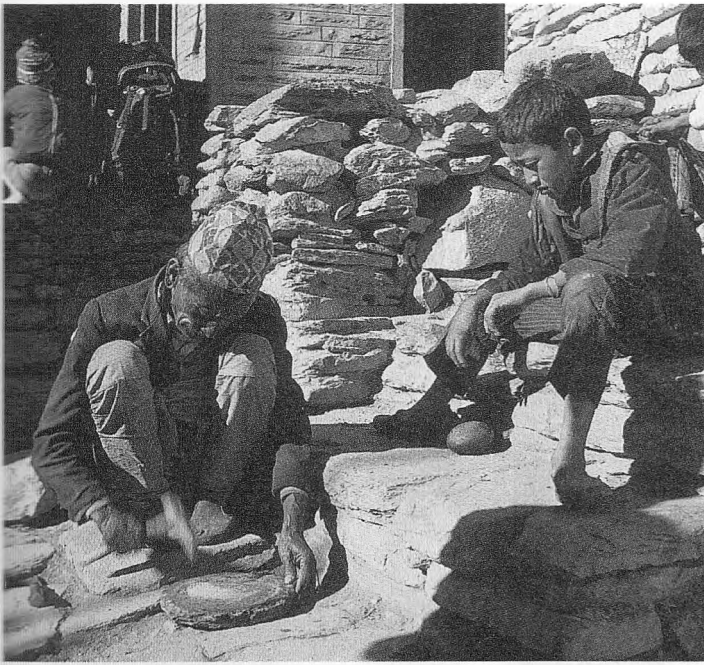
Classifications are of necessity arbitrary, and these classifications of the subsystems and components of culture are no exception. The three-part categorization of culture, while helping us appreciate its structure and complexity, can simultaneously obscure the many-sided nature of individual elements of culture. A dwelling, for example, is an artifact providing shelter for its occupants. It is, simultaneously, a sociofact reflecting the nature of the family or kinship group it is designed to house, and a mentifact summarizing a culture group's convictions about appropriate design, orientation, and building materials of dwelling units. In the same vein, clothing serves as an artifact of bodily protection appropriate to climatic conditions, available materials and techniques, or the activity in which the wearer is engaged. But garments also may be sociofacts, identifying an individual's role in the social structure of the community or culture, and mentifacts, evoking larger community value systems (Figure 2.20).

Nothing in a culture stands totally alone. Changes in the ideas that a society holds may affect the sociological and technological systems just as changes in technology

force adjustments in the social system. The abrupt alteration of the ideological structure of Russia following the 1917 communist revolution from a monarchical, agrarian, capitalistic system to an industrialized, communistic society involved sudden, interrelated alteration of all facets of that country's culture system. The equally abrupt disintegration of Russian communism in the early 1990s was similarly disruptive of all its established economic, social, and administrative structures. The interlocking nature of all aspects of a culture is termed **cultural integration**.

Culture Change

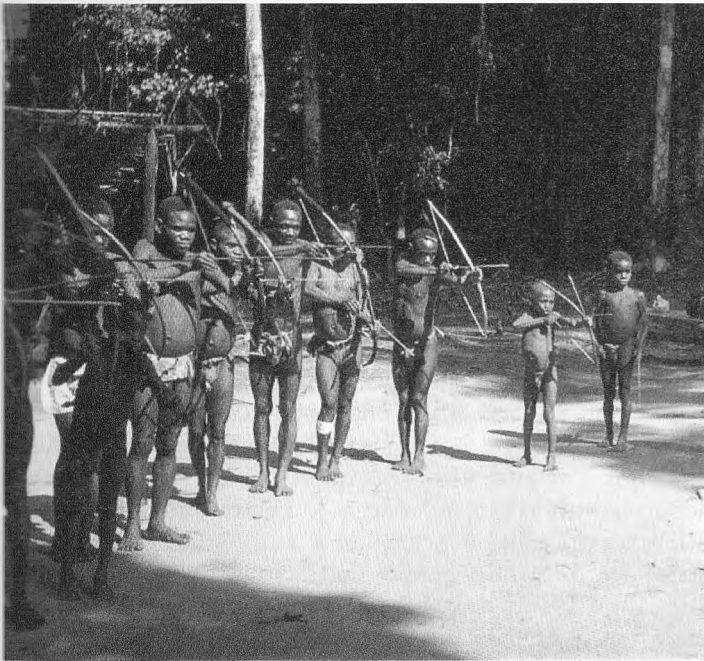
The recurring theme of cultural geography is change. No culture is, or has been, characterized by a permanently fixed set of material objects, systems of organization, or even ideologies. Admittedly, all of these may be long enduring within a society at equilibrium with its resource base and totally isolated from need or influence for change. But such isolation and stagnation have always been rare. On the whole, while cultures are essentially conservative, they are simultaneously constantly changing. They are always in a state of flux. Some changes are major and pervasive. The transition from hunter-gatherer to sedentary farmer, as we have seen, affected markedly every facet of the cultures experiencing that change. Profound, too, has been the impact of the Industrial Revolution and its associated urbanization on all societies it has touched.



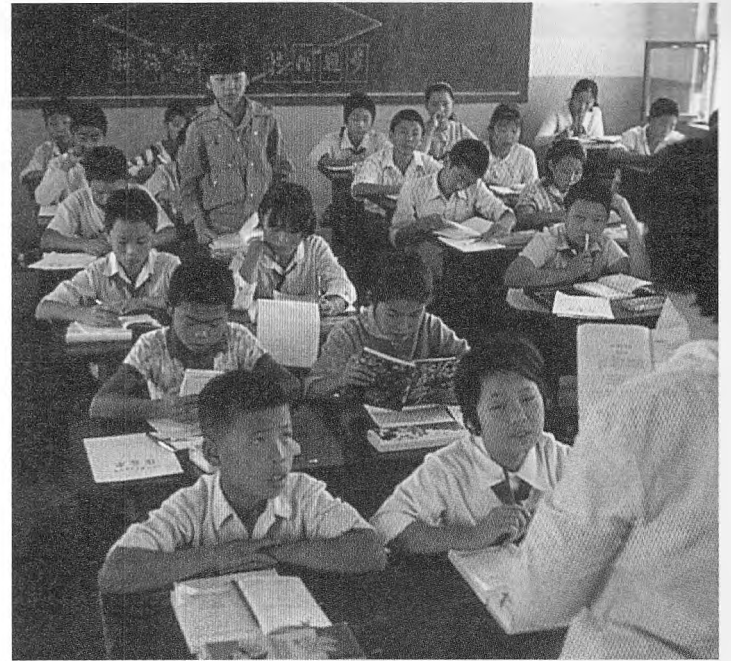
(a)



(b)

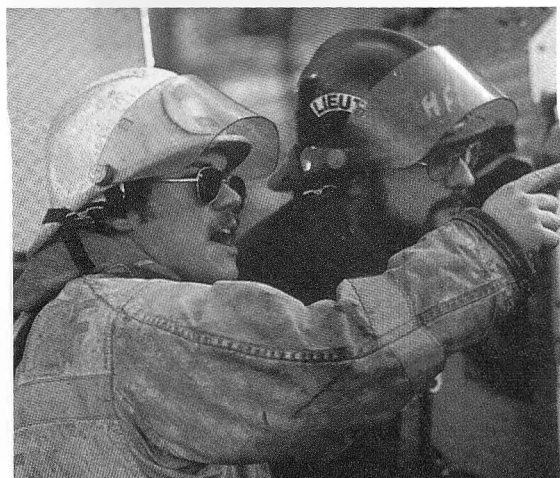


(c)

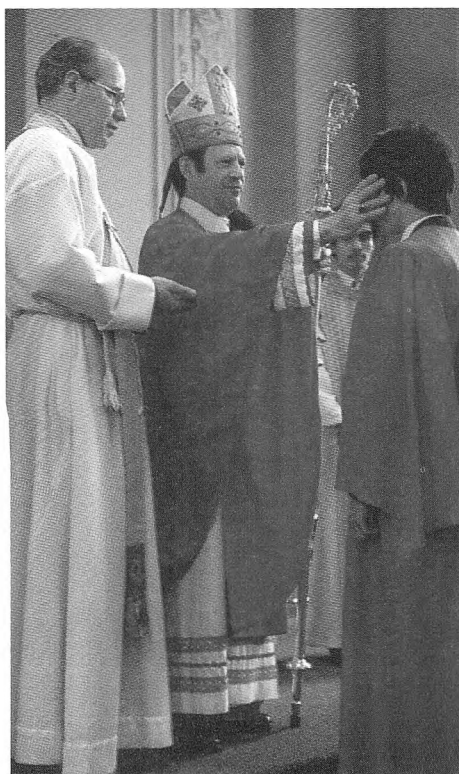


(d)

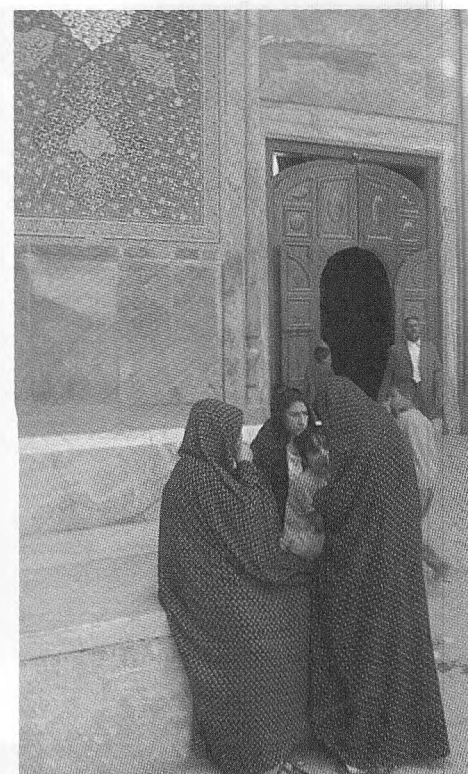
FIGURE 2.19 All societies prepare their children for membership in the culture group. In each of these settings, certain values, beliefs, skills, and proper ways of acting are being transmitted to the youngsters.



(a)



(b)



(c)

FIGURE 2.20 (a) When clothing serves primarily to cover, protect, or assist in activities, it is an *artifact*. (b) Some garments are *sociofacts*, identifying a role or position within the social structure: the distinctive “uniforms” of a soldier, a cleric, or a beribboned ambassador immediately proclaim their respective roles in a culture’s social organizations. (c) The mandatory chadors of Iranian females are *mentifacts*, indicative not specifically of the role of the wearer but of the values of the culture the wearer represents.

Not all change is so pervasive as that following the introduction of agriculture or the Industrial Revolution. Many changes are so slight individually as to go almost unnoticed at their inception, though cumulatively they may substantially alter the affected culture. Think of how the culture of the United States differs today from what you know it to have been in 1940—not in essentials, perhaps, but in the innumerable electrical, electronic, and transportation devices that have been introduced and in the social, behavioral, and recreational changes they have wrought. Such cumulative changes occur because the cultural traits of any group are not independent; they are clustered in a coherent and integrated pattern. Change in an apparently minor and limited fashion will have wide repercussions as associated traits arrive at accommodation with the adopted adjustment. Change, both major and minor, within cultures is induced by *innovation* and *diffusion*.

Innovation

Innovation implies changes to a culture that result from ideas created within the social group itself and adopted by the culture. The novelty may be an invented improvement in material technology, like the bow and arrow or

the jet engine. It may involve the development of nonmaterial forms of social structure and interaction: feudalism, for example, or Christianity.

Primitive and traditional societies characteristically are not innovative. For societies at equilibrium with their environment and with no unmet needs, change has no adaptive value and no reason to occur. Indeed, all societies have an innate resistance to change. Complaints about youthful fads or the glorification of times past are familiar cases in point. However, when a social group is inappropriately unresponsive—mentally, psychologically, or economically—to changing circumstances and to innovation, it is said to exhibit **cultural lag**.

Innovation—invention—frequently under stress, has characterized the history of humankind. As we have seen, growing populations at the end of the Ice Age necessitated an expanded food base. In response, domestication of plants and animals appears to have occurred independently in more than one world area. Indeed, a most striking fact about early agriculture is the universality of its development or adoption within a very short span of human history. In 10,000 B.C., the world population of no more than 10 million was exclusively hunter-gatherers. By A.D. 1500, only 1% of the world’s 350 million people still

followed that way of life. The revolution in food production affected every facet of the threefold subsystems of culture of every society accepting it. All innovation has a radiating impact on the web of culture; the more basic the innovation, the more pervasive its consequences.

In most modern societies, innovative change has become common, expected, and inevitable. The rate of invention, at least as measured by the number of patents granted, has steadily increased, and the period between idea conception and product availability has been decreasing. A general axiom is that the more ideas available and the more minds able to exploit and combine them, the greater the rate of innovation. The spatial implication is that larger urban centers of advanced technologies tend to be centers of innovation. This is not just because of their size but because of the number of ideas interchanged. Indeed, ideas not only stimulate new thoughts and viewpoints but also create circumstances in which the society must develop new solutions to maintain its forward momentum (Figure 2.21).

Diffusion

Diffusion is the process by which an idea or innovation is transmitted from one individual or group to another across space. Diffusion may assume a variety of forms, each different in its impact on social groups. Basically, however, two processes are involved: (1) People move, for any of a number of reasons, to a new area and take their culture with them. For example, immigrants to the American colonies brought along crops and farming techniques, building styles, or concepts of government alien to their new home. (2) Information about an innovation (e.g., hy-

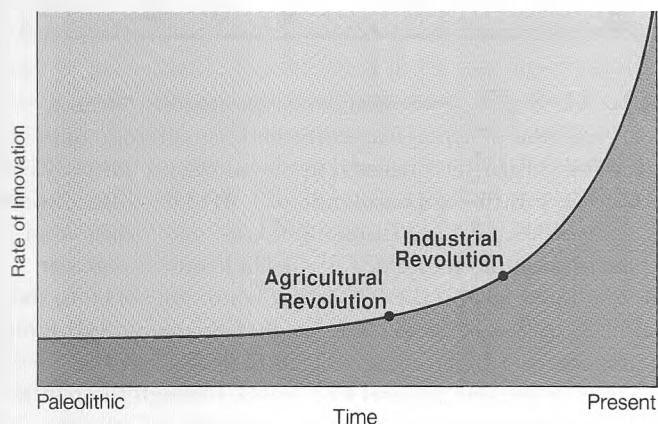


FIGURE 2.21 The rate of innovation through human history. Hunter-gatherers, living in easy equilibrium with their environment and their resource base, had little need for innovation and no necessity for cultural change. Increased population pressures led to the development of agriculture and the diffusion of the ideas and techniques of domestication, urbanization, and trade. With the Industrial Revolution, dramatic increases in innovation began to alter cultures throughout the world.

brid corn or compact discs) may spread throughout a society, perhaps aided by local or mass media advertising; or new adopters of an ideology or way of life—for example, a new religious creed—may be inspired or recruited by immigrant or native converts. The former is known as **relocation diffusion**, the latter as **expansion diffusion** (Figure 2.22).

Expansion diffusion involves the spread of an item or idea from one place to others. In the process the thing diffused also remains—and is frequently intensified—in the origin area. Islam, for example, expanded from its Arabian Peninsula origin locale across much of Asia and North Africa. At the same time it strengthened its hold over its

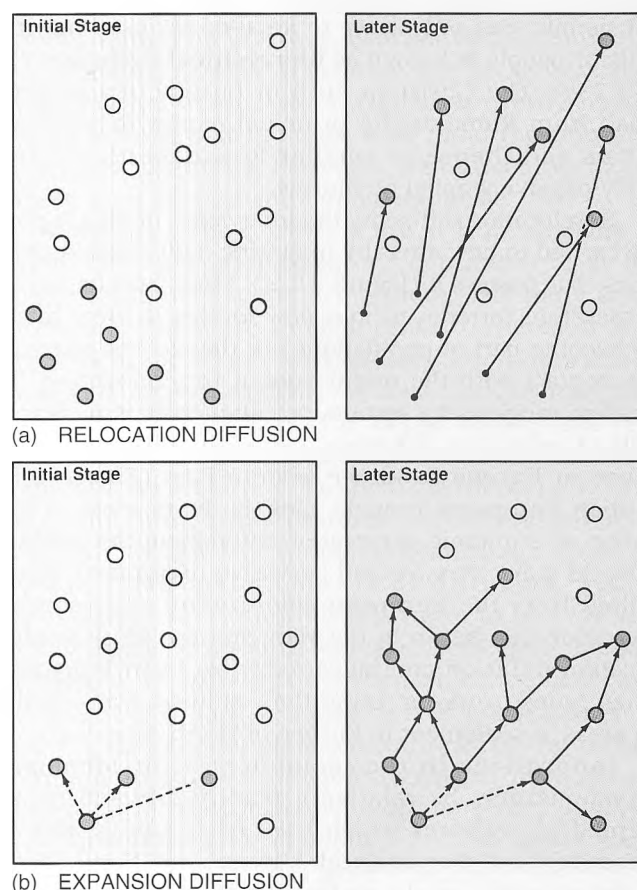


FIGURE 2.22 Patterns of diffusion. (a) In *relocation diffusion*, innovations or ideas are transported to new areas by carriers who permanently leave the home locale. The “Pennsylvania Dutch” barn (Figure 6.23) was brought to Pennsylvania by German immigrants and spread to other groups and areas southward through Appalachia and westward into Ohio, Indiana, Illinois, and Missouri. Not all farmers or farm districts in the path of advancement adopted the new barn design. (b) In *expansion diffusion*, a phenomenon spreads from one place to neighboring locations, but in the process remains and is often intensified in the place of origin (see Figure 5.29).

Redrawn by permission from *Spatial Diffusion*, Peter R. Gould, p. 4, Association of American Geographers, 1969.

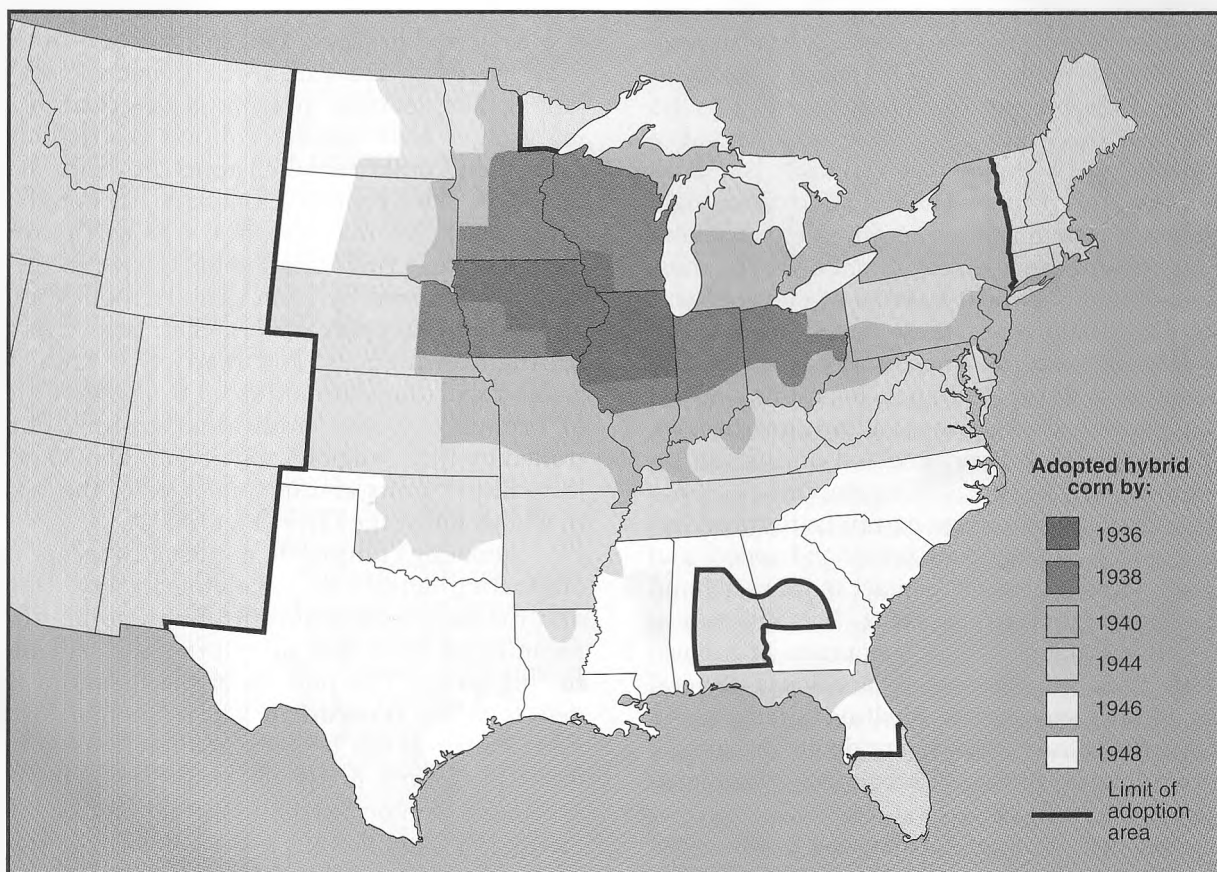
The places of origin of many ideas, items, and technologies important in contemporary cultures are only dimly known or supposed, and their routes of diffusion are at best speculative. Gunpowder, printing, and spaghetti are presumed to be the products of Chinese inventiveness; the lateen sail has been traced to the Near Eastern culture world. The moldboard plow is ascribed to 6th-century Slavs of north-eastern Europe. The sequence and routes of the diffusion of these innovations has not been documented.

In other cases, such documentation exists, and the process of diffusion is open to analysis. For example, hybrid corn was originally adopted by imaginative farmers of

northern Illinois and eastern Iowa in the mid-1930s. By the late 1930s and early 1940s, the new seeds were being planted as far east as Ohio and north to Minnesota, Wisconsin, and northern Michigan. By the late 1940s, all commercial corn-growing districts of the United States and southern Canada were cultivating hybrid corn varieties.

Clearly marked as well is the diffusion path of the custom of smoking tobacco, a practice that originated among Amerindians. Sir Walter Raleigh's Virginia colonists, returning home in 1586, introduced smoking in English court circles, and the habit very quickly spread among the general populace. England became the source region of the new custom for northern Europe. Smoking was introduced to Holland by English med-

ical students in 1590. Dutch and English together spread the habit by sea to the Baltic and Scandinavian areas and overland through Germany to Russia, where by 1634, laws were being passed to curb the practice of smoking. The innovation continued its eastward diffusion, and within a hundred years tobacco had spread across Siberia and was, in the 1740s, reintroduced to the American continent at Alaska as both a habit and an item of trade carried by Russian fur traders. A second route of diffusion for tobacco smoking can be traced from Spain, where the custom was introduced in 1558, and from which it spread more slowly through the Mediterranean area into Africa, the Near East, and Southeast Asia.



Source: Redrawn from data in Zvi Griliches, "Hybrid Corn and the Economics of Innovation" in *Science*, 132(3422): 277 (July 29, 1960), figure 3.

Reflecting on an average morning in the life of a "100% American," Ralph Linton noted:

Our solid American citizen awakens in a bed built on a pattern which originated in the Near East but which was modified in Northern Europe before it was transmitted to America. He throws back covers made from cotton, domesticated in India, or linen, domesticated in the Near East, or wool from sheep, also domesticated in the Near East, or silk, the use of which was discovered in China. All of these materials have been spun and woven by processes invented in the Near East. . . . He takes off his pajamas, a garment invented in India, and washes with soap invented by the ancient Gauls. . . .

Returning to the bedroom, . . . he puts on garments whose form originally derived from the skin

clothing of the nomads of the Asiatic steppes [and] puts on shoes made from skins tanned by a process invented in ancient Egypt and cut to a pattern derived from the classical civilizations of the Mediterranean. . . . Before going out for breakfast he glances through the window, made of glass invented in Egypt, and if it is raining puts on overshoes made of rubber discovered by the Central American Indians and takes an umbrella invented in southeastern Asia. . . .

[At breakfast] a whole new series of borrowed elements confronts him. His plate is made of a form of pottery invented in China. His knife is of steel, an alloy first made in southern India, his fork a medieval Italian invention, and his spoon a derivative of a Roman original. He begins breakfast with an orange, from the eastern Mediterranean, a cantaloupe from Persia, or perhaps a piece of African watermelon. With this he has coffee, an Abyssinian plant. . . . [He] may

have the egg of a species of bird domesticated in Indo-China, or thin strips of flesh of an animal domesticated in Eastern Asia which have been salted and smoked by a process developed in northern Europe.

When our friend has finished eating . . . he reads the news of the day, imprinted in characters invented by the ancient Semites upon a material invented in China by a process invented in Germany. As he absorbs the accounts of foreign troubles he will, if he is a good conservative citizen, thank a Hebrew deity in an Indo-European language that he is 100 percent American.

Ralph Linton, *The Study of Man: An Introduction*, ©1936, pp. 326-327. Reprinted by permission of Prentice-Hall, Inc., Upper Saddle River, NJ.

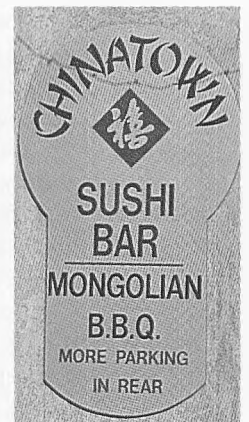


FIGURE 2.24 Foreign foods modified for American tastes and American palates accustomed to dishes from all cultures together represent *syncretism* in action.



FIGURE 2.25 Baseball, an import from America, is one of the most popular sports in Japan, attracting millions of spectators annually.

Cultural Modification and Adoption

A culture group may undergo major modifications in its own identifying traits by adopting some or all of the characteristics of another, dominant culture group. Such is the case in *acculturation*—discussed at greater length in Chapter 6 (pp. 184)—as immigrant populations take on the values, attitudes, customs, and speech of the receiving society. A different form of contact and subsequent cultural alteration may occur in a conquered or colonized region where the subordinate or subject population is either forced to adopt the culture of the new ruling group, introduced through relocation diffusion, or does so voluntarily, overwhelmed by the superiority in numbers or the technical level of the conqueror. Tribal Europeans in areas of Roman conquest, native populations in the wake of Slavic occupation of Siberia, and Native Americans stripped of their lands following European settlement of North America experienced this kind of cultural modification or adoption.

In many instances, close contact between two different groups may involve adjustments of the original cultural patterns of both. For example, changes in Japanese political organization and philosophy were imposed by occupying Americans after World War II, and the Japanese voluntarily adopted some more frivolous aspects of Amer-

ican life (Figure 2.25). In turn, American society was enriched by the selective importation of Japanese cuisine, architecture, and philosophy, demonstrating the two-way nature of cultural diffusion.

Summary

The web of culture is composed of many strands. Together, culture traits and complexes in their spatial patterns create human landscapes, define culture regions, and distinguish culture groups. Those landscapes, regions, and group characteristics change through time as human societies interact with their environment, develop for themselves new solutions to collective needs, or are altered through innovations adopted from outside the group itself. The cultural uniformity of a preagricultural world composed solely of hunter-gatherers was lost as domestication of plants and animals in many world areas led to the emergence of culture hearths of wide-ranging innovation and to a cultural divergence between farmers and gatherers. Innovations spread outward from their origin points, carried by migrants through relocation diffusion or adopted by others through a variety of expansion diffusion processes. Although diffusion barriers exist, most successful or advantageous innovations find

adopters, and both cultural modification and cultural convergence of different societies result. The details of the technological, sociological, and ideological subsystems of culture define the differences that still exist between world areas.

The ivory hunters who opened our chapter showed how varied and complex the culture of even a primitive group can be. Their artifacts of clothing, fire making, hunting, and fishing displayed diversity and ingenuity. They were part of a structured kinship system and en-

gaged in organized production and trade. Their artistic efforts and ritual burial customs speak of a sophisticated set of abstract beliefs and philosophies. Their culture complex did not develop in isolation; it reflected at least in part their contacts with other groups, even those far distant from their Paris Basin homeland. As culture groups have done always and everywhere, the hunters carried on their own pursuits and interacted with others in spatial settings. They exhibited and benefited from structured *spatial behavior*, the topic to which we next turn our attention.

KEY WORDS

- | | | |
|-------------------------|------------------------------|----------------------------|
| artifact 51 | culture hearth 47 | independent invention 57 |
| carrying capacity 43 | culture realm 36 | innovation 54 |
| contagious diffusion 56 | culture region 36 | mentifact 51 |
| cultural convergence 49 | culture trait 36 | multilinear evolution 49 |
| cultural divergence 43 | diffusion 55 | possibilism 37 |
| cultural ecology 36 | diffusion barrier 57 | relocation diffusion 55 |
| cultural integration 52 | environmental determinism 37 | sociofact 51 |
| cultural lag 54 | expansion diffusion 55 | sociological subsystem 51 |
| cultural landscape 38 | hierarchical diffusion 56 | syncretism 57 |
| culture 34 | hunter-gatherers 40 | technological subsystem 51 |
| culture complex 36 | ideological subsystem 51 | |

FOR REVIEW

1. What is included in the concept of *culture*? How is culture transmitted? What personal characteristics affect the aspects of culture that any single individual acquires or fully masters?
2. What do we mean by *domestication*? When and where did the domestication of plants and animals occur? What impact on culture and population numbers did plant domestication have?
3. What is a *culture hearth*? What new traits of culture characterized the early hearths? Identify and locate some of the major culture hearths that emerged at the close of the Neolithic period.
4. What do we mean by *innovation*? By *diffusion*? What different patterns of diffusion can you describe? Discuss the role played by innovation and diffusion in altering the cultural structure in which you are a participant from that experienced by your great-grandparents.
5. Differentiate between *culture traits* and *culture complexes*. Between *environmental determinism* and *possibilism*.
6. What are the components or subsystems of the three-part system of culture? What cultural characteristics are included in each of the subsystems?

SELECTED REFERENCES

- | | | |
|--|--|--|
| Brown, Lawrence A. <i>Innovation Diffusion: A New Perspective</i> . London and New York: Methuen, 1981. | Crosby, Alfred W. <i>Ecological Imperialism: The Biological Expansion of Europe 900–1900</i> . Cambridge: Cambridge University Press, 1986. | Gebauer, Anne B., and T. Douglas Price, eds. <i>Transitions to Agriculture in Prehistory</i> . Monographs in World Archeology No. 4. Madison, WI: Prehistory Press, 1992. |
| Bryan, Alan L., ed. <i>New Evidence for the Pleistocene Peopling of the Americas</i> . Orono: University of Maine, Center for the Study of Early Man, 1986. | Deane, Phyllis. <i>The First Industrial Revolution</i> . 2d ed. New York: Cambridge University Press, 1979. | Gould, Peter. <i>Spatial Diffusion</i> . Association of American Geographers, Commission on College Geography. <i>Resource Paper</i> No. 4. Washington, D.C.: Association of American Geographers, 1969. |
| Coe, Michael, Dean Snow, and Elizabeth Benson. <i>Atlas of Ancient America</i> . New York: Facts on File Incorporated, 1986. | Denevan, William M. "The Pristine Myth: The Landscape of the Americas in 1492." <i>Annals of the Association of American Geographers</i> 82, no. 3 (1992):369–385. | Haggett, Peter. "Geographical Aspects of the Emergence of Infectious Diseases." <i>Geografiska Annaler</i> 76B, no. 2 (1994):91–104. |
| Cowan, C. Wesley, and Patty Jo Watson, eds. <i>The Origins of Agriculture: An International Perspective</i> . Washington, D.C.: Smithsonian Institution Press, 1992. | Frankfort, Henri. <i>The Birth of Civilization in the Near East</i> . Garden City, NY: Doubleday, 1956. | |

- Henderson, John S. *The World of the Ancient Maya*. Ithaca, NY: Cornell University Press, 1981.
- Isaac, Erich. *Geography of Domestication*. Englewood Cliffs, NJ: Prentice-Hall, 1970.
- Keatinge, Richard W., ed. *Peruvian Prehistory*. New York: Cambridge University Press, 1987.
- Kroeber, Alfred L., and Clyde Kluckhohn. "Culture: A Critical Review of Concepts and Definitions." *Harvard University. Papers of the Peabody Museum of American Archaeology and Ethnology* 47, no. 2 (1952).
- MacNeish, Richard S. *The Origins of Agriculture and Settled Life*. Norman: University of Oklahoma Press, 1991.
- Morrill, Richard, Gary L. Gaile, and Grant Ian Thrall. *Spatial Diffusion*. Scientific Geography Series, Vol. 10. Newbury Park, CA: SAGE Publications, 1988.
- Morris, Craig, and Adriana von Hagen. *The Inka Empire and its Andean Origins*. New York: Abbeville Press, 1993.
- "The Peopling of the Earth." *National Geographic* (October 1988):434-503.
- Pfeiffer, John E. *The Emergence of Society: A Prehistory of the Establishment*. New York: McGraw-Hill, 1977.
- Platt, Robert S. "Determinism in Geography." *Annals of the Association of American Geographers* 38 (1948):126-132.
- Redman, Charles L. *The Rise of Civilization: From Early Farmers to Urban Society in the Ancient Near East*. San Francisco: W. H. Freeman, 1978.
- Rodrique, Christine M. "Can Religion Account for Early Animal Domestications . . . ?" *Professional Geographer* 44, no. 4 (1992):417-430.
- Rogers, Alisdair, ed. *Peoples and Cultures*. The Illustrated Encyclopedia of World Geography. New York: Oxford University Press, 1992.
- Rogers, Everett M. *Diffusion of Innovations*. 3d ed. New York: Free Press, 1983.
- Runnels, Curtis N. "Environmental Degradation in Ancient Greece." *Scientific American* (March 1995):96-99.
- Sauer, Carl. *Agricultural Origins and Dispersals*. New York: American Geographical Society, 1952.
- Sebastian, Lynne. *The Chaco Anasazi: Sociopolitical Evolution in the Prehistoric Southwest*. New York: Cambridge University Press, 1992.
- Sjoberg, Gideon. "The Origin and Evolution of Cities." *Scientific American* 213 (1965):54-63.
- Steward, Julian H. *Theory of Culture Change*. Urbana: University of Illinois Press, 1955.
- Thomas, William I... Jr., ed. *Man's Role in Changing the Face of the Earth*. Chicago: University of Chicago Press, 1956.
- Wagner, Philip L., and Marvin W. Mikesell. *Readings in Cultural Geography*. Chicago: University of Chicago Press, 1962.
- White, Leslie A. *The Science of Culture: A Study of Man and Civilization*. New York: Farrar, Straus and Giroux, 1969.
- White, Randall. *Dark Caves, Bright Visions: Life in Ice Age Europe*. New York: American Museum of Natural History in Association with W. W. Norton & Company, 1986.
- Wilbanks, Thomas J. " 'Sustainable Development' in Geographic Perspective." *Annals of the Association of American Geographers* 84, no. 4 (1994):541-556.
- Zohary, Daniel, and Mari Hopf. *Domestication of Plants in the Old World*. 2d ed. Oxford, England: Clarendon Press, 1993.

SPATIAL INTERACTION AND SPATIAL BEHAVIOR

CHAPTER

3

Bases for Interaction 64

A Summarizing Model 65

Complementarity 65

Transferability 65

Intervening Opportunity 66

Measuring Interaction 66

Distance Decay 67

The Gravity Concept 68

Interaction Potential 68

Movement Biases 69

Human Spatial Behavior 70

Individual Activity Space 70

The Tyranny of Time 72

Distance and Human Interaction 72

Spatial Interaction and the Accumulation of Information 73

Information Flows 76

Information and Perception 77

Perception of Environment 77

Perception of Natural Hazards 79

Migration 82

Principal Migration Patterns 83

Types of Migration 83

Controls on Migration 85

SUMMARY 91

KEY WORDS 92

FOR REVIEW 92

SELECTED REFERENCES 92



*People and goods in economic and social
interaction along the autobahn in Germany .*

Early in January of 1849 we first thought of migrating to California. It was a period of National hard times . . . and we longed to go to the new El Dorado and “pick up” gold enough with which to return and pay off our debts.

Our discontent and restlessness were enhanced by the fact that my health was not good. . . . The physician advised an entire change of climate thus to avoid the intense cold of Iowa, and recommended a sea voyage, but finally approved of our contemplated trip across the plains in a “prairie schooner.”

Full of the energy and enthusiasm of youth, the prospects of so hazardous an undertaking had no terror for us, indeed, as we had been married but a few months, it appealed to us as a romantic wedding tour.¹

So begins Catherine Haun’s account of their 9-month journey from Iowa to California, just two of the quarter-million people who traveled across the continent on the Overland Trail in one of the world’s great migrations. The migrants faced months of grueling struggle over badly marked routes that crossed swollen rivers, deserts, and mountains. The weather was often foul, with hailstorms, drenching rains, and burning summer temperatures. Graves along the route were a silent testimony to the lives claimed by buffalo stampedes, Indian skirmishes, cholera epidemics, and other disasters.

What inducements were so great as to make emigrants leave behind all that was familiar and risk their lives on an uncertain venture? Catherine Haun alludes to economic hard times gripping the country and to their hope for riches to be found in California. Like other migrants, the Hauns were attracted by the climate in the West, which was said to be always sunny and free of disease. Finally, like most who undertook the perilous journey West, the Hauns were young, moved by restlessness, a sense of adventure, and a perception of greater opportunities in a new land. They, like their predecessors back to the beginnings of humankind, were acting in space and across space on the basis of acquired information and anticipation of opportunity—prepared to pay the price, in time, money, and hardship costs, of overcoming distance.

A fundamental question in human geography is, What considerations influence how individual human beings use space and act within it? Related queries include: Are there discernible controls on human spatial behavior? How does distance affect human interaction? How do our perceptions of places influence our spatial activities? How

do we overcome the consequences of distance in the exchange of commodities and information? How are movement and migration decisions (like that of the Hauns) reached? These are questions addressing geography’s concern with understanding spatial interaction.

Spatial interaction means the movement of peoples, ideas, and commodities within and between areas. The Hauns were engaging in spatial interaction (Figure 3.1). International trade, the movement of semitrailers on the expressways, radio broadcasts, and business or personal telephone calls are more familiar examples. Such movements and exchanges are designed to achieve effective integration between different points of human activity. Movement of whatever nature satisfies some felt need or desire. It represents the attempt to smooth out the spatially differing availability of required resources, commodities, information, or opportunities. Whatever the particular purpose of a movement, there is inevitably some manner of trade-off balancing the benefit of the interaction with the costs that are incurred in overcoming spatial separation. Because commodity movements represent simple demonstrations of the principles underlying all spatial interactions, let us turn to them first.

Bases for Interaction

Neither the world’s resources nor the products of people’s efforts are uniformly distributed. Commodity flows are responses to these differences; they are links between points of supply and locales of demand. Such response may not be immediate or even direct. Matters of awareness of supplies



FIGURE 3.1 Cross-country movement was slow, arduous, and dangerous early in the 19th century, and the price of long-distance spatial interaction was far higher in time and risks than a comparable journey today.

1. From Catherine Haun, “A Woman’s Trip Across the Plains in 1849,” in Lillian Schlissel, *Women’s Diaries of the Westward Journey* (New York: Schocken Books, 1982).

or markets, the presence or absence of transportation connections, costs of movement, ability to pay for things wanted and needed—all and more are factors in the structure of trade. Underlying even these, however, is a set of controlling principles governing spatial interaction.

A Summarizing Model

The conviction that spatial interaction reflects areal differences led the geographer Edward Ullman (1912–1976) to speculate on the essential conditions affecting such interactions and to propose an explanatory model. He observed that spatial interaction is effectively controlled by three flow-determining factors that he called *complementarity*, *transferability*, and *intervening opportunity*. Although Ullman's model deals with commodity flows, it has—as we shall see—applicability to informational transfers and patterns of human movements as well.

Complementarity

For two places to interact, one place must have a supply of an item for which there is an effective demand in the other, as evidenced by desire for the item, purchasing power to acquire it, and means to transport it. The word describing this circumstance is **complementarity**. *Effective* supply and demand are important considerations; mere differences from place to place in commodity sur-

plus or deficit are not enough to initiate exchange. Greenland and the Amazon basin are notably unlike in their natural resources and economies, but their amount of interaction is minimal. Supply and market must come together, as they do in the flow of seasonal fruits and vegetables from California's Imperial Valley to the urban markets of the American Midwest and East or in the movement of manganese from Ukraine to the steel mills of Western Europe. The massive movement of crude and refined petroleum between spatially separated effective supplies and markets clearly demonstrates complementarity in international trade (Figure 3.2). More generalized patterns of complementarity underlie the exchanges of the raw materials and agricultural goods of less developed countries for the industrial commodities of the developed states.

Transferability

Even when complementarity exists, spatial interaction occurs only when conditions of **transferability**—acceptable costs of an exchange—are met. Spatial movement responds not just to availability and demand but to considerations of time and cost. Transferability is an expression of the mobility of a commodity, and is a function of three interrelated conditions: (1) the characteristics and value of the product; (2) the distance, measured in time and money penalties,

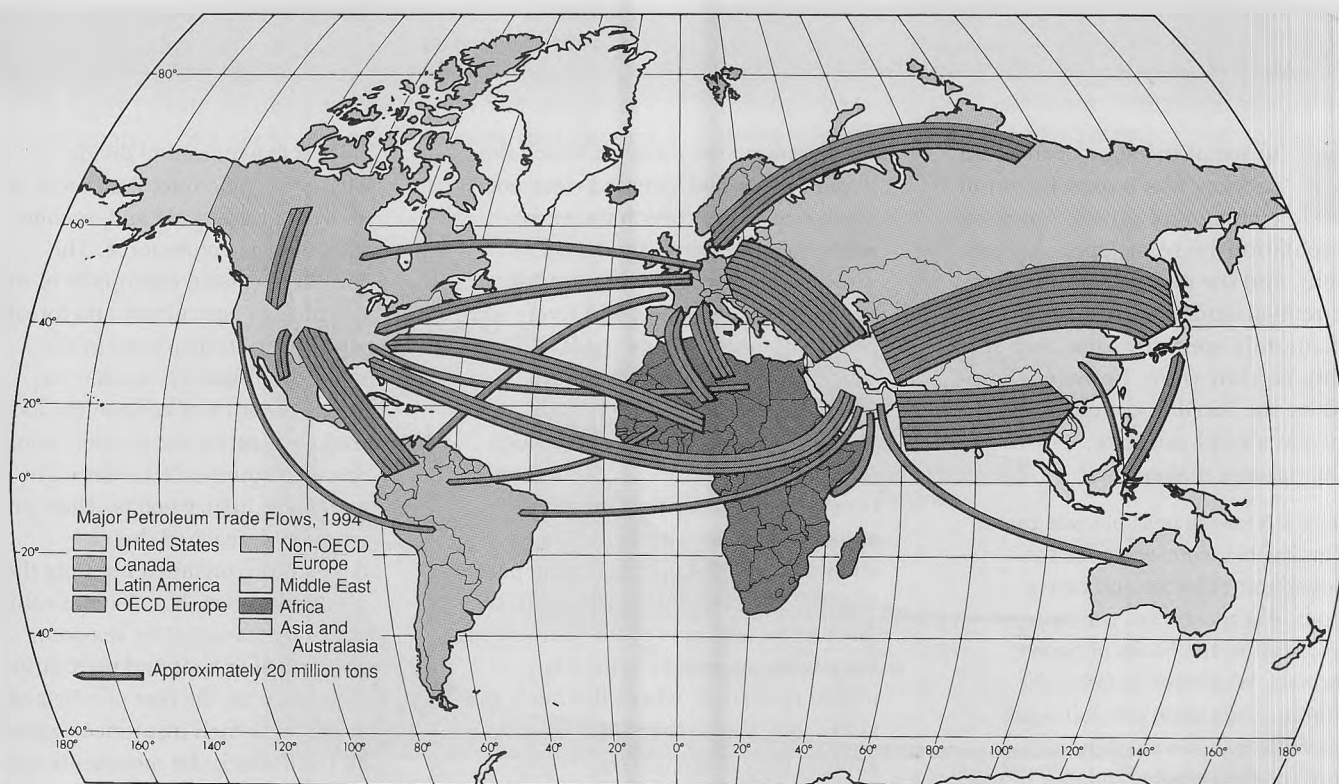


FIGURE 3.2 Interregional trade in oil, 1994. Complementarity is so basic in initiating interaction that even relatively low-value bulk commodities such as coal, fertilizer, and grain move in trade over long distances. For many years, despite fluctuating prices, petroleum has been the most important commodity in international trade. The line widths are proportional to average daily movements.

over which it must be moved, and (3) the ability of the commodity to bear the costs of movement. If the time and money costs of traversing a distance are too great, exchange does not occur. That is, mobility is not just a physical matter but an economic one as well. If a given commodity is not affordable upon delivery to an otherwise willing buyer, it will not move in trade, and the potential buyer must seek a substitute or go without.

Transferability is not a constant condition. It differs between places, over time, and in relation to what is being transferred and how it is to be moved. The opening of a logging road will connect a sawmill with stands of timber formerly inaccessible (nontransferable). An increasing scarcity of high-quality ores will enhance the transferability of lower-quality mine outputs by increasing their value. Low-cost bulk commodities not economically moved by air may be fully transferable by rail or water. Poorly developed and costly transportation may inhibit exchanges even at short distance between otherwise willing traders (see "Roads as Barriers in Medieval Europe"). In short, transferability expresses the changing relationships between the costs of transportation and the value of the product to be shipped.

Intervening Opportunity

Complementarity can be effective only in the absence of more attractive alternative sources of supply or demand closer at hand or cheaper. **Intervening opportunities** serve to reduce

supply-demand interactions that otherwise might develop between distant complementary areas. A supply of Saharan sand is not enough to assure its flow to sand-deficient Manhattan Island because supplies of sand are more easily and cheaply available within the New York metropolitan region. For reasons of cost and convenience, a purchaser is unlikely to buy identical commodities at a distance when a suitable nearby supply is available. When it is, the intervening opportunity serves to demonstrate complementarity at a shorter distance.

Similarly, markets and destinations are sought, if possible, close at hand. Growing metropolitan demand in California reduces the importance of midwestern markets for western fruit growers. The intervening opportunities offered by Chicago or Philadelphia reduce the number of job seekers from Iowa searching for employment in New York City. More people from New England take winter vacations in Florida, which is relatively near and accessible, than in Southern California, which is not. That is, opportunities that are discerned closer at hand reduce the pull of opportunities offered by a distant destination (Figure 3.3). Patterns of spatial interaction are dynamic, reflecting the changeable structure of apparent opportunity.

Measuring Interaction

Complementarity, transferability, and intervening opportunity—the controlling conditions of commodity movement—help us understand all forms of spatial interaction, including

ROADS AS BARRIERS IN MEDIEVAL EUROPE



Europe at the start of the 12th century was poised for rapid change and growth, sparked by population increase, spread of settlement, and the revival of commerce. That revival and the promise it held for economic specialization and spatial interaction were, however, hampered by the terrible condition of the continent's road network, as the following passage makes clear.

As much use as possible was made of navigable waterways for the movement of bulky and heavy goods, but most were transported overland on the backs of pack animals. Wherever possible the Roman roads were still followed, but these had never been built north of the Danube and east of the Rhine, and elsewhere bridges had in many places collapsed and the roads had fallen into disrepair.

Furthermore, the cities on which the Roman roads had focussed were not necessarily those which the early medieval traveller wished to visit.

Most roads were merely tracks. Bridges were very few, and rivers were generally forded. Many roads, especially in central and eastern Europe, were not clearly defined, consisting of multiple paths through the forest and waste. The Alps aroused considerable fears, and the roads across their passes were avoided whenever possible. Crossing the passes was strenuous and dangerous, but the most hazardous part of the journey was usually the approach to the high mountains. Here, where the roads ran alternately through defiles and wide valleys, they could be more easily blocked and the traveller harassed by robbers and burdened with tolls.

It is convenient to divide Medieval trade into, first, local or short-distance trade and, second, long-distance commerce. The former consisted essentially of the products of agriculture and forestry, which were transported to the nearest monastery, market, or town. In terms of volume the local trade was much the greater. Long-distance commerce consisted in general of luxury goods. Their price, when they reached their destination, included not only the production cost, but also the value added by transport by sea-going ship, by river boat and pack animal, together with the cost of tolls and doubtless a high insurance against all risks which the merchants ran.

Source: Norman J. G. Pounds, *An Historical Geography of Europe, 450 B.C.—A.D. 1330* (New York: Cambridge University Press, 1973).

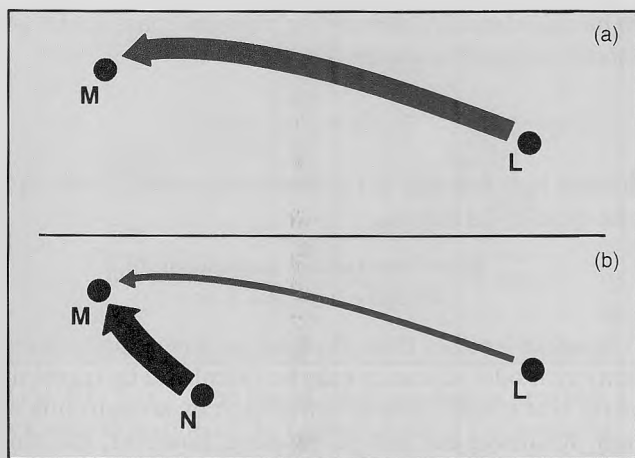


FIGURE 3.3 (a) The volume of expected flow of a good between centers *L* and *M*, based solely on their complementarity and distance apart, may be (b) materially reduced if an alternate supplier is introduced as an intervening opportunity nearer to the market.

the placing of long-distance phone calls, the residential locational decisions of commuters, and the once-in-a-lifetime transcontinental adventure of the Hauns. Interaction of whatever nature between places is not, of course, meaningfully described by the movement of a single commodity, by the habits of an individual commuter, or the once-only decision of a migrant. The discovery of an Inuit (Eskimo) ivory carving in a Miami gift shop does not establish significant interaction between the Arctic coast and a Florida resort.

The study of unique events is suggestive but not particularly informative. We seek general principles that govern

the frequency and intensity of interaction both to validate the three preconditions of spatial exchange and to establish the probability that any given potential interaction will actually occur. Our interest is similar to that of the physical scientist investigating, for example, the response of a gas to variations in temperature and pressure. The concern there is with *all* of the gas molecules and the probability of their collective reactions; the responses of any particular molecule are of little interest. Similarly, we are concerned here with the probability of aggregate, not individual, behavior.

Distance Decay

In all manner of ways, our lives and activities are influenced by the **friction of distance**. That phrase reminds us that distance has a retarding effect on human interaction because there are increasing penalties in time and cost associated with longer-distance, more expensive interchanges. We visit nearby friends more often than distant relatives; we go more frequently to the neighborhood convenience store cluster than to the farther regional shopping center. Telephone calls or mail deliveries between nearby towns are greater in volume than those to more distant locations.

Our common experience, clearly supported by maps and statistics tracing all kinds of flows, is that most interactions occur over short distances. That is, interchange decreases as distance increases, a reflection of the fact that transferability costs increase with distance. More generally stated, **distance decay** describes the decline of an activity or function with increasing distance from its point of origin. As the examples in Figure 3.4 demonstrate, near destinations have a disproportionate pull over more distant points in commodity movements. However, it is also evident that the rate of distance decay varies with the type of activity.

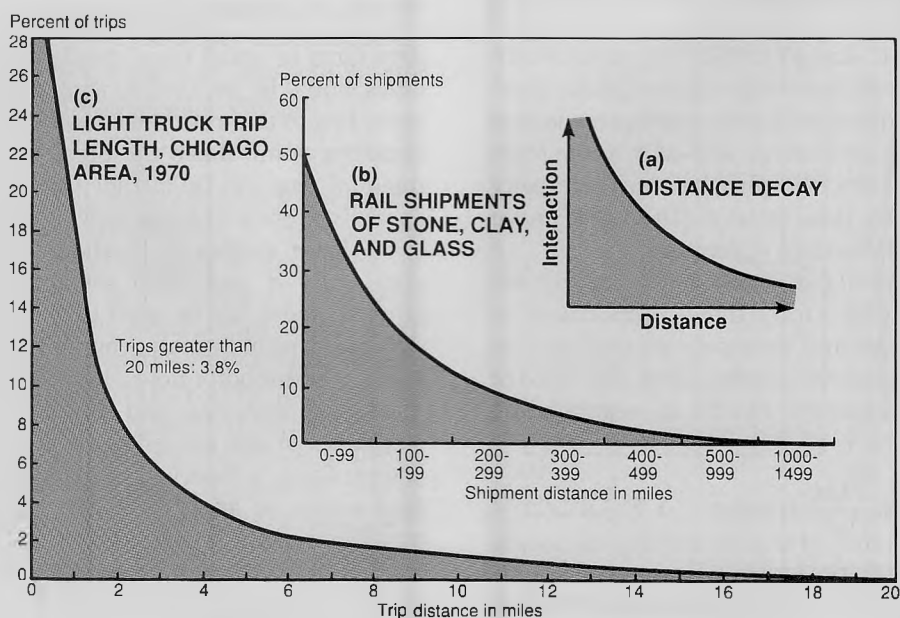


FIGURE 3.4 The shape of distance decay. The geographer W. Tobler summarized the concept of distance decay in proposing his "first law of geography: everything is related to everything else, but near things are more related than distant things." Distance decay curves vary with the type of flow: (a) is a generalized statement of distance decay, (b) summarizes U.S. data for 1963, and (c) suggests the primary use of light trucks as short-haul pickup and delivery vehicles.

Study of all manner of spatial interconnections has led to the very general conclusion that interaction between places is inversely related to the square of the distance separating them. That is, volume of flow between two points 80 kilometers (50 miles) apart would probably be only one-quarter of that between centers at 40 kilometers (25 miles) apart. Such a rigid *inverse-square* relationship is well documented in the physical sciences. For social, cultural, and economic relations, however, it is at best a useful approximation. In human interaction, linear distance is only one aspect of transferability; cost and time are often more meaningful measures of separation.

When the friction of distance is reduced by lowered costs or increased ease of flow, the slope of the distance decay curve is flattened and more total area is effectively united than when those costs are high. When telephone calls are charged by uniform area rates rather than strictly by distance, more calls are placed to the outer margins of the rate area than expected. Expressways extend commuting travel ranges to central cities and expand the total area conveniently accessible for weekend recreation. Figure 3.4 shows that shipping distances for high-cost truck transport are, on the average, shorter than for lower-cost rail hauls.

The Gravity Concept

Interaction decisions are not based on distance or distance-cost considerations alone. The large regional shopping center attracts customers from a wide radius because of the variety of shops and goods its very size promises. We go to distant big cities "to seek our fortune" rather than to the nearer small town. We are, that is, attracted by the expectation of opportunity that we associate with larger rather than smaller places. That expectation is summarized by another model of spatial interaction, the **gravity model**, also drawn from the physical sciences.

In the 1850s, Henry C. Carey (1793–1879), in his *Principles of Social Science*, observed that the law of "molecular gravitation" is an essential condition in human existence and that the attractive force existing between areas is akin to the force of gravity. According to Carey, the physical laws of gravity and motion developed by Sir Isaac Newton (1642–1727) have applicability to the aggregate actions of humans.

Newton's *law of universal gravitation* states that any two objects attract each other with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between them. Thus, the force of attraction, F , between two masses, M_i and M_j , separated by distance, d , is

$$F = g \frac{M_i M_j}{d_{ij}^2},$$

where g is the "gravitational constant."

Carey's interests were in the interaction between urban centers and in the observation that a large city is more likely to attract an individual than is a small hamlet. His first interest could be quickly satisfied by simple analogy. The expected interaction (I) between two places, i and

j , can be calculated by converting physical mass in the gravity model to population size (P), so that

$$I_{ij} = \frac{P_i P_j}{D_{ij}^2}$$

Exchanges between any set of two cities, A and B , can therefore be quickly estimated:

$$I_{AB} = \frac{\text{population of } A \times \text{population of } B}{(\text{distance between } A \text{ and } B)^2}$$

In social—rather than physical—science applications of the gravity model, distance may be calculated by travel time or travel cost modifications rather than by straight line separation. Whatever the unit of measure, however, the model assures us that although spatial interaction always tends to decrease with increasing distance between places, at a given distance it tends to expand with increases in their size.

Carey's second observation—that large cities have greater drawing power for individuals than small ones—was subsequently addressed by the *law of retail gravitation*, proposed by William J. Reilly (1899–1970) in 1931. Using the population and distance inputs of the gravity model, Reilly concluded that the *breaking point* (BP) or boundary marking the outer edge of either of the cities' trade area could be located by the expression

$$BP = \frac{d_{ij}}{1 + \sqrt{\frac{P_2}{P_1}}}$$

where

BP = distance from city 1 to the breaking point (or boundary)

d_{ij} = distance between city 1 and city 2

P_1 = population of city 1

P_2 = population of city 2

Any farm or small town resident located between the two cities would be inclined to shop in one or the other of them according to that resident's position relative to the calculated breaking point. Since the breaking point between cities of unequal size will lie farther from the larger of the two, its spatially greater drawing power is assured (Figure 3.5).

Later studies in location theory, city systems, trade area analysis, and other social topics all suggest that the gravity model can be used to account for a wide variety of flow patterns in human geography, including population migration, commodity flows, journeys to work or to shop, telephone call volumes, and the like. Each such flow pattern suggests that size as well as distance influences spatial interaction. Carey's observation made nearly 150 years ago initiated a type of analysis that has continuing relevance. In modified form it is used today for a variety of practical studies that help us better understand the "friction of distance."

Interaction Potential

Spatial interaction models of distance decay and gravitational pull deal with only two places at a time. The world of reality is rather more complex. All cities, not just city pairs,

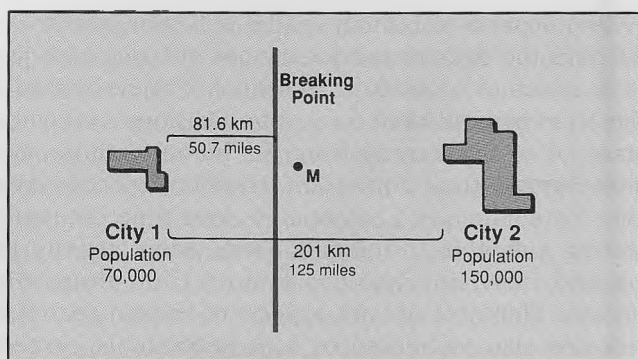


FIGURE 3.5 The law of retail gravitation provides a quick determination of the trade boundary (or breaking point) between two cities. In the diagram, cities 1 and 2 are 201 kilometers (125 miles) apart. Reilly's law tells us that the breaking point between them lies 81.6 kilometers (50.7 miles) distant from city 1. A potential customer located at M, midway (100.5 km or 62.5 mi) between the cities, would lie well within the trade zone of city 2. A series of such calculations would define the "trade area" of any single city.

within a regional system of cities have the possibility of interacting with each other. Indeed, the more specialized the goods produced in each separate center—that is, the greater their collective complementarity—the more likely is it that such multiple interactions will occur.

A **potential model**, also based on Newtonian physics, provides an estimate of the interaction opportunities available to a center in such a multicentered network. It tells us the relative position of each point in relation to all other places within a region. It does so by summing the size and distance relationships between all points of potential interaction within an area. The concept of potential is applicable whenever the measurement of the intensity of spatial interaction is of concern—as it is in studies of marketing, land values, broadcasting, commuting patterns, and the like.

Movement Biases

Distance decay and the gravity and potential models help us understand the bases for interaction in an idealized area without natural or cultural barriers to movement or restrictions on routes followed, and in which only rational interaction decisions are made. Even under those idealized conditions, the pattern of spatial interaction that develops for whatever reason inevitably affects the conditions under which future interactions will occur. An initial structure of centers and connecting flows will tend to freeze into the landscape a mutually reinforcing continuation of that same pattern. The predictable flows of shoppers to existing shopping centers make those centers attractive to other merchants. New store openings increase customer flow; increased flow strengthens the developed pattern of spatial interaction. And increased road traffic calls for the highway improvement that encourages additional traffic volume.

Such an aggregate regularity of flow is called a **movement bias**. We have already noted a *distance bias* favoring short movements over long. There is also *direction bias*, in which of all possible directions of movement, actual flows are restricted to only one or a few. Direction bias is simply a statement that from a given origin, flows are not random (Figure 3.6); rather, certain places have a greater attraction than do others. The movement patterns from an isolated farmstead are likely oriented to a favored shopping town. On a larger scale, in North America or Siberia long-distance freight movements are directionally biased in favor of east-west flows. Direction bias reflects not just the orientation but also the intensity of flow. Movements from a single point—from Novosibirsk in Siberia, for example, or from Winnipeg, Canada, or Kansas City in the United States—may occur in all directions; they are in reality more intense along the east-west axis.

Such directional biases are in part a reflection of *network bias*, a shorthand way of saying that the presence or absence of connecting channels strongly affects the likelihood that spatial interaction will occur. A set of routes and the set

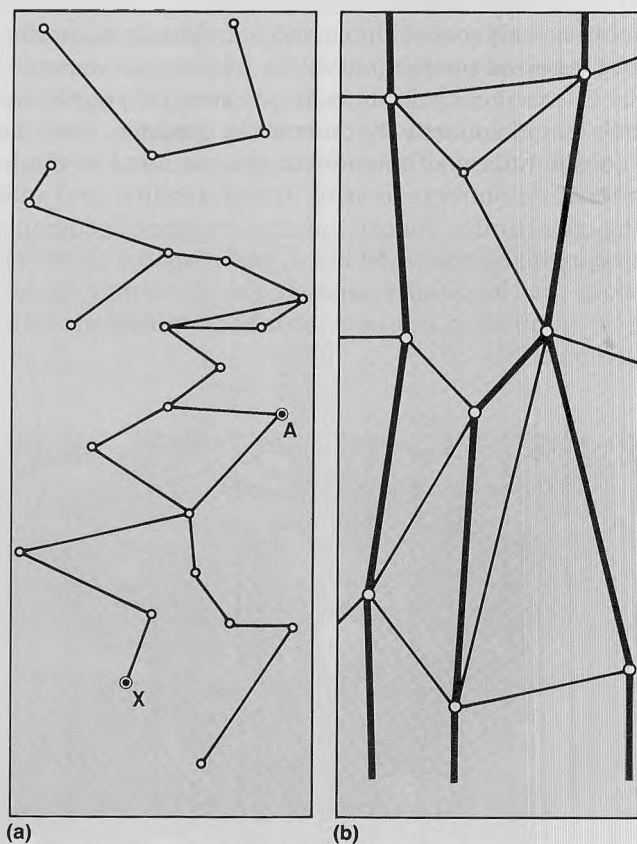


FIGURE 3.6 Direction bias. (a) When direction bias is absent, movements tend to be almost random, occurring in all possible directions, but less likely between points, such as A and X, not directly connected. (b) Direction bias indicating predominantly north-south movements. Direction bias implies greatest intensity of movement within a restricted number of directions.

of places that they connect are collectively called a **network**. Flows cannot occur between all points if not all points are linked. In Figure 3.6a, the interchange between A and X, though not necessarily impossible, is unlikely because the routeway between them is indirect and circuitous. In information flows, a worker on the assembly line is less likely to know of company production plans than is a secretary in the executive offices; these two workers are tied into quite different information networks.

A recognition of movement biases helps to refine the coarser generalizations of spatial interaction based on complementarity, transferability, and intervening opportunity. Other modifying statements have been developed, but each further refinement moves us away from aggregate behavior toward less predictable individual movements and responses. The spatial interaction questions we ask and the degree of refinement of the answers we require determine the modifications we must introduce into the models we employ.

Human Spatial Behavior

Humans are not commodities and individually do not necessarily respond predictably to the impersonal dictates of spatial interaction constraints. Yet, to survive, people must be mobile and collectively do react to distance, time, and cost considerations of movement in space and to the implications of complementarity, transferability, and intervening opportunity. Indeed, an exciting line of geographic inquiry involves how individuals make spatial behavioral decisions and how those separate decisions may be summarized by models and generalizations to explain collective actions.

Two aspects of human spatial behavior concern us. The first is the daily or temporary use of space—the journeys to stores or to work or to school. The second is the longer-term commitment related to decisions to travel, to migrate, or to settle away from the home territory. Both aspects imply a time dimension. Humans' spatial actions are not instantaneous. They operate over time, frequently imparting a rhythm to individual and group activity patterns and imposing choices among time-consuming behaviors. Elements of both aspects of human spatial behavior are also embodied in how individuals perceive space and act within it and how they respond to information affecting their space-behavioral decisions.

Individual Activity Space

One of the realities of life is that groups and countries draw boundaries around themselves and divide space into territories that are, if necessary, defended. Some see the concept of **territoriality**—the emotional attachment to and the defense of home ground—as a root explanation of much of human action and response. It is true that some individual and collective activity appears to be governed by territorial defense responses: the conflict between street groups in claiming and protecting their “turf” (and their fear for their lives when venturing beyond it) and the sometimes violent rejection by ethnic urban neighborhoods of an advancing black, Hispanic, or other population group. On a more individualized basis, each of us claims as **personal space** the zone of privacy and separation from others our culture or our physical circumstances require or permit. North Americans demand greater face-to-face separation in conversations than do Latin Americans. Personal space on a crowded beach or in a department store is acceptably more limited than it is in our homes or when we are studying in a library (Figure 3.7).



(a)

FIGURE 3.7 Our demanded *personal space* is not necessarily uniform in shape or constant in size. We tolerate strangers closer to our sides than directly in front of us; we accept more crowding in an elevator than in a store. We tend to distance ourselves from others in a library, but accept the press of the crowd on a popular beach—as do these vacationers (a) along the Costa Blanca in Spain.



(b)

For most of us, our personal sense of territoriality is a tempered one. We regard our homes and property as defensible private domains but open them to innocent visitors, known and unknown, or to those on private or official business. Nor do we confine our activities so exclusively within controlled home territories as street-gang members do within theirs. Rather, we have a more or less extended home range, an **activity space** or area within which we move freely on our rounds of regular activity, sharing that space with others who are also about their daily affairs. Figure 3.8 suggests probable activity spaces for a suburban family of five for a day. Note that the activity space is different and for the mapped day rather limited for each individual, even though two members of the family use automobiles. If one week's activity were shown, more paths would be added to the map.

The types of trips that individuals make and thus the extent of their activity space depend on at least three interrelated variables: their stage in the life cycle; the means of mobility at their command; and the demands or opportunities implicit in their daily activities. The first variable, *stage in the life cycle*, refers to membership in specific age groups. School-age children usually travel short distances to lower schools and longer distances to upper-level schools. After-school activities tend to be limited to walking or bicycle trips to nearby locations. Greater mobility is characteristic of high school students. Adults responsible for household duties make shopping trips and trips related to child care as well as journeys

away from home for social, cultural, or recreational purposes. Wage-earning adults usually travel farther from home than other family members. Elderly people may, through infirmity or interests, have less extensive activity spaces.

The second variable that affects the extent of activity space is *mobility*, or the ability to travel. An informal consideration of the cost and effort required to overcome the friction of distance is implicit. Where incomes are high, automobiles are available, and the cost of fuel is reckoned minor in the family budget, mobility may be great and individual activity space large. In societies or neighborhoods where cars are not a standard means of conveyance, the daily nonemergency activity space may be limited to walking, bicycling, or taking infrequent trips on public transportation. Wealthy suburbanites are far more mobile than are residents of inner-city slums, a circumstance that affects ability to seek or retain work and to have access to medical care, educational facilities, and social services.

A third factor limiting activity space is the individual assessment of the existence of possible activities or *opportunities*. In primitive societies, where the needs of daily life are satisfied at home, the impetus for journeys away from home is minimal. Without stores, schools, factories, or even roads, expectations and opportunities are limited. Not only are activities spatially restricted, but **awareness space**—knowledge of opportunity locations beyond normal activity space—is minimal, distorted, or absent. In low-income neighborhoods of modern cities in any country, poverty

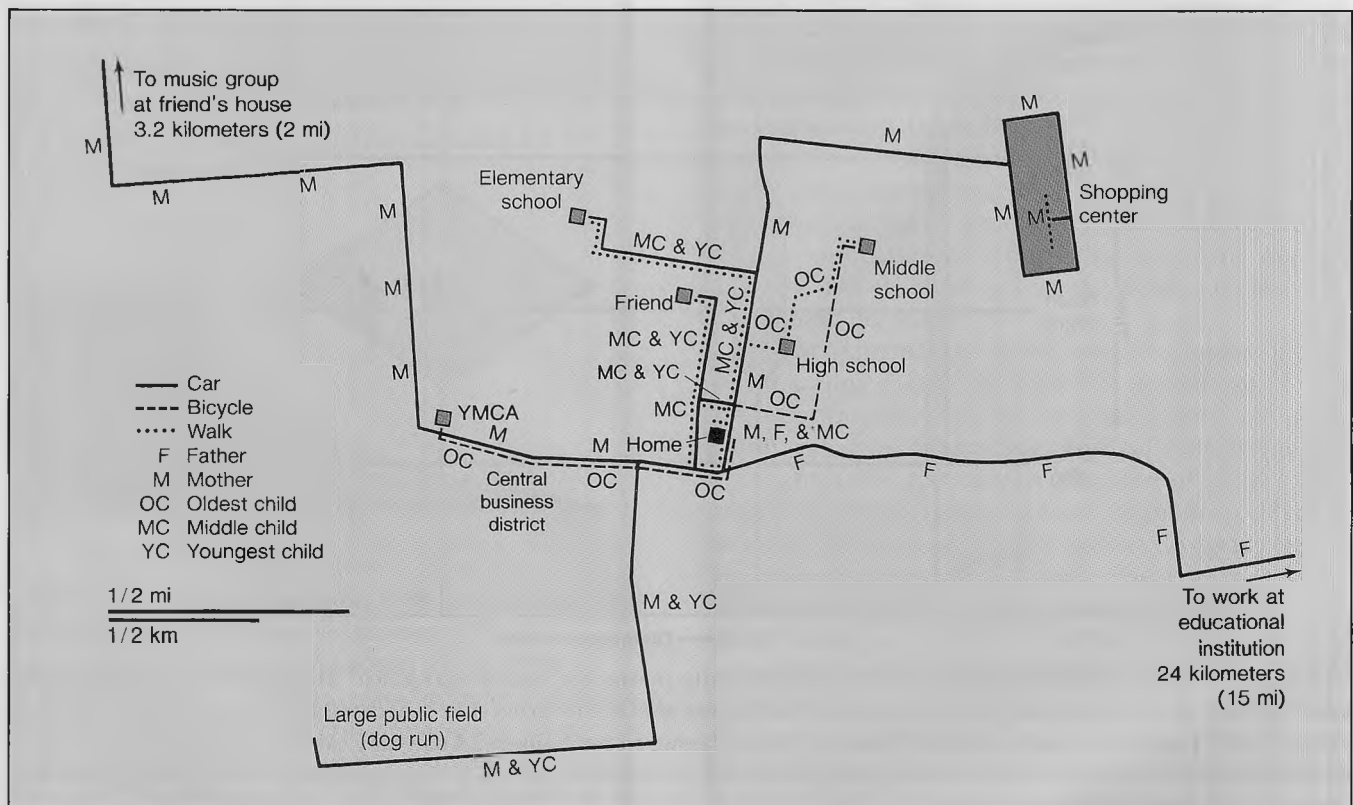


FIGURE 3.8 Activity space for each member of one of the author's family of five for a typical weekday. Routes of regular movement and areas recurrently visited help to foster a sense of territoriality and to color one's perceptions of space.

and isolation restrict access to information about opportunities and therefore reinforce other limitations on activity space (Figure 1.30).

The Tyranny of Time

The daily activities of humans—eating, sleeping, traveling between home and destination (and back), working or attending classes—all consume time as well as involve space. An individual's spatial reach is restricted because one cannot be in two different places at the same moment or engage simultaneously in activities that are spatially separate. Further, since there is a finite amount of time within a day and each of us is biologically bound to a daily rhythm of day and night, sleeping and eating, time tyrannically limits the spatial choices we can make and the activity space we can command.

Our daily space-time constraints—our *time-geography*—may be represented by a **space-time prism**, the volume of space and length of time within which our activities must be confined. Its size and shape are determined by our mobility; its boundaries define what we can or cannot accomplish spatially or temporally (Figure 3.9). If our circumstances demand that we walk to work or school (3.9*b*), the sides of our prism are steep and the space available for our activities is narrow. We cannot use time spent in transit for other activities, and the area reasonably accessible to the pedestrian is limited. The space-time prism for the driver (3.9*c*) has flattened sides and the individual's spatial range is wide. The dimensions of the prism determine what spatially defined

activities are possible, for no activity can exceed the bounds of the prism (see "Space, Time, and Women"). Since most activities have their own time constraints, the choices of things you can do and the places you can do them are strictly limited. Defined class hours, travel time from residence to campus, and dining hall location and opening and closing hours, for example, may be the constraints on your *space-time path* (Figure 3.10). If you also need part-time work, your choice of jobs is restricted by their respective locations and work hours, for the job, too, must fit within your daily space-time prism.

Distance and Human Interaction

People make many more short-distance trips than long ones, a statement in human behavioral terms of the concept of *distance decay*. If we drew a boundary line around our activity space, it would be evident that trips to the boundary are taken much less often than short-distance trips around the home. The tendency is for the frequency of trips to fall off very rapidly beyond an individual's **critical distance**—the distance beyond which cost, effort, and means strongly influence our willingness to travel. Figure 3.11 illustrates the point with regard to journeys from the homesite.

Regular movements defining our individual activity space are undertaken for different purposes and are differently influenced by time and distance considerations. The kind of activities individuals engage in can be classified according to type of trip: journeys to work, to school, to shop,

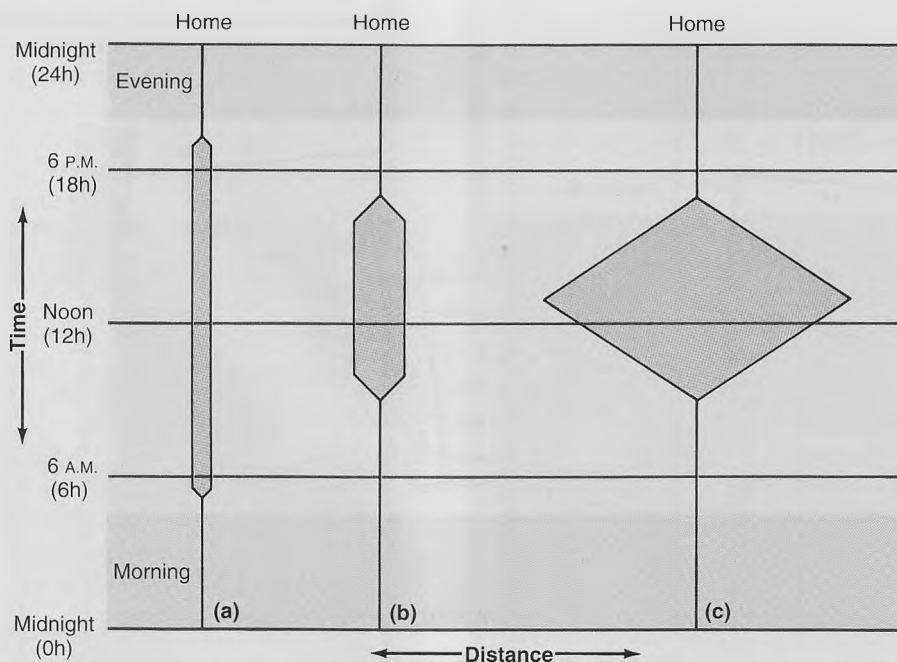


FIGURE 3.9 The space-time prism. An individual's daily prism has both geographical limits and totally surrounding space-time walls. The *time* (vertical axis) involved in movement affects the space that is accessible, along with the time and space available for other than travel purposes. (a) When collecting firewood for household use may take an entire day, as it does in some deforested Third World countries, no time or space is left for other activities, and the gatherer's space-time prism may be represented by a straight line. (b) Walking to and from work or school and spending the required number of hours there leave little time to broaden one's area of activity. (c) The automobile permits an extension of the geographical boundaries of the driver's space-time prism; the range of activity possibilities and locations is expanded for the highly mobile.

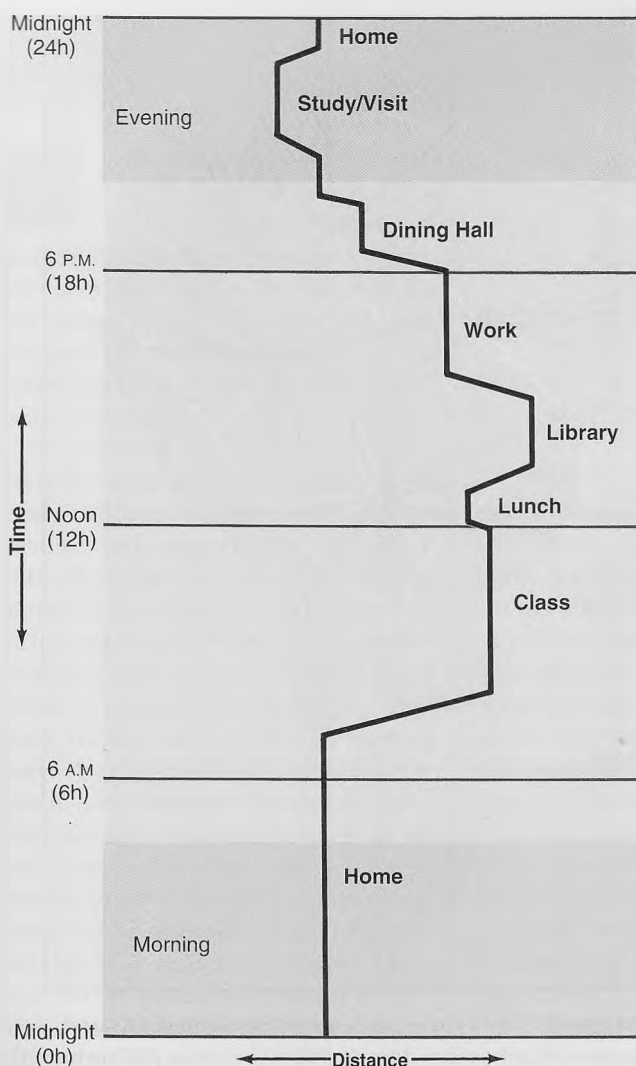


FIGURE 3.10 School-day space-time path for a hypothetical college student.

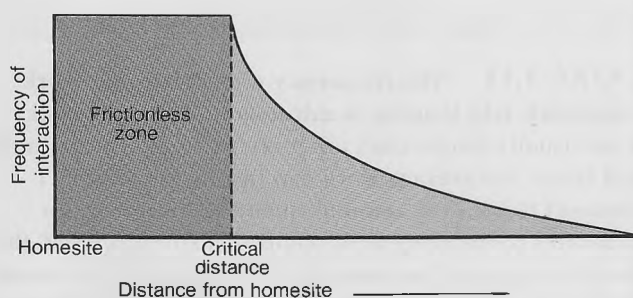


FIGURE 3.11 Critical distance. This general diagram indicates how most people observe distance. For each activity, there is a distance beyond which the intensity of contact declines. This is called the *critical distance* if distance alone is being considered, or the *critical isochrone* (from Greek *isos*, "equal," and *chronos*, "time") if time is the measuring rod. The distance up to the critical distance, is identified as a *frictionless zone*, in which time or distance considerations do not effectively figure in the trip decision.

for recreation, and so on. People in nearly all parts of the world make these same types of journeys, though the spatially variable requirements of culture, economy, and personal circumstance dictate their frequency, duration, and significance to an individual (Figure 3.12). A small child, for example, will make many trips up and down the block but is inhibited by parental admonitions from crossing the street. Different but equally effective distance constraints control adult behavior.

The journey to work plays a decisive role in defining the activity space of most adults. Formerly restricted by walking distance or by the routes and schedules of mass transit systems, the critical distances of work trips have steadily increased in Western European and North American cities as the private automobile figures more importantly in the movement of workers (Figure 3.13). Daily or weekly shopping may be within the critical distance of an individual, and little thought may be given to the cost or the effort involved. That same individual, however, may relegate shopping for special goods to infrequent trips and carefully consider their cost and effort. The majority of our social contacts tend to be at short distance within our own neighborhoods or with friends who live relatively close at hand; longer social trips to visit relatives are less frequent. In all such trips, however, the distance decay function is clearly at work (Figure 3.14).

Spatial Interaction and the Accumulation of Information

Critical distances, even for the same activity, are different for each person. The variables of life-cycle stage, mobility, and opportunity, together with an individual's interests and demands, help define how often and how far a person will travel. On the basis of these variables, we can make inferences about the amount of information a person is likely to acquire about his or her activity space and the area beyond. The accumulation of information about the opportunities and rewards of spatial interaction helps increase and justify movement decisions.

For information flows, however, space has a different meaning than it does for the movement of commodities. Communication, for example, does not necessarily imply the time-consuming physical relocations of freight transportation (though in the case of letters and print media it usually does). Indeed, in modern telecommunications, the process of information flow may be instantaneous regardless of distance. The result is space-time convergence to the point of the obliteration of space. A Bell System report tells us that in 1920, putting through a transcontinental telephone call took 14 minutes and eight operators. By 1940, the call completion time was reduced to less than 1½ minutes. In the 1960s, direct distance dialing allowed a transcontinental connection in less than 30 seconds, and electronic switching has now reduced the completion time to that involved in dialing a number and answering a phone.

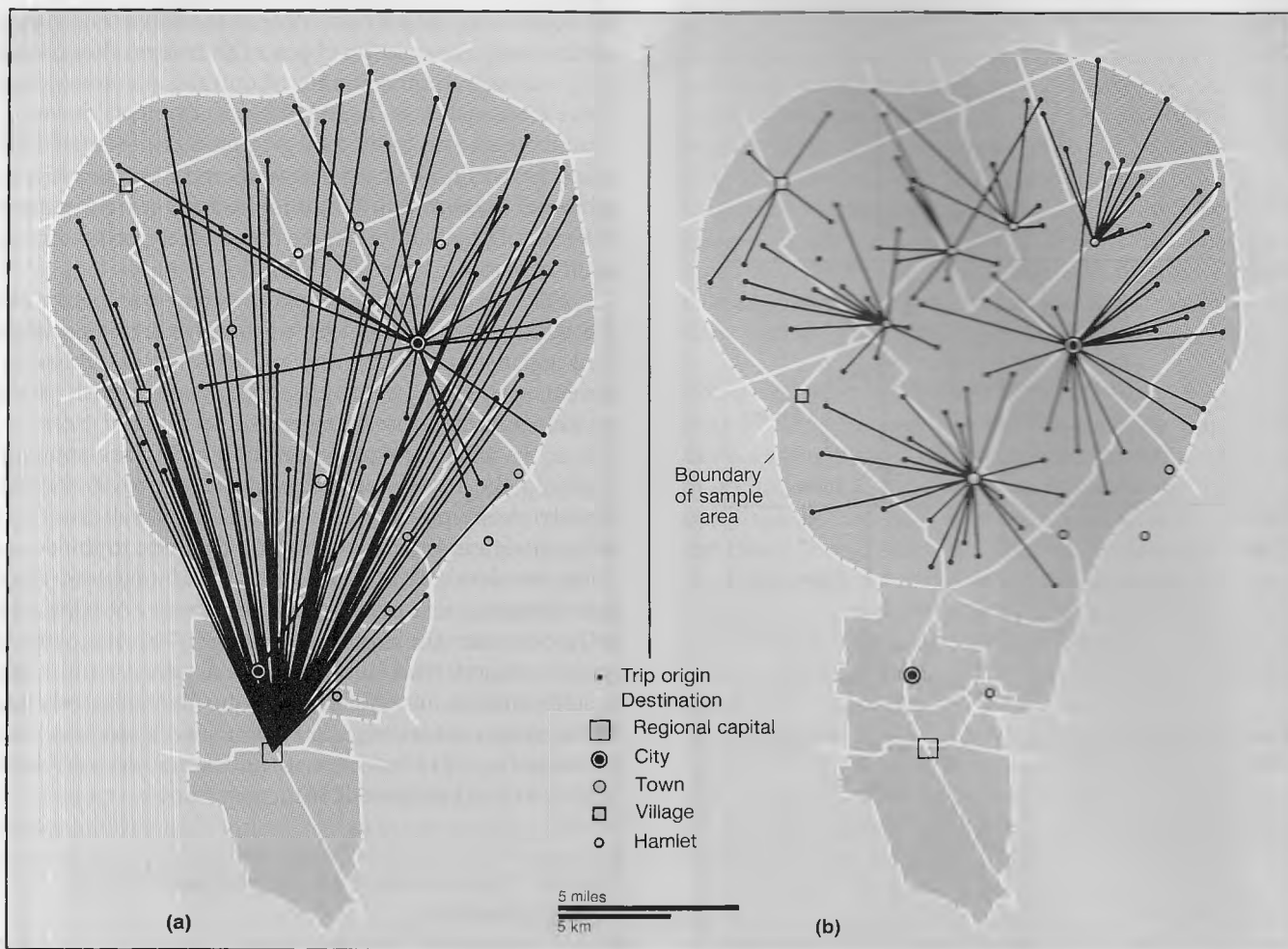


FIGURE 3.12 Travel patterns for purchases of clothing and yard goods of (a) rural cash-economy Canadians and (b) Canadians of the Old Order Mennonite sect. These strikingly different travel behaviors demonstrate the great differences that may exist in the action spaces of different culture groups occupying the same territory in midwestern Canada. They suggest that “modern” rural Canadians, owning cars and wishing to take advantage of the variety of goods offered in the more distant regional capital, are willing to travel longer distances than are people of a traditionalist culture who have different mobility and whose different demands in clothing and other consumer goods are satisfied in nearby small settlements.

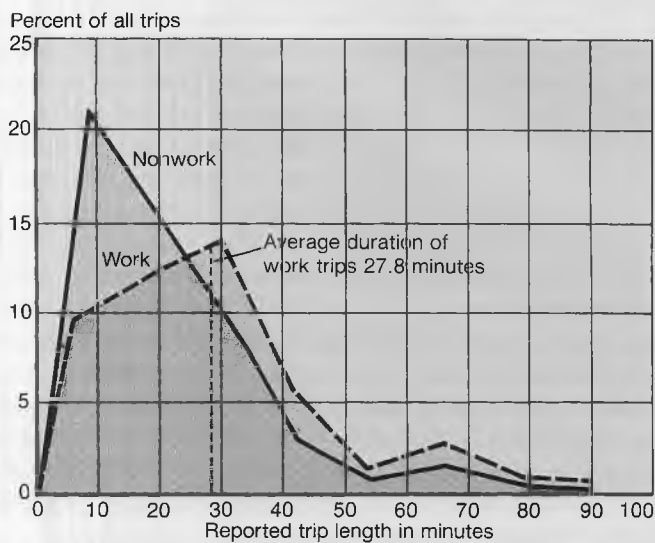


FIGURE 3.13 The frequency distribution of work and nonwork trip lengths in minutes in Toronto. Work trips are usually longer than other recurring journeys. In the United States, the average work trip in 1990 covered 17.1 kilometers (10.6 miles) and took about 19.7 minutes; for suburbanites commuting to the central business district, the journey to work took between 30 and 45 minutes. In western Canada, average work trip length in Calgary and Edmonton, Alberta, was 11 kilometers (6.8 miles) and took 18 minutes. For North American metropolitan areas, at least, 20 to 30 minutes seemed to be the upper limit of commuting time before people began to consider time and distance to work seriously in their choice of homesite. Most nonwork trips are relatively short.

From a time-geographic perspective it is apparent that many of the limitations women face in their choices of employment or other activities outside the home reflect the restrictions that women's time budgets and travel paths place on their individual daily activity mixes.

Consider the case* of the unmarried working woman with one or more children of preschool age. The location and operating hours of available child-care facilities may have more of an influence on her choice of job than do her labor skills or the relative merits of alternative employment opportunities. From the diagram we see that the woman cannot leave her home base, *A*, before a given hour because the only available full-day child-care service, *D*, is not open earlier. She must return at the specified child pick-up time and arrive home to prepare food at a reasonable (for the child) dinnertime. Her travel mode and speed determine the outer limits of her daily space-time prism.

Both of two solid job offers, *W*₁ and *W*₂, have the same working hours and fall within her space-time prism. The preferred, better paying job is *W*₂, but she cannot accept it because drop-off

time at the child-care center would make her late for work, and work hours would make her miss the center's closing time. On the other hand, although *W*₁ is acceptable from a child-care standpoint, it leaves no time (or store options) for shopping or errands except during the lunch hour (indicated by the small subprism). Job choice and shopping opportunities are thus determined not by the woman's labor skills or awareness of store price comparisons but by her time-geographic constraints. Other women in other job-skill, parenthood, locational, or mobility circumstances experience different but comparable space-path restrictions.

Mobility is a key to activity mix, time-budget, and space-path configurations. Again, research indicates that women are frequently disadvantaged. Because of their multiple work, child-care, and home maintenance tasks, women on

average make more—though shorter—trips than men, leaving less time for alternate activities. Although the automobile reduces those time demands, women have less access to cars than do males, in part because in many cities they are less likely to have a driver's license and because they typically cede use of a single family car to husbands. The lower income level of many single women with or without children limits their ability to own cars and leads them to use public transit disproportionately to their numbers—to the detriment of both their money and time-space budgets. They are, it has been observed, "transportation deprived and transit dependent."

*Suggested by Risa Palm and Allan Pred, *A Time-Geographic Perspective on Problems of Inequality for Women*. Institute of Urban and Regional Development, Working Paper no. 236. University of California, Berkeley, 1974.

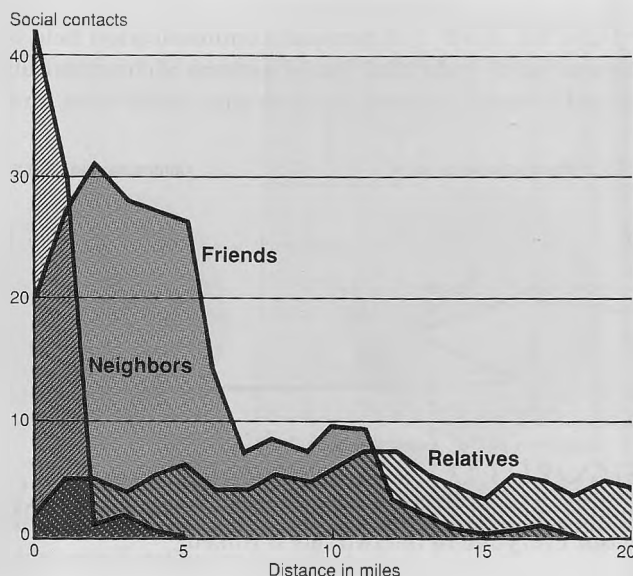
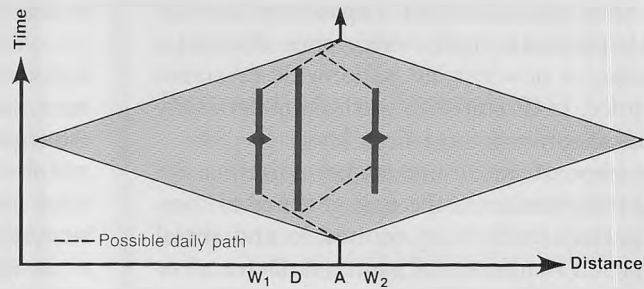


FIGURE 3.14 Social interaction as a function of distance. Visits with neighbors on the same street are frequent; they are less common with neighbors around the corner and diminish quickly to the vanishing point after a residential relocation. Friends exert a greater spatial pull, though the distance decay factor is clearly evident. Visits with relatives offer the greatest incentive for longer-distance (though relatively infrequent) journeys.

A speculative view of the future suggests that as distance ceases to be a determinant of the cost or speed of communication, the spatial structure of economic and social decision making may be fundamentally altered. Determinations about where people live and work, the role of cities and other existing command centers, flows of domestic and international trade, constraints on human mobility, and even the concepts and impacts of national boundaries may fundamentally change with new and unanticipated consequences for patterns of spatial interaction.

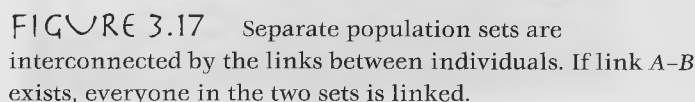
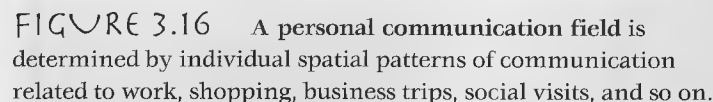
Spatially significant information flows are of two types: individual (person-to-person) exchanges and mass (source-to-area) communication. A further subdivision into formal and informal interchange recognizes, in the former, the need for an interposed channel (radio, press, postal service, or telephone, for example) to convey messages. Informal communication requires no such institutionalized message carrier.

The graph illustrates the historical trend of the U.S. dollar's value. It begins at approximately 21 dollars in 1919 and shows a steep decline to about 9 dollars by 1930. After a brief plateau, it drops again to around 4 dollars by 1940. From 1940 to 1950, the value remains relatively stable, fluctuating between 2.5 and 4 dollars. Following 1950, there is a consistent, gradual decline, reaching approximately 1 dollar by 1990.

Year	Value (Dollars)
1919	21
1920	16
1925	11
1930	9
1935	8
1940	4
1945	2.5
1950	2.5
1960	2
1970	1.5
1980	1
1990	1

76

Mass communication is the formal, structured transmission of information in essentially a one-way flow between single points of origin and broad areas of reception. There are few transmitters and many receivers. The mass media are by nature "space filling." From single origin points they address their messages by print, radio, or television to potential receivers within a defined area. The number and location of disseminating points, therefore, are related to their spatial coverage characteristics, to the minimum size of area and population necessary for their support, and to the capability of the potential audiences to receive their message. The coverage area is determined both by the nature of the medium and by the corporate intent of the agency.



There are no inherent spatial restrictions on the dissemination of printed materials. In the United States, much book and national magazine publishing has localized in New York City, as have the services supplying news and features for sale to the print media located there and elsewhere in the country. Paris, Buenos Aires, Moscow, London—indeed, the major metropolises and/or capital cities of other countries—show the same spatial concentration. Regional journals emanate from regional capitals, and major metropolitan newspapers, though serving primarily their home market, are distributed over (or produce special editions for distribution within) tributary areas whose size and shape depend on the intensity of competition from other metropolises. A spatial information hierarchy has thus emerged.

Hierarchies are also reflected in the market-size requirements for different levels of media offerings. National and international organizations are required to expedite information flows (and, perhaps, to control their content), but market demand is heavily weighted in favor of regional and local coverage. In the electronic media, the result has been national networks with local affiliates acting as the gatekeepers of network offerings, and adding to them locally originating programs and news content. A similar market subdivision is represented by the regional editions of national newspapers and magazines. At a different scale, the spatial distribution of newspapers in Kansas (Figure 3.18) shows their hierarchical pattern.

The technological ability to fill space with messages from different mass media is useless if receiving audiences do not exist. In illiterate societies, publications cannot inform or influence. Unless the appropriate receivers are widely available, television and radio broadcasts are a waste of resources. Perhaps no invention in history has done more to weld isolated individuals and groups of purely person-to-person communicators into national societies exposed to centralized information flows than has the low-cost transistor radio. Its battery-powered transportability converts the remotest village and the most isolated individual into a

receiving node of entertainment, information, and political messages. The direct satellite broadcast of television programs to community antennae or communal sets brings that mass medium to remote areas of Arctic Canada, India, Indonesia, and other world areas able to invest in the technology but as yet unserved by ground stations.

Information and Perception

Human spatial interaction, as we have seen, is conditioned by a number of factors. Complementarity, transferability, and intervening opportunities help pattern the movement of commodities and peoples. Flows between points and over area are influenced by distance decay and partially explained by gravity and potential models. Individuals in their daily affairs operate in activity spaces that are partly determined by stage in life cycle, mobility, and a variety of socioeconomic characteristics. In every instance of spatial interaction, however, decisions are based on information about opportunity or feasibility of movement, exchange, or want satisfaction.

More precisely, actions and decisions are based on **place perception**—the awareness we have, as individuals, of home and distant places and the beliefs we hold about them. Place perception involves our feelings and understandings, reasoned or irrational, about the natural and cultural characteristics of an area and about its opportunity structure. Whether our view accords with that of others or truly reflects the “real” world seen in abstract descriptive terms is not the major concern. Our perceptions are the important thing, for the decisions people make about the use of their lives or about their actions in space are based not necessarily on reality but on their assumptions and impressions of reality.

Perception of Environment

Psychologists and geographers are interested in determining how we arrive at our perceptions of place and environment both within and beyond our normal activity space. The images we form firsthand of our home territory have been in

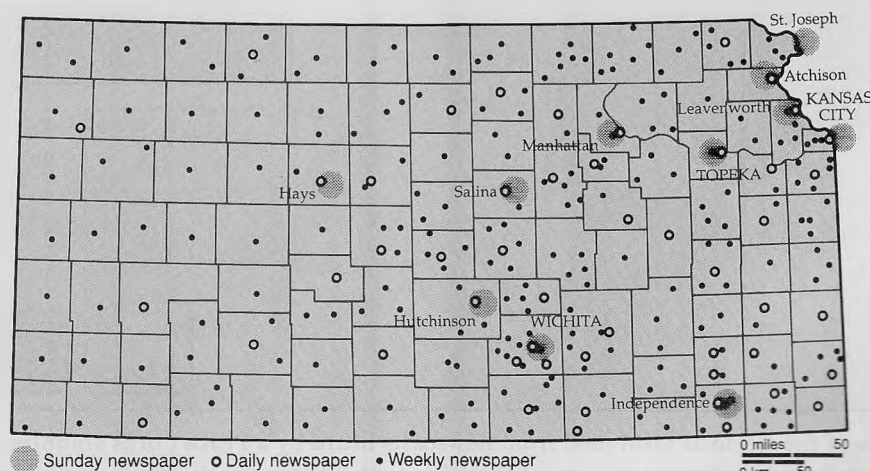


FIGURE 3.18 The hierarchy of newspaper coverage in Kansas in the 1970s. The counties in sparsely populated western Kansas had only weekly papers. The more populous eastern part of the state had daily and Sunday papers, with wide-area distribution.

part reviewed in the discussion of mental maps in Chapter 1. The perceptions we have of more distant places are less directly derived (Figure 3.19). In technologically advanced societies, television and radio, magazines and newspapers, books and lectures, travel brochures and hearsay all combine to help us develop a mental picture of unfamiliar places and of the interaction opportunities they may contain. Again, however, the most effectively transmitted information seems to come from word-of-mouth reports. These may be in the form of letters or visits from relatives, friends, and associates who supply information that helps us develop lines of attachment to relatively unknown areas.

There are, of course, barriers to the flow of information, including that of distance decay. Our knowledge of close places is greater than our knowledge of distant points; our contacts with nearby persons theoretically yield more information than we receive from afar. Yet in crowded areas with maximum interaction potential, people commonly set psychological barriers around themselves so that only a limited number of those possible interactions and information exchanges actually occur. We raise barriers against information overload and to preserve a sense of privacy that permits the filtering out of information that does not directly affect us. There are obvious barriers to long-distance information flows as well, such as time and money costs, mountains, oceans, rivers, and differing religions, languages, ideologies, and political systems.

Barriers to information flow give rise to what we earlier (page 69) called *direction bias*. In the present usage, this implies a tendency to have greater knowledge of places in some

directions than in others. Not having friends or relatives in one part of a country may represent a barrier to individuals, so that interest in and knowledge of the area beyond the "unknown" region are low. In the United States, both northerners and southerners tend to be less well informed about each other's areas than about the western part of the country. Traditional communication lines in the United States follow an east-west rather than a north-south direction, the result of early migration patterns, business connections, and the pattern of the development of major cities. In Russia, directional bias favors a north-south information flow within the European part of the country and less familiarity with areas far to the east. Within Siberia, however, east-west flows dominate.

When information about a place is sketchy, blurred pictures develop. These influence the impression—the perception—we have of places and cannot be discounted. Many important decisions are made on the basis of incomplete information or biased reports, such as decisions to visit or not, to migrate or not, to hate or not, even to make war or not. Awareness of places is usually accompanied by opinions about them, but there is no necessary relationship between the depth of knowledge and the perceptions held. In general, the more familiar we are with a locale, the more sound the factual basis of our mental image of it will be. But individuals form firm impressions of places totally unknown to them personally, and these may color interaction decisions.

One way to determine how individuals envisage home or distant places is to ask them what they think of different locales. For instance, they may be asked to rate places ac-

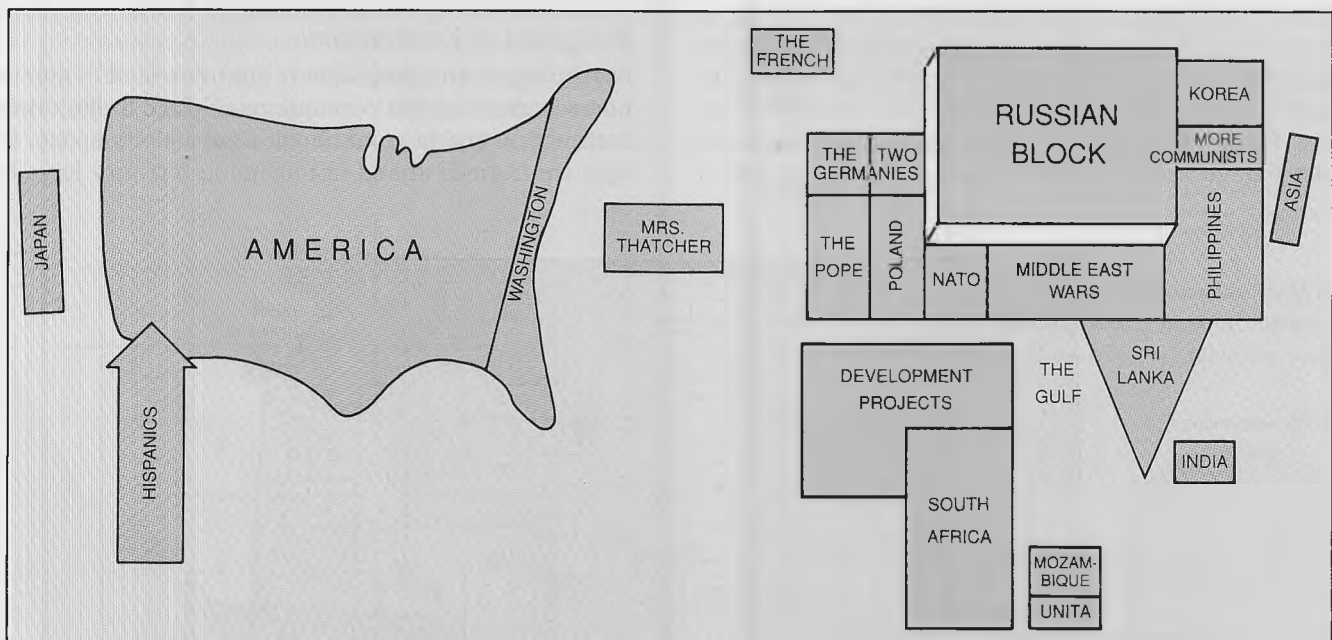


FIGURE 3.19 A view of the world as fashioned from newscasts heard by a Peace Corps volunteer working in the Central African Republic. The map is based on several months of listening to the Africa Service of the Voice of America (VOA) during 1987. Both areas and topics shown were those in the news and selected for emphasis by the broadcasters, whose choices helped form the mental maps and awareness patterns of their listeners. The "Russian Block" took on a three-dimensional reality not intended by the VOA.

ording to desirability—perhaps residential desirability—or to make a list of the 10 best and the 10 worst cities in their country of residence. Certain regularities appear in such inquiries. Figure 3.20 presents some residential desirability data elicited from college students in three provinces of Canada. These and comparable mental maps derived from studies conducted by researchers in many countries suggest that near places are preferred to far places unless much information is available about the far places. Places of similar culture are favored, as are places with high standards of living. Individuals tend to be indifferent to unfamiliar places and areas and to dislike those that have competing interests (such as distasteful political and military activities or conflicting economic concerns) or a physical environment perceived to be unpleasant.

On the other hand, places perceived to have superior climates or landscape amenities are rated highly in mental map studies and favored in tourism and migration deci-

sions. The southern and southwestern coast of England is attractive to citizens of generally wet and cloudy Britain, and holiday tours to Spain, the south of France, and the Mediterranean islands are heavily booked by the English. A U.S. Census Bureau study indicates that “climate” is, after work and family proximity, the most often reported reason for interstate moves by adult individuals of all ages. International studies reveal a similar migration motivation based not only on climate but also on concepts of natural beauty and amenities.

Perception of Natural Hazards

Less certain is the negative impact on spatial interaction or relocation decisions of assessments of *natural hazards*, processes or events in the physical environment that are not caused by humans but that have consequences harmful to them. Distinction is made between chronic, low-level hazards

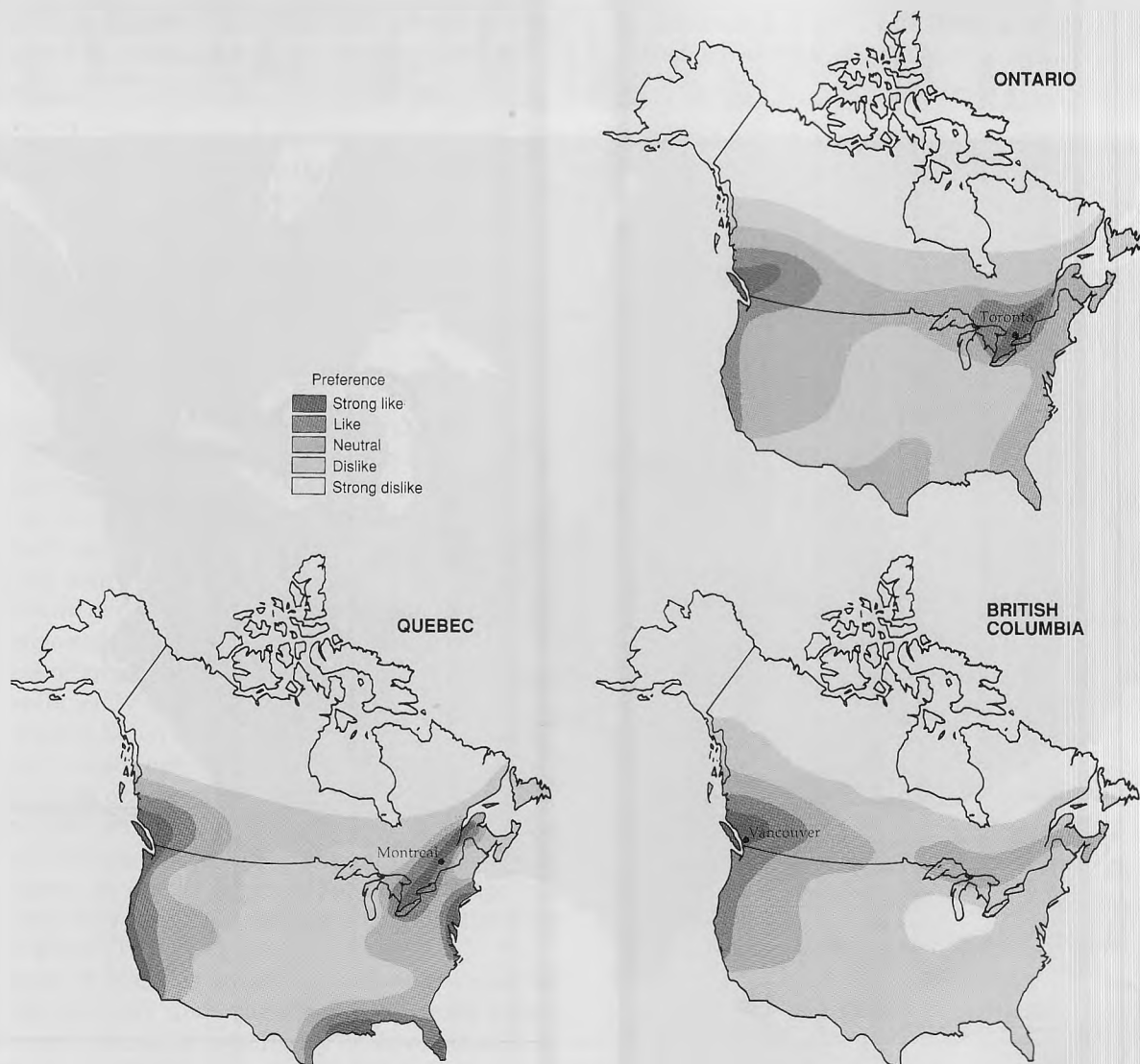


FIGURE 3.20 Residential preferences of Canadians. Each of these maps shows the residential preference of a sampled group of Canadians from the provinces of British Columbia, Ontario, and Quebec, respectively. Note that each group of respondents prefers its own area, but all like the Canadian and U.S. west coasts.

(health-affecting mineral content of drinking water, for example) and high-consequence/low-probability events such as hurricanes, earthquakes, landslides, and the like. Remedial low-level hazards do not appear to create negative space perceptions, though highly publicized chronic natural conditions, such as suspected cancer-related radon emissions (Figure 3.21) may be an exception. Space perception studies do reveal, however, a small but measurable adverse assessment of locales deemed "dangerous," no matter what the statistical probability of the hazard occurring.

Mental images of home areas do not generally include as an overriding concern an acknowledgment of potential natural dangers. The cyclone that struck the delta area of Bangladesh on November 12, 1970, left dead at least 500,000 people, yet after the disaster the movement of people into the area swelled the population above precyclone levels—a resettlement repeated after other cyclones in 1985 and 1991. The July 28, 1976, earthquake in the Tangshan area of China devastated a major urban-industrial complex, with casualties estimated to lie between 700,000 and 1 million. Rebuilding began almost immediately, as it usually does following earth-

quake damage (Figure 3.22). The human response to even such major and exceptional natural hazards is duplicated by a general tendency to discount dangers from more common hazard occurrences. Johnstown, Pennsylvania, has suffered recurrent floods, and yet its residents rebuild; violent storms strike the Gulf and East coasts of the United States, and people remain or return. Californians may be concerned about Kansas tornadoes if contemplating a move there but be unconcerned about earthquake dangers at home.

Why do people choose to settle in areas of high-consequence hazards in spite of the potential threat to their lives and property? Why do hundreds of thousands of people live along the San Andreas fault in California, build houses in Pacific coastal areas known to experience severe erosion during storms, return to flood-prone river valleys in Europe or Asia, or avalanche-threatened Andean valleys? What is it that makes the risk worth taking? Ignorance of natural hazard danger is not necessarily a consideration. People in seismically active regions of the United States and Europe, at least, do believe that damaging earthquakes are a possibility in their districts but, research indicates, are reluctant to do

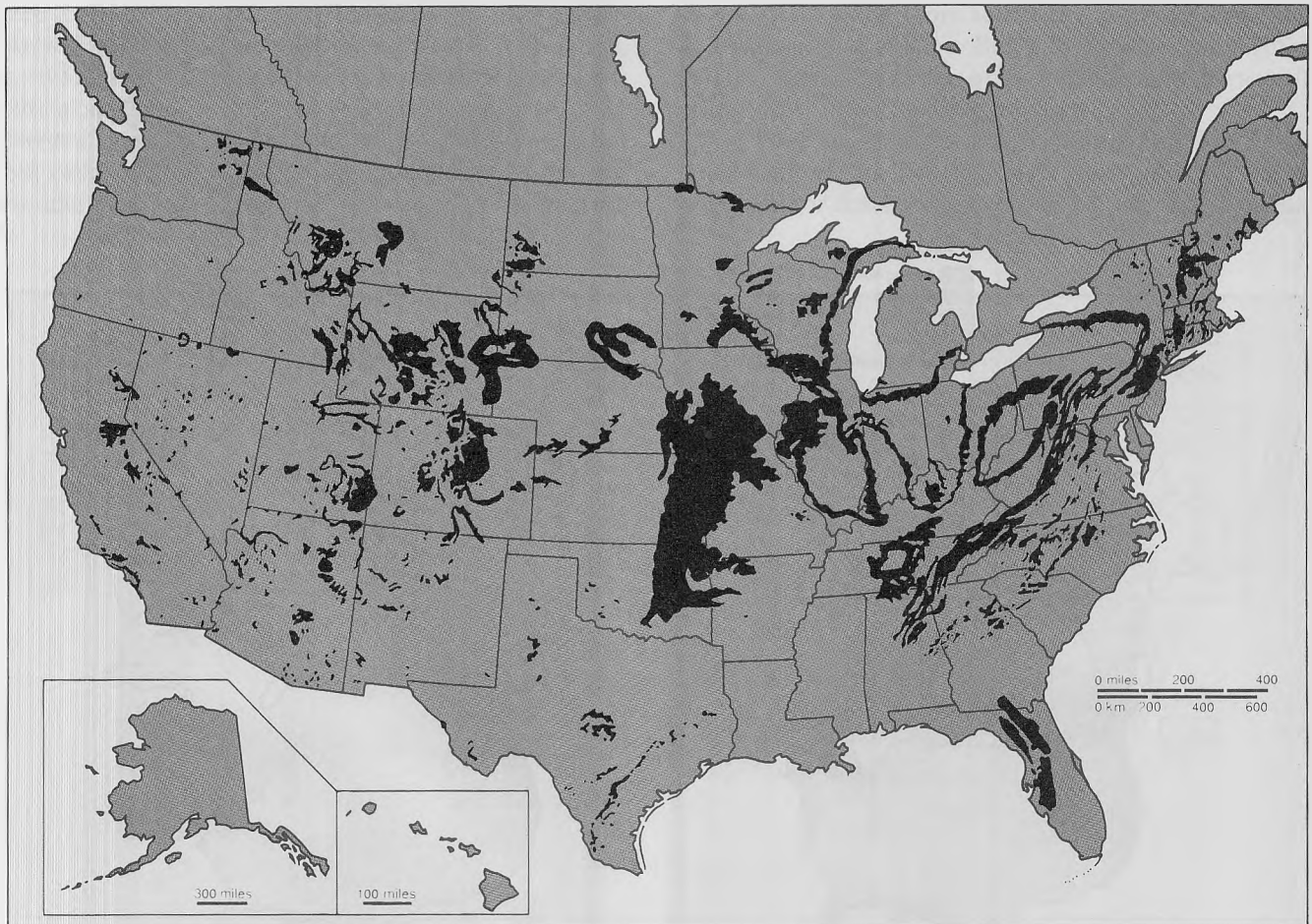


FIGURE 3.21 Areas with potentially high radon levels. The radon "scare" began in 1984 with the discovery that a Pennsylvania family was being exposed in its home to the equivalent of 455,000 chest X rays per year. With the estimate that as many as 20% of the nation's annual lung-cancer deaths may be attributable to radon, homeowners and seekers were made aware of a presumed new but localized environmental hazard.



FIGURE 3.22 Destruction from the San Francisco earthquake and fire. The first shock struck San Francisco early on the morning of April 18, 1906, damaging the city's water system. Fire broke out and raged for three days. It was finally stopped by dynamiting buildings in its path. When it was over, some 500 people were dead or missing, and 25,000 buildings had been destroyed. Locally, the event is usually referred to as the Great Fire of 1906, suggesting a denial of the natural hazard in favor of assigning blame to correctable human error. Post-destruction reconstruction began at once. Rebuilding following earthquake damage is the rule, though the immediate return of population to northern Italian areas after a major quake in 1976 was followed by an abrupt exodus after a subsequent, much weaker shock.

anything about the risk. Similar awareness and reticence accompanies other low-incidence/high-consequence natural dangers. Less than one-tenth of 1% of respondents to a federal survey in the mid-1970s gave "natural disaster" as the reason for their interstate residential move.

There are many reasons why natural hazard risk does not deter settlement or adversely affect space-behavioral decisions. Of importance, of course, is the persistent belief that the likelihood of an earthquake or a flood or other natural calamity is sufficiently remote so that it is not reasonable or pressing to modify behavior because of it. People are influenced by their innate optimism and the predictive uncertainty about timing or severity of a calamitous event and by their past experiences in high-hazard areas. If they have not suffered much damage in the past, they may be optimistic about the future. If, on the other hand, past damage has been great, they may think that the probability of repetition in the future is low (Table 3.1).

Perception of place as attractive or desirable may be quite divorced from any understanding of its hazard potential. Attachment to locale or region may be an expression of emotion and economic or cultural attraction, not just a rational assessment of risk. The culture hearths of antiquity

TABLE 3.1 Common Responses to the Uncertainty of Natural Hazards

ELIMINATE THE HAZARD

*Deny or Denigrate
Its Existence*

"We have no floods here,
only high water."
"It can't happen here."

*Deny or Denigrate
Its Recurrence*

"Lightning never strikes twice
in the same place."
"It's a freak of nature."

ELIMINATE THE UNCERTAINTY

*Make It Determinate
and Knowable*

"Seven years of great plenty
... After them seven years
of famine."
"Floods come every five years."

*Transfer Uncertainty
to a Higher Power*

"It's in the hands of God."
"The government is taking
care of it."

Burton and Kates, "The Perception of Natural Hazards in Resource Management," 3 *Natural Resources Journal* 455 (1964). Used by permission of the University of New Mexico School of Law, Albuquerque, NM.

discussed in Chapter 2 and shown on Figure 2.16 were for the most part sited in flood-prone river valleys; their enduring attraction was undiminished by that potential danger. The home area, whatever disadvantages an outside observer may discern, exerts a force not easily dismissed or ignored.

Indeed, high-hazard areas are often sought out because they possess desirable topography or scenic views, as do, for instance, coastal areas subject to storm damage. Once people have purchased property in a known hazard area, they may be unable to sell it for a reasonable price even if they so desire. They think that they have no choice but to remain and protect their investment. The cultural hazard—loss of livelihood and investment—appears more serious than whatever natural hazards there may be.

Carried further, it has been observed that spatial adjustment to perceived natural hazards is a luxury not affordable to impoverished people in general or to the urban and rural poor of Third World countries in particular. Forced by population growth and economic necessity to exert ever-greater pressures on fragile environments or to occupy at higher densities hazardous hillside and flood-plain slums, their margin of safety in the face of both chronic and low-probability hazards is minimal to nonexistent (Figure 3.23).

Migration

When continental glaciers began their retreat some 11,000 years ago, the activity space and awareness space of Stone Age humans were limited. As a result of pressures of numbers, need for food, changes in climate, and other inducements, those spaces were collectively enlarged to encompass the world. **Migration**—the permanent relocation of residential place and activity space—has been one of the enduring themes of human history. It has contributed to the evolution of separate cultures, to the diffusion of those cultures and their components by interchange and communication, and to the frequently complex mix of peoples and cultures found in different areas of the world.

Massive movements of people within countries, across national borders, and between continents have emerged as a pressing concern of the late 20th century. They affect national economic structures, determine population density and distribution patterns, alter traditional ethnic, linguistic, and religious mixtures, and inflame national debates and international tensions. Because migration patterns and conflicts touch so many aspects of social and economic relations and have become so important a part of current human geographic realities, their specific impact becomes an important part of several of our topical concerns. Portions of the story of migration have been touched on already in Chapter 2; other elements of it are part of later discussions of population (Chapter 4), ethnicity (Chapter 6), economic development (Chapter 10), urbanization (Chapter 11), and international political relations (Chapter 12). Because migration is, above all, the result of individual and family decisions, our interest here is with migration as an unmistakable, recurring, and near-universal expression of human spatial behavior. Reviewing that behavioral basis of migration now will give us common ground for understanding its impacts in other contexts later.

Migration embodies all the principles of spatial interaction and space relations we have already reviewed. Complementarity, transferability, and intervening opportunities and barriers all play a role. Space information and perception are important, as are the sociocultural and economic characteristics of the migrants and the distance relationships between their original and prospective locations of settlement. In less abstract terms, mass and individual migration decisions may express real-life responses to poverty, rapid population growth, environmental deterioration, or international and civil conflict or war. In its current troubling dimensions, migration may be as much a strategy for survival as an unforced but reasoned response to economic and social opportunity.

Although all spatial movement incorporates the same theoretical interaction principles, not all long-distance interaction involves migration. That term is reserved for movements presumed to be permanent relocations, though seasonal and short-term moves are often imprecisely considered “migratory” (Figure 3.24). Naturally, the length of



FIGURE 3.23 Many of the poor of Rio de Janeiro, Brazil, occupy steep hillside locations above the reach of sewer, water, and power lines that hold the more affluent at lower elevations. Frequent heavy rains cause mudflows from the saturated hillsides that wipe away the shacks and shelters that insecurely cling to them, and deposit the homes and hopes of the poor in richer neighborhoods below.

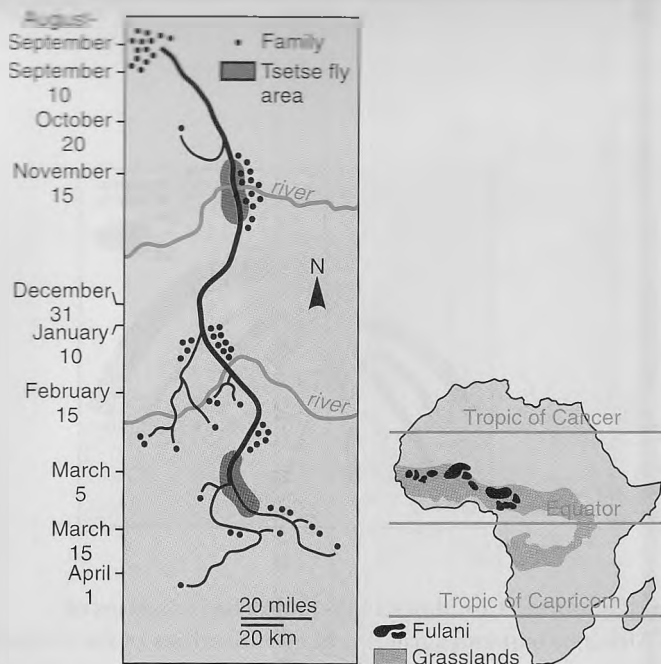


FIGURE 3.24 Fulani movement paths. Nomadic people have regular routes of “migration” that involve near-continuous movement in response to the needs of their herds or flocks. Their moves are always temporary and involve a circuit, not a one-way flow. The groups of Fulani families herd their cattle within the savanna of West Africa. On their southward trek during the dry season, the groups separate; when returning north during the wet season, they reunite. Migration circuits may be changed annually in response to the availability of pasture and the location of areas free of the tsetse fly, the transmitter of “sleeping sickness.”

the move and its degree of disruption of established activity space patterns raise distinctions important in the study of migration. A change of residence from the central city to the suburbs certainly changes both residence and activity space of schoolchildren and of adults in many of their non-working activities. But the working adults may still retain the city—indeed, the same place of employment there—as an action space. On the other hand, immigration from Europe to the United States and the massive farm-to-city movements of rural Americans late in the 19th and early in the 20th centuries meant a total change of all aspects of behavioral patterns.

Principal Migration Patterns

Migration flows may be discussed at different scales, from massive intercontinental torrents to individual decisions to move to a new house or apartment within the same metropolitan area. At each level, the factors influencing the spatial interaction are different, with differing impacts on population patterns and cultural landscapes.

At the broadest scale, *intercontinental* movements range from the earliest peopling of the habitable world to the most recent flight of Asian refugees to countries of Europe or the Western Hemisphere. The population structure

of the United States, Canada, Australia and New Zealand, Argentina, Brazil, and other South American countries—as Chapter 4 suggests—is a reflection and result of massive intercontinental flows of immigrants that began as a trickle during the 16th and 17th centuries and reached a flood during the 19th and early 20th (Figure 4.20). World War II and its immediate aftermath involved more than 25 million permanent population relocations, all of them international but not all intercontinental.

Intracontinental and *interregional* migrations involve movements between countries and within countries, most commonly in response to individual and group assessments of improved economic conditions or changes in life cycle, but often reflecting flight from disastrous environmental, economic, or political conditions. The millions of actual and potential refugees from adverse circumstances in their homelands following the dissolution of Eastern European communist states and economic systems exemplify that kind of flight. Between 1980 and 1995, Europe received some 17 million migrants, often refugees, who joined the 15 million labor migrants (“guest workers”) already in West European countries in the early 1980s (Figure 3.25).

North America has its counterparts in the hundreds of thousands of immigrants coming (many illegally) to the United States each year from Mexico, Central America, and the Caribbean region. The Hauns, whose westward trek opened this chapter, were part of a massive 19th-century regional shift of Americans that continues today (Figure 3.26). The former USSR experienced a similar, though eastward, flow of people in this century. Some 100 million people—nearly 2% of world population—lived in a country other than the country of their birth in the mid-1990s, and migration had become a world social, economic, and political issue of first priority.

In the 20th century, nearly all countries have experienced a great movement of peoples from agricultural areas to the cities, continuing a pattern of *rural-to-urban* migration that first became prominent during the 18th- and 19th-century Industrial Revolution in advanced economies, and now is even more massive than international migrant flows. While the rate of urban growth is decreasing in the more developed countries, urbanization in the developing world continues apace, as will be discussed more fully in Chapter 11.

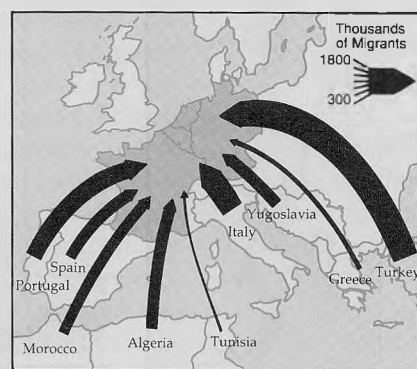
Types of Migration

Migrations may be forced or voluntary or, in many instances, reluctant relocations imposed on the migrants by circumstances.

In *forced migrations*, the relocation decision is made solely by people other than the migrants themselves (Figure 3.27). Perhaps 10 to 12 million Africans were forcibly transferred as slaves to the Western Hemisphere from the late 16th to early 19th centuries. Half or more were destined for the Caribbean and most of the remainder for Central and South America, though nearly a million arrived in the United States. Australia owed its earliest European settlement to convicts



(a)



(b)

FIGURE 3.25 International labor flows. (a) Major international labor migration flows 1960–1980. The industries of Western Europe, oil and construction work in Arabia, mining in South Africa, urban and agricultural opportunities in the United States, and similar economic attractions elsewhere sparked international labor movements from widely scattered source regions. Economic stagnation and domestic unemployment in many economies in the later 1980s and 1990s changed both the incidence of perceived opportunity for labor migrants and the willingness of formerly receptive countries to accept them. (b) European “guest worker” flows. For prosperous, but labor-short Western Europe (West Germany, France, Belgium, Netherlands, and Switzerland), major source regions for labor immigrants in the early 1980s were southern and southeastern Europe, Turkey, and North Africa.

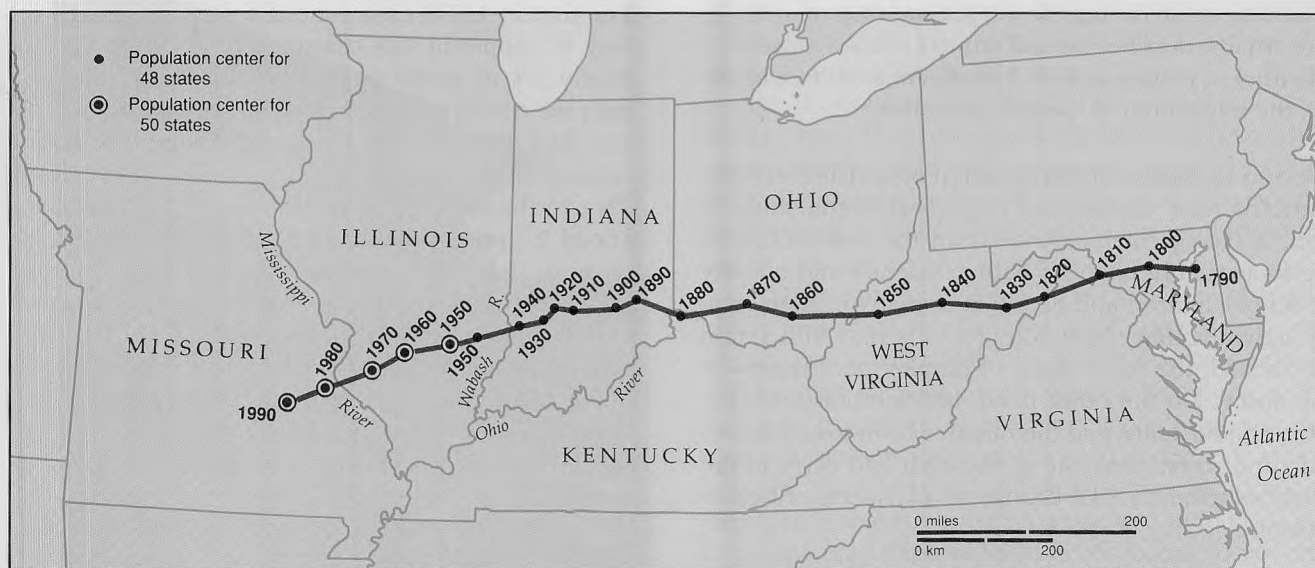


FIGURE 3.26 Westward shift of population, 1790–1990. Two hundred years of western migration and population growth are recorded by the changing U.S. center of population. (The “center of population” is that point at which a rigid map of the United States would balance, reflecting the identical weights of all residents in their location on the census date.) The westward movement was rapid for the first 100 years of census history and slowed between 1890 and 1950. Some of the post-1950 acceleration reflects population growth in the “Sunbelt.” However, the two different locations for the population center in 1950 and the symbol change indicate the geographical pull on the center of population exerted by the admission of Alaska and Hawaii to statehood.

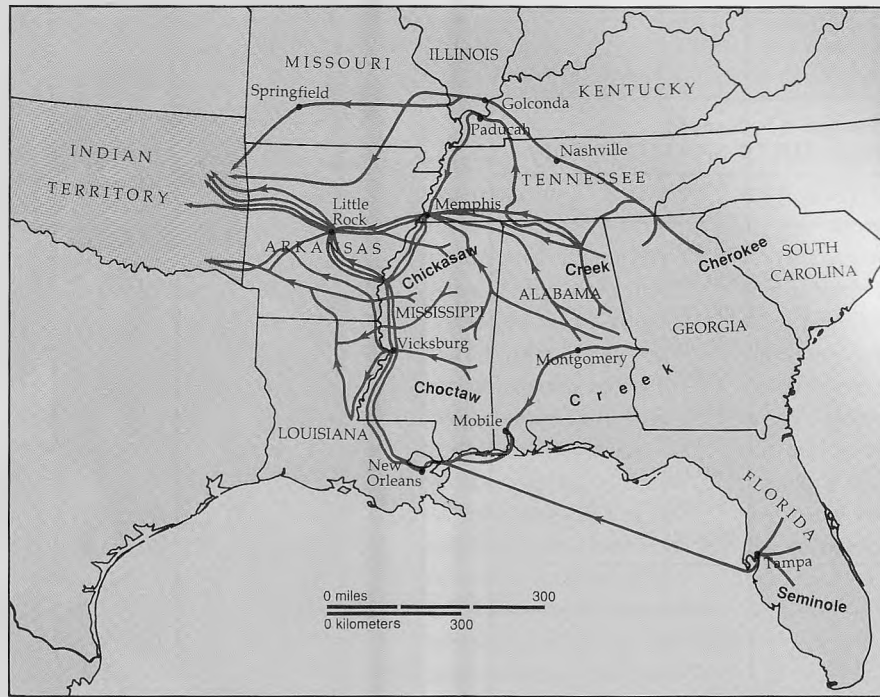


FIGURE 3.27 Forced migrations: The Five Civilized Tribes. Between 1825 and 1840, some 100,000 southeastern Amerindians were removed from their homelands and transferred by the Army across the Mississippi River to “Indian Territory” in present-day Oklahoma. By far the largest number were members of the Five Civilized Tribes of the South: Cherokees, Choctaws, Chickasaws, Creeks, and Seminoles. Settled, Christianized, literate small-farmers, their forced eviction and arduous journey—particularly along what the Cherokees named their “Trail of Tears” in the harsh winter of 1837–1838—resulted in much suffering and death.

transported after the 1780s to the British penal colony established in southeastern Australia (New South Wales). More recent involuntary migrants include millions of Soviet citizens forcibly relocated from countryside to cities and from the western areas to labor camps in Siberia and the Russian Far East beginning in the late 1920s. Nigeria expelled 2 million foreign workers in 1983 and another 700,000 in 1985 to reduce unemployment among its own citizens. Germany and other European countries restricted immigration and encouraged repatriation of foreign nationals within their borders beginning in 1990. Other examples abound.

Less than fully voluntary migration—*reluctant relocation*—of some 6 million Indonesians has taken place under an aggressive governmental campaign begun in 1969 to move people from densely settled Jawa (Java, roughly 580 per km² or 1500 people per sq. mi.) to other islands and territories of the country in what has been called the “biggest colonization program in history.” International refugees from war and political turmoil or repression annually numbered some 20 million or more in the mid-1990s, according to the United Nations and the World Refugee Survey. In the past, refugees sought asylum mainly in Europe and other developed areas. More recently, the flight of people is primarily from developing countries to other developing regions, and many countries with the largest refugee populations are among the world’s poorest. About 80% of

the officially recorded refugees have found asylum in Southeast Asia, southern and eastern Africa, the Near East and South Asia, and South and Central America (Table 3.2). Sub-Saharan Africa alone housed some 6 million refugees in 1995 (Figure 3.28). Worldwide, an additional 26 million people are “internally displaced.” In a search for security or sustenance, they have left their home areas but not crossed an international boundary.

The great majority of migratory movements, however, are *voluntary* (volitional), representing individual response to the factors influencing all spatial interaction decisions. At root, migrations take place because the migrants believe that their opportunities and life circumstances will be better at their destination than they are at their present location (see “Why People Migrate”).

Controls on Migration

Economic considerations crystallize most migration decisions, though nomads fleeing the famine and spreading deserts of the Sahel obviously are impelled by different economic imperatives than is the executive considering a job transfer to Montreal or the resident of Appalachia seeking factory employment in the city. Among the aging, affluent populations of highly developed countries, retirement amenities figure importantly in perceptions of residential attractiveness of areas. Educational opportunities, changes in

TABLE 3.2 Top 10 Origin and Destination Countries of Refugees, 1995 Estimates

REFUGEE NUMBERS
(ROUNDED TO NEAREST 50,000)

Origin Countries

Afghanistan	3,400,000
Palestine	2,800,000
Rwanda	1,700,000
Former Yugoslavia	1,400,000
Liberia	750,000
Somalia	450,000
Sudan	400,000
Angola	350,000
Eritrea	350,000
Viet Nam	300,000

Receiving Countries

Iran	2,000,000
Pakistan	1,500,000
Zaire	1,400,000
Jordan	1,100,000
Gaza Strip	600,000
Sudan	600,000
Tanzania	600,000
Guinea	550,000
West Bank	500,000
Germany	400,000

Source: U.S. Committee for Refugees, 1995

life cycle, and environmental attractions or repulsions are but a few other possible migration motivations.

Migration theorists attribute international economic migrations to a series of often overlapping mechanisms. Differentials in wages and job opportunities between home and destination countries are perhaps the major driving force in such individual migration decisions. Those differentials are in part rooted in a built-in demand for workers at the bottom of the labor hierarchy in more prosperous developed countries whose own workers disdain low-income, menial jobs. Migrants are available to fill those jobs, some argue, because advanced economies make industrial investment in developing or colonial economies to take advantage of lower labor costs there. New factories inevitably disturb existing peasant economies, employ primarily short-term female workers, and leave a residue of unemployed males available and prone to migrate in search of opportunity. If successful, international economic migrants, male or female, help diversify sources of family income through their remittances from abroad, a form of household security that in itself helps motivate some international economic migration.

Negative home conditions that impel the decision to migrate are called **push factors**. They might include loss of job, lack of professional opportunity, overcrowding or slum

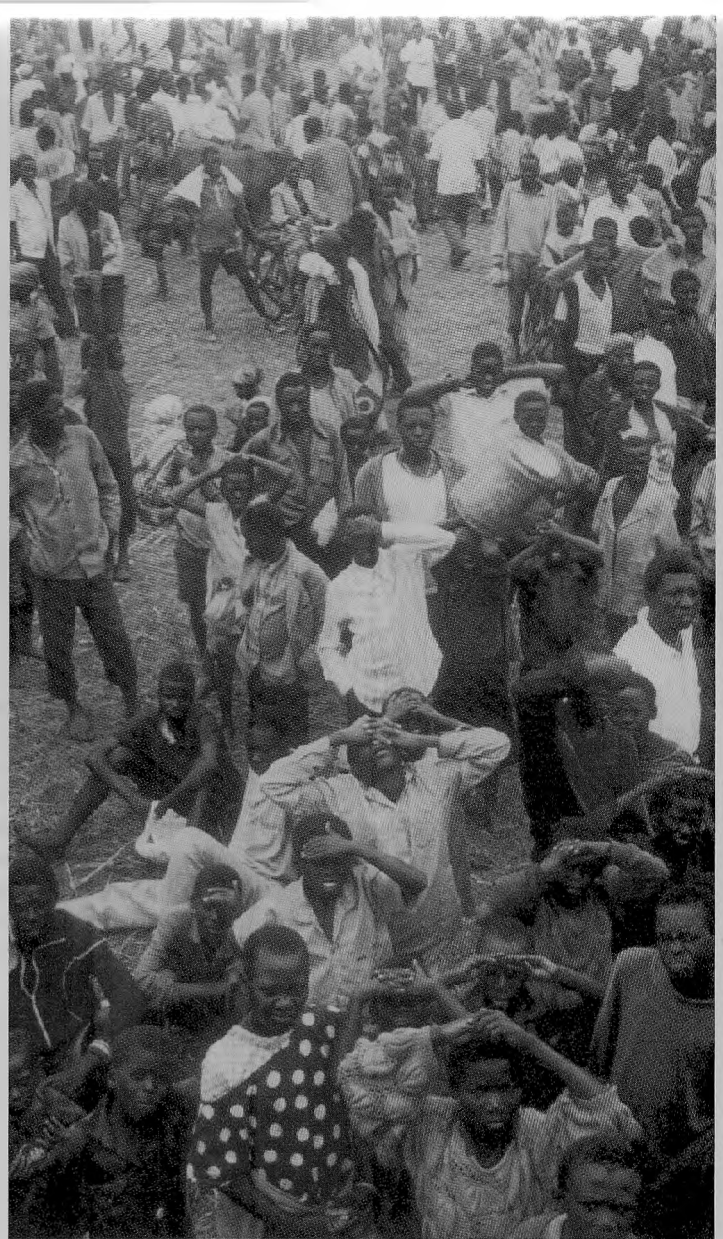


FIGURE 3.28 Rwandan refugees near the border of Rwanda and Tanzania. Approximately 1 million Rwandans fled into neighboring Zaire, Tanzania, Uganda, and Burundi in 1994 to escape civil war in their home country. Fleeing war, repression, and famine, millions of people in developing nations have become reluctant migrants from their homelands.

clearance, or a variety of other influences including poverty, war, and famine. The presumed positive attractions of the migration destination are known as **pull factors**. They include all the attractive attributes perceived to exist at the new location—safety and food, perhaps, or job opportunities, better climate, lower taxes, more room, and so forth. Very often migration is a result of both perceived push and pull factors. It is *perception* of the areal pattern of opportunities and want satisfaction that is important here, whether or not perceptions are supported by objective reality. In China, for example, a “floating” population of more than 100 million surplus workers has flooded into cities from the countryside, seeking urban employment that exists primarily in their anticipation.



Some 2 billion of the world's 5.7 billion people live in poverty, the vast majority of them in the developing countries of Asia, Africa, and Latin America. Poor people in poor countries are major components of the growing tide of human movement within and between countries for reasons summarized in the following account.

Poor people may move from village to town, from town to city or from one country to another. But all respond to the same basic forces—the push of poverty and the pull of opportunity.

Poverty in developing countries is greatest in the rural areas—home to around 750 million of the world's poorest people. Of these, around 20 to 30 million move each year to the towns and cities. And an increasing proportion of these migrants are

“environmental refugees,” whose land is so eroded or exhausted that it can no longer support them.

People in towns and cities have greater opportunities. They often earn twice as much as those in rural areas—and may live 10 years longer. They have on average twice as much access to health services and safe water—and four times the access to safe sanitation services.

Developing countries have made enormous progress over the past three decades, but they still have less than one-twentieth of the per capita income of the industrial countries. And around 40% of the labor force is unemployed or underemployed—compared with an average unemployment rate of between 6% and 7% in the North.

People in developing countries are also much more likely to be disrupted by natural disasters, civil strife and war.

During the past four decades, there were more than 200 armed conflicts on the developing countries' soil, claiming more human lives than World War II.

Migration from one country to another is usually difficult—and sometimes dangerous. But for many of the world's poorest people, it is the most rational move. About 75 million people from developing countries are on the move each year as refugees, displaced persons, transient workers, or legal or illegal migrants.

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The concept of place utility helps us to understand the decision-making process that potential voluntary migrants undergo. **Place utility** is the measure of an individual's satisfaction with a given residential location. The decision to migrate is a reflection of the appraisal—the perception—by the prospective migrant of the current homesite as opposed to other sites of which something is known or hoped for. In the evaluation of comparative place utility, the decision maker considers not only perceived value of the present location, but also expected place utility of potential destinations.

Those evaluations are matched with the individual's *aspiration level*, that is, the level of accomplishment or ambition that the person sees for herself or himself. Aspirations tend to be adjusted to what one considers attainable. If one finds present circumstances satisfactory, then **spatial search** behavior—the process by which locational alternatives are evaluated—is not initiated. If, on the other hand, dissatisfaction with the home location is felt, then a utility is assigned to each of the possible migration locations. The utility is based on past or expected future rewards at various sites. Because new places are unfamiliar to the searcher, the information received about them acts as a substitute for the personal experience of the homesite. The decision maker can do no more than sample information about place alternatives and, of course, there may be sampling errors.

One goal of the potential migrant is to avoid physically dangerous or economically unprofitable outcomes in the final migration decision. Place utility evaluation, therefore,

requires assessments not only of hoped-for pull factors of new sites but also of the potentially negative economic and social reception the migrant might experience at those sites. An example of that observation can be seen in the case of the large numbers of young Mexicans and Central Americans who have migrated both legally and illegally to the United States. Faced with poverty and overpopulation at home, they regard the place utility in Mexico as minimal. With a willingness to work, they learn from friends and relatives of job opportunities north of the border and, hoping for success or even wealth, quickly place high utility on relocation to the United States. Many know that dangerous risks are involved in entering the country illegally, but even legal immigrants face legal restrictions or rejections that are advocated or designed to reduce the pull attractions of the United States (See “Backlash”).

Another migrant goal is to reduce uncertainty. That objective may be achieved either through a series of transitional relocation stages or when the migrant follows the example of known predecessors. **Step migration** involves the place transition from, for example, rural to central city residence through a series of less extreme locational changes—from farm to small town to suburb and, finally, to the major central city itself. **Chain migration** assures that the mover is part of an established migrant flow from a common origin to a prepared destination. An advance group of migrants, having established itself in a new home area, is followed by second and subsequent migrations originating in the same

FOR YOUR CONSIDERATION

BACKLASH

Migrants can enter a country legally—with a passport, visa, work permit, or other authorization—or illegally. Some aliens initially enter a country legally but on a temporary basis (as a student or tourist, for example), but then remain after their departure date. Others may arrive claiming the right of political asylum but actually seeking economic opportunity. The easily accessible politically open states of Western Europe and North America have been particularly subject to such incursions, and in all measures of resistance and prohibition have been discussed or enacted in recent years.

The United States has seen a rising tide of emotion against the estimated 4 to 5 million people who reside illegally in the country, a sentiment that has been reflected in a number of actions. Greater efforts, for example, are being made to deter illegal crossings along the Mexican border by both increasing the number of Border Patrol agents and by building steel fences near El Paso, Texas, Nogales, Arizona, and San Ysidro, California. Four states—Florida, Texas, Arizona, and California—have sued the federal government to win reimbursement for the costs of illegal immigration. The governor of California proposed an amendment to the Constitution to deny citizenship to children born on American soil if their parents are not legal residents of the United States. Finally, and most dramatically, in November 1994, California voters approved by a overwhelming margin a proposition that would deny certain public services to illegal aliens.

Proposition 187, as it is known, prohibits state and local government agencies from providing publicly funded education, nonemergency health care, welfare benefits, and social services to any person they cannot verify as either a U.S. citizen or a person legally admitted to the country. The measure also requires state and local agencies to report suspected illegal immigrants to the Immigration and Naturalization Service and to certain state officials. Both provisions were struck down by U.S. District Court in late 1995.

Proponents of Proposition 187 argued that California can no longer support the burden of high levels of immigration, especially if the immigrants cannot enter the more skilled professions. They contended that welfare, medical, and educational benefits are magnets that draw illegal aliens into the state. These unauthorized immigrants are estimated to cost California taxpayers more than \$3.5 billion per year and result in overcrowded schools and public health clinics, and the reduction of services to legal residents. Why should the latter pay for benefits for people who are breaking the law?, 187-supporters asked.

Those opposed to 187 contended that projected savings are illusory because the proposition collides with federal laws that guarantee access to public education for all children in the United States. It also violates federal Medicaid laws, so California will be in danger of losing all regular Medicaid funding. Forcing an estimated 300,000 children out of school and onto the streets will increase the risk of juvenile crime. Forbidding

doctors from giving immunizations or basic medical care to anyone suspected of being an illegal immigrant will encourage the spread of communicable diseases throughout the state, putting everyone at risk. Educators, doctors, and other public service officials would be turned into immigration officers, a task for which they are ill-suited. Finally, opponents argued that the proposition will not stop the flow of illegal aliens because it does nothing to increase enforcement at the border or to punish employers who hire undocumented workers.

Questions:

1. What do you think are the magnets that draw immigrants across the border: jobs or benefits? Is the denial of services likely to reduce the perceived place utility of the United States and thus reduce illegal immigration?
2. Do you believe the federal government has an obligation to help states bear the costs of education, medical care, and incarceration for unauthorized immigrants? Why or why not?
3. Should the United States require citizens to have a national identification card? Why or why not?
4. If you had been able to vote on Proposition 187, how would you have voted? Why?
5. Is it good policy not to educate or give basic medical care to any persons, even those not legally in the country?

home district and frequently united by kinship or friendship ties. Public and private services for legal migrants and informal service networks for undocumented or illegal migrants become established and contribute to the continuation or expansion of the chain migration flow. Ethnic and foreign-born enclaves in major cities and rural areas in a number of countries are the immediate result, as we shall see more fully in Chapter 6.

Sometimes the chain migration is specific to occupational groups. For example, nearly all newspaper vendors in New Delhi, in the north of India, come from one small district in Tamil Nadu, in the south of India. Most construction workers in New Delhi come either from Orissa, in the east of India, or Rajasthan, in the northwest. The diamond trade of Bombay, India, is dominated by a network of about 250 related families who come from a small town several hundred miles to the north.

A corollary of all out-migration flows is **counter (or return) migration**—the likelihood that as many as 25% of all migrants will return to their place of origin. For the United States, return migration—defined as moving back to one's state of birth—makes up about 20% of all domestic moves. That figure varies dramatically between states. More than a third of in-migrants to West Virginia, for example, were returnees—as were over 25% of those moving to Pennsylvania, Alabama, Iowa, and a few other states. Such widely different states as New Hampshire, Maryland, California, Florida, Wyoming, and Alaska were among the several that found returnees were fewer than 10% of their in-migrants. Interviews suggest that states deemed attractive draw new migrants in large numbers, while those with high proportions of returnees in the migrant stream are not perceived as desirable destinations by other than former residents.

Once established, origin and destination pairs of places tend to persist. Areas that dominate a locale's in- and out-migration patterns make up the **migration fields** of the place in question. As we would expect, areas near the point of origin comprise the largest part of the migration field, though larger cities more distantly located may also be prominent as the ultimate destination of hierarchical step migration. Some migration fields reveal a distinctly *channelized* pattern of flow. The channels link areas that are in some way tied to one another by past migrations, by economic trade considerations, or some other affinity. The flow along them is greater than otherwise would be the case (Figure 3.29) but does not necessarily involve individuals with personal or family ties. The former streams of southern blacks and whites to northern cities, of Scandinavians to Minnesota and Wisconsin, and of U.S. retirees to Florida and Arizona or their European counterparts to Iberia or the Mediterranean coast are all examples of **channelized migration**.

Voluntary migration is responsive to other controls that influence all forms of spatial interaction. Push-pull factors may be equated with *complementarity*; costs (emotional and financial) of a residence relocation are expressions of *transferability*. Other things being equal, large cities exert a stronger migrant pull than do small towns, a reflection of the

impact of the *gravity model*. The *distance decay* effect has often been noted in migration studies (Figure 3.30). Movers seek to minimize the *friction of distance*. In selecting between two potential destinations of equal merit, a migrant tends to choose the nearer as involving less effort and expense. And since information about distant areas is less complete and satisfying than awareness of nearer localities, short moves are favored over long ones. Research indicates that determined migrants with specific destinations in mind are unlikely to be deterred by distance considerations. However, groups for whom push factors are more determining than specific destination pulls are likely to limit their migration distance in response to encountered apparent opportunities. For them, *intervening opportunity* affects locational decisions.

Observations such as these were summarized in the 1870s and 1880s as a series of “laws of migration” by E. G. Ravenstein (1834–1913). Among those that remain relevant are the following:

1. Most migrants go only a short distance.
2. Longer-distance migration favors big-city destinations.
3. Most migration proceeds step-by-step.
4. Most migration is rural to urban.
5. Each migration flow produces a counterflow.
6. Most migrants are adults; families are less likely to make international moves.
7. Most international migrants are young males.

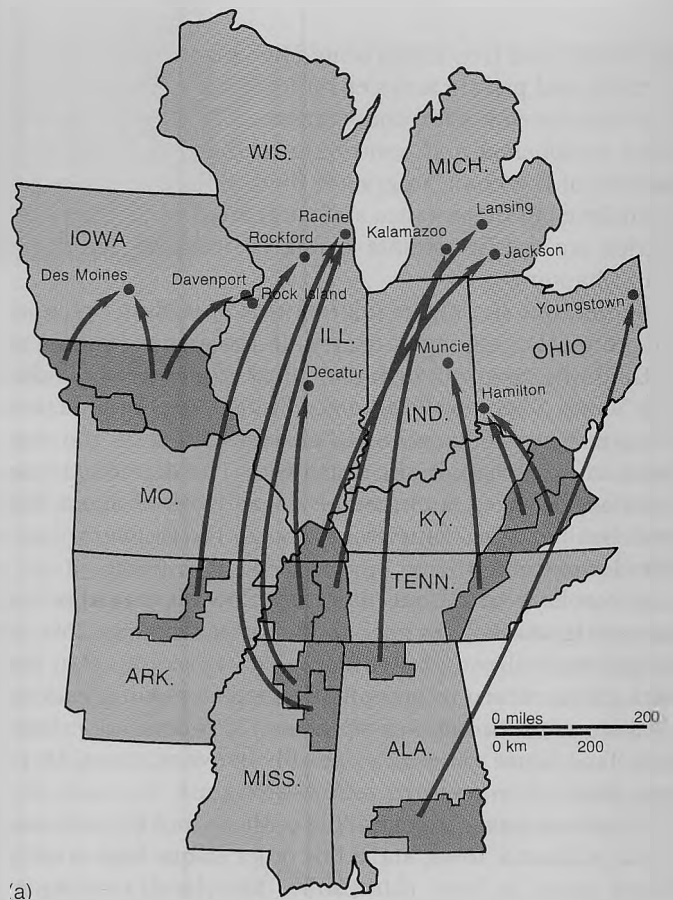
The latter two “laws” introduce the role of personal attributes (and attitudes) of migrants: their age, sex, education, and economic status. Migrants do not represent a cross section of the populace from which they come. Selectivity of movers is evident, and the selection shows some regional differences. In most societies, young adults are the most mobile (Figure 3.31). In the United States during the 1980s, mobility peaked among those in their twenties, especially the later twenties, and tended to decline thereafter. Among West African cross-border migrants, a World Bank study reveals, the age group 15–39 predominated.

Ravenstein's conclusion that young adult males are dominant in economically-pushed international movement is less valid today than when first proposed. In reality, women and girls now comprise between 40–60% of all international migrants worldwide. It is true that legal and illegal migrants to the United States from Mexico and Central America are primarily young men, as were first-generation “guest workers” in European cities. But population projections for West European countries suggest that women will shortly make up the largest part of their foreign-born population, and in one-third of the countries of sub-Saharan Africa, including Burkina Faso, Swaziland, and Togo, the female share of foreign-born populations was as large as the male. Further, among rural-to-urban migrants in Latin America since the 1960s, women have been in the majority.

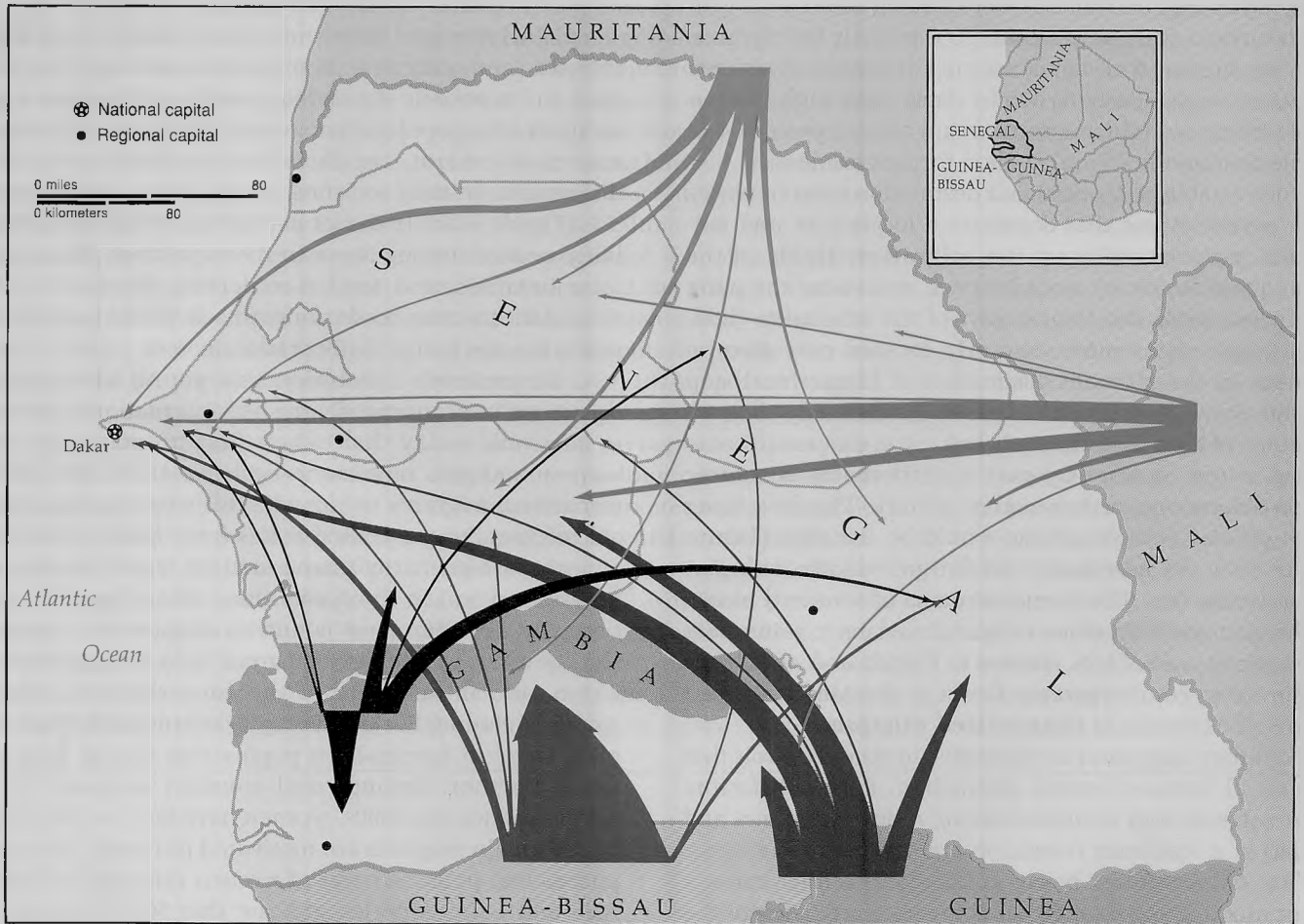
Female migrants are motivated primarily by economic pushes and pulls. Surveys of women migrants in Southeast Asia and Latin America indicate that 50%–70% moved in

FIGURE 3.29 Channelized migration flows.

(a) Place-specific flows from the rural South to midwestern cities of medium size. Distance is not necessarily the main determinant of flow direction. Perhaps through family and friendship links, the rural southern areas are tied to particular midwestern destinations. (b) International migration streams into Senegal are less place specific, as these immigration paths of resident immigrants suggest. Distance from home country is a prime consideration, but some flows ignore proximity and follow predecessor migrants to more distant areas.



(a)



(b)

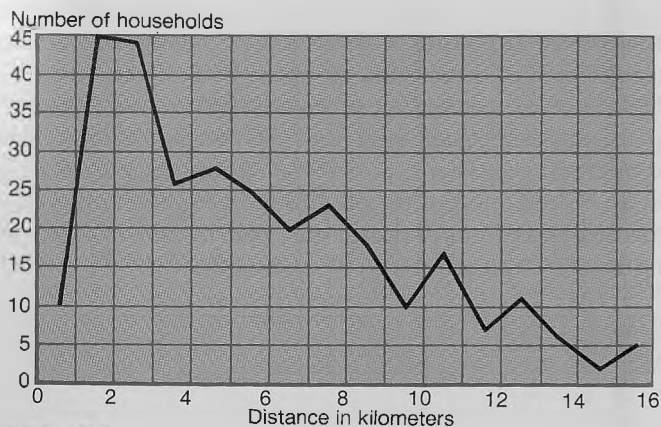


FIGURE 3.30 Distance between old and new residences in the Asby area of Sweden. Notice how the number of movers decreased with increasing distance.

search of employment and commonly first moved while in their teens. The proportion of young, single women is particularly high in rural-to-urban migration flows, reflecting their limited opportunities in increasingly overcrowded agricultural areas. To the push-and-pull factors normally associated with migration decisions, there are sometimes added family pressures that encourage young women with few employment opportunities to migrate as part of a household's survival strategy. In Latin America, the Philippines, and parts of Asia, emigration of young girls from large, landless families is more common than from smaller families or those with land rights. Their remittances of foreign earnings help maintain their parents and siblings at home.

For modern Americans in interregional moves, the decisions to migrate are more ordinary but individually just as compelling. They appear to involve (1) changes in life cycle (e.g., getting married, having children, getting a divorce); (2) changes in the career cycle (getting a first job or a promotion, receiving a career transfer, seeking work in a new location, retiring); (3) changes of residence associated with individual personality. Work-related relocations are most important in U.S. interstate migrations. Some people, of course, simply seem to move often for no discernible reason, whereas others, *stayers*, settle into a community permanently. For other developed countries, a different set of summary migration factors may be present.

Summary

Spatial interaction is the dynamic evidence of the areal differentiation of the earth's surface and of the interdependence between geographic locations. The term refers to the movement of goods, information, people, ideas—indeed, of every facet of economy and society—between one place and another. It includes the daily spatial activities of individuals and the collective patterns of their short- and long-distance behavior in space. The principles and constraints that unite,

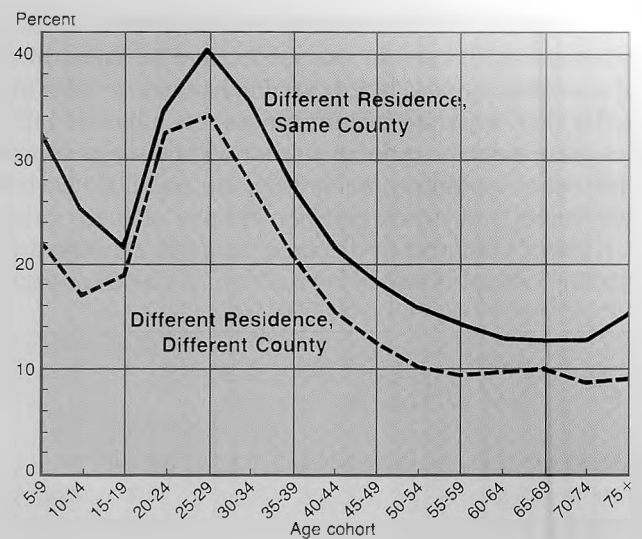


FIGURE 3.31 Percentage of 1994 population over 5 years of age with a different residence than in 1993. Young adults figure most prominently in both short- and long-distance moves in the United States, an age-related pattern of mobility that has remained constant over time. The 1990 census revealed that among people between the ages of 15 and 24, more than 7 in 10 had recently moved. Among those 75 and older, the mobility rate was about 1 in 20.

define, and control spatial behavior in this sense constitute an essential organizing focus for the study of human geographic patterns of the earth.

We have seen that whatever the type of spatial behavior or flow, a limited number of recurring mechanisms of guidance and control are encountered. Three underlying bases for spatial interaction are: *complementarity*, which encourages flows between areas by balancing supply with demand or satisfying need with opportunity; *transferability*, which affects movement decisions by introducing cost, effort, and time considerations; and *intervening opportunities*, which suggests that costs of overcoming distance may be reduced by finding closer alternate points where needs can be satisfied. The flows of commodities, ideas, or people governed by these interaction factors are interdependent and additive. Flows of commodities establish and reinforce traffic patterns, for example, and also channelize the movement of information and people.

Those flows and interactions may further be understood by the application of uniform models to all forms of spatial interaction from interregional commodity exchanges to an individual's daily pattern of movement. Distance decay tells us of the inevitable decline of interaction with increasing distance. The gravity model suggests that major centers of activity can exert interaction pulls that partly compensate for distance decay. Recognition of movement biases explains why spatial interaction in the objective world may deviate from that proposed by abstract models.

Humans in their individual and collective short- and long-distance movements are responsive to these impersonal spatial controls. Their spatial behaviors are also influenced by their separate circumstances. Each has an activity and awareness space reflective of individual socioeconomic and life-cycle conditions. Each differs in mobility. Each has unique wants and needs and perceptions of their satisfaction. Human response to distance decay is expressed in a controlling critical distance beyond which the frequency of

interaction quickly declines. That decline is partly conditioned by unfamiliarity with distant points outside normal activity space. Perceptions of home and distant territory therefore color interaction flows and space evaluations. In turn, those perceptions, well or poorly based, underlie travel and migration decisions, part of the continuing spatial diffusion and interaction of people. It is to people and their patterns of distribution and regional growth and change that we turn our attention in the following chapter.

KEY WORDS

activity space 71
awareness space 71
chain migration 87
channelized migration 89
complementarity 65
counter migration 89
critical distance 72
distance decay 67
friction of distance 67

gravity model 68
intervening opportunity 66
migration 82
migration field 89
movement bias 69
network 70
personal communication field 76
personal space 70
place perception 77

place utility 87
potential model 69
pull factor 86
push factor 86
space-time prism 72
spatial interaction 64
spatial search 87
step migration 87
territoriality 70
transferability 65

FOR REVIEW

1. What is *spatial interaction*? What are the three fundamental conditions governing all forms of spatial interaction? What is the distinctive impact or importance of each of the conditions?
2. What variations in *distance decay* curves might you expect if you were to plot shipments of ready-mixed concrete, potato chips, and computer parts? What do these respective curves tell us about transferability?
3. What is *activity space*? What factors affect the areal extent of an individual's activity space?
4. On a piece of paper, and following the model of Figure 3.10, plot your *space-time path* for your movements on a typical class day. What alterations in your established movement habits might be necessary (or become possible) if (a) instead of walking, you rode a bike, (b) instead of biking, you drove a car, (c) instead of driving, you had to use the bus or go by bike or on foot?
5. What does the thought that transportation and communication are *space adjusting* imply? In what ways has technology affected the "space adjustment" in commodity flows? In information flows?
6. Recall the places you have visited in the past week. In your movements, were the rules of *distance decay* and *critical distance* operative? What variables affect *your* critical distances?
7. What considerations appear to influence the decision to migrate? How do perceptions of *place utility* induce or inhibit migration?
8. What is a *migration field*? Some migration fields show a *channelized* flow of people. Select a particular channelized migration flow (such as the movement of Scandinavians to Michigan, Wisconsin, and Minnesota, or people from the Great Plains to California, or southern blacks to the North) and speculate why a channelized flow developed.

SELECTED REFERENCES

- Andrew, Caroline, and Beth Moore Milroy. *Life Spaces: Gender, Household, Employment*. Vancouver: University of British Columbia Press, 1988.
- Barkan, Elliott Robert. *Asian and Pacific Islander Migration to the United States: A Model of New Global Patterns*. Westport, CT: Greenwood Press, 1993.
- Brown, Lawrence A. *Innovation Diffusion: A New Perspective*. New York: Methuen, 1981.
- Brunn, Stanley, and Thomas Leinbach. *Collapsing Space and Time: Geographic Aspects of Communication and Information*. Winchester, MA: Unwin Hyman, 1991.
- Burton, Ian, Robert W. Kates, and Gilbert F. White. *The Environment as Hazard*. 2d ed. New York: Guilford Publications, 1993.
- Castles, Stephen, and Mark J. Miller. *The Age of Migration: International Population Movements in the Modern World*. New York: Guilford Publications, 1993.

- Clark, W. A. V. *Human Migration*. Vol. 7, *Scientific Geography Series*. Newbury Park, CA: Sage, 1986.
- Clarke, John I., Peter Curson, S. L. Kayastha, and Prithvish Nag, eds. *Population and Disaster*. Oxford, England: Basil Blackwell, 1989.
- Constantinou, Stavros T., and Nicholas D. Diamantides. "Modeling International Migration: Determinants of Emigration from Greece to the United States, 1820-1980." *Annals of the Association of American Geographers* 75 (1985):352-369.
- Demko, George J., and William B. Wood. "International Refugees: A Geographical Perspective." *Journal of Geography* 86 (1987):225-228.
- Fligstein, Neil. *Going North: Migration of Whites and Blacks from the South, 1900-1950*. New York: Academic Press, 1981.
- Gober, Patricia. "Americans on the Move." *Population Bulletin* 48, no. 3. Washington, D.C.: Population Reference Bureau, 1993.
- Golledge, Reginald G., and Robert J. Stimson. *Analytical Behavioral Geography*. London: Croom Helm, 1987.
- Hägerstrand, Torsten. *Innovation Diffusion as a Spatial Process*. Chicago: The University of Chicago Press, 1967.
- Hall, Peter, and Paschal Preston. *The Carrier Wave: New Information Technology and the Geography of Innovation, 1846-2003*. Winchester, MA: Unwin Hyman, 1988.
- Hanson, Susan, and Geraldine Pratt. "Geographic Perspectives on the Occupational Segregation of Women." *National Geographic Research* 6, no. 4 (1990):376-399.
- Hay, Alan. "The Geographical Explanation of Commodity Flow." *Progress in Human Geography* 3 (1979):1-12.
- Jakle, John A., Stanley Brunn, and Curtis C. Roseman. *Human Spatial Behavior: A Social Geography*. North Scituate, MA: Duxbury Press, 1976. Reprint. Prospect Heights, IL: Waveland Press, 1985.
- Kane, Hal. *The Hour of Departure: Forces That Create Refugees and Migrants*. Worldwatch Paper 125. Washington, D.C.: Worldwatch Institute, 1995.
- Kellerman, Aharon. *Telecommunications and Geography*. New York: John Wiley & Sons, 1993.
- King, Russel, ed. *The New Geography of European Migrations*. New York: John Wiley & Sons, 1994.
- Lee, Everett S. "A Theory of Migration." *Demography* 3 (1966):47-57.
- Lenntorp, Bo. *Paths in Space-Time Environments*. Lund Studies in Geography. Series B. Human Geography, no. 44, Lund, Sweden: Lund University, 1976.
- Lewis, G. J. *Human Migration: A Geographical Perspective*. London: Croom Helm, 1982.
- Lindsay, Beverly, ed. *African Migration and National Development*. University Park: Pennsylvania State University Press, 1985.
- Long, Larry H. *Migration and Residential Mobility in the United States*. New York: Russell Sage Foundation, 1988.
- Lowe, John C., and S. Moryadas. *The Geography of Movement*. Boston: Houghton Mifflin, 1975.
- Massey, Douglas S., et al. "International Migration Theory: The North American Case." *Population and Development Review* 20, no. 4 (1994):699-751.
- Massey, Douglas S., et al. "Theories of International Migration: A Review and Appraisal." *Population and Development Review* 19, no. 3 (1993):431-466.
- Michelson, William. *From Sun to Sun: Daily Obligations and Community Structure in the Lives of Employed Women and Their Families*. Totowa, NJ: Rowman & Allanheld, 1985.
- Morrill, Richard L., Gary L. Gaile, and Grant Ian Thrall. *Spatial Diffusion*. Vol. 10, *Scientific Geography Series*. Newbury Park, CA: Sage, 1988.
- Murdie, Robert A. "Cultural Differences in Consumer Travel." *Economic Geography* 41 (1965):211-233.
- Newland, Kathleen. *International Migration: The Search for Work*. Worldwatch Paper 33. Washington, D.C.: Worldwatch Institute, 1979.
- Newland, Kathleen. *Refugees: The New International Politics of Displacement*. Worldwatch Paper 43. Washington, D.C.: Worldwatch Institute, 1981.
- Palm, Risa. *Natural Hazards*. Baltimore, MD: Johns Hopkins University Press, 1990.
- Palm, Risa. "Women in Nonmetropolitan Areas: A Time-Budget Survey." *Environment and Planning A* 13 (1981):373-378.
- Plane, David A. "Age-Composition Change and the Geographical Dynamics of Interregional Migration in the U.S." *Annals of the Association of American Geographers* 82, no. 1 (1992):64-85.
- Ravenstein, E. G. "The Laws of Migration." *Journal of the Royal Statistical Society* 48 (1885):167-227; 52 (1889):241-301.
- Rogge, John R., ed. *Refugees: A Third World Dilemma*. Totowa, NJ: Rowman & Littlefield, 1987.
- Roseman, Curtis C. "Channelization of Migration Flows from the Rural South to the Industrial Midwest." *Proceedings of the Association of American Geographers* 3 (1971):140-146.
- Russell, Sharon Stanton, and Michael Teitelbaum. *International Migration and International Trade*. World Bank Discussion Papers, no. 160. Washington, D.C.: The World Bank, 1992.
- Segal, Aaron. *An Atlas of International Migration*. Providence, NJ: K. G. Saur, 1993.
- Simon, Rita James, and Caroline B. Brettell, eds. *International Migration: The Female Experience*. Totowa, NJ: Rowman & Allanheld, 1986.
- Stouffer, Samuel. "Intervening Opportunities: A Theory Relating Mobility and Distance." *American Sociological Review* 5 (1940):845-867.
- Stutz, Frederick P. "Distance and Network Effects on Urban Social Travel Fields." *Economic Geography* 49 (1973):134-144.

- Stutz, Frederick P. *Social Aspects of Interaction and Transportation*. Association of American Geographers, Commission on College Geography. *Resource Paper* No. 76-2. Washington, D.C.: Association of American Geographers, 1976.
- Svart, Larry M. "Environmental Preference Migration: A Review." *Geographical Review* 66 (1976):314-330.
- Szalai, Alexander, ed. *The Use of Time: Daily Activities of Urban and Suburban Populations in Twelve Countries*. The Hague: Mouton, 1972.
- Tinkler, Keith. "Reilly's 'Law' Revisited." *The Operational Geographer* 10, no. 1 (1992):12-16.
- Tocalis, Thomas R. "Changing Theoretical Foundations of the Gravity Concept of Human Interaction." In *The Nature of Change in Geographical Ideas*, edited by Brian J. L. Berry, pp. 66-124. *Perspectives in Geography* 3. DeKalb: Northern Illinois University Press, 1978.
- Ullman, Edward L. "The Role of Transportation and the Basis for Interaction." In *Man's Role in Changing the Face of the Earth*, edited by William E. Thomas, Jr., pp. 862-880. Chicago: University of Chicago Press, 1956.
- United Nations. High Commissioner for Refugees. *The State of the World's Refugees: The Search for Solutions*. New York: Oxford University Press, 1995.
- White, Paul, and Robert Woods. *The Geographical Impact of Migration*. London: Longman, 1980.
- Wood, William B. "Forced Migration: Local Conflicts and International Dilemmas." *Annals of the Association of American Geographers* 84, no. 4 (1994):607-634.
- Zachariah, K. C., and Julien Condé. *Migration in West Africa: Demographic Aspects*. New York: Oxford University Press for the World Bank, 1981.

POPULATION:

WORLD PATTERNS, REGIONAL TRENDS

CHAPTER

4

Population Growth	96
Some Population Definitions	98
Birth Rates	98
Fertility Rates	99
Death Rates	102
Population Pyramids	104
Natural Increase	107
Doubling Times	108
The Demographic Transition	109
The Western Experience	110
A World Divided	113
The Demographic Equation	113
Population Relocation	114
Immigration Impacts	114
World Population Distribution	116
Population Density	119
Overpopulation	120
Urbanization	122
Population Data and Projections	122
Population Data	123
Population Projections	124
Population Controls	125
Population Prospects	126

SUMMARY	127
KEY WORDS	128
FOR REVIEW	128
SELECTED REFERENCES	128



This 1990 New York Earth Day gathering emphasizes the world's increasing population numbers and densities.

Zero, possibly even negative [population] growth was the 1972 slogan proposed by the prime minister of Singapore, an island country in Southeast Asia. His nation's population, which stood at 1 million at the end of World War II (1945), had doubled by the mid-1960s. To avoid the overpopulation he foresaw, the government decreed "Boy or girl, two is enough" and refused maternity leaves and access to health insurance for third or subsequent births. Abortion and sterilization were legalized, and children born fourth or later in a family were to be discriminated against in school admissions policy. In response, birth rates by the mid-1980s fell to below the level necessary to replace the population, and abortions were terminating more than one-third of all pregnancies.

"At least two. Better three. Four if you can afford it" was the national slogan proposed by that same prime minister in 1986, reflecting fears that the stringencies of the earlier campaign had gone too far. From concern that overpopulation would doom the country to perpetual Third World poverty, Prime Minister Lee Kuan Yew was moved to worry that population limitation would deprive it of the growth potential and national strength implicit in a youthful, educated workforce adequate to replace and support the present aging population. His 1990 national budget provided for sizable long-term tax rebates for second children born to mothers under 28. Not certain that financial inducements alone would suffice to increase population, the Singapore government annually renews its offer to take 100,000 Hong Kong Chinese who might choose to leave when China takes over their territory in 1997.

The policy reversal in Singapore reflects an inflexible population reality: The structure of the present determines the content of the future. The size, characteristics, growth trends, and migrations of today's populations help shape the well-being of peoples yet unborn but whose numbers and distributions are now being determined. The numbers, age, and sex distribution of people; patterns and trends in their fertility and mortality; their density of settlement and rate of growth all affect and are affected by the social, political, and economic organization of a society. Through them, we begin to understand how the people in a given area live, how they may interact with one another, how they use the land, what pressure on resources exists, and what the future may bring.

Population geography provides the background tools and understandings of those interests. It focuses on the number, composition, and distribution of human be-

ings in relation to variations in the conditions of earth space. It differs from **demography**, the statistical study of human population, in its concern with *spatial* analysis—the relationship of numbers to area. Regional circumstances of resource base, type of economic development, level of living, food supply, and conditions of health and well-being are basic to geography's population concerns. They are, as well, fundamental expressions of the human–environmental relationships that are the substance of all human geographic inquiry.

Population Growth

Sometime during the summer of 1995, a human birth raised the earth's population to 5.7 billion people. In 1965 there were about 3.3 billion. That is, over the 30 years between those two dates, the world's population grew on average by about 80 million people annually, or some 220,000 per day. That growth has increased in recent years, fluctuating between 85 and 95 million people added annually, or between 240,000 and 260,000 per day. It is generally agreed that we will see a year 2000 population of about 6.3 billion (the 20th century began with fewer than 2 billion) inhabitants. Demographers assume that world population will stabilize at about 11.6 billion after the year 2150, with over 95% of the growth occurring in countries now considered "developing." (Figure 4.1). We will return to these projections, and the difficulties inherent in making them, later in this chapter.

Just what is implied by numbers in the millions and billions? With what can we equate the 1995 population of Gabon in Africa (about 1.2 million) or of China (about 1.2 billion)? Unless we have some grasp of their scale and meaning, our understanding of the data and data manipulations of the population geographer can at best be superficial. It is difficult to appreciate a number as vast as 1 million or 1 billion, and the great distinction between them. Some examples offered by the Population Reference Bureau may help in visualizing their immensity and implications.

- A 2.5-centimeter (1-inch) stack of U.S. paper currency contains 233 bills. If you had a *million* dollars in thousand-dollar bills, the stack would be 11 centimeters (4.3 inches) high. If you had a *billion* dollars in thousand-dollar bills, your pile of money would reach 109 meters (357 feet)—about the length of a football field.
- You had lived a *million* seconds when you were 11.6 days old. You won't be a *billion* seconds old until you are 31.7 years of age.
- The supersonic airplane the Concorde could theoretically circle the globe in only 18.5 hours at its cruising speed of 2150 kilometers (1340 miles) per hour. It would take 31 days for a passenger to journey a *million* miles on the Concorde, while a trip of a *billion* miles would last 85 years.

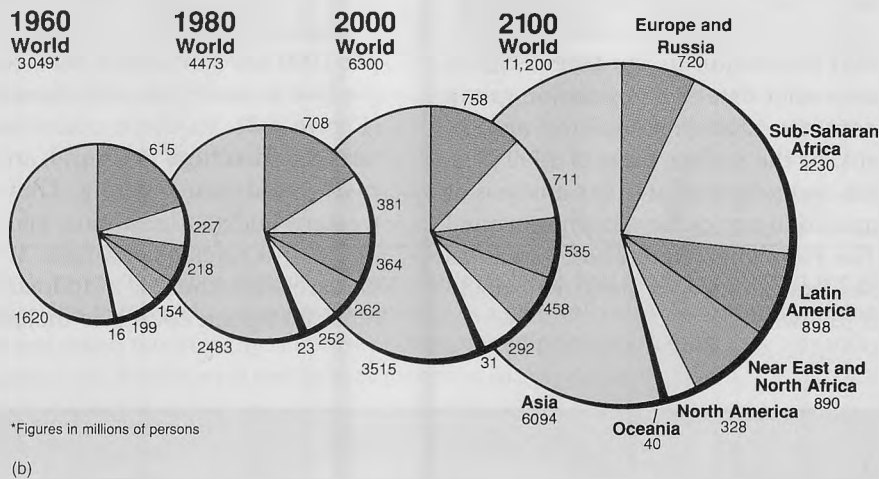
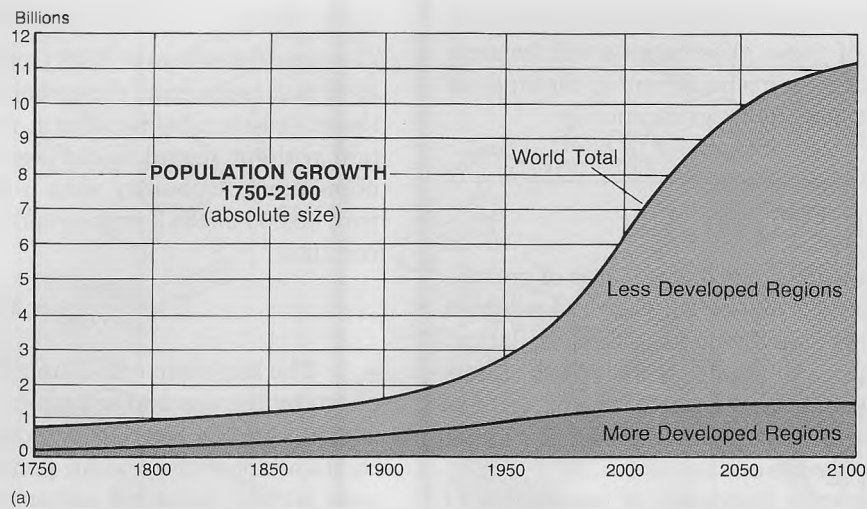


FIGURE 4.1 World population numbers and projections. (a) After two centuries of slow growth, world population began explosive expansion after World War II. United Nations projections are for a global population of about 6.3 billion in A.D. 2000 and for 9.8 billion in 2050. The total may rise to over 11 billion by the end of the 21st century. (b) The greatest numerical growth during the 1990s will occur in Asia, and sub-Saharan Africa will show the highest percentage increase, but the relative population rankings of major world regions will remain the same throughout this century. "Europe and Russia" includes the Eastern European and Caucasian states that were republics of the former Soviet Union and all of Russia, including Siberia.

The implications of the present numbers and the potential increases in population are of vital current social, political, and ecological concern. Population numbers were much smaller some 11,000 years ago when continental glaciers began their retreat, people spread to formerly unoccupied portions of the globe, and human experimentation with food sources initiated the Agricultural Revolution. The 5 or 10 million people who then constituted all of humanity obviously had considerable potential to expand their numbers. In retrospect, we see that the natural resource base of the earth had a population-supporting capacity far in excess of the pressures exerted on it by early hunting and gathering groups.

Some observers maintain that despite present numbers or even those we can reasonably anticipate for the future, the adaptive and exploitive ingenuity of humans is in no danger of being taxed. Others, however, compare the earth to a self-contained spaceship and declare with chilling conviction that a finite vessel cannot bear an ever-increasing number of

passengers. They point to recurring problems of malnutrition and starvation (though these are realistically more a matter of failures of distribution than of inability to produce enough foodstuffs worldwide). They cite dangerous conditions of air and water pollution, the loss of forest and farmland, the nearing exhaustion of many minerals and fossil fuels, and other evidences of strains on world resources as foretelling the discernible outer limits of population growth.

Why are we suddenly confronted with what seems to many an insoluble problem—the apparently unending tendency of humankind to increase in numbers? On a worldwide basis, populations grow only one way: The number of births in a given period exceeds the number of deaths. Ignoring for the moment regional population changes resulting from migration, we can conclude that the observed and projected dramatic increases in population must result from the failure of natural controls to limit the number of births or to increase the number of deaths, or from the success of

human ingenuity in circumventing such controls when they exist. The implications of these observations will become clearer after we define some terms important in the study of world population and explore their significance.

Some Population Definitions

Demographers employ a wide range of measures of population composition and trends, though all their calculations start with a count of events: of individuals in the population, of births, deaths, marriages, and so on. To those basic counts demographers bring refinements that make the figures more meaningful and useful in population analysis. Among them are *rates* and *cohort measures*.

Rates simply record the frequency of occurrence of an event during a given time frame for a designated population—for example, the marriage rate as the number of marriages performed per 1000 population in the United States last year. **Cohort** measures refer data to a population group unified by a specified common characteristic—the age cohort of 1–5 years, perhaps, or the college class of 1999 (Figure 4.2). Basic 1996 counts and rates useful in the analysis of world population and population trends have been reprinted with the permission of the Population Reference Bureau as Appendix B to this book. Examination of them will document the discussion that follows.

Birth Rates

The **crude birth rate** (CBR), often referred to simply as the *birth rate*, is the annual number of live births per 1000 population. It is “crude” because it relates births to total population without regard to the age or sex composition of that population. A country with a population of 2 million and with 40,000 births a year would have a crude birth rate of 20 per 1000.

$$\frac{40,000}{2,000,000} = 20 \text{ per } 1000$$

The birth rate of a country is, of course, strongly influenced by the age and sex structure of its population, by the customs and family size expectations of its inhabitants, and by its adopted population policies. Since these conditions vary widely, recorded national birth rates vary—in 1996, from a high of 55 per 1000 in Gaza to the low of 9 per 1000 in 7 European countries. Although birth rates greater than 30 per 1000 are considered *high*, some 30% of the world's people live in countries with rates that are that high or higher (Figure 4.3). In these countries the population is prominently agricultural and rural, and a high proportion of the female population is young. They are found chiefly in Africa, western and southern Asia, and Latin America.

Birth rates of less than 20 per 1000 are reckoned *low* and are characteristic of industrialized, urbanized countries. Most European countries including Russia, Anglo America,



FIGURE 4.2 Whatever their differences may be by race, sex, or ethnicity, these babies will forever be clustered demographically into a single *birth cohort*.

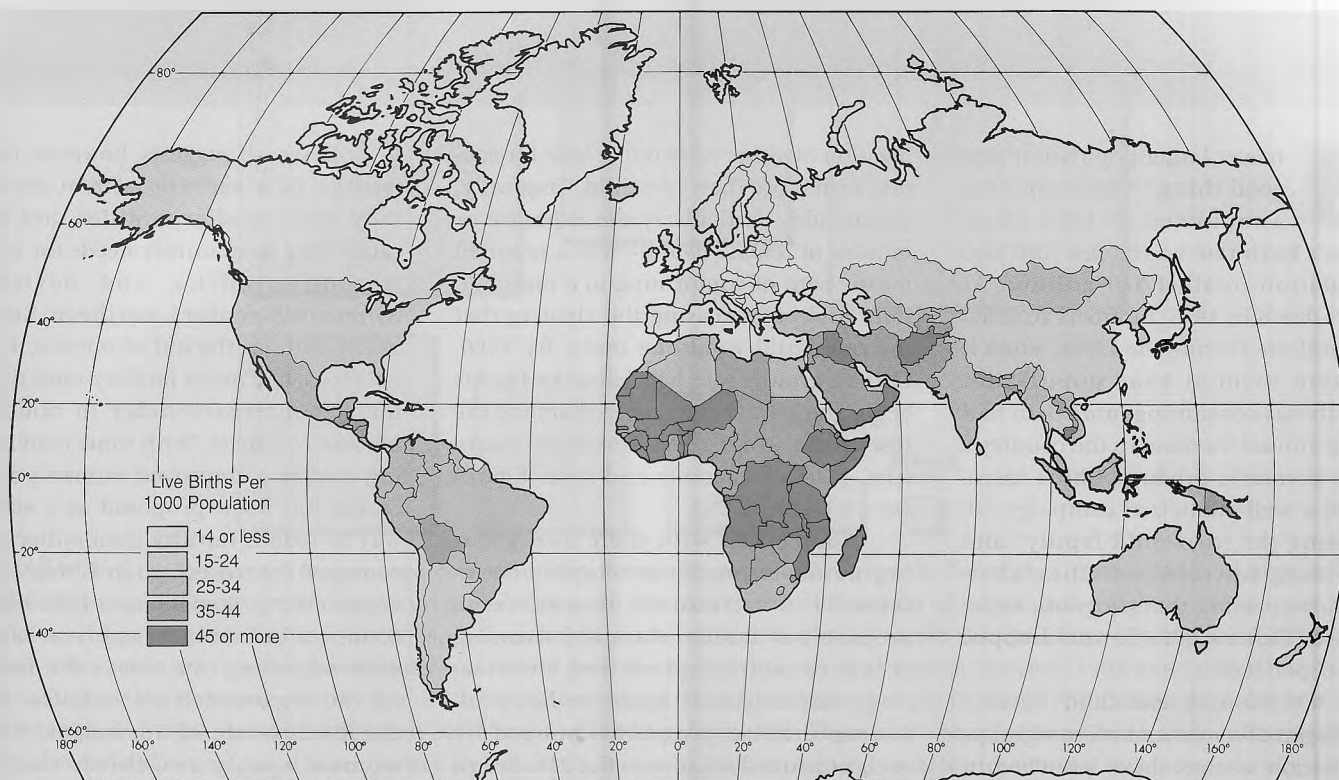


FIGURE 4.3 Crude birth rates. The map suggests a degree of precision that is misleading in the absence of reliable, universal registration of births. The pattern shown serves, however, as a generally useful summary of comparative reproduction patterns if class divisions are not taken too literally. Reported or estimated population data vary annually, so this and other population maps may not agree in all details with the figures recorded in Appendix B.

Japan, Australia, and New Zealand have low rates as, importantly, do an increasing number of developing states such as China (see “China’s Way—and Others”) that have adopted stringent family-planning programs. *Transitional* birth rates (between 20 and 30 per 1000) characterize some, mainly smaller, “developing” countries.

As the recent population histories of Singapore and China indicate, birth rates are subject to change. The decline to present low birth rates of European countries and of some of the areas that they colonized is usually ascribed to industrialization, urbanization, and in recent years, maturing populations. While restrictive family planning policies in China rapidly reduced the birth rate from over 33 per 1000 in 1970 to 18 per 1000 in 1986, industrializing Japan experienced a 15-point decline in the decade 1948–1958 with little governmental intervention. Indeed, the stage of economic development appears closely related to variations in birth rates among countries, although rigorous testing of this relationship proves it to be imperfect (Figure 4.3). As a group, the more developed states of the world showed a crude birth rate of 12 per 1000 in 1996; less developed countries (excluding China) registered 31 per 1000.

Religious and political beliefs can also affect birth rates. The convictions of many Roman Catholics and Muslims that their religion forbids the use of artificial birth control techniques often lead to high birth rates among believers. How-

ever, dominantly Catholic Italy shows Europe’s lowest birth rate, and Islam itself does not prohibit contraception. Similarly, some European governments—concerned about birth rates too low to sustain present population levels—subsidize births in an attempt to raise those rates. Regional variations in projected percentage contributions to world population growth are summarized in Figure 4.4.

Fertility Rates

Crude birth rates may display such regional variability because of differences in age and sex composition or disparities in births among the reproductive-age, rather than total, population. **Total fertility rate (TFR)** is a more accurate statement than the birth rate in showing the amount of reproduction in the population (Figure 4.5). This rate tells us the average number of children that would be born to each woman if, during her childbearing years, she bore children at the current year’s rate for women that age. The fertility rate minimizes the effects of fluctuation in the population structure and is thus a more reliable figure for regional comparative and predictive purposes than the crude birth rate.

A total fertility rate of 2.1 is necessary just to replace present population. On a worldwide basis, the TFR for 1996 was 3.0. The more developed countries recorded a 1.6 rate, while less developed states (excluding China) had a collective TFR of 4.0, down from 5.0 in the mid-1980s. Indeed, the

An ever larger population is "a good thing," Chairman Mao announced in 1965 when China's birth rate was 37 per 1000 and population totalled 540 million. At Mao's death in 1976, numbers reached 852 million. During the 1970s, when it became evident that population growth was consuming more than half of the annual increase in the country's gross domestic product, China introduced a well-publicized campaign advocating the "two-child family" and providing services, including abortions, supporting that program. In response, China's growth rate dropped to 15.7 per 1000.

"One couple, one child" became the slogan of a new and more vigorous population control drive launched in 1979, backed by both incentives and penalties to assure its success in China's tightly controlled society. Late marriages were encouraged; free contraceptives, cash awards, abortions, and sterilizations were provided to families limited to a single child. Penalties, including steep fines, were levied for second births. At the campaign's height in 1983, the government ordered the ster-

ilization of either husband or wife for couples with more than one child. Tragically, infanticide—particularly the exposure or murder of female babies—was a reported means both of conforming to a one-child limit and of increasing the chances that the one child would be male. By 1986, China's growth rate had fallen to 1%, far below the 2.4% then registered among the rest of the world's less developed countries. (The comparable mid-1990s figures were 1.1% and 2.2%).

Concerned with their own growing numbers, many developing countries have introduced less-extreme programs of family planning stressing access to contraception and sterilization. International agencies have encouraged these programs, buoyed by such presumed success as the 21% fall in fertility rates in Bangladesh from 1970 to 1990 as the proportion of married women of reproductive age using contraceptives rose from 3% to 40% under intensive family planning encouragement and frequent adviser visits. The costs per birth averted, however, were reckoned at an unsupportable \$180 in 1987, about 120% of the country's per capita gross domestic product.

Research suggests, however, that fertility falls because women decide they want smaller families, not because they have unmet needs for contraceptive advice and devices. Nineteenth-century northern Europeans without the aid of science, it is observed, had lower fertility rates than their counterparts today in middle-income countries. With some convincing evidence, improved women's education has been proposed as a surer way to reduce fertility than either encouraged contraception or China's coercive efforts. Studies from individual countries indicate that one year of female schooling can reduce the fertility rate by between 5% and 10%. Yet the fertility rate of uneducated Thai women is only two-thirds that of Ugandan women with secondary education. Obviously, the demand for babies is not solely a function of ignorance.

Instead, that demand seems closely tied to the use value placed on children by poor families in some parts of the developing world. Where those families share in such communal resources as firewood, animal fodder, grazing land, fish, and the like, the more of those collective resources that can be converted to private family property and use, the better off is the family. Indeed, the more communal resources that are available for "capture," the greater are the incentives for a household to have more children to appropriate them. Some population economists conclude that only when population numbers increase to the point of total conversion of communal resources to private property—and children have to be supported and educated rather than employed—will poor families in developing countries want fewer children. If so, coercion, contraception, and education may be less effective as checks on fertility than the economic consequence of population increase itself.



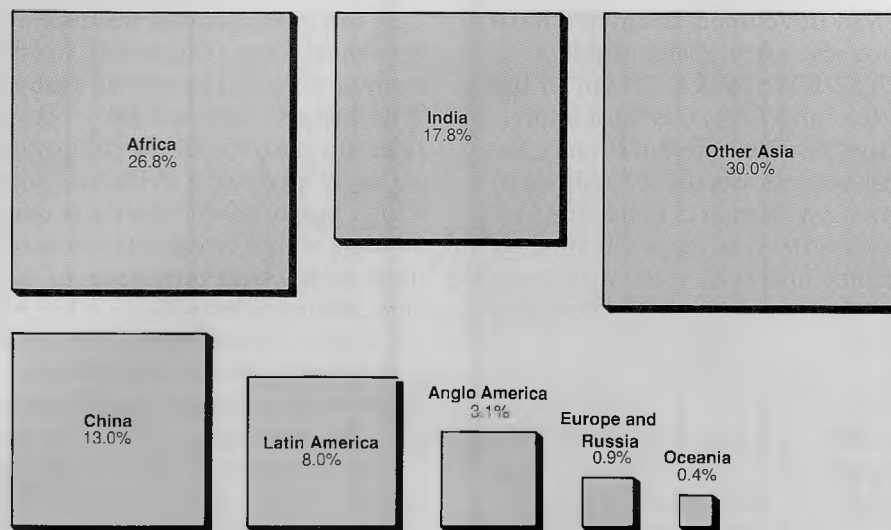


FIGURE 4.4 Projected percentage contributions to world population growth, by region, 1995–2010. Birth rate changes affecting differently sized regional populations are altering the world pattern of population increase. Africa, containing 12.5% of world population in the mid-1990s, will probably account for 27% of total world increase between 1995 and 2010. Between 1965 and 1975, China's contribution to world growth was 2.5 times that of Africa; between 1995 and 2010, Africa's numerical growth will be over twice that of China. China added 65 million more people to world population than did India between 1970 and 1980. Between 1995 and 2010, India will add at least 68 million more people than China and will be overtaking China as the world's most populous country by A.D. 2045. Between 1990 and 2025, the UN projects, no less than 95% of global population growth will be in the developing countries of Africa, Asia, and Latin America.

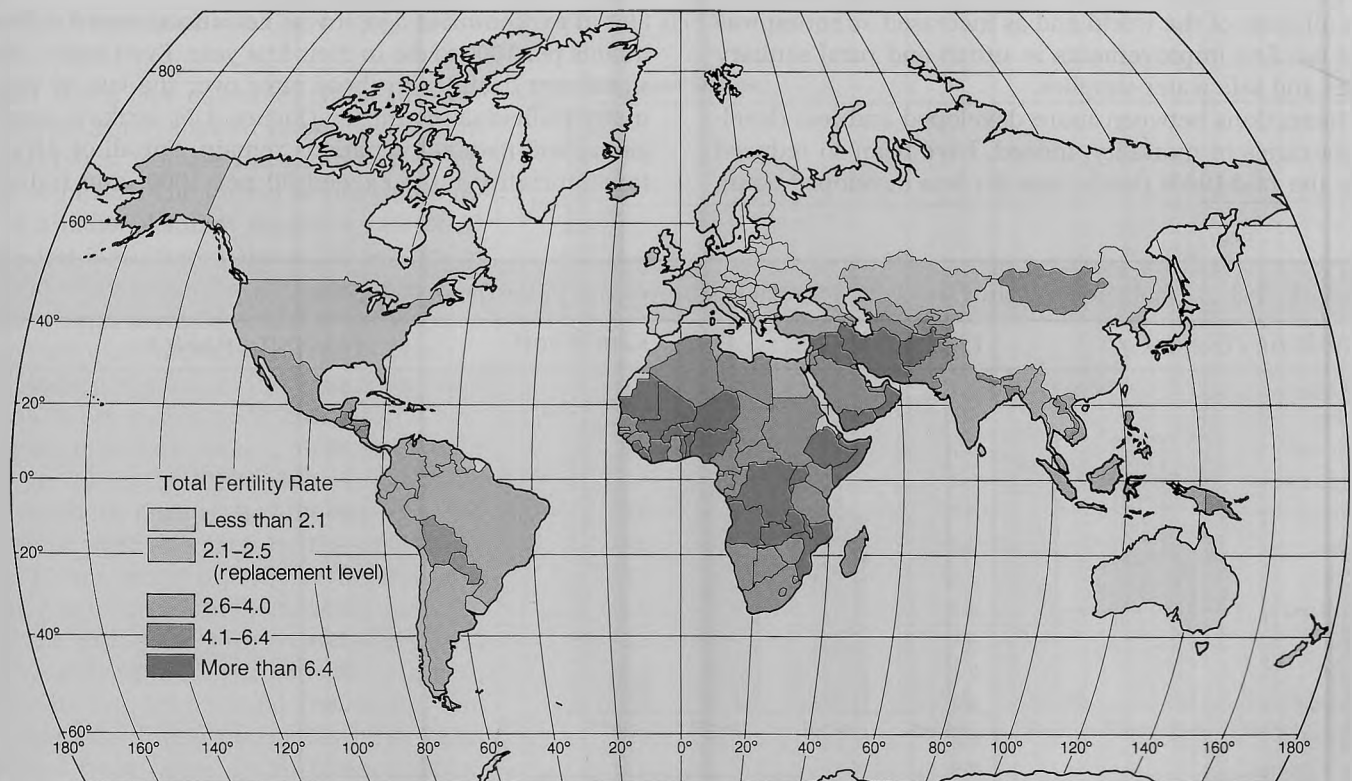


FIGURE 4.5 Total fertility rate (TFR) indicates the average number of children that would be born to each woman if, during her childbearing years, she bore children at the same rate as women of those ages actually did in a given year. Since the TFR is age-adjusted, two countries with identical birth rates may have quite different fertility rates and therefore different prospects for growth. Depending on mortality conditions, a TFR of 2.1 to 2.5 children per woman is considered the “replacement level,” at which a population will eventually stop growing.

fertility rates for many less developed countries have dropped dramatically since the early 1960s (Table 4.1). China's drop from a TFR of 5.9 births per woman in the early 1960s to below 2.0 in the early 1990s was most impressive and demographically significant because of China's status as the world's foremost state in population. Although fertility rates are still 6 or over per woman in much of Africa and in many smaller Asian countries (see Appendix B), their worldwide impressive declines in recent years make it at least possible for total population to stabilize at the projected 11.6 billion level by A.D. 2150.

Death Rates

The **crude death rate** (CDR), also called the **mortality rate**, is calculated in the same way as the crude birth rate: the annual number of events per 1000 population. In the past, a valid generalization was that the death rate, like the birth rate, varied with national levels of development. Characteristically, highest rates (over 20 per 1000) were found in the less developed countries of Africa, Asia, and Latin America; lowest rates (less than 10) were associated with developed states of Europe and Anglo America. That correlation became decreasingly valid as dramatic Third World reductions in crude death rates occurred in the years following World War II. Infant mortality rates and life expectancies improved as antibiotics, vaccination, and pesticides to treat diseases and control disease carriers were made available in almost all parts of the world and as increased attention was paid to funding improvements in urban and rural sanitary facilities and safe water supplies.

Distinctions between more developed and less developed countries in mortality, indeed, have been so reduced that by the mid-1990s death rates for less developed coun-

tries as a group actually were lower than those for the more developed states (Figure 4.6). Notably and tragically, that reduction does not extend to maternal mortality rates (see "The Risks of Motherhood"). Like crude birth rates, death rates are meaningful for comparative purposes only when we study identically structured populations. Countries with a high proportion of elderly people, such as Denmark and Sweden, would be expected to have higher death rates than those with a high proportion of young people, such as Iceland, assuming equality in other national conditions affecting health and longevity. The pronounced youthfulness of populations in developing countries is an important factor in the recently reduced mortality rates of those areas.

To overcome that lack of comparability, death rates can be calculated for specific age groups. The *infant mortality rate*, for example, is the ratio of deaths of infants aged 1 year or under per 1000 live births:

$$\frac{\text{deaths age 1 year or less}}{1000 \text{ live births}}$$

Infant mortality rates are significant because it is at these ages that the greatest declines in mortality have occurred, largely as a result of the increased availability of health services. The drop in infant mortality accounts for a large part of the decline in the general death rate in the last few decades, for mortality during the first year of life is usually greater than in any other year.

Two centuries ago, it was not uncommon for 200–300 infants per 1000 to die in their first year. Even today, despite significant declines in those rates over the last 60 years in many individual countries (Figure 4.7), striking world regional and national variations remain. For all of Africa, infant mortality rates exceed 90 per 1000, and individual

TABLE 4.1 Total Fertility Rate Change in Selected Less Developed Countries and Regions

REGION OR COUNTRY	EARLY 1960S ^A	MID-1990S ^B	PERCENT CHANGE
East Asia	5.3	1.8	-66.0
China	5.9	1.9	-67.8
South Asia	6.1	3.8	-37.7
Afghanistan	7.0	6.9	-1.4
Bangladesh	6.7	4.3	-35.8
India	5.8	3.4	-41.4
Nepal	5.9	5.8	-1.7
Thailand	6.4	2.2	-65.6
Africa	6.7	5.8	-13.4
Egypt	7.1	3.9	-45.1
Kenya	8.2	5.7	-30.5
Nigeria	6.9	6.3	-8.7
Latin America	5.9	3.1	-47.5
Brazil	6.2	2.9	-53.2
Guatemala	6.8	5.4	-20.6
Mexico	6.7	3.1	-53.7

Sources: ^AThomas W. Merrick, with PRB staff, "World Population in Transition," *Population Bulletin* 41, no. 2 (Washington, D.C.: Population Reference Bureau, 1986) and ^B*World Population Data Sheet*, Population Reference Bureau.

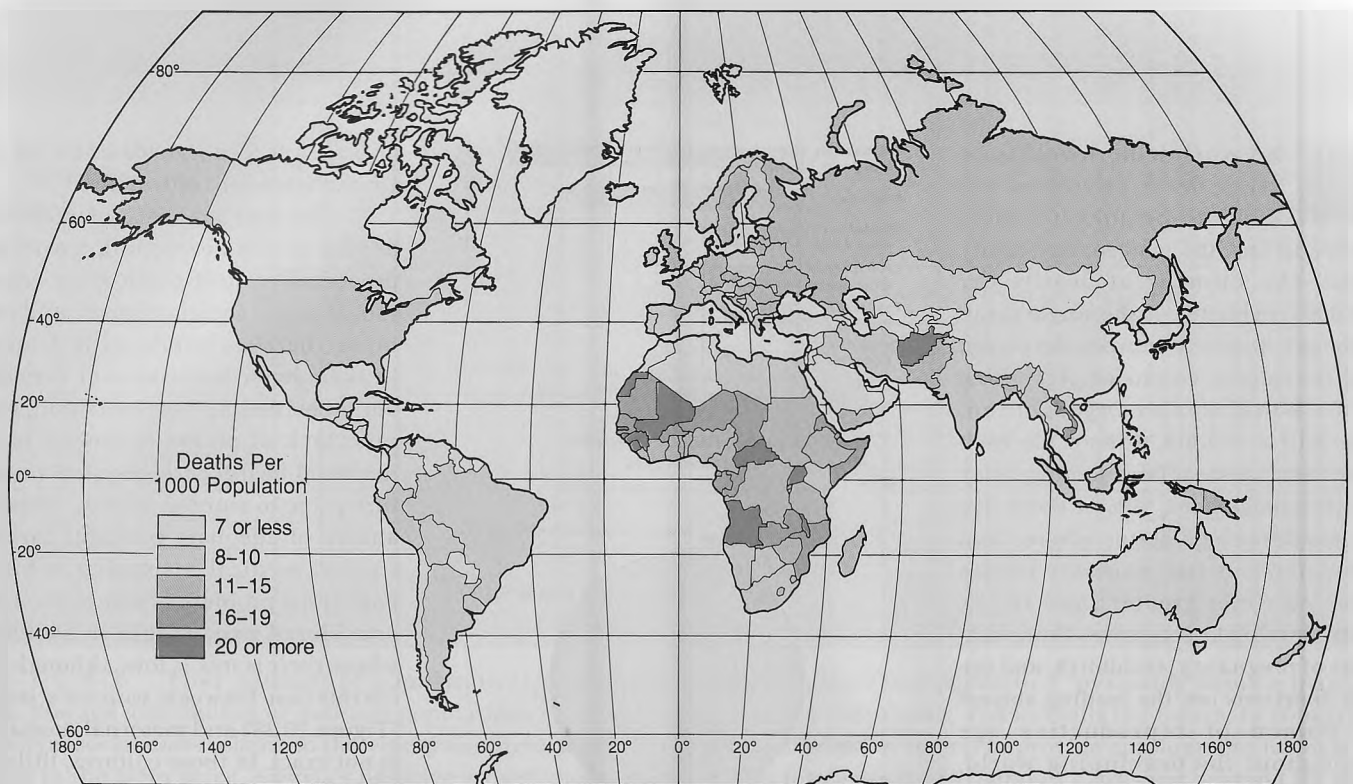


FIGURE 4.6 Crude death rates show less worldwide variability than do the birth rates displayed in Figure 4.3, the result of widespread availability of at least minimal health protection measures and a generally youthful population in the developing countries, where death rates are frequently lower than in “old age” Europe.

African states (for example, Guinea-Bissau and Sierra Leone) showed rates above 140 in the mid-1990s. Nor are rates uniform within single countries. The former Soviet Union reported a national infant mortality rate of 23 (1991), but it registered above 110 in parts of its Central Asian region. In contrast, infant mortality rates in Anglo America and Western Europe are more uniformly in the 6–8 range.

Modern medicine and sanitation have increased life expectancy and altered age-old relationships between birth and death rates. In the early 1950s, only 5 countries, all in northern Europe, had life expectancies at birth of over 70 years. By the mid-1990s, some 40 countries outside of Europe and North America—though none in Africa—were on that list. The availability and employment of modern methods of health and sanitation have varied regionally, and the least developed countries have least benefited from them. In such underdeveloped and impoverished areas as much of

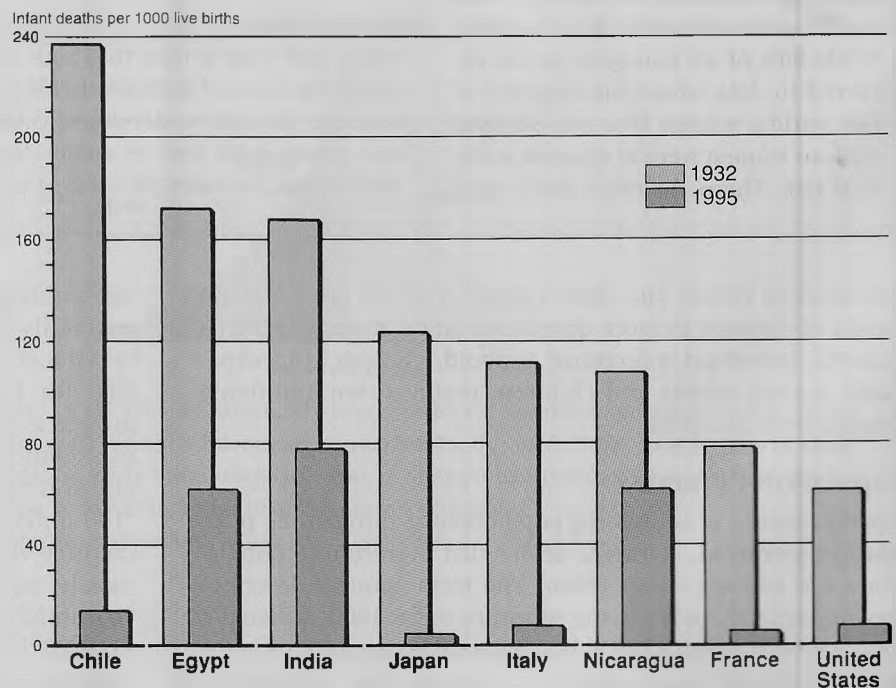


FIGURE 4.7 Infant mortality rates for selected countries. Dramatic declines in the rate have occurred in all countries, a result of international programs of health care delivery aimed at infants and children in developing states. Nevertheless, the decreases have been proportionately greatest in the urbanized, industrialized countries, where sanitation, safe water, and quality health care are more widely available.

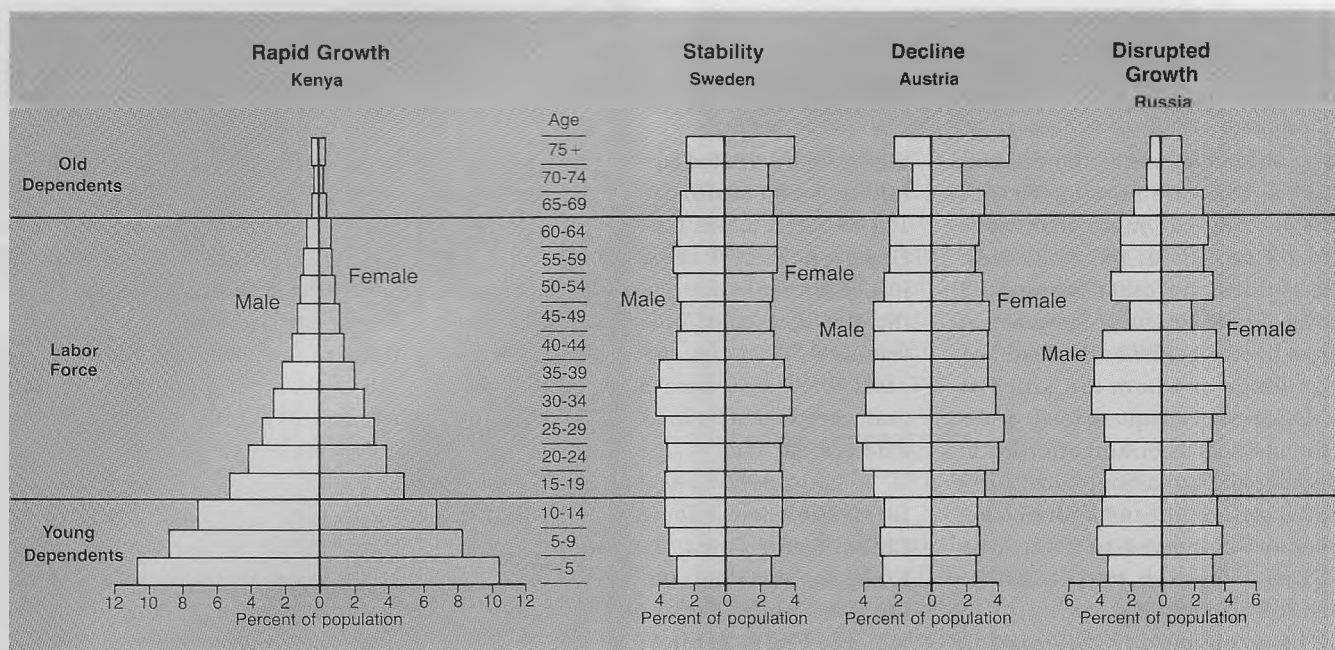


FIGURE 4.8 Four patterns of population structure. These diagrams show that population “pyramids” assume many shapes. The age distribution of national populations reflects the past, records the present, and foretells the future. In countries like Kenya, social costs related to the young are important and economic expansion is vital to provide employment for new entrants in the labor force. Austria’s negative growth means a future with fewer workers to support a growing demand for social services for the elderly. The 1992 pyramid for Russia reports the sharp decline in births during World War II as a “pinching” of the 45–49 cohort and shows the heavy male mortality of both World Wars in the large deficits of men above age 65.

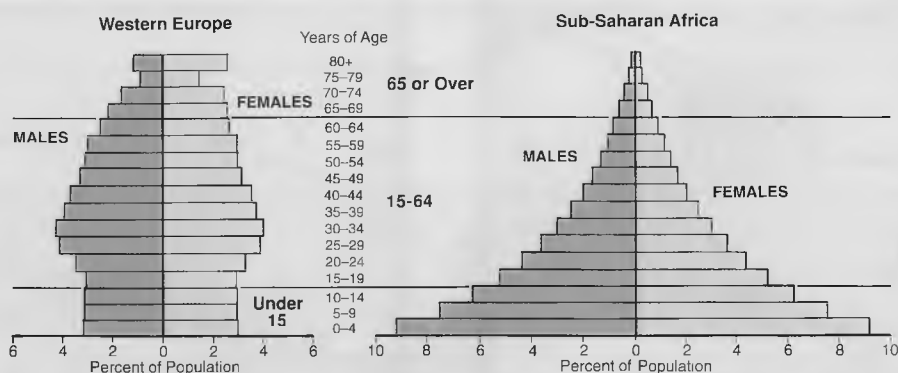


FIGURE 4.9 Summary population pyramids, 1995. The economically less developed countries of sub-Saharan Africa show a much younger age profile than do more developed Western European countries. In the mid-1990s, nearly 50% of their population was below age 15; in many developed regions, only about one-fifth was in that youthful cohort. In contrast, the proportion of population above 65 in Western Europe is five times that of sub-Saharan countries.

Source: Lori S. Ashford, “New Perspectives on Population: Lessons from Cairo,” *Population Bulletin* 50, no. 1 (1995), Figure 3.

The population pyramid provides a quickly visualized demographic picture of immediate practical and predictive value. For example, the percentage of a country’s population in each age group strongly influences demand for goods and services within that national economy. A country with a high proportion of young has a high demand for educational facilities and certain types of health delivery services. Additionally, of course, a large portion of the population is too young to be

employed (Figures 4.9 and 4.10). On the other hand, a population with a high percentage of elderly people also requires medical goods and services specific to that age group (Figure 4.11), and these people must be supported by a smaller proportion of workers. The **dependency ratio** is a simple measure of the number of dependents, old or young, that each 100 people in the productive years (usually, 15–64) must support. Population pyramids give quick visual evidence of that ratio.

100 MILLION WOMEN ARE MISSING



Worldwide, some 100 million females are missing, victims of nothing more than their sex. In China, India, Pakistan, New Guinea, and many other developing countries a traditional preference for boys has meant neglect and death for girls, millions of whom are killed at birth, deprived of adequate food, or denied the medical attention afforded to favored sons. Increasingly in China and India ultrasound and amniocentesis tests are employed to determine the sex of a fetus so that it can be aborted if it's a female.

The evidence for the missing women starts with one fact: About 105 males are conceived and born for every 100 females. Normally, girls are hardier and more resistant to disease than boys, and in populations where

the sexes are treated equally in matters of nutrition and health care, there are about 105 to 106 females for every 100 males. However, the 1990 census of China found just 93.8 females for every 100 males and the 1991 census of India found just 92.9 females for every 100 males. In both cases, the ratios were more unfavorable than they had been in censuses taken just a decade earlier.

Ratio deviations are most striking for second and subsequent births. In China, South Korea, Taiwan, and Hong Kong, for example, the most recent figures for first child sex ratios are near normal, but rise to 121 boys per 100 girls for a second Chinese child to 185 for a third Korean. On that evidence, the problem of missing females is getting worse. Conservative calculations suggest there are nearly 50 million females missing in

China alone, about 4% of the national population and more than are unaccounted for in any other country.

The problem is seen elsewhere. In much of South and West Asia and North Africa there are only some 94 females for every 100 males, a shortfall of about 12% of normal (Western) expectations. But not all poor countries show the same disparities. In sub-Saharan Africa, where poverty and disease are perhaps more prevalent than on any other continent, there are 102 females for every 100 males, and in Latin America and the Caribbean there are equal numbers of males and females. Cultural norms and practices, not poverty or underdevelopment, seem to determine the fate and swell the numbers of the world's 100 million missing women.

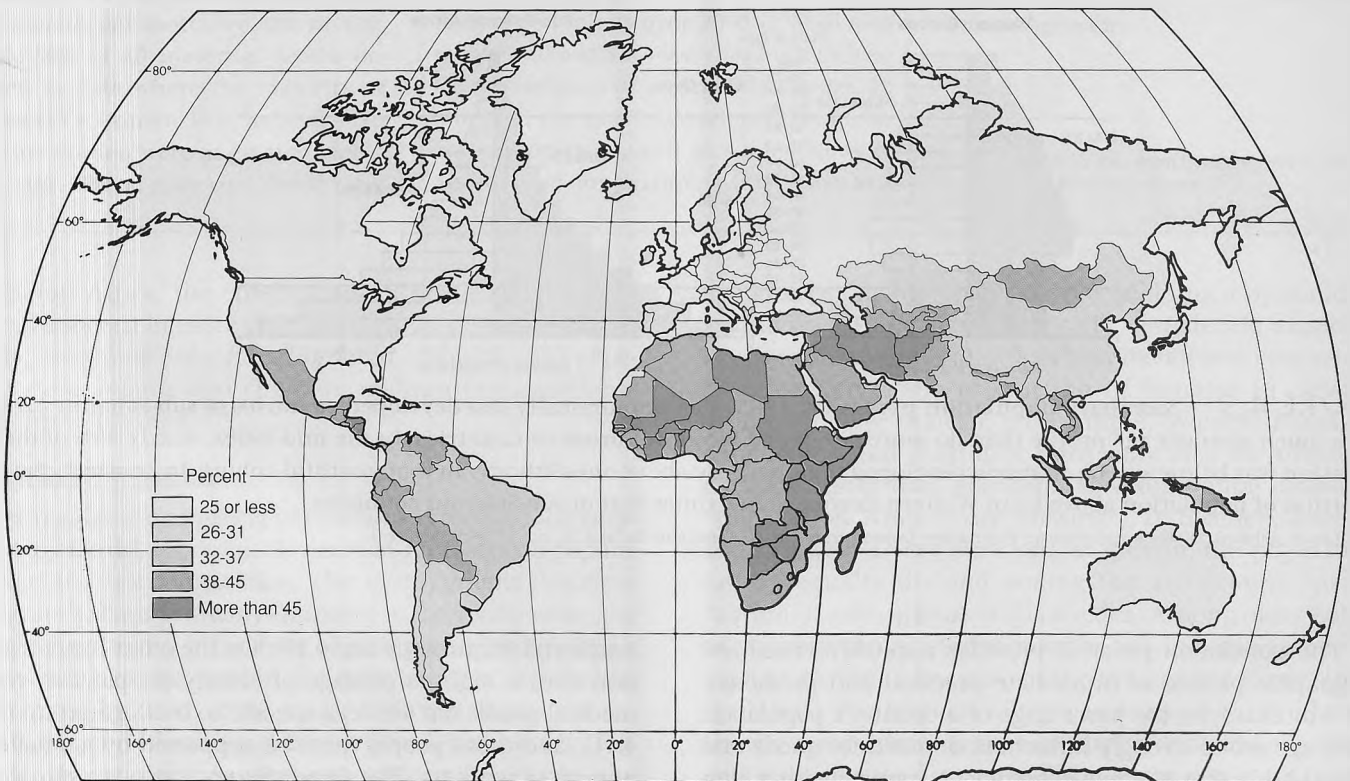


FIGURE 4.10 Percentage of population under 15 years of age. A high proportion of a country's population under 15 increases the dependency ratio of that state and promises future population growth as the youthful cohorts enter childbearing years.



FIGURE 4.11 As these Dutch senior citizens exemplify, Europe is an aging continent with an ever-growing proportion of the elderly dependent on the financial support of a reduced working-age population. Rapidly growing developing countries, in contrast, face increasing costs for the needs of the very young.

They also foretell future problems resulting from present population policies or practices. The strict family-size rules and widespread preferences for sons in China, for example, skews the pyramid in favor of males. At current trends, about 1 million excess males will enter an imbalanced marriage market in China beginning about 2010. Millions of bachelors, unconnected to society by wives and children, may pose threats to social order and, perhaps, national stability not foreseen or planned when family control programs were put in place, but clearly suggested when made evident by population pyramid distortions.

Natural Increase

Knowledge of their sex and age distributions also enables demographers to forecast countries' future population levels, though the reliability of projections decreases with increasing length of forecast (Figure 4.12). Thus, a country with a high proportion of young people will experience a high rate of natural increase unless there is a very high mortality rate among infants and juveniles or fertility and birth rates change materially. The **rate of natural increase** of a population is derived by subtracting the crude death rate from the crude birth rate. *Natural* means that increases or decreases due to migration are not included. If a country had a birth rate of 22 per 1000 and a death rate of 12 per 1000 for a given year, the rate of natural increase would be 10 per 1000. This rate is usually expressed as a percentage, that is, as a rate per 100 rather than per 1000. In the example given, the annual increase would be 1%.

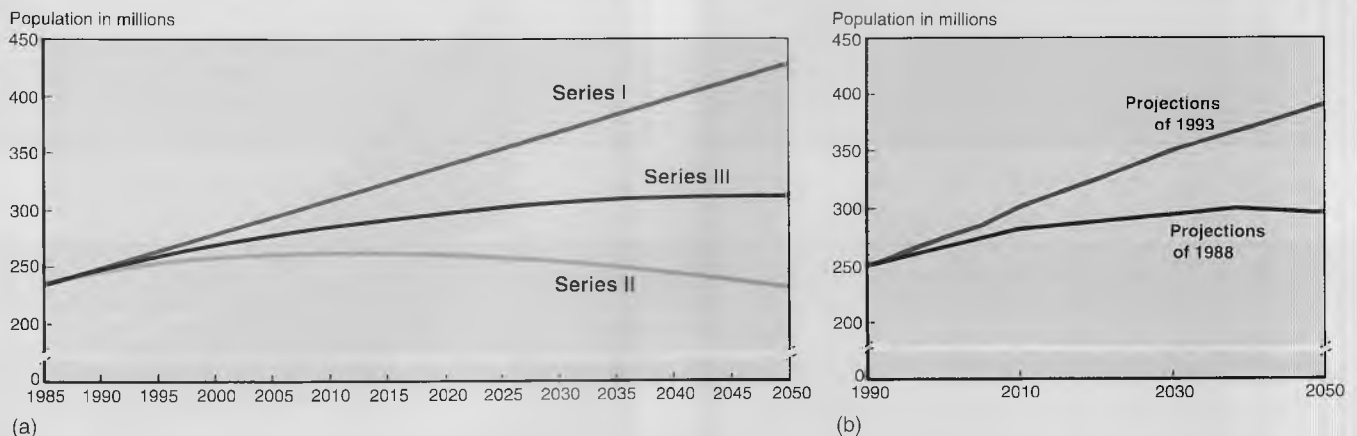


FIGURE 4.12 Possible population futures for the United States. As these population projections to 2050 illustrate, expected future numbers vary greatly because the birth and death rates and immigration flow assumptions they are based on are different. (a) Depending on the assumptions, 1985 Census Bureau projections of U.S. population in 2050 ranged from 231 million (low series) to 429 million (high series). (b) The Bureau's new 1988 middle series projection was again revised in late 1993, reflecting actual population counts and new assumptions about fertility, immigration, and racial and ethnic differentials in births and deaths. Those counts and assumption revisions increased the earlier A.D. 2050 projection by 31%.

Source: U.S. Bureau of the Census.

Doubling Times

The rate of increase can be related to the time it takes for a population to double, that is, the **doubling time**. Table 4.2 shows that it would take 70 years for a population with a rate of increase of 1% (approximately the rate of growth of New Zealand or South Korea in the mid-1990s) to double. A 2% rate of increase—recorded in the early 1990s by the developing world as a whole—means that the population will double in only 35 years. (Population doubling time can be closely determined by dividing the growth rate into the number “69.” Thus, $69 \div 2 = 35$ years.) How could adding only 20 people per 1000 cause a population to grow so quickly? The principle is the same as that used to compound interest in a bank. Table 4.3 shows the number yielded by a 2% rate of increase at the end of successive 5-year periods.

For the world as a whole, the rates of increase have risen over the span of human history. Therefore, the doubling time has decreased. Note in Table 4.4 how the population of the world has doubled in successively shorter periods of time. It will reach 9.5 billion during the first half of the 21st century if the present rate of growth continues (Figure 4.1). In countries with high rates of increase (Figure 4.13),

the doubling time is less than the 46 years projected for the world as a whole (at growth rates recorded in 1996). Should world fertility rates decline (as they have in recent years), population doubling time will correspondingly increase as it has since 1990 (Figure 4.14).

Here, then, lies the answer to the question posed earlier. Even small annual additions accumulate to large total increments because we are dealing with geometric or exponential (1, 2, 4, 8) rather than arithmetic (1, 2, 3, 4) growth. The ever-increasing base population has reached such a size that each additional doubling results in an astronomical increase in the total. A simple mental exercise suggests the inevitable consequences of such doubling, or **J-curve**, growth. Take a very large sheet of the thinnest paper you can find and fold it in half. Fold it in half again. After seven or eight folds the sheet will have become as thick as a book—too thick for further folding by hand. If you could make 20 folds, the stack would be nearly as high as a football field is long. From then on, the results of further doubling are astounding. At 40 folds, the stack would be well on the way to the moon and at 70 it would reach twice as far as the distance to the nearest star. After 100

TABLE 4.2 Doubling Time in Years at Different Rates of Increase

ANNUAL PERCENTAGE INCREASE	DOUBLING TIME (YEARS)
0.5	140
1.0	70
2.0	35
3.0	24
4.0	17
5.0	14
10.0	7

TABLE 4.3 Population Growth Yielded by a 2% Rate of Increase

YEAR	POPULATION
0	1000
5	1104
10	1219
15	1345
20	1485
25	1640
30	1810
35	2000

TABLE 4.4 Population Growth and Approximate Doubling Times since A.D. 1

YEAR	ESTIMATED POPULATION	DOUBLING TIME (YEARS)
1	250 million	
1650	500 million	1650
1804	1 billion	154
1927	2 billion	123
1974	4 billion	47
World population may reach 2021	8 billion	47 ^a

^aThe leveling of doubling time reflects assumptions of decreasing and stabilizing fertility rates. No current projections contemplate a further doubling to 16 billion people.

Source: United Nations.

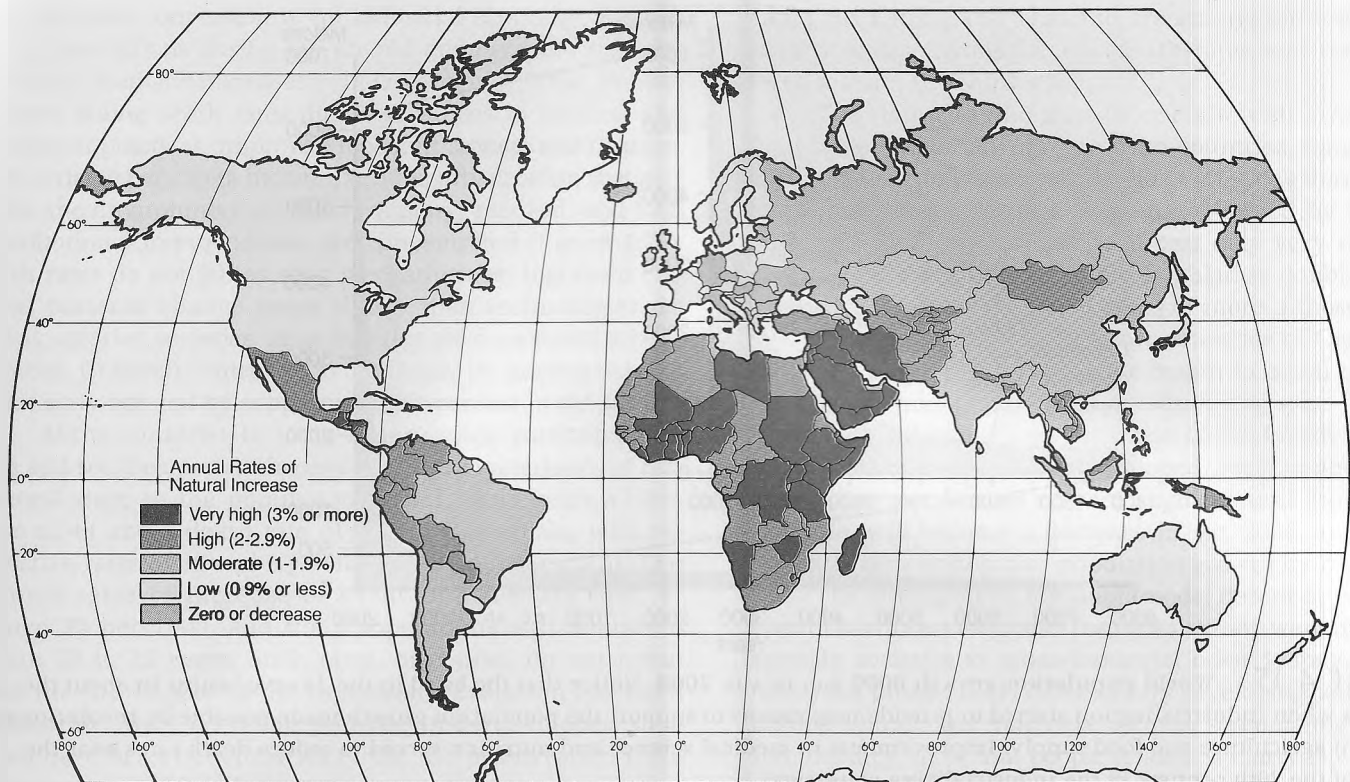


FIGURE 4.13 Annual rates of natural increase. The world's 1995 rate of natural increase (1.5%) would mean a doubling of population in 45 years. Many individual continents and countries, of course, deviate widely from the global average rate of growth and have vastly different doubling times. Africa as a whole has the highest rates of increase, followed by western Asia and Central and South America. Europe and North America are prominent among the low-growth areas, with such countries as Italy actually experiencing single year negative growth and showing doubling times measured in millennia.

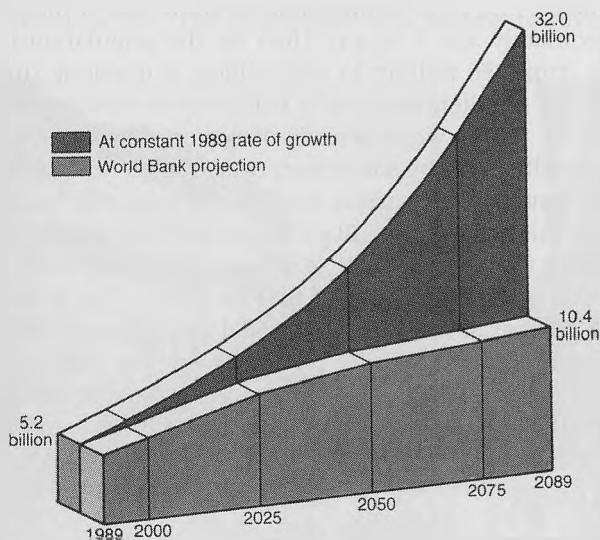


FIGURE 4.14 The "doubling time" calculation illustrates the long-range effect of growth rates on populations. It should never be used to suggest a prediction of future population size, for population growth reflects not just birth rates, but death rates, age structure, and migration. Demographers generally assume that high present growth rates will gradually be reduced. Therefore, if population does double, it will take longer to do so than is suggested by a "doubling time" based on the current rate.

folds, our paper would be more than ten billion light years across and span the known universe. Rounding the bend on the J-curve, which world population has done (Figure 4.15), poses problems and has implications for human occupancy of the earth of a vastly greater order of magnitude than ever faced before.

The Demographic Transition

The theoretical consequence of exponential population growth cannot be realized. Some form of braking mechanism must necessarily operate to control totally unregulated population growth. If voluntary population limitation is not undertaken, involuntary controls of an unpleasant nature may be set in motion.

One attempt to summarize an observed voluntary relationship between population growth and economic development is the **demographic transition** model. It traces the changing levels of human fertility and mortality presumably associated with industrialization and urbanization. Over time, the model assumes, high birth and death rates will gradually be replaced by low rates (Figure 4.16). The *first stage* of that replacement process—and of the demographic transition model—is characterized by high birth and high but fluctuating death rates.

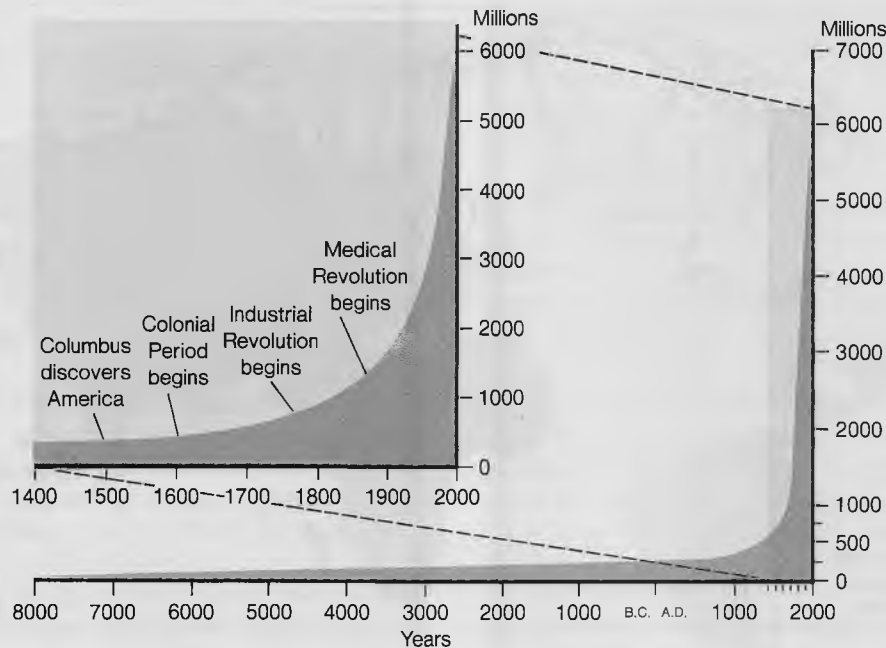


FIGURE 4.15 World population growth 8000 B.C. to A.D. 2000. Notice that the bend in the J-curve begins in about the mid-1700s when industrialization started to provide new means to support the population growth made possible by revolutionary changes in agriculture and food supply. Improvements in medical science and nutrition served to reduce death rates near the opening of the 20th century in the industrializing countries.

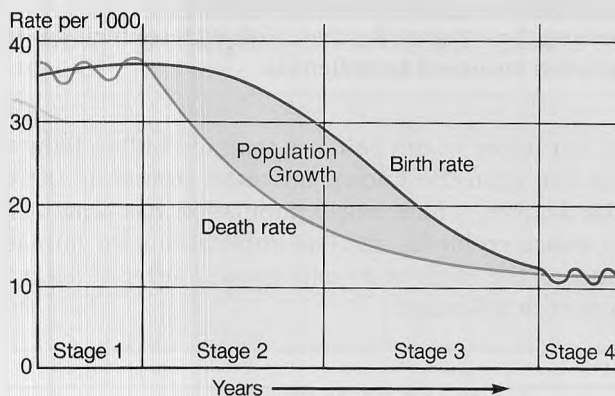


FIGURE 4.16 Stages in the demographic transition. During the first stage, birth and death rates are both high, and population grows slowly. When the death rate drops and the birth rate remains high, there is a rapid increase in numbers. During the third stage, birth rates decline and population growth is less rapid. The fourth stage is marked by low birth and death rates and, consequently, by a low rate of natural increase or even by decrease if death rates should exceed those of births. Indeed, the negative growth rates of, particularly, Eastern European countries and Russia have suggested to some that a fifth state of population decline is—at least regionally—a logical extension of the transition model.

As long as births only slightly exceed deaths, even when the rates of both are high, the population will grow only slowly. This was the case for most of human history until about A.D. 1750. Demographers think that it took from approximately A.D. 1 to A.D. 1650 for the population to increase from 250 million to 500 million, a doubling time of more than a millennium and a half. Growth was not steady, of course. There were periods of regional expansion that were usually offset by sometimes catastrophic decline. Wars, famine, and other disasters took heavy tolls. For example, the bubonic plague (the Black Death), which swept across Europe in the 14th century, is estimated to have killed over one-third of the population of that continent. The first stage of the demographic transition model is no longer found in any country. In the middle 1990s, the highest death rates—found in a few African and Asian countries—were in the low 20s per 1000; but the birth rates in some of those same countries were even higher, near or above 50 per 1000.

The Western Experience

The demographic transition model was developed to explain the population history of Western Europe. That area entered a *second stage* with the industrialization that began about 1750. Its effects—declining death rates accompanied by continuing high birth rates—have been dispersed worldwide even with-

out universal conversion to an industrial economy. Rapidly rising populations during the second demographic stage result from dramatic increases in life expectancy. That, in turn, reflects falling death rates due to advances in medical and sanitation practices, improved foodstuff storage and distribution, a rising per capita income, and the urbanization that provides the environment in which sanitary, medical, and food distributional improvements are concentrated (Figure 4.17). Birth rates do not fall as soon as death rates; ingrained cultural patterns change more slowly than technologies. In many agrarian societies, large families are considered advantageous. Children contribute to the family by starting to work at an early age and by supporting their parents in old age.

Many countries in Latin America and parts of southern and southeastern Asia display the characteristics of this second stage in the population model. Syria, with a birth rate of 44 and a death rate of 6, and Guatemala, with respective rates of 36 and 7 (1996 estimates), are typical. The annual rates of increase of such countries are near or above 30 per 1000, and their populations will double in about 20 to 25 years. Such rates, of course, do not mean that the full impact of the Industrial Revolution has been worldwide; they do mean that the underdeveloped societies have been beneficiaries of the life preservation techniques associated with it.

The *third stage* follows when birth rates decline as people begin to control family size. The advantages that having many children bring in an agrarian society are not so evident in urbanized, industrialized cultures. In fact, such cultures may view children as economic liabilities rather than assets. When the birth rate falls and the death rate remains low, the population size begins to level off.



FIGURE 4.17 Vienna, Austria, in the 1870s. A modernizing Europe experienced improved living conditions and declining death rates during the 19th century.

Chile, Sri Lanka, and Thailand are among the many countries now displaying the low death rates and transitional birth rates of the third stage.

The demographic transition ends with a *fourth* and final stage. Essentially all European countries, Canada, Australia, and Japan are among the 40 or so states that have entered this phase. Because it is characterized by very low birth and death rates, it yields at best only very slight percentage increases in population. Population doubling times may be as long as a thousand years or more if those present low birth rates continue. In a few countries of Central and Eastern Europe death rates have begun to equal or exceed birth rates, and populations are declining (see "Europe's Population Dilemma"), an extension of the fourth stage into a fifth so far confined to the developed world in general, not just to Europe. Japan's current slight natural increase, for example, will become a decrease in A.D. 2006, and Taiwan forecasts zero or negative population growth by 2035.

The demographic transition model describes the experience of northwest European countries as they went from rural-agrarian societies to urban-industrial ones. It may not fully reflect the prospects of contemporary developing countries. In Europe, church and municipal records, some dating from the 16th century, show that people tended to marry late or not at all. In England before the Industrial Revolution as many as half of all women in the 15–50 age cohort were unmarried. Infant mortality was high, life expectancy low. With the coming of industrialization in the 18th and 19th centuries, immediate factory wages instead of long apprenticeship programs permitted earlier marriage and more children. Since improvements in sanitation and health came only slowly, death rates remained high. Around 1800, 25% of Swedish infants died before their first birthday. Population growth rates remained below 1% per year in France throughout the 19th century.

Beginning about 1860, first death rates and then birth rates began their significant, though gradual, decline. This "mortality revolution" came first, as an *epidemiologic transition* echoed the demographic transition with which it is associated. Many formerly fatal epidemic diseases became endemic, that is, essentially continual within a population. As people developed partial immunities, mortalities associated with them declined. Improvements in animal husbandry, crop rotation and other agricultural practices, and new foodstuffs (the potato was an early example) from overseas colonies raised the level of health of the European population in general.

At the same time, sewage systems and sanitary water supplies became common in larger cities, and general levels of hygiene improved everywhere (Figure 4.18). Deaths due to infectious, parasitic, and respiratory diseases and to malnutrition declined, while those related to chronic illnesses associated with a maturing and aging population increased. Western Europe passed from a first-stage "Age of Pestilence and Famine" to an ultimate "Age of Degenerative and Human-Origin Diseases." However, recent increases in

EUROPE'S POPULATION DILEMMA

Although international dismay may be expressed over rising world populations, some European states are facing an opposite domestic concern. Europe's population is older than that of any other continent, and for many of its countries, population is stagnating or declining. The fertility rates (TFRs) of 37 of the continent's 40 states in 1996 were below the replacement level—the level of fertility at which populations replace themselves—of 2.1. None of the larger countries are at present replacing their population through natural increase. With 1996 fertility rates of 1.2 to 1.3 Germany, Italy, Slovenia, and Spain stand at the bottom of the international reproduction scale. Not surprisingly, Western Europe also has the oldest population in the world, with a small proportion of young and a large share of middle-aged and retired persons in its population pyramid. Indeed, almost all of Europe has the same problem of declining population growth, reduced work-age cohorts, and an aging citizenry. The continent's population could begin to decline in the 1990s, barring a dra-

matic increase in birth rates or massive Asian and African in-migration. By the early 21st century, Europe will have more older than younger people and its population "pyramid" will be inverted.

Spatially, Europe's remaining fertility is peripheral. Catholic Ireland in the west has a fertility rate at or a little above the replacement level, as do Lutheran Iceland in the far west and Sweden in the north. In the southeast, Muslim Albania shows high reproduction rates and is far above the replacement fertility point. The former communist states of Eastern Europe, which before 1989 generally had pro-natal policies and relatively high birth rates by Western European standards, have experienced sharp decreases in their reproduction rates since their liberation. Between 1989 and mid-1993, birth rates in eastern Germany dropped by more than 60%. In the same period, the birth rate fell more than 20% in Poland, around 25% in Bulgaria, over 30% in Estonia and Romania, and 35% in Russia. By 1991, deaths exceeded births in most areas of Eastern Europe, bringing its population trends in line with the West's. "In demographic terms," France's prime minister remarked, "Europe is vanishing."

The national social and economic consequences of population stability or reduction are not always perceived by those who advocate **zero population growth**, a condition achieved when births plus immigration equal deaths plus emigration. An exact equation of births and deaths means an increasing proportion of older citizens, fewer young people, and a rise in the median age of the population. Actual population decline, now the common European condition, exaggerates those consequences. Already, schools are closing and universities cut back in the face of permanently reduced demand. Governments will have to provide pensions and social services for the one-quarter of their citizens older than 60 and pay for them by taxes on a diminishing workforce. Germany in 1991 had 4 pensioners for every 10 workers; by 2030, the numbers will be equal. Unless European birth rates rise dramatically, or the massive immigration of the early 1990s continues, the continent's "old-age dependency ratio" will double by 2040. Once a population starts to age it is difficult to reverse the trend.



FIGURE 4.18 Pure piped water replacing individual or neighborhood wells, and sewers and waste treatment plants instead of privies, became increasingly common in urban Europe and North America during the 19th century. Their modern successors, such as the Windsor, Ontario, treatment plant shown here, helped complete the *epidemiologic transition* in developed countries.

drug- and antibiotic-resistant diseases, pesticide resistance of disease-carrying insects, and such new scourges of both the less developed and more developed countries as AIDS (acquired immune deficiency syndrome) cast doubt on the finality of that "ultimate" stage.

Malaria and tuberculosis have staged comebacks in resistant forms, and the World Health Organization estimates that there will be worldwide perhaps a million deaths a year from AIDS, with the greatest impact in Africa. Even these old and new scourges are unlikely to have serious long-term demographic consequences. The United Nations, for example, has estimated that in a hypothetical worst case—that is if all of Africa were affected by AIDS on the same scale as its worst known affected areas—Africa's population growth rate would still be about 1.8% at the end of the century. On a global scale, reproduction rates seem certain to outpace disease mortality rates.

In Europe, the striking reduction in death rates was echoed by similar declines in birth rates as societies began to alter their traditional concepts of ideal family size. In cities, child labor laws and mandatory schooling meant that children became a burden, not a contribution, to family economies. As "poor-relief" legislation and other forms of public welfare substituted for family support structures, the insurance value of children declined. Family consumption patterns altered as the Industrial Revolution made more widely available goods that served consumption desires, not just basic living needs. Children hindered rather than aided the achievement of the age's promise of social mobility and life-style improvement. Perhaps most important, and by some measures preceding and independent of the implications of the Industrial Revolution, were changes in the status of women and in their spreading conviction that control over childbearing was within their power and to their benefit.

A World Divided

The demographic transition model described the presumed inevitable course of population events from the high birth and death rates of premodern (underdeveloped) societies to the low and stable rates of advanced (developed) countries. The model failed to anticipate, however, that by the 1990s many developing societies would seemingly be locked in the second stage of the model, unable to realize the economic gains and social changes necessary to progress to the third stage of falling birth rates. The population history of Europe was apparently not inevitably or fully applicable to all developing countries of the middle and late 20th century.

The introduction of Western technologies of medicine and public health including antibiotics, insecticides, sanitation, immunization, infant and child health care, and eradication of smallpox, quickly and dramatically lowered the death rates in developing countries. Such imported technologies and treatments accomplished in a few years what it took Europe 50 or 100 years to experience. Sri Lanka, for example, sprayed extensively with DDT to combat malaria; life expectancy

jumped from 44 years in 1946 to 60 only 8 years later. With similar public health programs, India also experienced a steady reduction in its death rate after 1947. Simultaneously, with international sponsorship, food aid cut the death toll of developing states during drought and other disasters. The dramatic decline in mortality, which emerged only gradually throughout the European world but occurred so rapidly in contemporary developing countries, has been the most fundamental demographic change in human history.

Corresponding reductions in birth rates have been harder to achieve and depend less on supplied technology and assistance than they do on social acceptance of the idea of fewer children and smaller families (Figure 4.19). The consequence is a world polarized demographically. Roughly one-quarter of the world's countries—voluntarily or through national plan—have limited their rates of natural increase to about 0.8% annually. The other three-quarters are growing, on average, at triple that rate. In both instances, the established pattern tends to become self-reinforcing. Low growth permits the expansion of personal income and accumulation of capital that enhance the quality and security of life and make large families less attractive or essential.

When the population doubles each generation, as it must at the fertility rates of the highest-growth portion of the divided world, a different reinforcing mechanism operates. Population growth consumes in social services and assistance the investment capital that might promote economic expansion. Increasing populations place ever greater demands on limited soil, forest, water, grassland, and cropland resources. Those pressures may, through human-induced deforestation and desertification, for example, consume the environmental base itself. Productivity declines and population-supporting capacities are so diminished as to make difficult or impossible the economic progress upon which the demographic transition depends, an apparent equation of increasing international concern (see "The Cairo Plan").

The Demographic Equation

Births and deaths among a region's population—natural increases or decreases—tell only part of the story of population change. Migration involves the long-distance movement of people from one residential location to another. When that relocation occurs across political boundaries, it affects the population structure of both the origin and destination jurisdictions. The **demographic equation** summarizes the contribution made to regional population change over time by the combination of *natural change* (difference between births and deaths) and *net migration* (difference between in-migration and out-migration). On a global scale, of course, all population change is accounted for by natural change. The impact of migration on the demographic equation increases as the population size of the areal unit studied decreases.

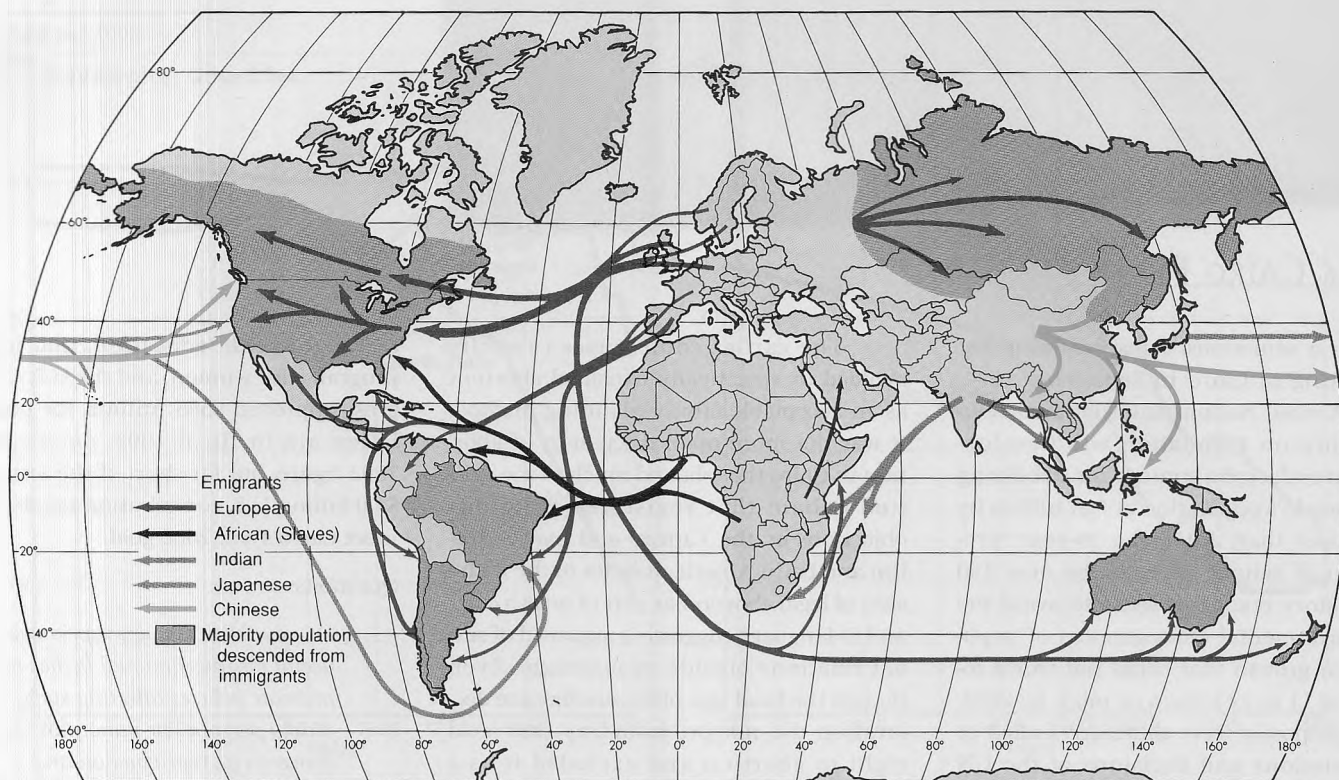


FIGURE 4.20 Principal migrations of recent centuries. The arrows suggest the major free and forced international population movements since about 1700. The shaded areas on the map are regions whose present population is more than 50% descended from the immigrants of recent centuries.

TABLE 4.5 Percentage of Natural Population Increase that Permanently Emigrated

PERIOD	EUROPE	ASIA ^A	AFRICA	LATIN AMERICA ^A
1851-1880	11.7	0.4	B	0.3
1881-1910	19.5	0.3	B	0.9
1911-1940	14.4	0.1	B	1.8
1940-1960	2.7 ^C	0.1	B	1.0
1960-1970	5.2	0.2	0.1	1.0
1970-1980	4.0	0.5	0.3	2.5

^AThe periods from 1850 to 1960 report emigration only to the United States.

^BLess than 0.1 percent

^CEmigration only to the United States.

Source: World Bank, *World Development Report 1984*, p. 69. Note: Numbers are calculated from data on gross immigration in Australia, Canada, New Zealand, and the United States.

It perhaps will have suffered distortion in its young adult sex ratios, and it certainly will have recorded a statistical aging of its population. The receiving society will likely experience increases in births associated with the youthful newcomers and, in general, have its average age reduced. As we shall see in Chapter 6, a more profound effect of immigration on receiving societies may be a partial or substantial modification of their existing ethnic mix as newcomers from different racial, religious, and national backgrounds alter the established cultural structure.

World Population Distribution

The millions and billions of people of our discussion are not uniformly distributed over the earth. The most striking feature of the world population distribution map (Figure 4.21) is the very unevenness of the pattern. Some land areas are nearly uninhabited, others are sparsely settled, and still others contain dense agglomerations of people. More than half of the world's people are found—unevenly concentrated, to

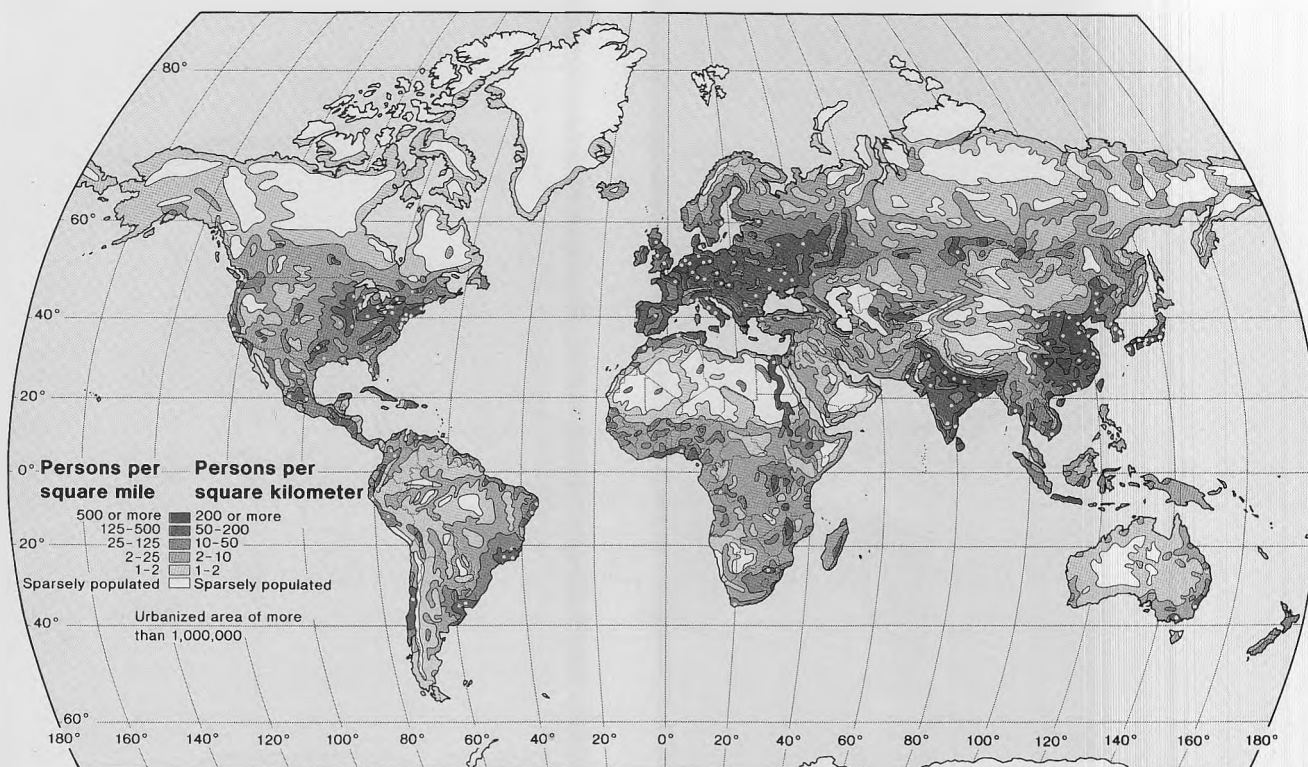


FIGURE 4.21 World population density.

be sure—in rural areas. More than 40% are urbanites, however, and a constantly growing proportion are residents of very large cities of 1 million or more.

Earth regions of apparently very similar physical makeup show quite different population numbers and densities, perhaps the result of differently timed settlement or of settlement by different cultural groups. Had North America been settled by Chinese instead of Europeans, for example, it is likely that its western sections would be far more densely settled than they now are. Northern and Western Europe, inhabited thousands of years before North America, contain more people than the United States on 70% less land.

We can draw certain generalizing conclusions from the uneven but far from irrational distribution of population shown in Figure 4.21. First, almost 90% of all people live north of the equator and two-thirds of the total dwell in the midlatitudes between 20° and 60° North (Figure 4.22). Second, a large majority of the world's inhabitants occupy only a small part of its land surface. Over half the people live on about 5% of the land, two-thirds on 10%, and almost nine-tenths on less than 20%. Third, people congregate in lowland areas; their numbers decrease sharply with increases in elevation. Temperature, length of growing season, slope and erosion problems, even oxygen reductions at very high altitudes, all appear to limit the habitability of higher elevations. One estimate is that between 50% and 60% of all people live below 200 meters (650 feet), a zone containing less than 30% of total land area. Nearly 80% reside below 500 meters (1650 feet).

Fourth, although low-lying areas are preferred settlement locations, not all such areas are equally favored. Continental margins have attracted densest settlement. About two-thirds of world population is concentrated within 500 kilometers (300 miles) of the ocean, much of it on alluvial lowlands and river valleys. Latitude, aridity, and elevation, however, limit the attractiveness of many seafront locations. Low temperatures and infertile soils of the extensive Arctic coastal lowlands of the Northern Hemisphere have restricted settlement there. Mountainous or desert coasts are sparsely occupied at any latitude, and some tropical lowlands and river valleys that are marshy, forested, and disease infested are unevenly settled.

Within the sections of the world generally conducive to settlement, four areas contain great clusters of population: East Asia, South Asia, Europe, and northeastern United States/southeastern Canada. The *East Asia* zone, which includes Japan, China, Taiwan, and South Korea, is areally the largest cluster. The four countries forming it contain 25% of all people on earth; China alone accounts for one in five of the world's inhabitants. The *South Asia* cluster is composed primarily of countries associated with the Indian subcontinent—Bangladesh, India, Pakistan, and the island state of Sri Lanka—though some might add to it the Southeast Asian countries of Cambodia, Myanmar, and Thailand. The four core countries alone account for another one-fifth, 21%, of the world's inhabitants. The South and the East Asian concentrations are thus home to nearly one-half of the world's people.



FIGURE 4.23 Terracing of hillsides is one device to extend a naturally limited productive area. The technique is effectively used here at the Malegcong rice terraces on densely settled Luzon Island of the Philippines.

Population Density

Margins of habitation could only be extended, of course, as humans learned to support themselves from the resources of new settlement areas. The numbers that could be sustained in old or new habitation zones were and are related to the resource potential of those areas and the cultural levels and technologies possessed by the occupying populations. The term **population density** expresses the relationship between number of inhabitants and the area they occupy.

Density figures are useful, if sometimes misleading, representations of regional variations of human distribution. The **crude density** or **arithmetic density** of population is the most common and least satisfying expression of that variation. It is the calculation of the number of people per unit area of land, usually within the boundaries of a political entity. It is an easily reckoned figure. All that is required is information on total population and total area, both commonly available for national or other political units. The figure can, however, be misleading and may obscure more of reality than it reveals. The calculation is an average, and a country may contain extensive regions that are only sparsely populated or largely undevelopable (Figure 4.24) along with intensively settled and developed districts. A national average density figure reveals nothing about either class of territory. In general, the larger the political unit for which crude or arithmetic population density is calculated, the less useful is the figure.

Various modifications may be made to refine density as a meaningful abstraction of distribution. Its descriptive precision is improved if the area in question can be subdivided into comparable regions or units. Thus it is more revealing to know that in the early 1990s New Jersey had a density of 405 and Wyoming of 2 persons per square kilometer (1050 and 5 per sq. mi.) of land area than to know only that the figure for the conterminous United States (48 states) was 34 per square kilometer (88 per sq. mi.). If large, sparsely populated Alaska is added, the U.S. density figure drops below 29 per square kilometer (74 per sq. mi.). The calculation may also be modified to provide density distinctions between classes of population—rural versus urban, for example. Rural densities in the United States rarely exceed 115 per square kilometer (300 per sq. mi.), while portions of major cities can have tens of thousands of people in equivalent space.

Another revealing refinement of crude density relates population not simply to total national territory but to that area of a country that is or may be cultivated, that is, to *arable* land. When total population is divided by arable land area alone, the resulting figure is the **physiological density** which is, in a sense, an expression of population pressure exerted on agricultural land. Table 4.6 makes evident that countries differ in physiological density and that the contrasts between crude and physiological densities of countries point up actual settlement pressures that are not revealed by arithmetic densities alone. But the calculation of physio-



FIGURE 4.24 Tundra vegetation and landscape, Ruby Range, Northwest Territories, Canada. Extensive areas of northern North America and Eurasia are part of the one-third or more of the world's land area considered as *noncumene*, sparsely populated portions of total national territory that affect calculations of arithmetic density.

TABLE 4.6 Comparative Densities for Selected Countries

COUNTRY	CRUDE DENSITY		PHYSIOLOGICAL DENSITY ^A	
	(MI ²)	(KM ²)	(MI ²)	(KM ²)
Argentina	32	12	246	95
Australia	6	2	98	38
Bangladesh	2320	896	3255	1257
Canada	8	3	163	63
China	331	128	3222	1244
Egypt	153	59	5912	2283
India	794	307	1393	538
Iran	97	37	1072	414
Japan	860	332	6918	2671
Nigeria	279	108	811	313
United Kingdom	636	246	2163	835
United States	74	29	355	137

^AIncludes arable land and land in permanent crops.

Sources: UN Food and Agriculture Organization (FAO), *Production Yearbook*, United States Department of Agriculture, *World Agriculture: Trends and Indicators*; and *World Population Data Sheet*, Population Reference Bureau.

logical density depends on uncertain definitions of arable and cultivated land, assumes that all arable land is equally productive and comparably used, and includes only one part of a country's resource base.

Overpopulation

It is an easy and common step from concepts of population density to assumptions about overpopulation or overcrowding. It is wise to remember that **overpopulation** is a value judgement reflecting an observation or conviction that an environment or territory is unable to support its present

population. (A related but opposite concept of *underpopulation* refers to the circumstance of too few people to develop the resources of a country or region sufficiently to improve the level of living of its inhabitants.)

Overpopulation is not the necessary and inevitable consequence of high density of population. Tiny Monaco, a principality in southern Europe about half the size of New York's Central Park, has a crude density of nearly 20,000 people per square kilometer (50,000 people per sq. mi.). Mongolia, a sizable state of 1,565,000 square kilometers (604,000 sq. mi.) between China and Siberian Russia, has 1.5

persons per square kilometer (4 per sq. mi.); Iran, only slightly larger, has 37 per square kilometer (96 per sq. mi.). Macao, an island possession of Portugal off the coast of China, has more than 26,000 persons per square kilometer (67,000 per sq. mi.); the Falkland Islands off the Atlantic coast of Argentina count at most 1 person for every 6.5 square kilometers (2.5 sq. mi.) of territory. No conclusions about conditions of life, levels of income, adequacy of food, or prospects for prosperity can be drawn from these density comparisons.

Overcrowding is a reflection not of numbers per unit area but of the **carrying capacity** of land—the number of people an area can support on a sustained basis given the prevailing technology. A region devoted to efficient, energy-intensive commercial agriculture that makes heavy use of irrigation, fertilizers, and biocides can support more people at a higher level of living than one engaged in the slash-and-burn agriculture described in Chapter 8. An industrial society that takes advantage of resources such as coal and iron ore and has access to imported food will not feel population pressure at the same density levels as a country with rudimentary technology.

Since carrying capacity is related to the level of economic development, maps such as Figure 4.21, displaying present patterns of population distribution and density, do not suggest a correlation with conditions of life. Many industrialized, urbanized countries have lower densities and higher levels of living than do less-developed ones. Densities in the United States, where there is a great deal of unused and unsettled land, are considerably lower than those in Bangladesh, where essentially all land is arable and which, with nearly 900 people per square kilometer (2300 per sq. mi.), is the most densely populated nonisland state in the world. At the same time, many African countries have low population densities and low levels of living, whereas Japan combines both high densities and wealth.

Overpopulation can be equated with levels of living or conditions of life that reflect a continuing imbalance between numbers of people and carrying capacity of the land. One measure of that imbalance might be the unavailability of food supplies sufficient in caloric content to meet individual daily energy requirements or so balanced as to satisfy normal nutritional needs. Unfortunately, dietary insufficiencies—with long-term adverse implications for life expectancy, physical vigor, and mental development—are most likely to be encountered in the developing countries, where much of the population is in the younger age cohorts (Figure 4.10).

If those developing countries simultaneously have rapidly increasing population numbers dependent on domestically produced foodstuffs, the prospects must be for continuing undernourishment and overpopulation. Much of sub-Saharan Africa finds itself in this circumstance. Africa's per capita food production decreased 25% between 1960 and 1990, and a further 30% drop is predicted over the following quarter century as the population-food gap widens (Figure 4.25). Egypt already must import more than half the food it

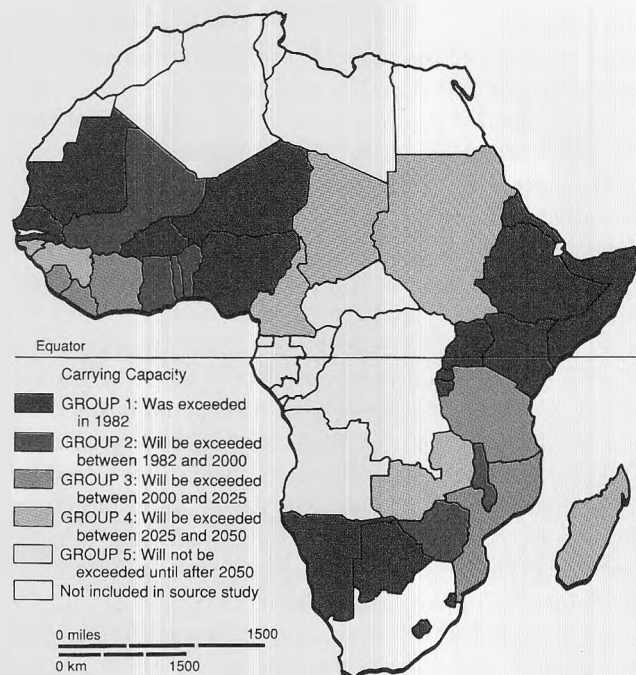


FIGURE 4.25 Carrying capacity and potentials in sub-Saharan Africa. The map assumes that (1) all cultivated land is used for growing food; (2) food imports are insignificant; (3) agriculture is conducted by low-technology methods.

consumes. Africa is not alone. The international Food and Agriculture Organization (FAO) projects that by A.D. 2000, no less than 65 separate countries with some 30% of the population of the developing world will be unable to feed their inhabitants from their own national territories at the low level of agricultural technology and inputs apt to be employed. Even rapidly industrializing China, an exporter of grain until 1994, has become a net grain importer; if its massive and growing population continues its new dependence on imported basic foodstuffs, world grain surpluses and food aid flows will be seriously affected.

In the contemporary world, insufficiency of domestic agricultural production to meet national caloric requirements cannot be considered a measure of overcrowding or poverty. Only a few countries are agriculturally self-sufficient. Japan, a leader among the advanced states, is the world's biggest food importer and supplies from its own production only 40% of the calories its population consumes. Its physiological density is high, as Table 4.6 indicates, but it obviously does not rely on an arable land resource for its present development. Largely lacking in either agricultural or industrial resources, it nonetheless ranks well on all indicators of national well-being and prosperity. For countries such as Japan, a sudden cessation of the international trade that permits the exchange of industrial products for imported food and raw materials would be disastrous. Domestic food production could not maintain the dietary levels now enjoyed by their populations and they, more starkly than many underdeveloped countries, would be "overpopulated."

Urbanization

Pressures on the land resource of countries are increased not just by their growing populations but by the reduction of arable land caused by such growth. More and more of world population increase must be accommodated not in rural areas but in cities that hold the promise of jobs and access to health, welfare, and other public services. As a result, the *urbanization* (transformation from rural to urban status) of population in developing countries is increasing dramatically. Since the 1950s, cities have grown faster than rural areas in nearly all developing states. Although Latin America, for example, has experienced substantial overall population increase, the size of its rural population is actually declining. Asian and African countries that were mostly rural in the mid-1990s will experience most of their future growth in cities. As recently as 1950 only two African cities (Johannesburg and Cairo) had reached the 1 million size; by 2025, it is estimated that the continent will have 36 cities of 4 million or more inhabitants and an average size of 9 million.

Largely because of population increases, the number and size of cities everywhere are growing. In 1950, less than 30% of the world's population lived in urban areas; by 1995 over 43% of a much larger total population were urban dwellers (Figures 4.26 and 11.2). Developing countries have spurred that change. By the mid-1990s, over one-third of their inhabitants were urban, and collectively the less devel-

oped areas contained nearly two-thirds of the world's city population. On UN projections, some 97% of all world population increase between 1990 and 2025 will be in urban areas.

The sheer growth of those cities in people and territory has increased pressures on arable land and adjusted upward both arithmetic and physiological densities. Urbanization consumes millions of hectares of cropland each year. In Egypt, for example, urban expansion and development between 1965 and 1985 took out of production as much fertile soil as the Aswan dam made newly available through irrigation with the water it impounds. By themselves, some of these cities, which are surrounded by concentrations of people living in uncontrolled settlements, slums, and shantytowns (Figure 11.40), are among the most densely populated areas in the world. They face massive problems in trying to provide housing, jobs, education, and adequate health and social services for their residents. These and other matters of urban geography are the topics of Chapter 11.

Population Data and Projections

Population geographers, demographers, planners, governmental officials, and a host of others rely on detailed population data to make their assessments of present national and world population patterns and to estimate future conditions.

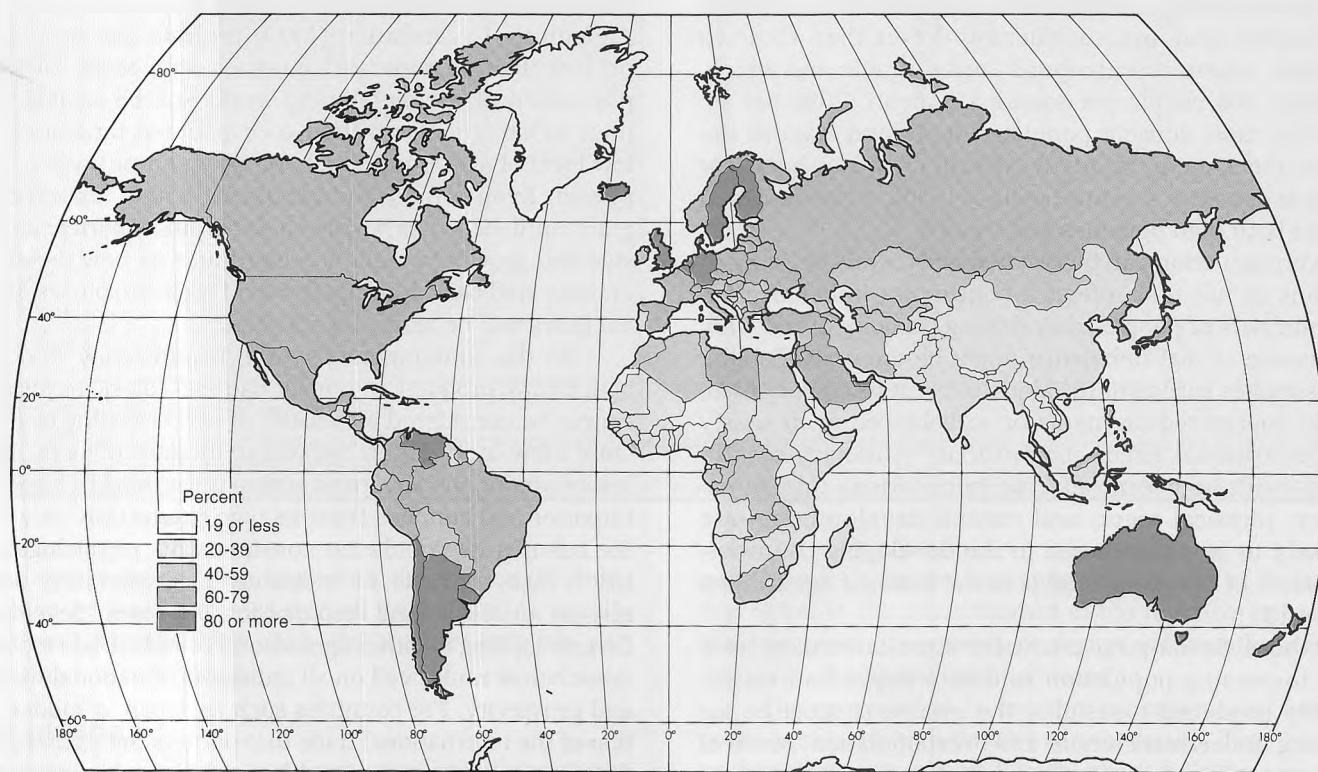


FIGURE 4.26 Percentage of national population classified as urban. Urbanization has been particularly rapid in the developing continents. In 1950, only 17% of Asians and 15% of Africans were urban; by the middle 1990s, over 30% of both Asians and Africans were city dwellers.



FIGURE 4.27 Taking the census in rural China in 1982. The sign identifies the "Third National Census. Mobile Registration Station." A new Fourth Population Census, requiring 7 million census workers to conduct, was undertaken on July 1, 1990.

Birth rates and death rates, rates of fertility and of natural increase, age and sex composition of the population, and other items are all necessary ingredients for their work.

Population Data

The data that students of population employ come primarily from the United Nations Statistical Office, the World Bank, the Population Reference Bureau, and ultimately, from national censuses and sample surveys. Unfortunately, the data as reported may on occasion be more misleading than informative. For much of the developing world, a national census is a massive undertaking. Isolation and poor transportation, insufficiency of funds and trained census personnel, high rates of illiteracy limiting the type of questions that can be asked, and populations suspicious of all things governmental serve to restrict the frequency, coverage, and accuracy of population reports.

However derived, detailed data are published by the major reporting agencies for all national units even when those figures are poorly based on fact or are essentially fictitious. For years, data on the total population, birth and death rates, and other vital statistics for Somalia were regularly reported and annually revised. The fact was, however, that Somalia had never had a census and had no system whatsoever for recording births. Seemingly precise data were regularly reported, as well, for Ethiopia. When that country had its first-ever census in 1985, at least one data source had to drop its estimate of the country's birth rate by 15% and in-

crease its figure for Ethiopia's total population by more than 20%. And a disputed 1992 census of Nigeria officially reported a population of 88.5 million, still the largest in Africa but far below the generally accepted and widely cited estimates of between 110 and 120 million Nigerians.

Fortunately, census coverage on a world basis is improving. Almost every country has now had at least one census of its population, and most have been subjected to periodic sample surveys (Figure 4.27). However, only about 10% of the developing world's population live in countries with anything approaching complete systems for registering births and deaths. Estimates are that 40% or less of live births in Indonesia, Pakistan, India, or the Philippines are officially recorded. Apparently, deaths are even less completely reported than births throughout Asia. And whatever the deficiencies of Asian states, African statistics are still less complete and reliable. It is, of course, on just these basic birth and death data that projections about population growth and composition are founded.

Even the age structure reported for national populations, so essential in many areas of population analysis, must be viewed with suspicion. In many societies, birthdays are not noted, nor are years recorded by the Western calendar. Non-Western ways of counting age also confuse the record. The Chinese, for example, consider a person to be 1 year old at birth and increase that age by 1 year each [Chinese] New Year's Day. Bias and error arise from the common tendency of people after middle age to report their ages

Population Controls

All population projections include an assumption that at some point in time population growth will cease and plateau at the replacement level. Without that assumption, future numbers become unthinkable large. For the world at unchecked present growth rates, there would be 1 trillion people three centuries from now, 4 trillion four centuries in the future, and so on. Although there is reasonable debate about whether the world is now overpopulated and about what either its optimum or maximum sustainable population should be, totals in the trillions are beyond any reasonable expectation.

Population pressures do not come from the amount of space humans occupy. It has been calculated, for example, that the entire human race could easily be accommodated within the boundaries of the state of Delaware. The problems stem from the food, energy, and other resources necessary to support the population and from the impact on the environment of the increasing demands and the technologies required to meet them. Rates of growth currently prevailing in many countries make it nearly impossible for them to achieve the kind of social and economic development they would like.

Clearly, at some point population will have to stop increasing as fast as it has been. That is, either the self-induced limitations on expansion implicit in the demographic transition will be adopted or an equilibrium between population and resources will be established in more dramatic fashion. Recognition of this eventuality is not new. "[The evils of] pestilence, and famine, and wars, and earthquakes have to be regarded as a remedy for nations, as the means of pruning the luxuriance of the human race," was the opinion of the theologian Tertullian during the 2d century A.D.

Thomas Robert **Malthus** (1766–1834), an English economist and demographer, put the problem succinctly in a treatise published in 1798: All biological populations have a potential for increase that exceeds the actual rate of increase, and the resources for the support of increase are limited. In later publications, Malthus amplified his thesis by noting the following:

1. Population is inevitably limited by the means of subsistence.
2. Populations invariably increase with increase in the means of subsistence unless prevented by powerful checks.
3. The checks that inhibit the reproductive capacity of populations and keep it in balance with means of subsistence are either "private" (moral restraint, celibacy, and chastity) or "destructive" (war, poverty, pestilence, and famine).

The deadly consequences of Malthus's dictum that unchecked population increases geometrically while food production can increase only arithmetically have been reported throughout human history, as they are today. Starva-

tion, the ultimate expression of resource depletion, is no stranger to the past or present. By conservative estimate, some 70 people worldwide will starve to death during the 2 minutes it takes you to read this page; half will be children under 5. They will, of course, be more than replaced numerically by new births during the same 2 minutes. Losses are always recouped. All battlefield casualties, perhaps 50 million, in all of humankind's wars over the last 300 years equal less than a 7-month replacement period at present rates of natural increase.

Yet, inevitably—following the logic of Malthus, the apparent evidence of history, and our observations of animal populations—equilibrium must be achieved between numbers and support resources. When overpopulation of any species occurs, a population dieback is inevitable. The madly ascending leg of the J-curve is bent to the horizontal, and the J-curve is converted to an S-curve. It has happened before in human history, as Figure 4.28 summarizes. The top of the **S-curve** represents a population size consistent with and supportable by the exploitable resource base. When the population is equivalent to the carrying capacity of the occupied area, it is said to have reached a **homeostatic plateau**.

In animals, overcrowding and environmental stress apparently release an automatic physiological suppressant of fertility. Although famine and chronic malnutrition may reduce fertility in humans, population limitation usually must be either forced or self-imposed. The demographic transition to low birth rates matching reduced death rates is cited as evidence that Malthus's first assumption was wrong: Human populations do not inevitably grow geometrically. Fertility behavior is conditioned by social determinants, not solely by biological or resource imperatives.

Although Malthus's ideas were discarded as deficient by the end of the 19th century in light of the European population experience, the concerns he expressed were revived during the 1950s. Observations of population growth in underdeveloped countries and the strain that growth placed on their resources inspired the viewpoint that improvements in living standards could be achieved only by raising investment per worker. Rapid population growth was seen

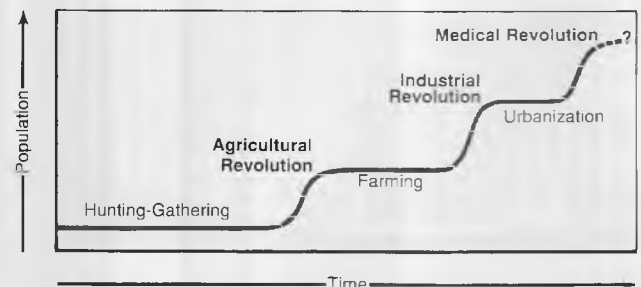


FIGURE 4.28 The steadily higher *homeostatic plateaus* (states of equilibrium) achieved by humans are evidence of their ability to increase the carrying capacity of the land through technological advance. Each new plateau represents the conversion of the J-curve into an S-curve.

Neo-Malthusianism has had a mixed reception. Asian countries, led by China and India, have in general—though with differing successes—adopted family planning programs and policies. In some instances, success has been declared complete. Singapore established its Population and Family Planning Board in 1965, when its fertility rate was 4.9 lifetime births per woman. By 1986, that rate had declined to 1.7, well below the 2.1 replacement level for developed countries, and the board was abolished as no longer necessary. Caribbean and South American countries, except the poorest and most agrarian, have also experienced declining fertility rates, though often these reductions have been achieved despite pronatalist views of governments influenced by the Roman Catholic church. Africa and the Middle East have generally been less responsive to the neo-Malthusian arguments because of ingrained cultural convictions among people, if not in all governmental circles, that large families—6 or 7 children—are desirable. Although total fertility rates have begun to decline in several sub-Saharan African states, they still remain nearly everywhere far above replacement levels. Islamic fundamentalism opposed to birth restrictions also is a cultural factor in the Near East and North Africa.

A third view, modifying cornucopian optimism, admits that products of human ingenuity such as the Green Revolution (see page 266) increase in food production have managed to keep pace with rapid population increases since 1970. But its advocates argue that scientific and technical ingenuity to enhance food production does not automatically appear; both complacency and inadequate research support have hindered continuing progress in recent years. And even if further advances are made, they observe, not all countries or regions have the social and political will or capacity to take advantage of them. Those that do not, third view advocates warn, will fail to keep pace with the needs of their populace and will sink into varying degrees of poverty and environmental decay, creating national and regional—though not necessarily global—crises.

Yet global crisis is exactly what is being predicted by some as the logical outcome of China's combination of expanding population and booming prosperity. Projecting from recent Chinese population trends, cropland and water scarcity, and increasing grain, dairy, and meat consumption, some worry that within 35 years China's demand for grain will so far exceed its own production capacity and place such massive demands on world grain supplies that global shortages and rocketing food costs will result. Ominously growing food scarcity, they fear, not military aggression may be the real threat to future world economic and political stability.

Regardless of population philosophies, theories, or cultural norms, the fact remains that in many parts of the world developing countries are showing significantly declining population growth rates. But reducing fertility levels even to the replacement level of 2.1 births per woman does not mean an immediate end to population growth. Because of the age



126

Eventually, of course, young populations grow older, and even the youthful developing countries are beginning to face the consequences of that reality. The problems of a rapidly aging population that already confront the industrialized economies are now being realized in the developing world as well. The growth rate of people aged 55 and over is three times as high in developing countries as in developed ones; in most, the rate is highest for those 75 and over. More than 1.2 million people worldwide reach the age of 55 each month; of that number, 80% live in developing countries that generally lack, health, income, and social service support systems adequate to the needs of their older citizens. To the social and economic implications of their present population momentum, therefore, developing countries must add the aging consequences of past patterns and rates of growth (Figure 4.30).

Summary

FIGURE 4.30 These senior citizens at exercise in Havana, Cuba, are part of the rapidly aging population of many developing countries. Worldwide, the over-60 cohort will number some 1.5 billion by 2030, some 16% of total population. But by 2020, a third of Singapore citizens will be 55 or older, and China will have as large a share of its population over 60—about one in four—as will Europe. Some developing countries will soon be aging faster than the developed West but without the old-age assistance and welfare programs advanced countries have put in place.

Although population control programs have been differentially introduced and promoted, the 5.7 billion humans present in the mid-1990s will likely nearly double in number by the year 2100. 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 population clusters, though smaller areas of great density are found in other re-

A respected geographer once commented that "population is the point of reference from which all other elements [of geography] are observed." Certainly, population geography is the essential starting point of the human component of the human-environment concerns of geography.

KEY WORDS

- physiological density 119
- population density 119
- population geography 96
- population projection 124
- population pyramid 104
- rate 98
- rate of natural increase 107
- replacement level 112
- S-curve 125
- total fertility rate 99
- zero population growth 112

FOR REVIEW

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 we tell about future population numbers from those shapes?
4. What variations do we discern in the spatial pattern of the *rate of natural increase* and, consequently, of population growth? What rate of natural increase would double population in 35 years?
5. How are population numbers projected from present conditions? Are projections the same as predictions? If not, in what ways do they differ?
6. Describe the stages in the *demographic transition*. Where has the final stage of the transition been achieved? Why do some analysts doubt the applicability of the demographic transition to all parts of the world?
7. Contrast *crude population density* and *physiological density*. For what differing purposes might each be useful? How is *carrying capacity* related to the concept of density?
8. What was Malthus's underlying assumption concerning the relationship between population growth and food supply? In what ways do the arguments of *neo-Malthusians* differ from the original doctrine? What governmental policies are implicit in *neo-Malthusianism*?
9. Why is *demographic momentum* a matter of interest in population projections? In which world areas are the implications of demographic momentum most serious in calculating population growth, stability, or decline?

SELECTED REFERENCES

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PATTERNS OF DIVERSITY AND UNITY

PART

11



Dressed for confirmation at a Chicago Ukrainian church, these girls show the close association of ethnicity and religion in the American mosaic.

Here, I slaughter a bull and I call [the Muslim] to share my meat. I say, "Let us share our meat." But he refuses the meat I slaughter because he says it is not slaughtered in a Muslim way. If he cannot accept the way I slaughter my meat, how can we be relatives? Why does he despise our food? So, let us eat our meat alone. . . . Why, they insult us, they combine contempt for our black skin with pride in their religion. As for us, we have our own ancestors and our own spirits; the spirits of the Rek, the spirits of the Twic, we have not combined our spirits with their spirits. The spirit of the black man is different. Our spirit has not combined with theirs.¹

¹The words of Chief Makuei Bilkuei of the Dinka, a Nilotic people of the southern Sudan. His comments are directed at the attempts to unite into a single people the Arabic Muslims of the north of the Republic of the Sudan with his and other black, Luo-speaking animist and Christian people of the country's southern areas. Recorded by Francis Mading Deng, *Africans of Two Worlds: The Dinka in Afro-Arab Sudan*. Copyright © 1978 Yale University Press, New Haven, CT. Reprinted by permission of the author.

SPENCER HIGH SCHOOL
YELLOW JACKETS
1991
CLASS "AA" FOOTBALL
STATE CHAMPIONS

WELCOME

ADVENT CHRISTIAN CHURCH
15 VILLE HOLLOW RD.

SPENCER
OF THE
AIRLINE
PARKERSBURG RD
& OAK DRIVE

CATHOLIC
CHURCH
Rt. 14 North
Mass 9:00a.m.
3 1/4 MI ON RT 33

First Baptist
Church
338 Main St.

CHURCH
OF CHRIST
RT 33 EAST
2 MILES

KINGDOM HALL
OF
Jehovah's
Witnesses
110 REYNOLDS ST.

PRESBYTERIAN
CHURCH
PARKERSBURG RD.
WELCOME

WOODMEN
OF THE WORLD
THE FAMILY FRATERNITY
PROTECTION - SERVICE
LODGE 300 MEETS
FOURTH MONDAY

ROTARY
INTERNATIONAL

WEST VIRGINIA CHAMBER OF COMMERCE
111
MEET VIRGINIA
CITY
1983

ST. JOHN'S
STRAIGHT AHEAD
— WELCOME —

PATTERNS OF DIVERSITY AND UNITY

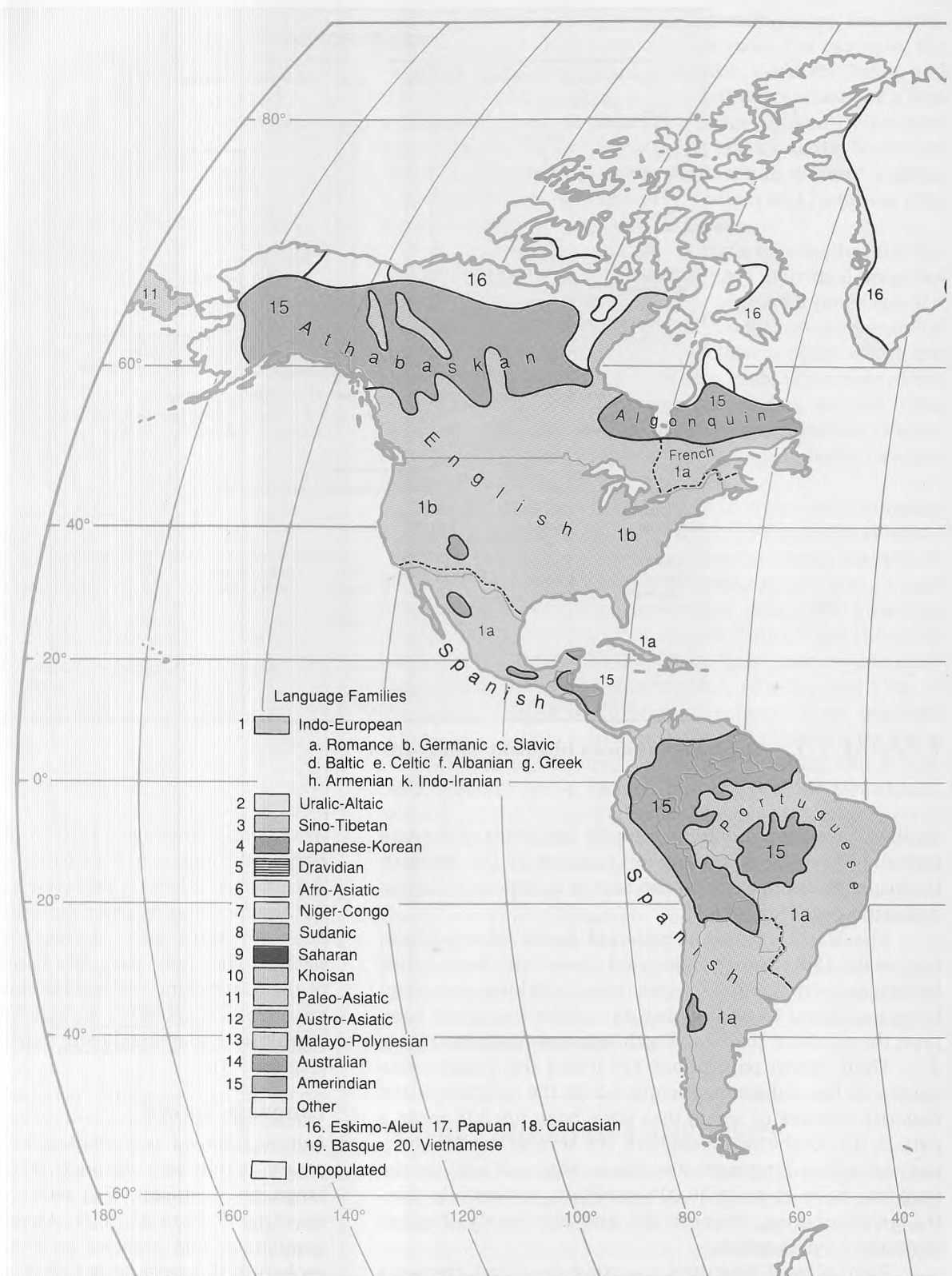


FIGURE 5.4 World language families. Language families are groups of individual tongues that had a common but remote ancestor. By suggesting that the area assigned to a language or language family uses that tongue exclusively, the map pattern conceals important linguistic detail. Many countries and regions have local languages spoken in territories too small to be recorded at this scale. The map also fails to report that the population in many regions is fluent in more than one language or that a second language serves as the necessary vehicle of commerce, education, or government. Nor is important information given about the number of speakers of different languages; the fact that there are more speakers of English in India or Africa than in Australia is not even hinted at by a map at this scale.

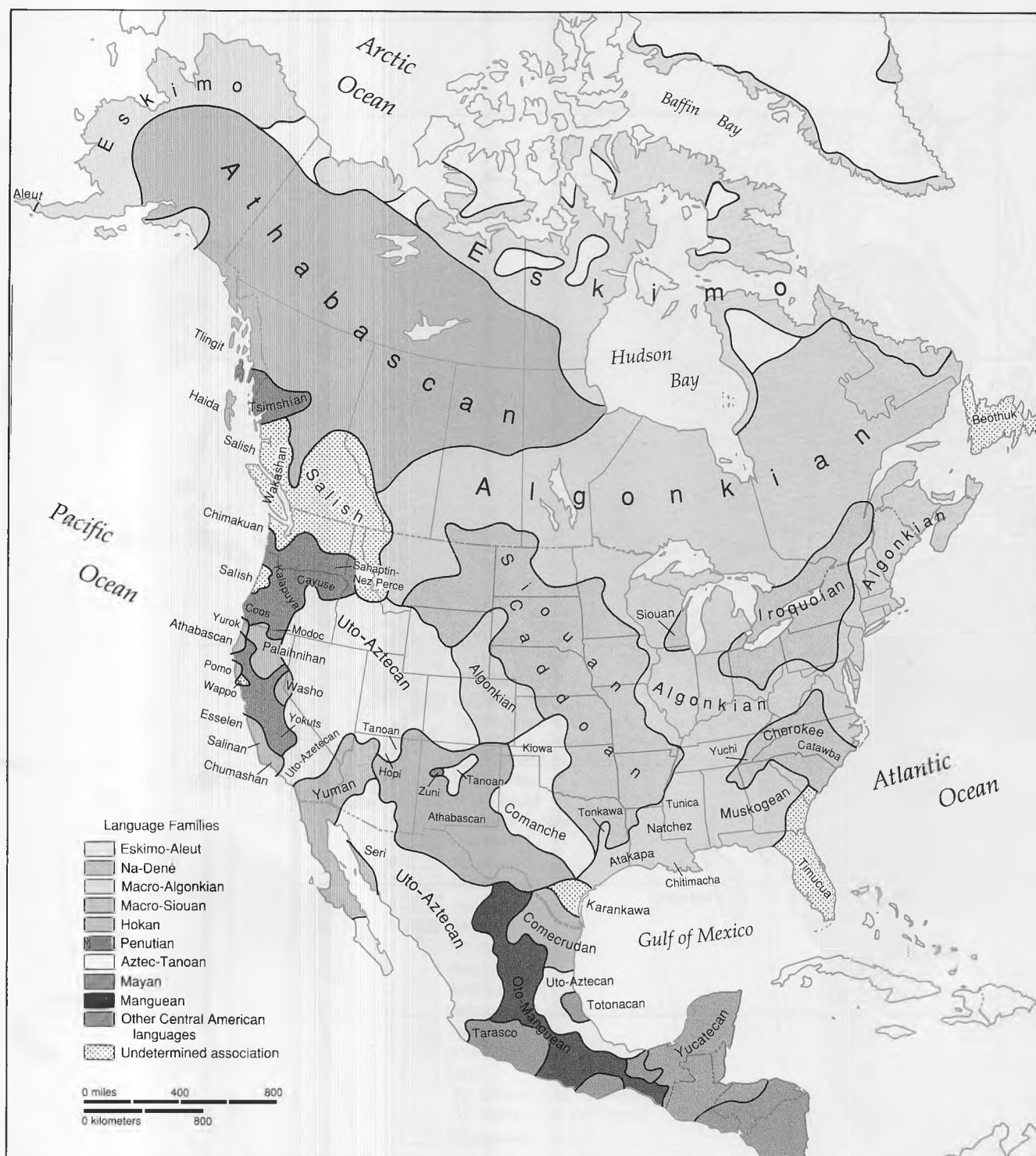


FIGURE 5.5 Amerindian language families of North America. As many as 300 different North American and more than 70 Meso-American tongues were spoken at the time of first European contact. The map summarizes the traditional view that these were grouped into 9 or 10 language families in North America, as many as 5 in Meso-America, and another 10 or so in South America. More recent research, however, suggests close genetic relationships between Native American tongues, clustering them into just 3 families: Eskimo-Aleut in the extreme north and Greenland; Na-Dené in Canada and the U.S. Southwest, and Amerind elsewhere in the hemisphere. Because each family has closer affinities with Asian language groups than with one another, it is suggested that each corresponds to a separate wave of Asian migration to the Americas: the first giving rise to the Amerind family, the second to the Na-Dené, and the last to the Eskimo-Aleut. Many Amerindian tongues have become extinct; others are still known only to very small groups of mostly elderly speakers.

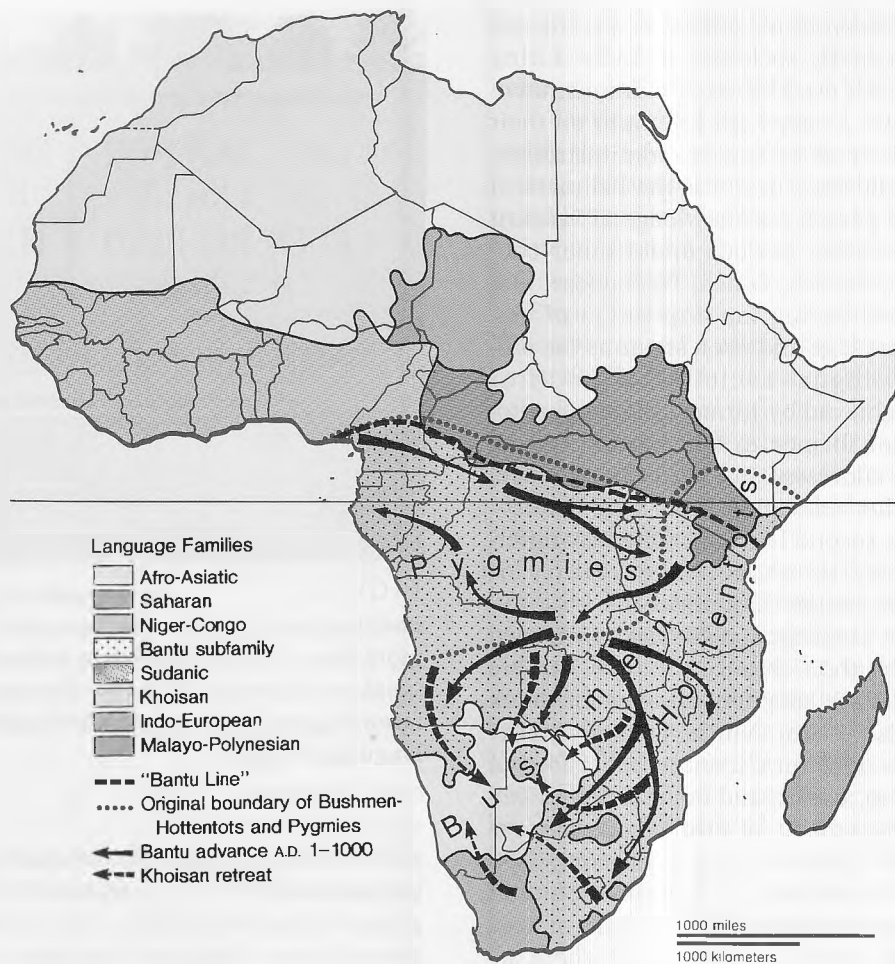


FIGURE 5.6 Bantu advance, Khoisan retreat in Africa. Linguistic evidence suggests that proto-Bantu speakers originated in the region of the Cameroon-Nigeria border, spread eastward across the southern Sudan, then turned southward to Central Africa. From there they dispersed slowly eastward, westward, and against slight resistance, southward. The earlier Khoisan-speaking occupants of sub-Saharan Africa were no match against the advancing metal-using Bantu agriculturalists. Pygmies, adopting a Bantu tongue, retreated deep into the forests; Bushmen and Hottentots retained their distinctive Khoisan “click” language but were forced out of forests and grasslands into the dry steppes and deserts of the southwest.

Latin, however, replaced earlier Celtic languages in western Europe not by force of numbers—Roman legionnaires, administrators, and settlers never represented a majority population—but by the gradual abandonment of their former languages by native populations brought under the influence and control of the Roman Empire. Adoption rather than eviction of language was the rule followed in perhaps the majority of historical and contemporary instances of language spread. Knowledge and use of the language of a dominating culture may be seen as a necessity when that language is the medium of commerce, law, civilization, and personal prestige. It was on that basis, not through numerical superiority, that Indo-European tongues were dispersed throughout Europe and to distant India, Iran, and Armenia. Likewise, Arabic became widespread in western Asia and North Africa not through massive population relocations but through conquest, religious conversion, and

superiority of culture. That is, languages may spread because they acquire new speakers.

Either form of language spread—dispersion of speakers or acquisition of speakers—represents one of the *spatial diffusion* processes introduced in Chapter 2. Massive population relocation in which culture is transported to and made dominant in a new territory is a specialized example of *relocation diffusion*. When the advantages of a new language are discerned and it is adopted by native speakers of another tongue, a form of *expansion diffusion* has occurred along with partial or total *acculturation* of the adopting population. Usually, those who are in or aspire to positions of importance are the first to adopt the new language of control and prestige. Later, through schooling, daily contact, and business or social necessity, other, lower social strata of society may gradually be absorbed into the expanding pool of language adopters.

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Migration, segregation, and isolation give rise to separate, mutually unintelligible languages because the society speaking the parent protolanguage no longer remains unitary. Comparable changes occur normally and naturally within a single language in word meaning, pronunciation, vocabulary, and *syntax* (the way words are put together in phrases and sentences). Because they are gradual, minor, and made

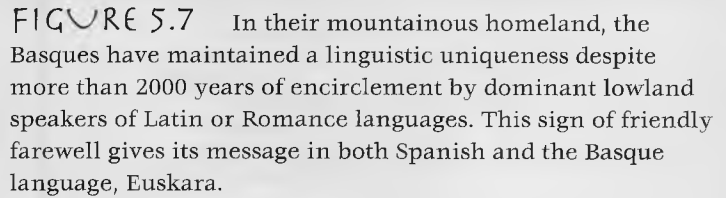
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FIGURE 5.9 International English. In worldwide diffusion and acceptance, English has no past or present rivals. Along with French, it is one of the two working languages of the United Nations, and some two-thirds of all scientific papers are published in it. English is the sole or joint official language of more nations and territories, some too small to be shown here, than any other tongue. It also serves as the effective unofficial language of administration in other multilingual countries with different formal official languages. "English as a second language" is indicated for countries with near-universal or mandatory English instruction in public schools. The full extent of English penetration of Continental Europe, where 83% of secondary school students study it as a second language, is not evident on this map.

Standard and Variant Languages

People who speak a common language such as English are members of a **speech community**, but membership does not necessarily imply linguistic uniformity. A speech community usually possesses both a **standard language**—comprising the accepted community norms of syntax, vocabulary, and pronunciation—and a number of more or less distinctive *dialects*, reflecting the ordinary speech of areal, social, professional, or other subdivisions of the general population.

Standard Language

A dialect may become the standard language through identity with the speech of the most prestigious, highest-ranking, and most powerful members of the larger speech community. A rich literary tradition may help establish its primacy, and its adoption as the accepted written and spoken norm in administration, economic life, and education will solidify its position, minimizing linguistic variation and working toward the elimination of deviant, nonstandard forms.

The dialect that emerges as the basis of a country's standard language is often the one identified with its capital or center of power at the time of national development. Standard French is based on the dialect of the Paris region, a variant that assumed dominance in the latter half of the 12th century and was made the only official language in 1539. Castilian Spanish became the standard after 1492 with the Castile-led reconquest of Spain from the Moors and the export of the dialect to the Americas during the 16th century. Its present form, however, is a modified version associated not with Castile but with Madrid, the modern capital of Spain. Modern Standard Chinese is based on the Mandarin dialect of Beijing. In England, *British Received Pronunciation*—the speech of educated people of London and southeastern England and used by the British Broadcasting System—is the accepted standard.

Other forces than the political may affect language standardization. In its spoken form, Standard German is based on norms established and accepted in the theater, the universities, public speeches, and radio and television. The

Excerpted by permission from *The Economist*,
London, December 20, 1986.

Pidgins and Creoles

Language is rarely a total barrier in communication between peoples, even those whose native tongues are mutually incomprehensible. Bilingualism or multilingualism may permit skilled linguists to communicate in a jointly understood third language, but long-term contact between less able populations may require the creation of new language—a pidgin—learned by both parties.

A **pidgin** is an amalgamation of languages, usually a simplified form of one, such as English or French, with borrowings from another, perhaps non-European local language. In its original form, a pidgin is not the mother tongue of any of its speakers; it is a second language for everyone who uses it, a language generally restricted to such specific functions as commerce, administration, or work supervision. For example, such is the variety of languages spoken among the some 270 ethnic groups of Zaire that a special tongue called Lingala, a hybrid of Congolese dialects and French, has been created to permit, among other things, issuance of orders to army recruits drawn from all parts of the country.

Pidgins are characterized by a highly simplified grammatical structure and a sharply reduced vocabulary, adequate to express basic ideas but not complex concepts. If a pidgin becomes the first language of a group of speakers—who may have lost their former native tongue through disuse—a **creole** has evolved. In their development, creoles invariably acquire a more complex grammatical structure and enhanced vocabulary.

Creole languages have proved useful integrative tools in linguistically diverse areas; several have become symbols of nationhood. Swahili, a pidgin formed from a number of Bantu dialects, originated in the coastal areas of East Africa and spread by trade during the period of English and German colonial rules. When Kenya and Tanzania gained independence, they made Swahili the national language of administration and education. Other examples of creolization are Afrikaans (a pidginized form of 17th-century Dutch used in the Republic of South Africa); Haitian Creole (the language of Haiti, derived from the pidginized French used in the slave trade); and Bazaar Malay (a pidginized form of the Malay language, a version of which is the official national language of Indonesia).

Lingua Franca

A **lingua franca** is an established language used habitually for communication by people whose native tongues are mutually incomprehensible. For them it is a *second language*, one learned in addition to the native tongue. Lingua franca, literally "Frankish tongue," was named from the dialect of France adopted as their common tongue by the Crusaders assaulting the Muslims of the Holy Land. Later, it endured as a language of trade and travel in the eastern Mediterranean, useful as a single tongue shared in a linguistically diverse region.

Between 300 B.C. and A.D. 500, the Mediterranean world was unified by Common Greek. Later, Latin became a lingua franca, the language of empire and, until replaced by the vernacular European tongues, of the Church, government, scholarship, and the law. Outside the European sphere, Aramaic served the role from the 5th century B.C. to the 4th century A.D. in the Near East and Egypt; Arabic followed Muslim conquest as the unifying language of that international religion after the 7th century. Mandarin Chinese and Hindi in India both formerly and today have a lingua franca role in their linguistically diverse countries. The immense linguistic diversity of Africa has made regional lingua francas there necessary and inevitable (Figure 5.14).

Official Languages

Governments may designate a single tongue as a country's **official language**, the required language of instruction in the schools and universities, government and business, the courts, and other official and semiofficial public and private activities. In societies in which two or more languages are in common use (**multilingualism**), such an official language may serve as the approved national lingua franca, guaranteeing communication among all citizens of differing native tongues. In many immigrant societies, such as the United States, only one of the many spoken languages may have implicit or official government sanction (see "An Official U.S. Language?")

Nearly every country in linguistically complex sub-Saharan Africa has selected a European language—usually that of their former colonial governors—as an official language (Figure 5.15), only rarely designating a native language or creole as an alternate official tongue. Indeed, less than 10% of the population of sub-Saharan Africa live in countries with any indigenous African tongue given official status. Nigeria has some 350 clearly different languages and is dominated by 3 of them: Hausa, Yoruba, and Ibo. For no Nigerian is English a native tongue, yet throughout the country English is the sole language of instruction and the sole official language. Effectively, all Nigerians must learn a foreign language before they can enter the mainstream of national life. Most Pacific Ocean countries, including the Philippines (with between 80 and 110 Malayo-Polynesian languages) and Papua New Guinea (with over 750 distinct Papuan tongues), have a European language as at least one of their official tongues.

In some countries, multilingualism has official recognition through designation of more than a single state language. Belgium and Canada, for example, have two official languages (*bilingualism*), reflecting rough equality in numbers or influence of separate linguistic populations comprising a single country. In a few multilingual countries, more than two official languages have been designated. Bolivia has three official tongues and Switzerland has four. South Africa's constitution designates 11 official languages, and India gives official status to 15 languages at the regional, though not at the national, level.

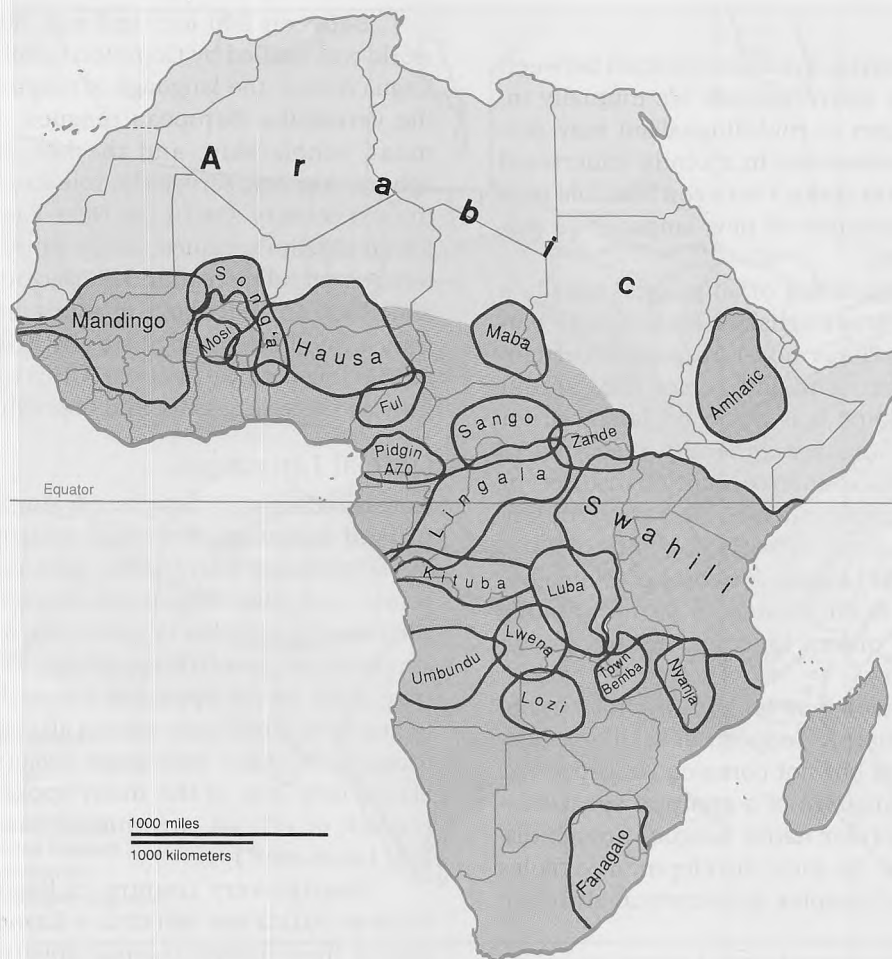
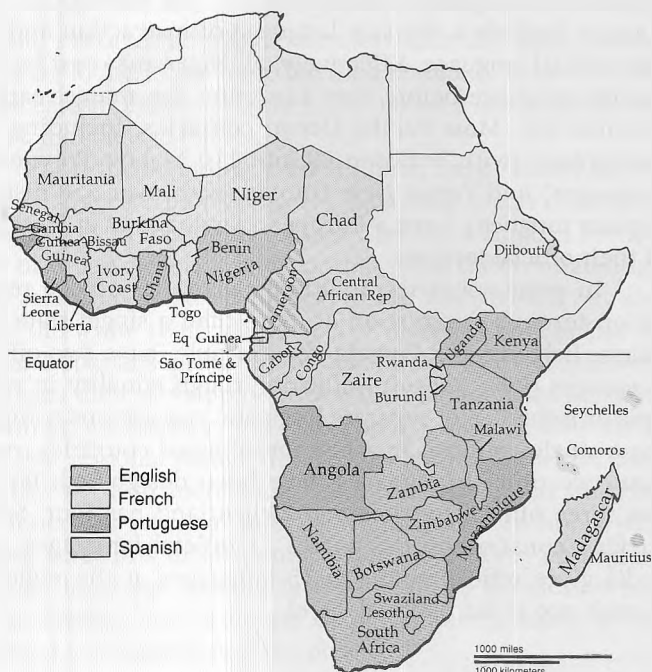


FIGURE 5.14 **Lingua francas of Africa.** The importance and areal extent of competing lingua francas in sub-Saharan Africa change over time, reflecting the spread of populations and the relative economic or political stature of speakers of different languages. In many areas, an individual may employ different lingua francas, depending on activity: dealing with officials, trading in the marketplace, conversing with strangers. Among the elite in all areas, the preferred lingua franca is apt to be a European language. Throughout northern Africa, Arabic is the usual lingua franca for all purposes.



Few countries remain purely *monolingual*, with only a single language of communication for all purposes among all citizens, though some are officially so. Past and recent movements of peoples as colonists, refugees, or migrants

have assured that most of the world's countries contain linguistically mixed populations. Maintenance of native languages among such populations is not assured, of course. Where numbers are small or pressures for integration into an economically and socially dominant culture are strong, immigrant and aboriginal (native) linguistic minorities tend to adopt the majority or official language for all purposes. On the other hand, isolation and relatively large numbers of speakers may serve to preserve native tongues. In Canada, for example, aboriginal languages with large populations of speakers—Cree, Ojibwe, and Inuktitut—are well maintained in their areas of concentration (respectively, northern Quebec, the northern prairies, and the Northwest Territories). In contrast, much smaller language groups in southern and coastal British Columbia have a much lower ratio of retention among native speakers.

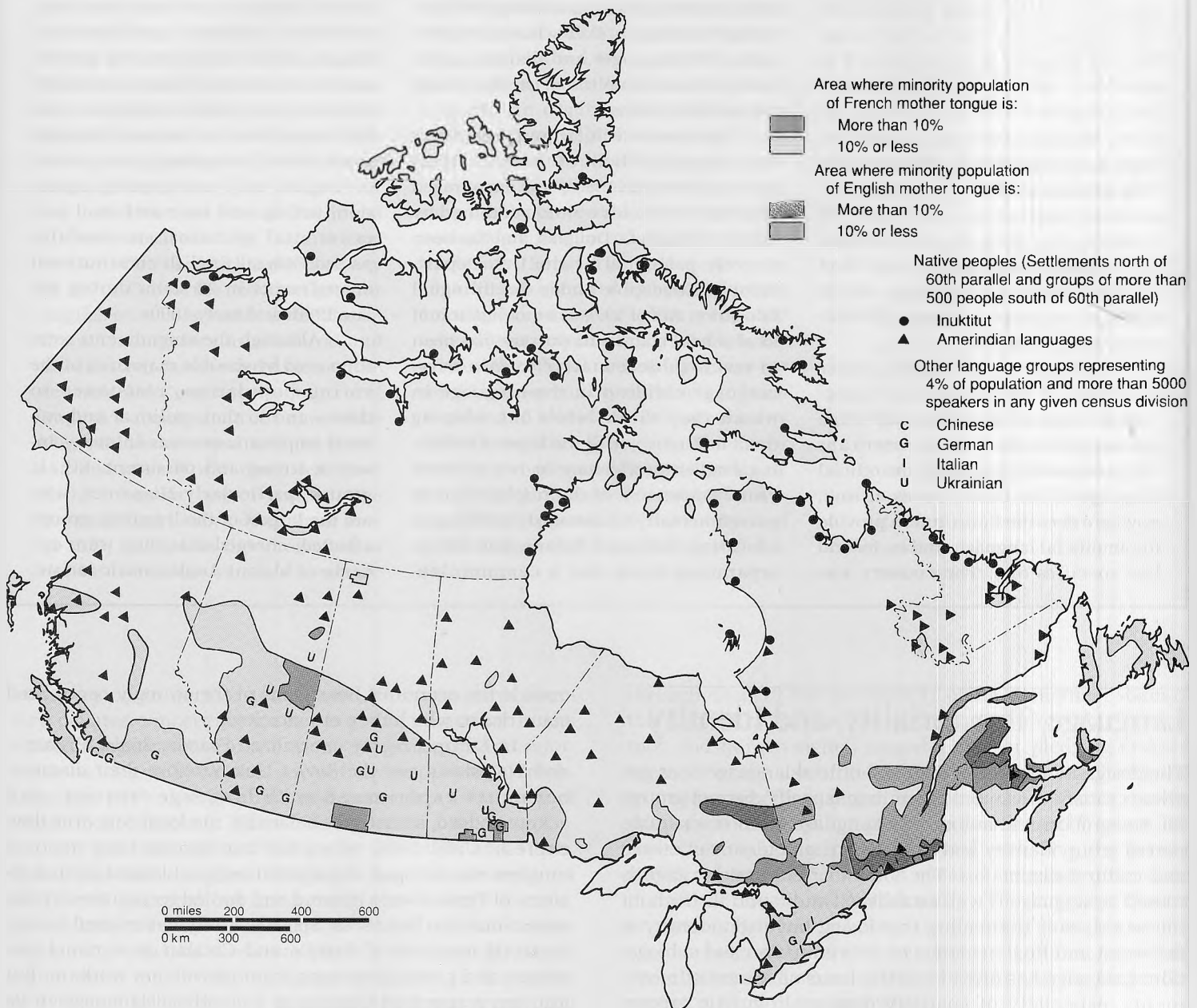


FIGURE 5.16 **Bilingualism and diversity in Canada.** The map shows areas of Canada which have a minimum of 5000 inhabitants and include a minority population identified with an official language.

in New York were often distorted by the English; Breukelyn, Vlissingen, and Haarlem became Brooklyn, Flushing, and Harlem. French names underwent similar twisting or translation, and Spanish names were adopted, altered, or, later, put into such bilingual combinations as Hermosa Beach. Amerindian tribal names—the Yennish, Maha, Kansa—were modified, first by French and later by English speakers—to Erie, Omaha, and Kansas. A faddish “Classical Revival” after the Revolution gave us Troy, Athens, Rome, Sparta, and other ancient town names and later spread them across the country (Figure 7.31). Bethlehem, Ephrata, Nazareth, and Salem came from the Bible. Names adopted were transported as settlements moved westward across the United States (Figure 5.17).

by indigenous peoples. Those names were sometimes adopted, but often shortened, altered, or—certainly—mispronounced. The vast territory that local Amerindians called “Mesconsing,” meaning “the long river,” was recorded by Lewis and Clark as “Quisconsing,” later to be further distorted into “Wisconsin.” *Milwaukee* and *Winnipeg*, *Potomac* and *Niagara*; the names of 27 of the 50 United States; and the present identity of thousands of North American places and features, large and small, had their origin in Native American languages.

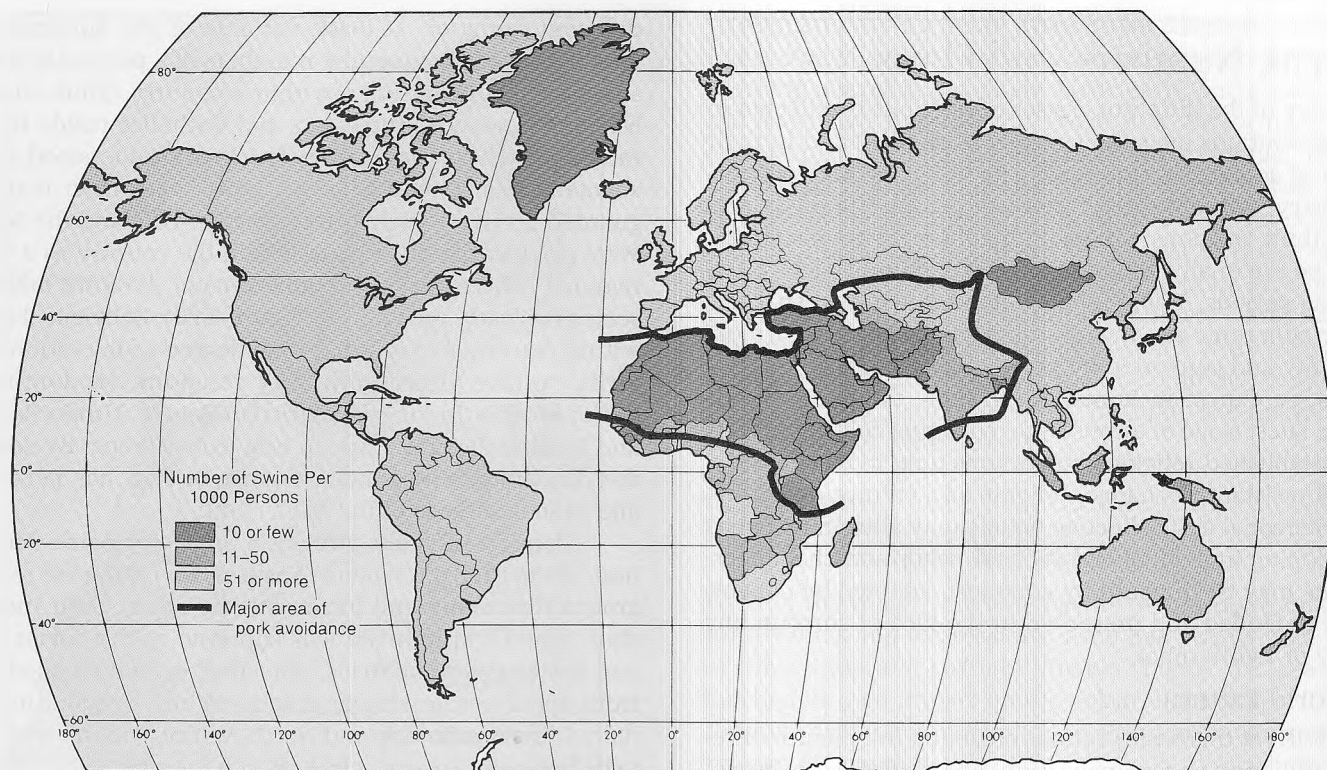


FIGURE 5.18 Pattern of swine production. Religious prohibition against the consumption of pork, particularly among those of the Jewish and Muslim faiths, finds spatial expression in the incidence of swine production. Because production figures are national summaries, the map does not faithfully report small-area distributions of either religious affiliation or animal raising.

classifying religions as they were in studying languages. A distinction between **monotheism**, belief in a single deity, and **polytheism**, belief in many gods, is frequent but not particularly spatially relevant. Simple territorial categories have been offered recognizing origin areas of religions: Western versus Eastern, for example, or African, Far Eastern, or Indian. With proper detail such distinctions may inform us where particular religions had their roots but do not reveal their courses of development, paths of diffusion, or current distributions.

Our geographic interest in classification of religions is different from that of, say, theologians or historians. We are not so concerned with the beliefs themselves or with their birthplaces (though both help us understand their cultural implications and areal arrangements). We are more interested in religions' patterns and processes of diffusion once they have developed, with the spatial distributions they have achieved, and with the impact of the practices and beliefs of different religious systems on the landscape. To satisfy at least some of those interests, geographers have found it useful to categorize religions as *universalizing*, *ethnic*, or *tribal (traditional)*.

Christianity, Islam, and Buddhism are the major world **universalizing religions**, faiths that claim applicability to all humans and that seek to transmit their beliefs through missionary work and conversion. Membership in universal-

izing religions is open to anyone who chooses to make some sort of symbolic commitment, such as baptism in Christianity. No one is excluded because of nationality, ethnicity, or previous religious belief.

Ethnic religions have strong territorial and cultural group identification. One becomes a member of an ethnic religion by birth or by adoption of a complex life-style and cultural identity, not by simple declaration of faith. These religions do not usually proselytize, and their members form distinctive closed communities identified with a particular ethnic group or political unit. An ethnic religion—for example, Judaism, Indian Hinduism, or Japanese Shinto—is an integral element of a specific culture; to be part of the religion is to be immersed in the totality of the culture.

Tribal or traditional religions are special forms of ethnic religions distinguished by their small size, their unique identity with localized culture groups not yet fully absorbed into modern society, and their close ties to nature. **Animism** is the name given to their belief that life exists in all objects, from rocks and trees to lakes and mountains, or that such inanimate objects are the abode of the dead, of spirits, and of gods. **Shamanism** is a form of tribal religion that involves community acceptance of a *shaman*, a religious leader, healer, and worker of magic who, through special powers, can intercede with and interpret the spirit world.

The nature of the different classes of religions is reflected in their distributions over the world (Figure 5.19) and in their number of adherents. Universalizing religions tend to be expansionary, carrying their message to new peoples and areas. Ethnic religions, unless their adherents are dispersed, tend to be regionally confined or to expand only slowly and over long periods. Tribal religions tend to contract spatially as their adherents are incorporated increasingly into modern society and converted by proselytizing faiths.

The World Pattern

different faiths or, at least, variants of the dominant professed religion. Frequently, members of a particular religion show areal concentration within a country. Thus, in urban Northern Ireland, Protestants and Catholics reside in separate areas whose boundaries are clearly understood and respected. The "Green Line" in Beirut, Lebanon marked a guarded border between the Christian East and the Muslim West sides of the city, while within the country as a whole, regional concentrations of adherents of different faiths and sects are clearly recognized (Figure 5.20). Religious diversity within countries may reflect the degree of toleration a majority culture affords minority religions. In dominantly (90%) Muslim Indonesia, Christian Bataks, Hindu Balinese, and Muslim Javanese live in easy coexistence. By contrast, the fundamentalist Islamic regime in Iran has persecuted and executed those of the Baha'i faith.

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158

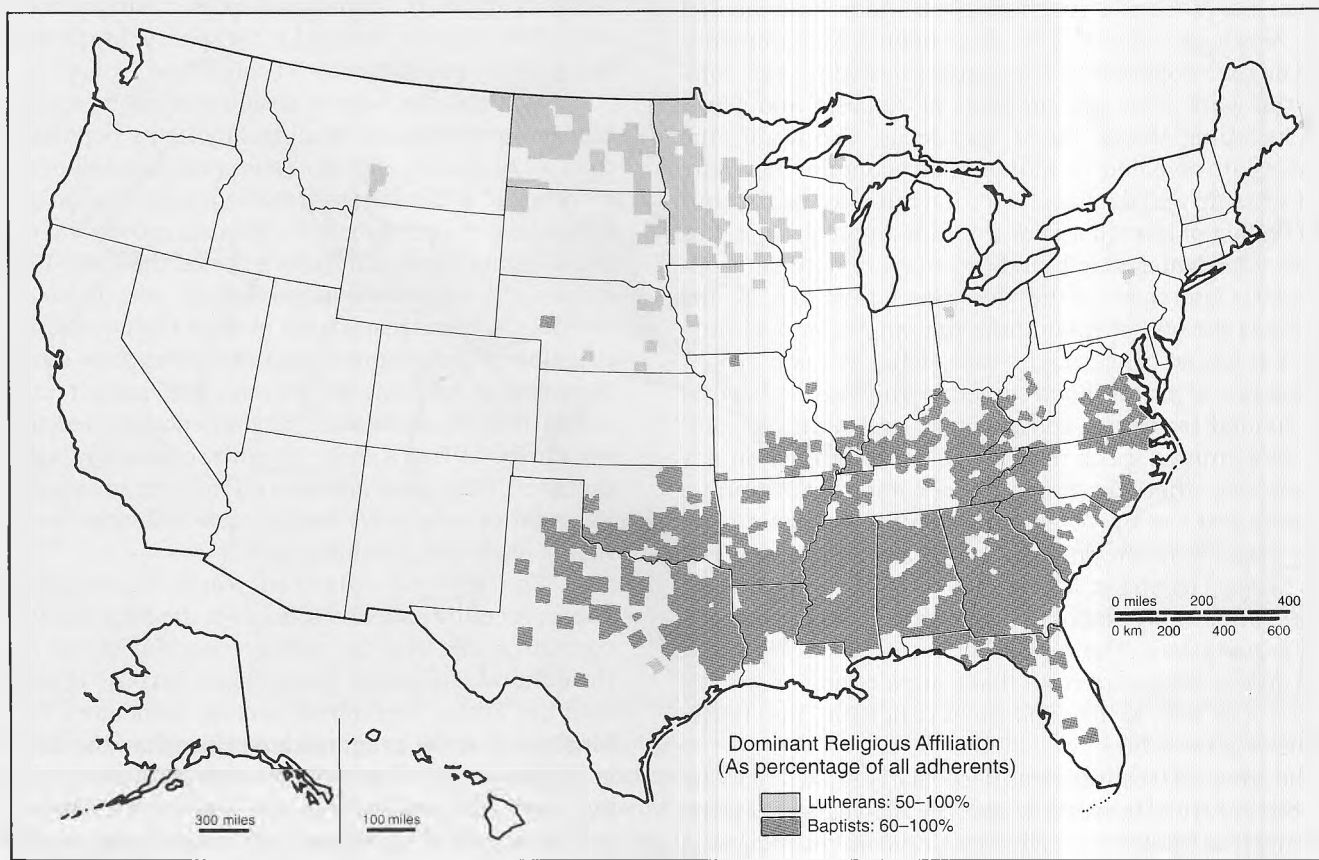
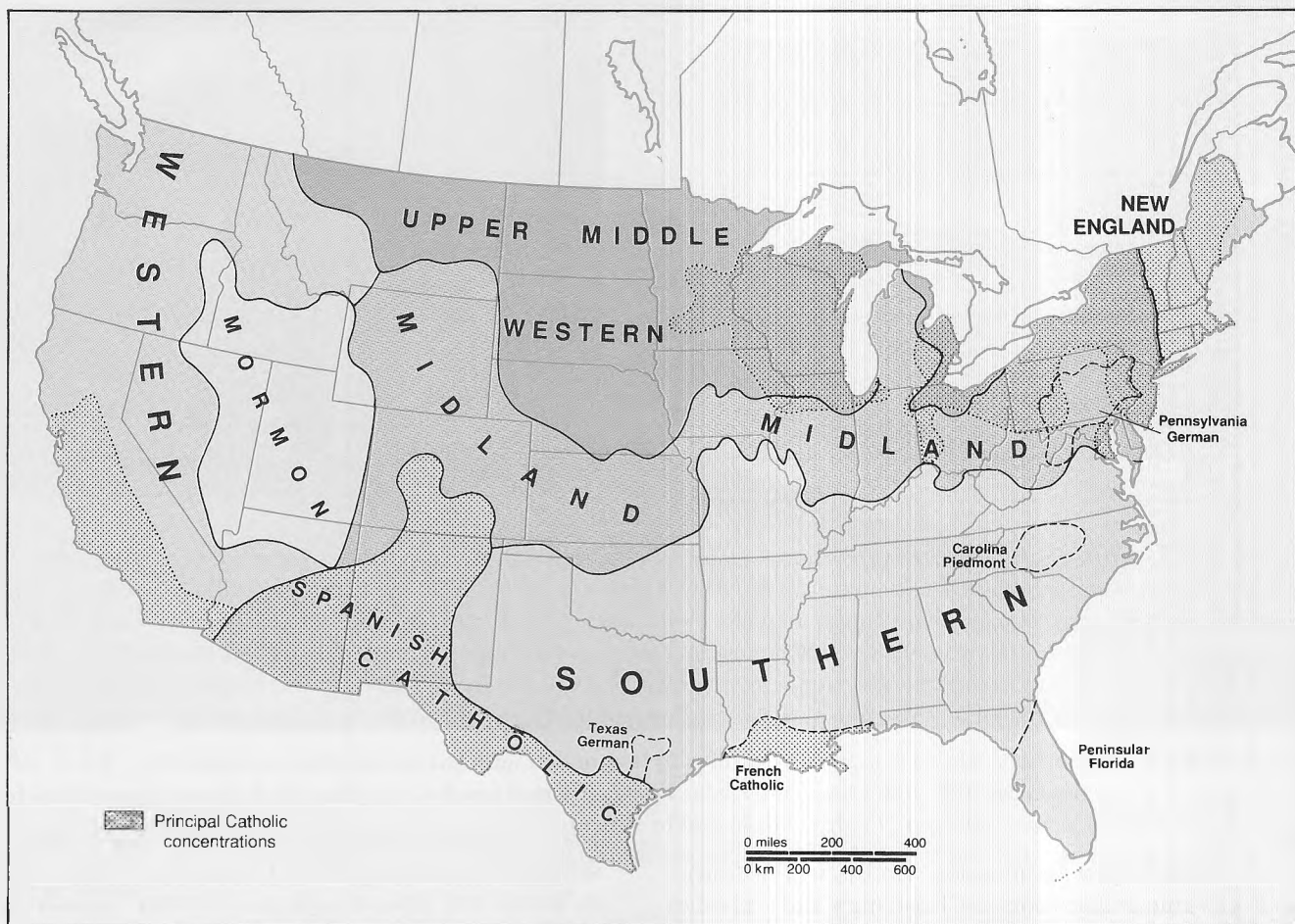


FIGURE 5.26 (a) Major religious regions of the United States. (b) Regional concentration of Baptists and Lutherans.
 (a) After Wilbur Zelinsky.

earliest mosques were modeled on or converted from Christian churches. With time, however, Muslim architects united Roman, Byzantine, and Indian design elements to produce the distinctive mosque architecture found throughout the world of Islam. With its perfectly proportioned, frequently gilded or tiled domes, its graceful, soaring towers and minarets (from which the faithful are called to prayer), and its delicately wrought parapets and cupolas, the carefully tended mosque is frequently the most elaborate and imposing structure of the town (Figure 5.30).

Hinduism

Hinduism is the world's oldest major religion. Though it has no datable founding event or initial prophet, some evidence traces its origin back 4000 or more years. Hinduism is not just a religion but an intricate web of religious, philosophical, social, economic, and artistic elements comprising a distinctive Indian civilization. Its estimated 760 million adherents are largely confined to India, where it claims 80% of the population.

Hinduism derives its name from its cradle area in the valley of the Indus River. From that district of present-day Pakistan, it spread by *contagious diffusion* eastward down the

Ganges River and southward throughout the subcontinent and adjacent regions by amalgamating, absorbing, and eventually supplanting earlier native religions and customs. Its practice eventually spread throughout southeastern Asia, into Indonesia, Malaysia, Cambodia, Thailand, Laos, and Vietnam as well as into neighboring Myanmar (Burma) and Sri Lanka. The largest Hindu temple complex is in Cambodia, not India, and Bali remains a Hindu pocket in dominantly Islamic Indonesia.

No common creed, single doctrine, or central ecclesiastical organization defines the Hindu. A Hindu is one born into a caste, a member of a complex social and economic—as well as religious—community. Hinduism accepts and incorporates all forms of belief; adherents may believe in one god or many or none. It emphasizes the divinity of the soul and is based on the concepts of reincarnation and passage from one state of existence to another in an unending cycle of birth and death in which all living things are caught. One's position in this life is determined by one's *karma*, or deeds and conduct in previous lives. Upon that conduct depends the condition and the being—plant, animal, or human—into which a soul, after a stay in heaven or hell, is reborn. All creatures are ranked, with humans at the top of the ladder.

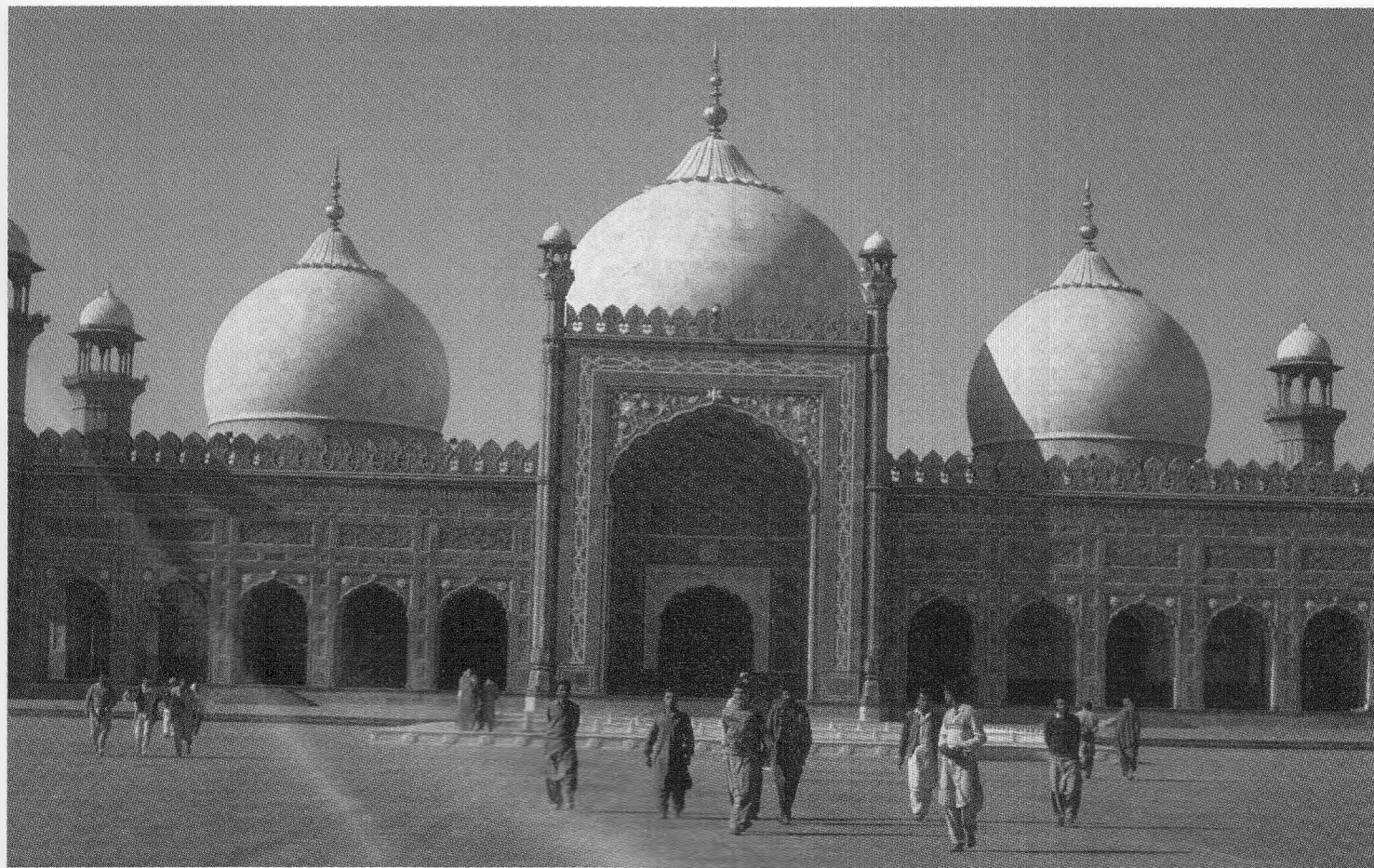


FIGURE 5.30 The common architectural features of the mosque make it an unmistakable landscape evidence of the presence of Islam in any local culture. The Badashi Mosque in Lahore, Pakistan would not be out of place architecturally in Muslim Malaysia or Indonesia.

mingle with, where you can live, what you may wear, eat, and drink, and how you can earn your livelihood.

The practice of Hinduism is rich with rites and ceremonies, festivals and feasts, processions and ritual gatherings of literally millions of celebrants. It involves careful observance of food and marriage rules and the performance of duties within the framework of the caste system. Pilgrimages to holy rivers and sacred places are thought to secure deliverance from sin or pollution and to preserve religious worth (Figure 5.31). In what is perhaps the largest periodic gathering of humans in the world, millions of Hindus of all castes, classes, and sects gather about once in 12 years for ritual washing away of sins in the Ganges River near Allahabad. Worship in the temples and shrines that are found in every village and the leaving of offerings to secure merit from the gods are required (see “Religion in Nanpur”). The doctrine of *ahimsa*—also fundamental in Buddhism—instructs Hindus to refrain from harming any living being.

Temples and shrines are everywhere; their construction brings merit to their owners—the villages or individuals who paid for them. Temples must be erected on a site that is beautiful and auspicious, in the neighborhood of water since the gods will not come to other locations. Within them, innumerable icons of gods in various forms are enshrined, the



FIGURE 5.31 Pilgrims at dawn worship in the Ganges River at Varanasi (Banares), India, one of the seven most sacred Hindu cities and the reputed earthly capital of Siva, Hindu god of destruction and regeneration. Hindus believe that to die in Varanasi means release from the cycle of rebirth and permits entrance into heaven.



FIGURE 5.34 The golden stupas of the Swedagon pagoda, Yangon, Myanmar (Rangoon, Burma).

It was joined by, or blended with, **Taoism**, an ideology that according to legend was first taught by Lao-tsu in the 6th century B.C. Its central theme is *Tao*, the Way, a philosophy teaching that eternal happiness lies in total identification with nature and deploring passion, unnecessary invention, unneeded knowledge, and government interference in the simple life of individuals. Beginning in the 1st century A.D., this

Buddhism also joined and influenced Japanese Shinto, the traditional religion of Japan that developed out of nature and ancestor worship. **Shinto**—the Way of the Gods—is basically a structure of customs and rituals rather than an ethical or moral system. It observes a complex set of deities, including deified emperors, family spirits, and the divinities residing in rivers, trees, certain

Meiji (1868–1912), the official state religion, emphasizing loyalty to the emperor. The centers of worship are the numerous shrines and temples in which the gods are believed to dwell and which are approached through ceremonial *torii*, or gateway arches (Figure 5.35).

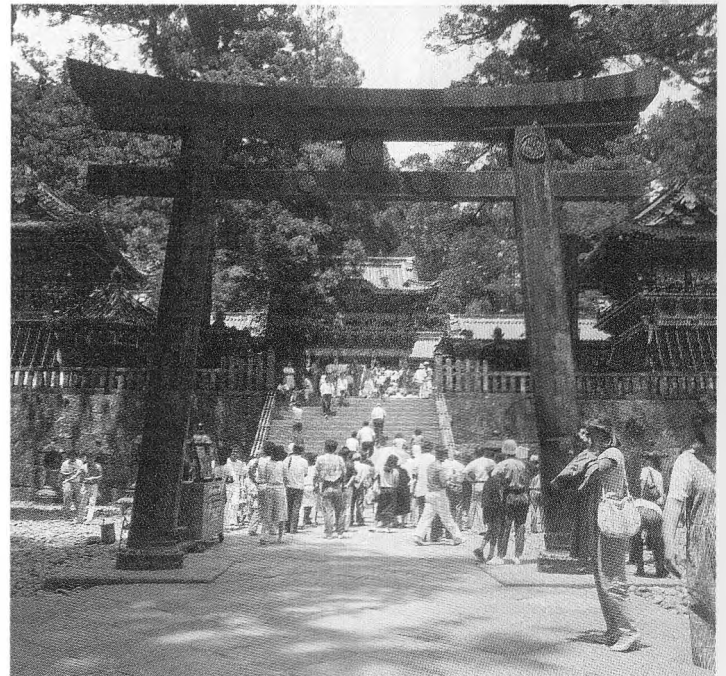


FIGURE 5.35 A Shinto shrine, Nikko Park, Honshu Island, Japan.

Summary

Language and religion are basic threads in the web of culture. They serve to identify and categorize individuals within a single society and to separate peoples and nations of different tongues and faiths. By their pronunciation and choice of words we quickly recognize districts of origin and educational levels of speakers of our own language and easily identify those who originally had different native tongues. In some societies, religion may serve as a similar identifier of individuals and groups who observe distinctive modes or rhythms of life dictated by their separate faiths. Both language and religion are mentifacts, parts of the ideological subsystem of culture; both are transmitters of culture as well as its identifiers. Both have distinctive spatial patterns—reflecting past and present processes of spatial interaction and diffusion—that are basic to the recognition of world culture realms.

Languages may be grouped genetically—by origin and historical development—but the world distribution of language families depends as much on the movement of peoples and histories of conquest and colonization as it does on patterns of linguistic evolution. Linguistic geography studies spatial variations in languages, variations that may be minimized by encouragement of standard and official languages or overcome by pidgins, creoles, and lingua francas. Toponymy, the study of place names, helps document that history of movement.

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While each is a separate and distinct thread of culture, language and religion are not totally unrelated. Religion can influence the spread of languages to new peoples and areas, as Arabic, the language of the Koran, was spread by conquering armies of Muslims. Religion may conserve as well as disperse language. Yiddish remains the language of religion in Hasidic Jewish communities; church services in German or Swedish, and school instruction in them, characterize some Lutheran congregations in Anglo America. Until the 1960s, Latin was the language of liturgy in the Roman church, and Sanskrit remains the language of the Vedas, sacred in Hinduism. Sacred texts may demand the introduction of an alphabet to nonliterate societies: the Roman alphabet follows Christian missionaries, Arabic script accompanies Islam. The Cyrillic alphabet of eastern Europe was developed by missionaries. The tie between language and religion is not inevitable. The French imposed their language but not their religion on Algeria; Spanish Catholicism but not the Spanish language became dominant in the Philippines.

Language and religion are important and evident components of spatial cultural variation. They are, however, only part of the total complex of cultural identities that set off different social groups. Prominent among those identities is that of *ethnicity*, a conviction of members of a social group that they have distinctive characteristics in common that significantly distinguish and isolate them from the larger population among which they reside. Our attention turns in the next chapter to the concept and patterns of ethnicity, a distinctive piece in the mosaic of human culture.

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animism 157
Buddhism 170
caste 169
Christianity 160
Confucianism 172
creole 149
dialect 145
ethnic religion 157
geographic (regional) dialect 146
Hinduism 168
Islam 166
isogloss 146
Judaism 159

- language 135
- language family 135
- lingua franca 149
- linguistic geography 146
- monotheism 157
- multilingualism 149
- official language 149
- pidgin 149
- polytheism 157
- protolanguage 136
- religion 156
- secularism 159

- shamanism 157
- Shinto 173
- social dialect 145
- speech community 144
- standard language 144
- syncretism 172
- Taoism 173
- toponym 154
- toponymy 154
- tribal (traditional) religion 157
- universalizing religion 157
- vernacular 145

FOR REVIEW

1. Why might one consider language the dominant differentiating element of culture separating societies?
2. In what way may religion affect other cultural traits of a society? In what cultures or societies does religion appear to be a growing influence? What might be the broader social or economic consequences of that growth?
3. In what way does the concept of *protolanguage* help us in linguistic classification? What is meant by *language family*? Is *genetic* classification of language an unfailing guide to spatial patterns of languages? Why or why not?
4. What spatial diffusion processes may be seen in the prehistoric and historic spread of languages? What have been the consequences of language spread on world linguistic diversity?
5. In what ways do *isoglosses* and the study of *linguistic geography* help us understand other human geographic patterns?
6. Cite examples that indicate the significance of religion as a cultural dominant in the internal and foreign relations of countries.
7. How does the classification of religions as *universalizing*, *ethnic*, or *tribal* help us to understand their patterns of distribution and spatial diffusion?

SELECTED REFERENCES

- Beer, William R., and James E. Jakob. *Language Policy and National Unity*. Totowa, NJ: Rowman & Allanheld, 1985.
- Beinart, Haim. *Atlas of Medieval Jewish History*. New York: Simon & Schuster, 1992.
- Bryson, Bill. *The Mother Tongue: English and How it Got That Way*. New York: Wm. Morrow, 1990.
- Burnaby, Barbara, and Roderic Beaujot. *The Use of Aboriginal Languages in Canada*. Ottawa: Minister of Supply and Services Canada, 1987.
- Caldarola, Carlo, ed. *Religions and Societies: Asia and the Middle East*. Berlin and New York: Mouton Publishers, 1982.
- Cartright, Don. "Language Policy and Internal Geopolitics: The Canadian Situation." In *Language in Geographic Context*, edited by Colin H. Williams, pp. 238-266. Clevedon, England and Philadelphia: Multilingual Matters Ltd., 1988.
- Carver, Craig. *American Regional Dialects: A Word Geography*. Ann Arbor: University of Michigan Press, 1987.
- Chadwick, Henry, and G. R. Evans, eds. *Atlas of the Christian Church*. New York: Facts on File Publications, 1987.
- Chambers, J. K., ed. *The Languages of Canada*. Montreal: Didier, 1979.
- Cooper, Robert L., ed. *Language Spread: Studies in Diffusion and Social Change*. Bloomington: Indiana University Press, 1982.
- Crystal, David, ed. *The Cambridge Encyclopedia of the English Language*. Cambridge, England: Cambridge University Press, 1995.
- Dutt, Ashok K., and Satish Davgun. "

THREADS OF DIVERSITY

6

A black and white photograph capturing a group of young girls in traditional Mexican folk costumes during a parade. The girls are wearing large, wide-brimmed hats and long, ruffled skirts. A banner in the background reads "Ballet Folclórico Alegria From Hayward". The girls are standing on a float, and the banner is held up by people behind them. The scene is outdoors, and the girls are looking towards the camera.

177

lands through introduction of both ruling elites and,!

!



FIGURE 6.1 “Guest workers”—frequently called by their German name, *Gastarbeiter*

¹ From Walter E. Eyt, "The New Americans," *Har!*

Our examination of ethnic patterns will concentrate on North America, an area originally occupied by a multitude of territorially, culturally, and linguistically distinctive Native American people who were overwhelmed and displaced by immigrants—and their descendants—representing a wide spectrum of the Old World's ethnic groups. While North America lacks the homelands that gave territorial identity to immigrant ethnics in their countries of origin, it has provided a case study of how distinctive culture groups partition space and place their claims and imprints on it. It shows, as well, the durability of the idea of ethnic distinction even under conditions and national myths that emphasize intermixing and homogenization of population as the accepted norm. Examples drawn from other countries and environments will serve to highlight ways in which American-based generalizations may be applied more broadly or in which the North American experience reflects a larger world scene.

No single trait denotes ethnicity. Group recognition may be based on language, religion, national origin, unique customs, or an ill-defined concept of “race” (see “The Matter of Race”). Whatever may establish the identity of a group, the common unifying bonds of ethnicity are a shared ancestry and cultural heritage, the retention of a set of distinctive traditions, and the maintenance of in-group interactions and relationships. The principal racial and ethnic groups of the United States are identified in Tables 6.1 and 6.2 and of Canada in Table 6.4.





NATIONS OF IMMIGRANTS

In Latin America, foreign population domination of native peoples was and is less complete and uniform than in Anglo America. While in nearly all South and Central American states, European and other nonnative ethnic groups dominate the social and economic hierarchy, in many they constitute only a minority of the total population. In Paraguay, for example, the vast majority of inhabitants are native Paraguayans who pride themselves on their Native American descent, and Amerindians comprise nearly half the population of Peru, Bolivia, and Ecuador. But European ethnics make up over 90% of the population of Argentina, Uruguay, Costa Rica, and southern Chile, and about 50% of the inhabitants of Brazil.

communist Eastern Europe. Many are “guest workers” and their families that were earlier recruited in Turkey and North Africa; or they are immigrants from former colonial or overseas territories in Asia, Africa, and the Caribbean. More than 6% of Germany’s inhabitants come from outside the European Union, as do over 3% of Holland’s and Belgium’s.

The trend of ethnic mixing is certain to continue and accelerate. Cross-border movements of migrants and refugees in Africa, Asia, the Americas, as well as in Europe, are continuing common occurrences of the later 20th century, reflecting growing incidences of ethnic strife, civil wars, famines, and economic hardships. But of even greater long-term influence are the growing disparities in population numbers and economic wealth between the older developed states and the developing world. The population of the world's poorer countries is growing twice as fast as Europe's of the late 19th century, when that continent fed the massive immigration streams across the Atlantic. The rich world, whose population is projected to stabilize well below 2 billion, will increasingly be a magnet for those from poorer countries where numbers will rise from some 4 billion to more than 7 billion by A.D. 2025 and to perhaps 10 billion in a half-century. The economic and population pressures building in the developing world insure greater international and intercontinental migration and a rapid expansion in the numbers of "nations of immigrants."

granted; refugees or migrants seeking economic opportunity or fleeing civil strife or starvation have no claims for acceptance. Increasingly, they are being turned away. The Interior Minister of France advocates "zero immigration"; Germany's government closed its doors in 1993 by increasing border controls and changing its constitutional right to asylum; Britain in 1994 tightened immigration rules even for foreign students and casual workers. And all European Union countries except Ireland have measures for turning back refugees who come via another EU country. In 1995, the EU's members materially narrowed the definition of who may qualify for asylum.

Nor is Europe alone. Hong Kong ejects Vietnamese refugees; Zaire orders Rwandans to return to their own country; India tries to stem the influx of Bangladeshis; the United States rejects "economic refugees" from Haiti. Algerians are increasingly resented in France as their numbers and cultural presence increase. Turks feel the enmity of a small but violent group of Germans, and East Indians and Africans find growing resistance among the Dutch. In many countries, policies of exclusion or restriction appear motivated by unacceptable influxes of specific racial, ethnic, or national groups.

1. Do you think all people everywhere should have a universal right of admittance to a country of choice equivalent to their declared right to depart their homelands? Why or why not?
2. Do you think it appropriate that destination states make a distinction between political and economic refugees? Why or why not?
3. Do you think it legitimate for countries to establish immigration quotas based on national origin, or to classify certain potential immigrants as unacceptable or undesirable on the grounds that their national, racial, or religious origins are incompatible with the culture of the prospective host country? Why or why not?

ETHNIC GROUPS	TIME PERIOD	NUMBERS IN MILLIONS (APPROXIMATE)
Blacks	1650s-1800	1
Irish	1840s and 1850s	1.75
Germans	1840s-1880s	4
Scandinavians	1870s-1900s	1.5
Poles	1880s-1920s	1.25
East European Jews	1880s-1920s	2.5
Austro-Hungarians	1880s-1920s	4
Italians	1880s-1920s	4.75
Mexicans	1950s-1990s	4.5
Cubans	1960s-1980s	1
Asians	1960s-1990s	5

The United States' cultural diversity has increased as its immigration source regions have changed from the traditional European areas to Latin America and Asia. The dominant European ethnic groups had completed their major periods of arrival in the United States by the 1920s, and immigration essentially halted until after World War II. Except for a spurt of legal and illegal immigration from Eastern Europe and Russia after 1990, the modest postwar revival of inflow from Europe went largely unnoticed as the new entrants affiliated with already assimilated groups of the same cultural background.

Figure 1 consists of eight pie charts arranged in two rows of four, each representing a different time period. The charts show the percentage distribution of countries by region. The regions are Latin America, North America, South and East Europe, North and West Europe, and Other. The time periods are 1820-60, 1861-1900, 1901-20, 1921-60, 1961-70, 1971-80, 1981-90, and 1991-95.

Time Period	Latin America	North America	South and East Europe	North and West Europe	Other
1820-60	95%	2%	3%	0%	0%
1861-1900	68%	22%	7%	2%	1%
1901-20	41%	4			

ETHNIC GEOGRAPHY: THREADS OF DIVERSITY

TABLE 6.4 Canadian Population by Selected Ethnic Origins, 1991

8.5% of the population, or nearly 23 million people, had been born abroad!

Acculturation and Assimilation

In the United States, at least, the sheer volume of multiple immigration streams makes the concept

Nonetheless, as we shall see, all immigrant groups after the first found a controlling culture in place, with accustomed!

The language barrier that has made it difficult for foreign-born groups!

FUNCTIONAL VARIATION BY ETHNIC AREAS

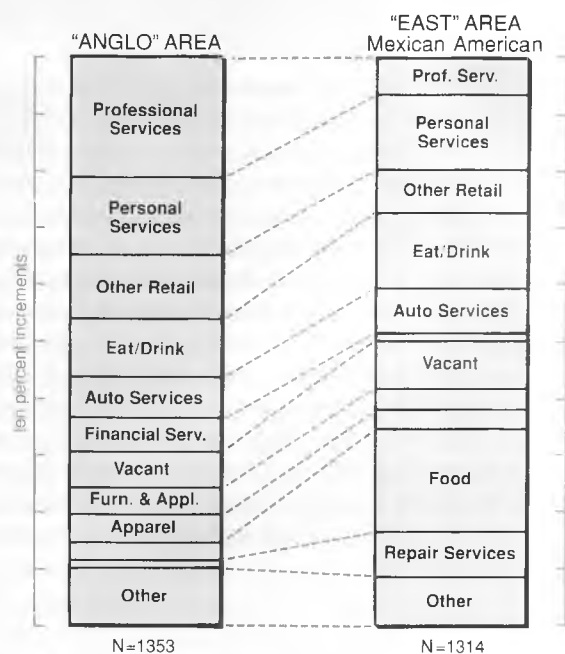


FIGURE 6.5 Variations in business establishments in Anglo and Mexican American neighborhoods of Los Angeles in the late 1970s. Although the total populations of the two areas were comparable, the Mexican American community had over three times more food stores because of the dominance of corner grocery stores over supermarkets. Bakeries (*tortillerías*) were a frequent expression of ethnic dietary habits. Neighborhood businesses conducted in Spanish and related to the needs of the community were the rule. Anglo neighborhoods, because of greater affluence, had greater numbers of professional services (doctors, lawyers) available.

Assimilation does not necessarily mean that ethnic consciousness is diminished or awareness of racial and cultural differences is reduced or lost. *Competition theory*, in fact, suggests that as ethnic minorities begin to achieve success and enter into mainstream social and economic life, awareness of ethnic differences may be heightened. Frequently, ethnic identity may be most clearly experienced and expressed by those who can most successfully assimilate but who choose to promote group awareness and ethnic mobilization movements. That promotion, the theory holds, is a reflection of pressures of American urban life and the realities of increased competition. Those pressures transform formerly isolated groups into recognized, self-assertive ethnic minorities pursuing goals and interests dependent on their position within the larger society.

While in the United States it is usually assumed that acculturation and assimilation are self-evidently advantageous, Canada established multiculturalism in the 1970s as

the national policy designed to reduce tensions between ethnic and language groups and to recognize that each thriving culture is an important part of the country's priceless personal resources. Since 1988, multiculturalism has been formalized by act of the Canadian parliament and supervised by a separate government ministry. An example of its practical application can be seen in the way Toronto, Canada's largest and the world's most multicultural city, routinely sends out property tax notices in six languages—English, French, Chinese, Italian, Greek, and Portuguese. Nevertheless, Canada—which takes in more immigrants per capita than any other industrialized country—began in 1995 to reduce the number of newcomers it was prepared to admit.

Both Canada and the United States seek to incorporate their varied immigrant minorities into composite national societies. In other countries quite different attitudes and circumstances may prevail when indigenous—not immigrant—minorities feel their cultures and territories threatened. The Sinhalese comprise 75% of Sri Lanka's population, but the minority Tamils have waged years of guerilla warfare to defend what they see as majority threats to their culture, rights, and property. In India, Kashmiri nationalists fight to separate their largely Muslim valley from the Hindu majority society. And in many multiethnic African countries, single party governments seek to impose a sense of national unity on populations whose primary and nearly unshakable loyalties are rooted in their tribes and not the state that is composed of many tribes. Across the world, conflicts between ethnic groups within states have proliferated in recent years. Armenia, Azerbaijan, Burma, Burundi, Ethiopia, Iraq, Russia, Rwanda, and the former Yugoslavia are others in a long list of countries where ethnic tensions have erupted into civil conflict.

Basques and Catalans of Spain and Corsicans, Bretons, and Normans of France have only recently seen their respective central governments relax strict prohibitions on teaching or using the languages that identified those ethnic groups. On the other hand, in Bulgaria, ethnic Turks who unofficially comprise 10% of the total population officially ceased to exist in 1984, when the government obliged Turkish speakers and Muslims to replace their Turkish and Islamic names with Bulgarian and Christian ones. The government also banned their language and strictly limited practice of their religion. The intent was to impose an assimilation not sought by the minority.

Elsewhere, ethnic minorities—including immigrant minorities—have grown into majority groups, posing the question of who will assimilate whom. Ethnic Fijians sought to resolve that issue by staging a coup to retain political power when the majority immigrant ethnic Indians came to power by election in 1987. As these and innumerable other examples from all continents demonstrate, Anglo American experiences and expectations have limited application to other societies differently constituted and motivated.

Areal Expressions of Ethnicity

Throughout much of the world, the close association of territoriality and ethnicity is well recognized, accepted, and often politically disruptive. Indigenous ethnic groups have developed over time in specific locations and, through ties of kinship, language, culture, religion, and shared history, have established themselves in their own and others' eyes as distinctive peoples with defined homeland areas. The boundaries of most countries of the world encompass a number of racial or ethnic minorities, whose demands for special territorial recognition have increased rather than diminished with advances in economic development, education, and self-awareness (Figure 6.6).

The dissolution of the Soviet Union in 1991, for example, not only set free the 14 ethnically based union republics that formerly had been dominated by Russia and Russians, but also opened the way for many smaller ethnic groups to seek recognition and greater local control from the majority populations, including Russians, within whose territory their homelands lay. In Asia, the Indian subcontinent was subdivided to create separate countries with primarily religious-territorial affiliations, and the country of India itself has adjusted the boundaries of its constituent states to accommodate linguistic-ethnic realities. Other continents and countries show a similar acceptance of the importance of ethnic territoriality in their administrative structure. In

[illegible]

With the exceptions of some—largely Canadian—Native American tribes and of French Canadians, there is not the coincidence in Anglo America between territorial claim and ethnic-racial distinctiveness so characteristic elsewhere in the world (Figure 6.7). The general absence of such claims is the result of the immigrant nature of American society. Even the Native American “homeland” reservations in the United States are dispersed, noncontiguous, and in large part artificial impositions. The spatial pattern of ethnicity that has developed is therefore more intricate and shifting than in many other pluralistic societies. It is not based on absolute ethnic dominance but on interplay between a majority culture and, usually, several competing minority groups. It shows the enduring consequences of early settlement and the changing structure of a fluid, responsive, freely mobile North American society.

Charter Cultures

Although, with the Canadian French and Native American exceptions noted, no single ethnic minority homeland area exists in present-day North America, a number of separate social and ethnic groups are of sufficient size and regional concentration to have put their impress on particular areas. Part of that imprint results from what the geographer Wilbur

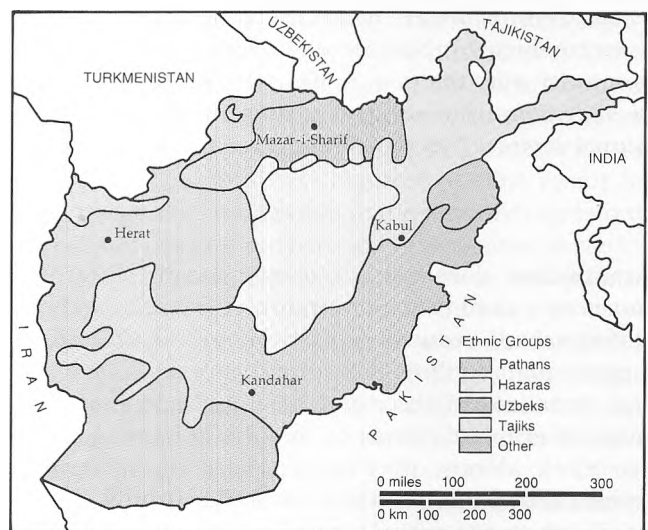
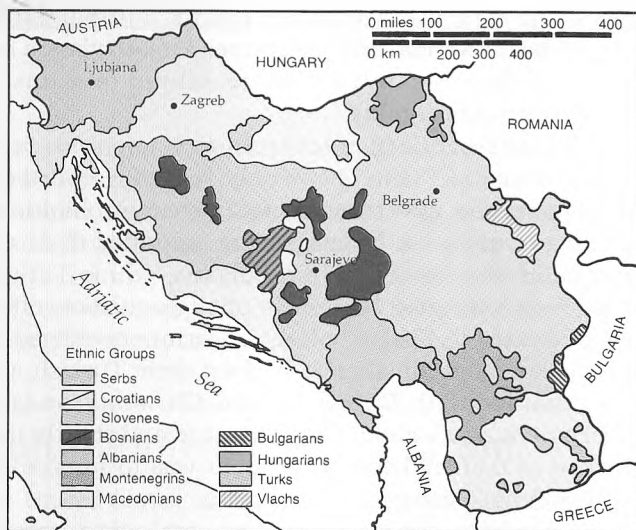
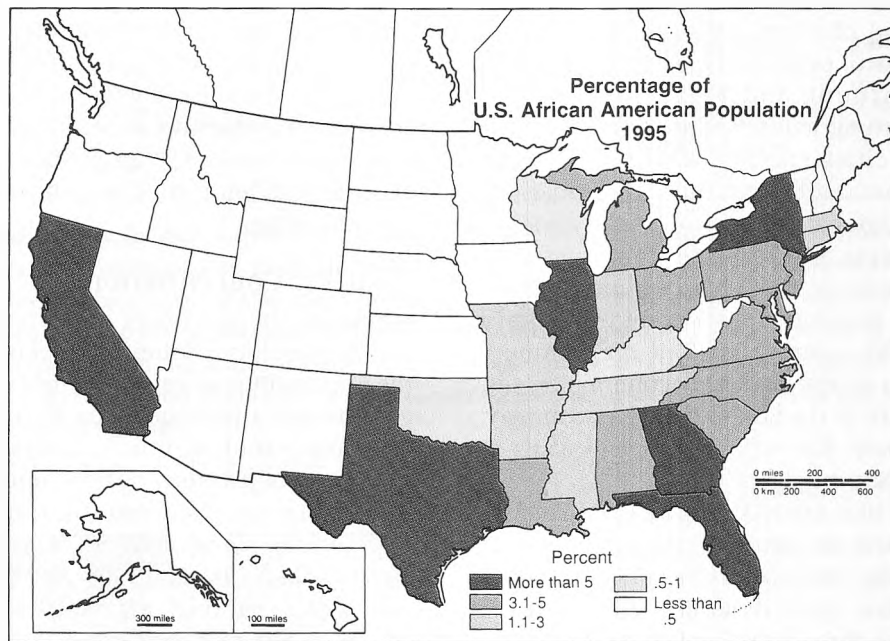
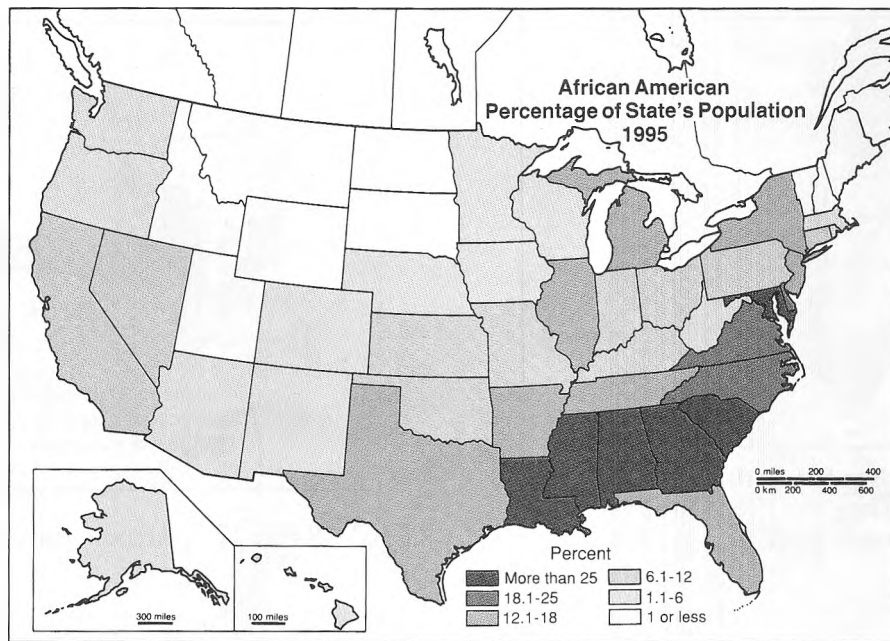


FIGURE 6.6 (a) **Ethnicity in former Yugoslavia.** Yugoslavia was formed after World War I (1914–1918) from a patchwork of Balkan states and territories, including the former kingdoms of Serbia and Montenegro, Bosnia-Herzegovina, Croatia-Slavonia, and Dalmatia. The authoritarian central government created in 1945 began to disintegrate in 1991 as non-Serb minorities voted for regional independence. In response, Serb guerillas backed by the Serb-dominated Yugoslav military engaged in a policy of territorial seizure and “ethnic cleansing” to secure areas claimed as traditional Serb “homelands.” Religious differences between Eastern Orthodox, Roman Catholic, and Muslim adherents compound!







the newcomer population and the other immigrant and host societies among whom residential space is sought.

Constraints on assimilation and the extent of discrimination and segregation are greater for some minorities than for others. In general, the rate of assimilation of an ethnic minority by the host culture depends on two sets of controls: external, including attitudes toward the minority held by the charter group and other competing ethnic groups, and internal controls of group cohesiveness and defensiveness.

External Controls

When the majority culture or rival minorities perceive an ethnic group as threatening, the group tends to be spatially isolated by external "blocking" tactics designed to confine the rejected minority and to resist its "invasion" of already occupied urban neighborhoods. The more tightly knit the threatened group, the more adamant and overt are its resistance tactics. When confrontation measures (including, perhaps, threats and vandalism) fail, the invasion of charter-group territory by the rejected minority proceeds until a critical percentage of newcomer housing occupancy is reached. That level, the **tipping point**, may precipitate a rapid exodus by the former majority population. Invasion, followed by succession, then results in a new spatial pattern of ethnic dominance according to models of urban social geography developed for American cities and examined in Chapter 11, models less applicable to the European scene.

Racial or ethnic discrimination in urban areas generally expresses itself in the relegation of the most recent, most alien, most despised minority to the poorest available housing. That confinement has historically been abetted by the concentration of the newest, least assimilated ethnic minorities at the low end of the occupational structure. Distasteful, menial, low-paying service and factory employment unattractive to the charter group is available to those new arrivals even when other occupational avenues may be closed. The dockworkers, street cleaners, slaughterhouse employees, and sweatshop garment workers of earlier America had and have their counterparts in other regions. In England, successive waves of West Indians and Commonwealth Asians took the posts of low-pay hotel and restaurant service workers, transit workers, refuse collectors, manual laborers, and the like; Turks in West German cities and North Africans in France play similar low-status employment roles.

In the United States there has been a spatial association between the location of such employment opportunities—the inner city central business district (CBD) and its margins—and the location of the oldest, most dilapidated, and least desirable housing. Proximity to job opportunity and the availability of cheap housing near the CBD, therefore, combined to concentrate the United States immigrant slum near the heart of the 19th-century central city. In the second half of the 20th century, the suburbanization of jobs, the rising skill levels required in the automated offices of the CBD, and the effective isolation of inner city residents by the absence of public transportation or their inability to pay for private transport have maintained the association of the

least competitive minorities and the least desirable housing area. But now, those locations lack the promise of entry-level jobs formerly close at hand.

That American spatial association does not necessarily extend to other cultures and urban environments. In Latin American cities, newest arrivals at the bottom of the economic and employment ladder are most apt to find housing in squatter or slum areas on the outskirts of the urban unit (Figure 11.40); prestigious housing claims room near the city center. European cities, too, have retained a larger proportion of upper-income groups at the urban center than have their American counterparts, with a corresponding impact on the distribution of lower-status, lower-income housing (Figure 11.36). In French urban agglomerations, at least, the outer fringes frequently have a higher percentage of foreigners than the city itself.

Internal Controls

Although part of the American pattern of urban residential segregation may be explained by the external controls of host-culture resistance and discrimination, the clustering of specific groups into discrete, ethnically homogeneous neighborhoods is best understood as the result of internal controls of group defensiveness and conservatism. The self-elected segregation of ethnic groups can be seen to serve four principal functions—defense, support, preservation, and "attack."

First, it provides *defense*, reducing individual immigrant isolation and exposure by physical association within a limited area. The walled and gated Jewish quarters of medieval European cities have their present-day counterparts in the clearly marked and defined "turfs" of street-gang members and the understood exclusive domains of the "black community," "Chinatown," and other ethnic or racial neighborhoods. In British cities, it has been observed that West Indians and Asians fill identical slots in the British economy and reside in the same sorts of areas, but they tend to avoid living in the *same* areas. West Indians avoid Asians; Sikhs isolate themselves from Muslims; Bengalis avoid Punjabis. In London, patterns of residential isolation even extend to West Indians of separate island homelands (see "The Caribbean Map in London").

Their own defined ethnic territory provides members of the group with security from the hostility of antagonistic social groups, a factor also underlying the white flight to "garrison" suburbs. That outsiders view at least some closely defined ethnic communities as homogeneous, impenetrable, and hostile is suggested by Figure 6.17, a "safety map" of Manhattan published in the newspaper *l'Aurore* for the guidance of French tourists.

Second, the ethnic neighborhood provides *support* for its residents in a variety of ways. The area serves as a halfway station between the home country and the alien society, to which admittance will eventually be sought. It acts as a place of initiation and indoctrination, providing supportive lay and religious ethnic institutions, familiar businesses, job opportunities where language barriers are minimal, and friendship and kinship ties to ease the transition to a new society.

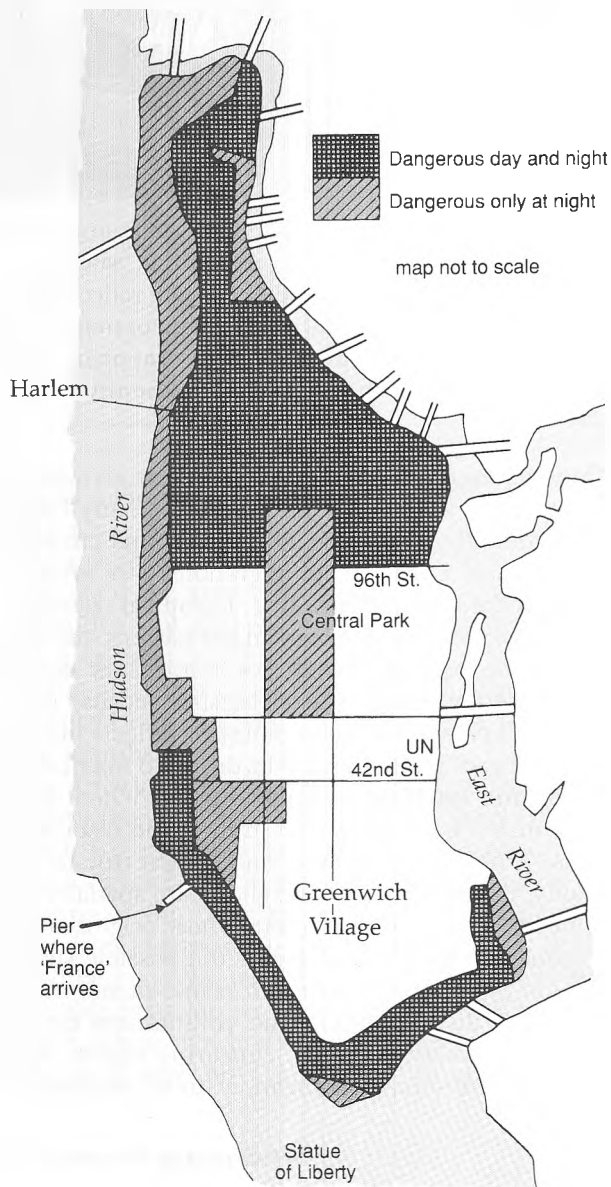




FIGURE 6.22 Ultra-orthodox Hasidim, segregating themselves by dress and custom, seek social isolation and shun corrupting outside influences even in the midst of the congestion of New York City and the excitement of the New York Marathon.

seeking identification with African roots are examples of culture rebound. Ethnic identity is fostered by the nuclear family and ties of kinship, particularly when reinforced by residential proximity. It is preserved by such group activities as distinctive feasts or celebrations, by marriage customs, and by ethnically identified clubs, such as the Turnverein societies of German communities or the Sokol movement of athletic and cultural centers among the Czechs.

The Ethnic Landscape

Landscape evidence of ethnicity may be as subtle as the greater number and size of barns in the German-settled areas of the Ozarks or the designs of churches or the names of villages. The evidence may be as striking as the buggies of the Amish communities, the massive Dutch (really, German-origin) barns of southeastern Pennsylvania (Figure 6.23), or the adobe houses of Mexican American settlements in the Southwest. The ethnic landscape, however defined, may be a relic, reflecting old ways no longer pursued. It may contain evidence of artifacts or designs imported, found useful, and retained. In some instances, the physical or customary trappings of ethnicity may remain unique to one or a very few communities. In others, the diffusion of ideas or techniques may have spread introductions to areas beyond their initial impact. The landscapes and landscape evidences explored by cultural geographers are many and complex. The following paragraphs seek merely to suggest the variety of topics pursued in tracing the landscape impacts evident from the cultural diversity of Anglo America.

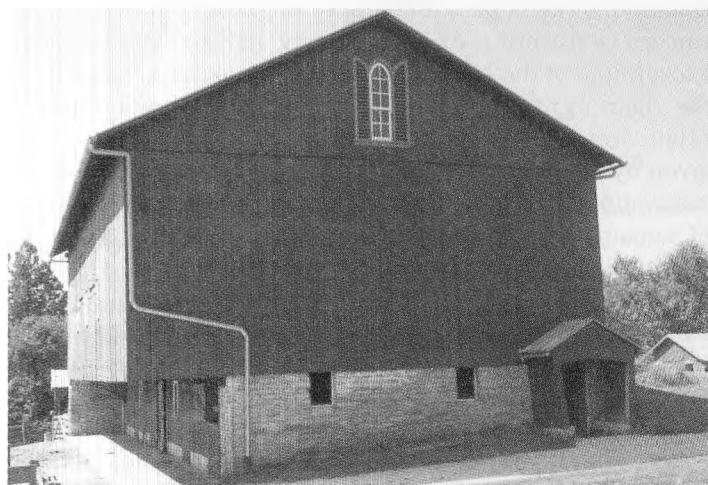
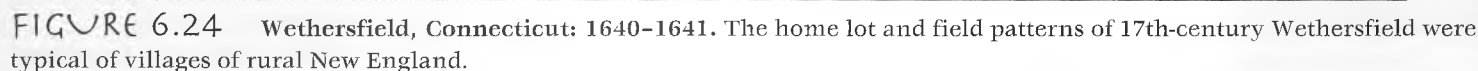


FIGURE 6.23 The Pennsylvania Dutch barn, with its origins in southern Germany, has two levels. Livestock occupy the ground level; on the upper level, reached by a gentle ramp, are the threshing floor, haylofts, and grain and equipment storage. A distinctive projecting forebay provides shelter for ground-level stock doors and unmistakably identifies the Pennsylvania Dutch barn. The style, particularly in its primitive log form, was exported from its eastern origins, underwent modification, and became a basic form in the Upland (i.e., off the Coastal Plain) South, Ohio, Indiana, Illinois, and Missouri. An example of a distinctive ethnic imprint on the landscape, the Pennsylvania Dutch barn also became an example of cultural transfer from an immigrant group to the charter group.



FOLK CULTURAL DIVERSITY AND REGIONALISM

Folk connotes traditional and nonfaddish, the characteristic or product of a homogeneous, cohesive, largely self-sufficient group that is essentially isolated from or resistant to outside influences, even of a larger society surrounding it. **Folk culture**, therefore, may be defined as the collective heritage of institutions, customs, skills, dress, and way of life of a small, stable, closely knit, usually rural community. Tradition controls folk culture, and resistance to change is strong. The homemade and handmade dominate in tools, food, music, story, and ritual. Buildings are erected without architect or blueprint, but with plan and purpose clearly in mind and by a design common to the local society using locally available building materials. When, as in North America, folk culture may represent a modification of imported ideas and techniques, local materials often substitute for a less-available original substance even as the design concepts are left unchanged.

Folk life is a cultural whole composed of both tangible and intangible elements. **Material culture** is made up of physical, visible things: everything from musical instruments to furniture, tools, and buildings. Collectively, material culture comprises the **built environment**, the landscape created by humans. At a different scale it also constitutes the contents of household and workshop. **Nonmaterial culture**, in contrast, is the intangible part, the mentifacts and sociofacts expressed in oral tradition, folk song and folk story, and customary behavior. Ways of speech, patterns of worship, outlooks and philosophies are parts of the nonmaterial component passed to following generations by teachings and examples.

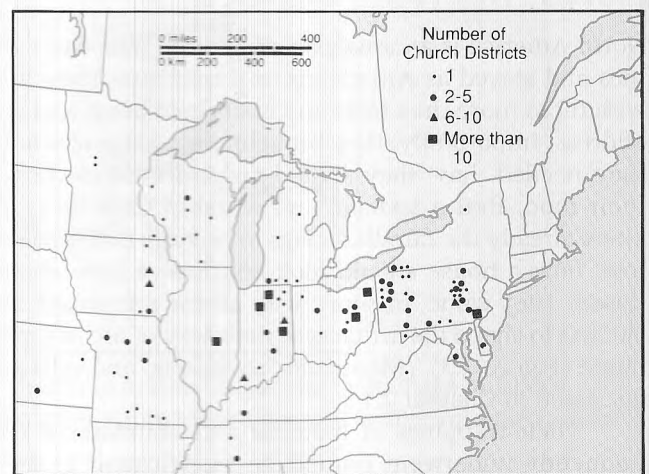
Within Anglo America, true folk societies no longer exist; the universalizing impacts of industrialization, urbanization, and mass communication have been too pervasive for their full retention. Generations of intermixing of cultures, of mobility of peoples, and of leveling public education have altered the meaning of *folk* from the identification of a group to the recognition of a style, an article, or an individual preference in design and production. The Old Order Amish, with their rejection of electricity, the internal combustion engine, and other "worldly" accoutrements in favor of buggy, hand tools, and traditional dress are one of the least altered—and few—folk societies of the United States (Figure 7.2).

Canada, on the other hand, with as rich a mixture of cultural origins as the United States, has kept to a much later date clearly recognizable ethnically unique folk and decorative art traditions. One observer has noted that nearly all of the national folk art traditions of Europe can be found in one form or another well preserved and practiced somewhere in Canada. From the earliest arts and crafts of New France to the domestic art forms and folk artifacts of the Scandinavians, Germans, Ukrainians, and others who settled in western Canada in the late 19th and early 20th centuries, folk and ethnic are intertwined through transference of traditions from homelands and their adaptation to the Canadian context.

Folk culture today is more likely to be expressed by individuals than by coherent, isolated groups. The collector of folk songs, the artist employing traditional materials and styles, the artisan producing in wood and metal products



(a)



(b)

FIGURE 7.2 (a) Motivated by religious conviction that the "good life" must be reduced to its simplest forms, Amish communities shun all modern luxuries of the majority secular society around them. Children use horse and buggy, not school bus or automobile, on their daily trip to this rural school in east central Illinois. (b) Distribution of Old Order Amish communities in the United States.

identified with particular groups or regions, the quilter working in modern fabrics the designs of earlier generations all are perpetuating folk culture: material culture if it involves “things”; nonmaterial if the preserved tradition relates to song, story, recipe, or belief. In this respect, each of us bears the evidence of folk life. Each of us uses proverbs traditional to our family or culture; each is familiar with and can repeat childhood nursery rhymes and fables. We rap wood for luck and likely know how to make a willow whistle, how to plant a garden by phases of the moon, and what is the “right” way to prepare a favorite holiday dish.

When many persons share at least some of the same folk **customs**—repeated, characteristic acts, behavioral patterns, artistic traditions, and conventions regulating social life—and when those customs and artifacts are distinctively identified with any area long inhabited by a particular group, a *folk culture region* may be recognized. As with landscape evidence of ethnicity, folk culture in its material and nonmaterial elements may be seen to vary over time and space and to have hearth regions of origin and paths of diffusion.

Indeed, in many respects, ethnic geography and folk geography are extensions of each other and are logically intertwined. The variously named “Swiss” or “Mennonite” or “Dutch” barn introduced into Pennsylvania by German immigrants has been cited as physical evidence of ethnicity; in some of its many modifications and migrations, it may also be seen as a folk culture artifact of Appalachia. The folk songs of, say, western Virginia can be examined either as nonmaterial folk expressions of the Upland South or as evidence of the ethnic heritage derived from rural English forebears. In the New World, the debt of folk culture to ethnic origins is clear and persuasive. With the passage of time, of course, the dominance of origins recedes and new cultural patterns and roots emerge.

North American Hearths

North America is an amalgam of peoples who came as ethnics and stayed as Americans or Canadians. They brought with them more than tools and household items and articles of dress. Importantly, they brought clear ideas of what tools they needed, how they should fashion their clothes, cook their food, find a spouse, and worship their deity. They knew already the familiar songs to be sung and stories to be told, how a house should look and how a barn should be raised. They came, in short, with all the mentifacts and sociofacts to shape the artifacts of their way of life in their new home (Figure 7.3). (Mentifacts, sociofacts, and artifacts are discussed in Chapter 2.)

Their trappings of material and nonmaterial culture frequently underwent immediate modification in the New World. Climates and soils were often different from their homelands; new animal and vegetable foodstuffs were found for their larders. Building materials, labor skills, and items of manufacture available at their origins were different or lacking at their destinations. What the newcomers brought in



FIGURE 7.3 Reconstructed Plimoth Plantation. The first settlers in the New World carried with them fully developed cultural identities. Even their earliest settlements reflected established ideas of house and village form. Later they were to create a variety of distinctive cultural landscapes reminiscent of their homeland areas, though modified by American environmental conditions and material resources.

tools and ideas they began to modify as they adapted and adjusted to different American materials, terrains, and potentials. The settlers still retained the essence and the spirit of the old but made it simultaneously new and American.

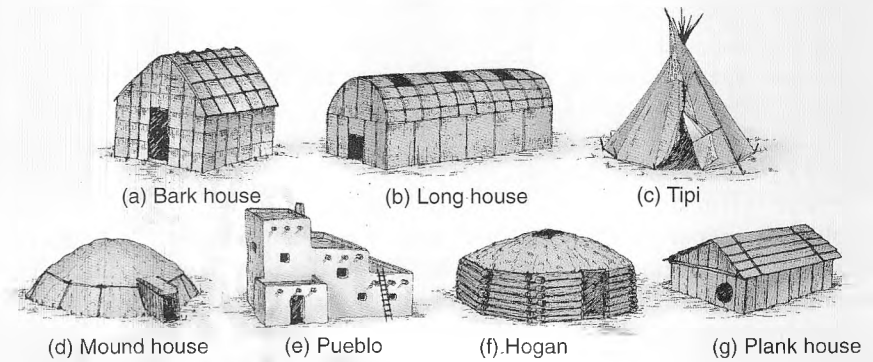
The first colonists, their descendants, and still later arrivals created not one but many cultural landscapes of America, defined by the structures they built, the settlements they created, and the regionally varied articles they made or customs they followed. The natural landscape of America became settled, and superimposed on the natural landscape as modified by its Amerindian occupants, were the regions of cultural traits and characteristics of the European immigrants (see “Vanished American Roots”). In their later movements and those of their neighbors and offspring, they left a trail of landscape evidence from first settlement to the distant interior locations where they touched and intermingled.

The early arrivers established footholds along the East Coast. Their settlement areas became cultural hearths, nodes of introduction into the New World—through *relocation diffusion*—of concepts and artifacts brought from the Old. Locales of innovation in a new land rather than areas of new invention, they were—exactly as their ancient counterparts discussed in Chapter 2—source regions from which relocation and *expansion diffusion* carried their cultural identities deeper into the continent (Figure 7.4). Later arrivals, as we have seen in Chapter 6, not only added their own evidence of passage to the landscape but often set up independent secondary hearths in advance of or outside of the main paths of diffusion.

Each of the North American hearths had its own mix of peoples and, therefore, its own landscape distinctiveness. French settlement in the lower St. Lawrence Valley

America, like every other world region, had its own primitive, naïve and indigenous original architecture. But this was the architecture of Indians—the bark houses of the Penobscots, the long houses of the Iroquois, the tipis of the Crows, the mounds of the Mandans, the pueblos of the Zuni, the hogans of the Navajos, the [plank] dwellings of Puget Sound.

Some of these were even elegant, many contained seeds of promise; but we swept them all aside. Indian words and Indian foods passed into the American culture but nothing important from the Indian architecture, save a belated effort to imitate the form but not the



function of the pueblos. (The so-called “Spanish” architecture of the Hispanic borderlands and northern Mexico, however—adobe walled with small windows and flat roofs supported by wooden beams—was of Amerindian, not European, origin.)

Source: From John Burchard and Albert Bush-Brown, *The Architecture of America: A Social and Cultural History*, (Boston: Little, Brown & Company, 1961), p. 57. © 1961, The American Institute of Architects.



FIGURE 7.4 Early North American culture hearths. The interior “national hearth,” suggested by Richard Pillsbury, represents a zone of coalescence in the eastern Midwest, from which composite housing ideas dispersed farther into the interior.

recreated there the long lots and rural house types of northwestern France. Upper Canada was English and Scottish with strong infusions of New England folk housing carried by Loyalists leaving that area during the Revolutionary War. Southern New England bore the imprint of settlers from rural southern England, while the Hudson Valley hearth showed the impress of Dutch, Flemish, English, German, and French Huguenot settlers.

In the Middle Atlantic area, the Delaware River hearth was created by a complex of English, Scotch-Irish, Swedish, and German influences. The Delaware Valley below Philadelphia also received the eastern Finns, or Karelians, who introduced, according to one viewpoint, the distinctive "backwoods" life-styles, self-sufficient economies, and log-building techniques and house designs of their forested homeland. It was their pioneering "midland" culture that was the catalyst for the rapid advance of the frontier and successful settlement of much of the interior of the continent and, later, of the Pacific Northwest.

Coastal Chesapeake Bay held English settlers, though Germans and Scotch-Irish were added elements away from the major rivers. The large landholdings of the area dispersed settlement and prevented a tightly or clearly defined culture hearth from developing, although distinctive house types that later diffused outward did emerge there. The Southern Tidewater hearth was dominantly English modified by West Indian, Huguenot, and African influences. The French again were part of the Delta hearth, along with Spanish and Haitian elements.

Later in time and deeper in the continental interior, the Salt Lake hearth marks the penetration of the distant West by the Mormons, considered an ethnic group by virtue of their self-identity through religious distinctiveness. Spanish American borderlands, the Upper Midwest Scandinavian colonies, English Canada, and the ethnic clusters of the Prairie Provinces could logically be added to the North American map of distinctive immigrant culture hearths.

The ethnic hearths gradually lost their identification with immigrant groups and became source regions of American architecture and implements, ornaments and toys, cookery and music. The evidence of the homeland was there, but the products became purely indigenous. In the isolated, largely rural American hearth regions, the ethnic culture imported from the Old World was partially transmuted into the folk culture of the New.

Folk Building Traditions

People everywhere house themselves and, if necessary, provide protection for their domesticated animals. Throughout the world, native rural societies established types of housing, means of construction, and use of materials appropriate to their economic and family needs, the materials and technologies available to them, and the environmental conditions they encountered. Because all these preconditions are spatially variable, rural housing and settlement patterns are

comparably varied, a diversity increasingly lost as standardization of materials (corrugated metal, poured concrete, cinder block, and the like) and of design replace the local materials and styles developed through millennia by isolated folk societies.

The world is not yet, of course, totally homogenized. The family compound of the Bambara of Mali (Figure 7.5) is obviously and significantly different from the farmstead of a North American rural family. The Mongol or Turkic *yurt*, a movable low-rounded shelter of felt, skin, short poles, and rope, is a housing solution adapted to the needs and materials of nomadic herdsman of the Asian grasslands (Figure 7.6a). A much different solution with different materials is reached by the Masai, a similar nomadic herding society but of the grasslands of eastern Africa. Their temporary home was traditionally the *manyatta*—an immovable, low-rounded hut made of poles, mud, and cow dung—which was abandoned as soon as local grazing and water supplies were consumed (Figure 7.6b). As the structures in Figure 7.7 can only slightly suggest, folk housing solutions in design and materials provide a worldwide mosaic of nearly infinite diversity and ingenuity.

Within the North American realm, although architectural diversity does not reach global proportions, the variety of ethnic and regional origins of immigrant streams and the differences in encountered environmental conditions assured architectural contrasts among the several settlement hearths of the New World. The landscapes of structures and settlements creating those contrasts speak to us of their creators' origins, travels, adaptations to new locales, and importations and retentions of the habits and customs of other places. One of the joys of travel in a world region as internally diverse as that of North America is to observe the variations in its cultural landscape, to listen to the many voices that tell of its creation through houses, barns, farmsteads, and village designs.

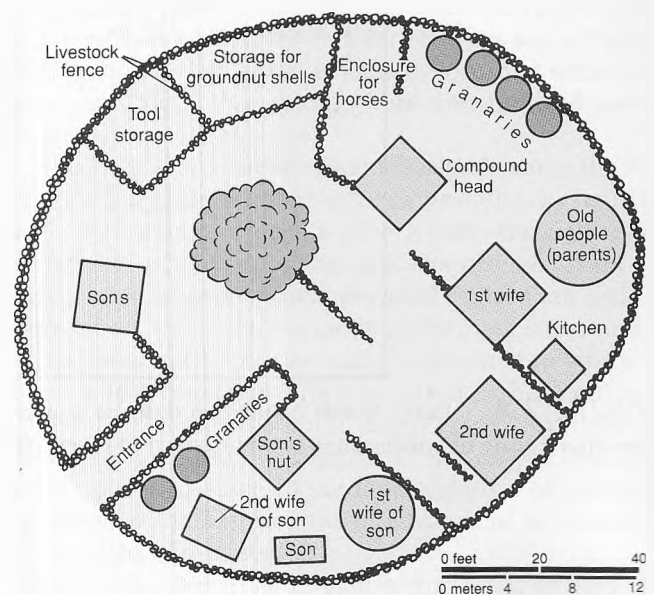


FIGURE 7.5 The extended family compound of the Bambara of Mali.

The folk cultural heritage is now passing; old farm structures are replaced or collapse with disuse as farming systems change. Old houses are removed, remodeled, or abandoned, and the modern, the popular, or the faddish everywhere replaces the evidences of first occupants. A close-knit community may preserve the past by resisting the present, but except where the efforts of preservationists have been successful in retaining and refurbishing one or a few structures or where outdoor museums and recreations have been developed, the landscapes—the voices—of the past are gradually lost. Many of those fading voices first took on their North American accents in the culture hearths suggested in Figure 7.4. They are still best heard in the house types associated with them.

The Northern Hearths

Vernacular house styles—those built in traditional form but without formal plans or drawings—were part of the material culture of early colonists that met new conditions in

America. In the Northeast, colder, snowier winters posed different environmental challenges than did the milder, frequently wetter climates of northwestern Europe, and American stone and timber were more accessible and suitable construction materials than the clay and thatch common in the homeland. Yet the new circumstances at first affected not at all, or only slightly, the traditional housing forms (see “Log Cabin Myths and Facts”).

The Lower St. Lawrence Valley

The St. Lawrence Valley (Figure 7.4) remains as one of the few areas with structural reminders of a French occupation that spread widely but impermanently over eastern North America (Figure 7.8). There, in French Canada, beginning in the middle of the 17th century, three major house types were introduced. All were styles still found in western France today.

In the lower valley below Quebec City, *Norman cottages* appear as near-exact replicas of houses of the Normandy region of northern France, with immense hipped

LOG CABIN MYTHS AND FACTS



First settlers to New England and Virginia brought with them familiarity with timber framing, wattle-and-daub infilling, and thatch roofing. They did not know of and did not construct the log cabins that are now commonly associated with pioneer settlement throughout the Eastern Seaboard. Log buildings were familiar, however, to the Swedes, Germans, and most particularly the eastern Finns, who introduced them into the Delaware Valley area. In Pennsylvania and much of the rest of North America, log construction—employing various building traditions and techniques—marked an initial settlement period. Log housing was not glorified by those who built and occupied it, however. As soon as affluence permitted, the log cabin was replaced (or concealed behind a new facade) by housing of greater prestige or social acceptability. Harold R. Shurtleff explains how the log cabin assumed a bigger role in American folklore than it had in the hearts and minds of its builders.

[T]o deny that log cabins or log dwelling houses existed in the early English settlements, or to maintain

the fact that framed houses were built by the English without passing through a log cabin stage, is to take issue with an American belief that is both deep-seated and tenacious.

The reasons for this emotional basis for the Log Cabin Myth are not far to seek. In the nineteenth century Americans began to marvel at their own progress, and to make a virtue of their early struggles with the wilderness. The log cabin as a symbol of democracy was dramatized in two famous presidential campaigns, those of 1840 and 1860. In literature the popular “Log-Cabin to White House” series firmly fixed the log cabin as the proper scenario for the birth of a great American; as early as 1840 Daniel Webster was apologizing for not having been born in one, and as late as 1935, we are told, a “considerable legend” had already grown up around the “log-cabin origins” of Roy Harris, the Oklahoma composer. Thus, the log cabin came to be identified with “Old Hickory,” “Tippecanoe,” and Abraham Lincoln, with democracy and the frontier spirit, and with the common man and his dream of the good life, and those persons, types, and forces of

which Americans are justly proud. The log cabin, along with the Indian, the long rifle, and the hunting shirt is associated with one of the greatest of all conquests, the winning of the West. It gives us that sense of the dramatic which we seek in our history. . . . [W]e need not be surprised that careless historians projected it back into the earliest colonial settlements, or that many Americans today feel a sense of outrage when told that neither Captain John Smith [of Virginia colony] nor Governor Bradford [of Massachusetts Bay] nor any of the founding fathers dwelt in a log cabin, or ever saw one.

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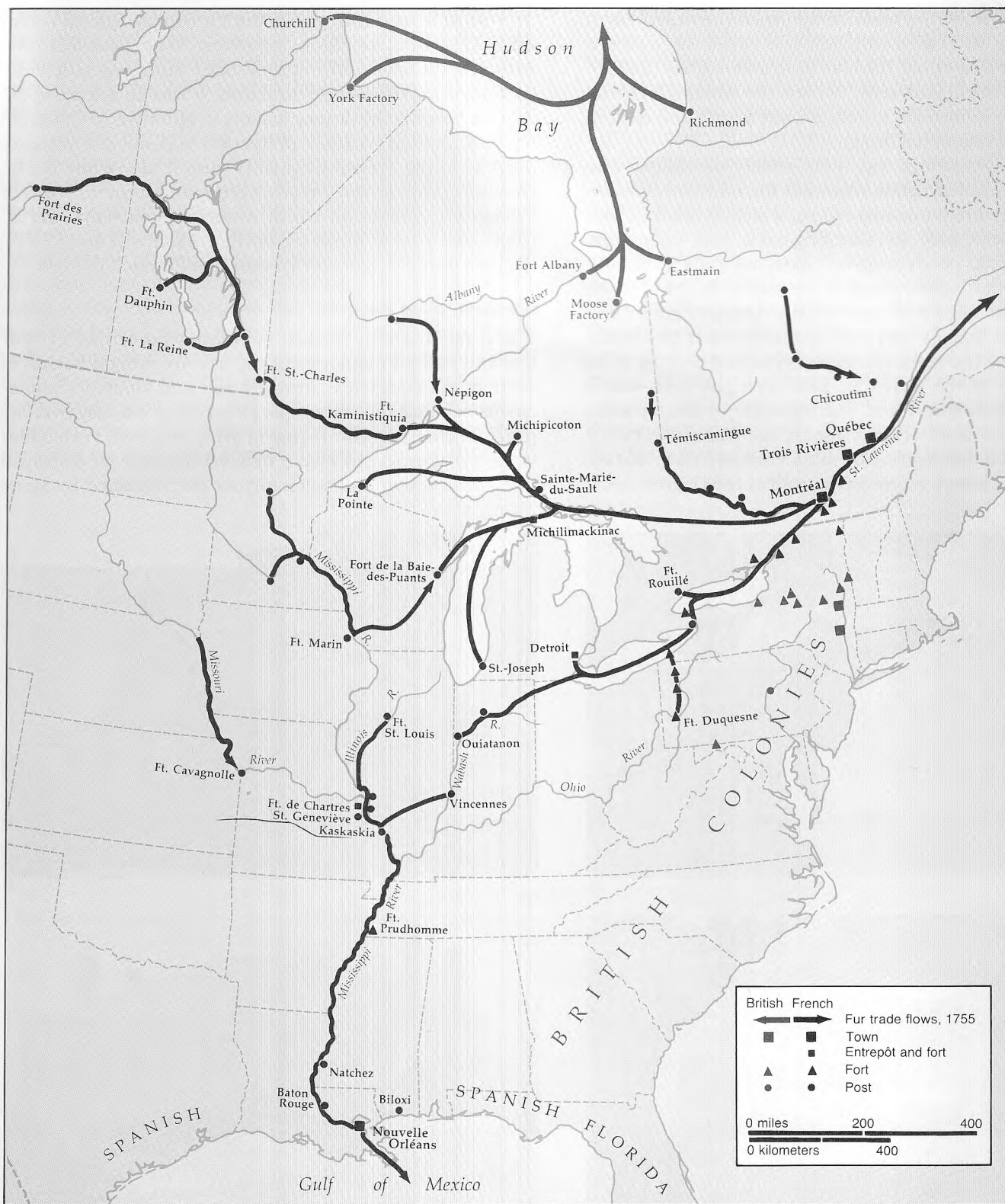


FIGURE 7.8 The “arc of French settlement” about 1750. The French were interested in the fur trade, not in the conversion of the wild landscape to one of farming and settlement. They needed the original forested environment, peopled not by settlers but by the Native American suppliers of the furs they sought. Except for the Lower St. Lawrence and parts of Atlantic Canada, most French influence was confined to their few larger towns, such as New Orleans and Detroit. French rural settlers were few; their impact on the landscape diminished rapidly away from towns and was more reflective of local than of French influences.

Sources: Based on Cole Harris, “French Landscapes in North America,” in *The Making of the American Landscape*, ed. Michael P. Conzen (Boston: Unwin Hyman, 1990), Fig. 4.1, p. 66; and R. Cole Harris, *Historical Atlas of Canada*, vol. 1, *From the Beginning to 1800* (Toronto: University of Toronto Press, 1987), Plate 40.

roofs steeply pitched to wide or upturned (bell-cast) eaves (Figure 7.9a). In France, the bell-cast eaves threw water from the roof away from the clay base and earthen walls of the house. In the St. Lawrence Valley, the building material was fieldstone embedded in mortar, but inertia and custom preserved the traditional design.

The *Quebec cottage* was more widely distributed and more varied in construction materials than the Norman cottage. It featured two unequal rooms, a steeply pitched (but gabled) roof with wide, overhanging eaves and, frequently, an elevated front porch or galley. External walls were built of mortared and whitewashed stone rubble or, often, were framed and sheathed with sawn weatherboard (Figure 7.9b). Later versions usually had two chimneys, near but inside the gable ends. The *Montreal house*—so named because of its concentration in the Upper St. Lawrence Lowland—was a larger stone structure more characteristic of the crowded city than of the open countryside. It has distinctive heavy stone gables containing one or more chimney flues carried above the roof line as a protection against fire (Figure 7.9c).

As well as house styles, the French brought the characteristic *Quebec long barn*, stretching 50 or more feet wide with several bays and multiple barn functions efficiently contained within a single structure. It was an attractive design for keeping the farmer indoors in bitterly cold Canadian winters, though weather protection was not the primary purpose of the French original (Figure 7.9d). While the St. Lawrence Valley house types were found in other areas of French settlements in North America—Louisiana, the St. Genevieve area of Missouri, northern Maine (Figure 7.8)—the long barn was not carried outside of French Canada.

Southern New England

The rural southern English colonists who settled in New England carried memories of the heavily framed houses of their home countries: sturdy posts and stout horizontal beams held together by simple joinery and sided by overlapping clapboards. The series of New England vernacular houses that emerged in the new settlements all displayed that construction and were further distinguished by steep



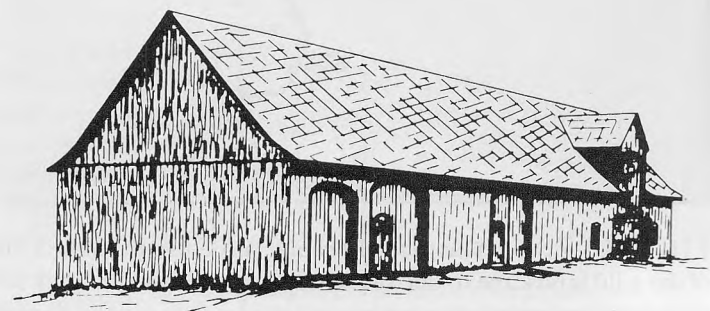
(a)



(b)



(c)



(d)

FIGURE 7.9 Buildings of the Lower St. Lawrence hearth region. (a) The Norman cottage; (b) the Quebec cottage; (c) the Montreal house; (d) the Quebec long barn.

(a), (b), and (c) Courtesy of John A. Jakle. (d) Allen G. Noble, *Wood, Brick, and Stone*, vol. 2 (Amherst: University of Massachusetts Press, 1984), p. 18. Reprinted by permission.

roofs and massive central chimneys. Brick and stone buildings were rare in New England. Clay and lime for their construction were not easily available, and houses built of those materials had not been part of the home district culture of the settlers.

Among the primary house types evolved in the New England hearth were: (1) the *garrison house*, a two-story house with central chimney separating two rooms of roughly equal size on each floor. Its characteristic second floor overhang was a relict of urban house design in medieval Europe (Figure 7.10a); (2) the *saltbox house*, showing that same floor plan enlarged through a shed or lean-to addition giving extra rooms on the first floor to the rear and therefore having an asymmetrical gable roof (Figure 7.10b); and (3) the *New England large house*, a still larger structure of up to 10 rooms with lobby entrance, central chimney, and a symmetrical gable roof. Later, the central-chimney design gave way completely to the *Georgian* style with paired chimneys that reinforced the sense of balance (Figure 7.10c).

The New England hearth also created the *gable-front* house and its modification, the *upright-and-wing* or *lazy-T* house (Figure 7.10d). Versions of the upright-and-wing—undergoing modifications as they migrated—became landscape staples in both rural and urban areas from western New York into the Middle West. Among the rural outbuildings throughout the southern part of New England, the small rectangular English barn organized around its central threshing floor was the rule.

The Hudson Valley

An area settled by a complex mixture of Dutch, French, Flemish, English, and German settlers, the Hudson Valley showed a comparable mixture of common house forms. Little evidence of the once-dominant Dutch influence now remains. Dutch houses were usually of stone or brick, often one-and-a-half story, one-room-deep elongated structures, frequently with the gable end toward the front. Dutch barns, roughly square in plan with steep-pitched roof, horizontal



(a)



(b)



(c)



(d)

FIGURE 7.10 New England house types. (a) The garrison house; (b) the saltbox house; (c) the Georgian-style variant of the New England large house; (d) an upright-and-wing house, the wing representing a one-story extension of the basic gable-front house plan.

(b) and (d) Courtesy of John A. Jakle.

clapboard siding, and multiple entrances in the gable ends, were found throughout the area of Dutch settlement.

The Middle Atlantic Hearths

The Middle Atlantic hearths were also ethnically diverse and the sites of vernacular architecture more influential on North American housing styles than any other early settlement areas. The log cabin, later carried into Appalachia and the trans-Appalachian interior, evolved there. There, too, was introduced what would later be called the *I house*—a two-story structure one room deep with two rooms on each floor—that became prominent in the Upper South and the Lower Middle West in the 19th century.

The Delaware Valley

Dutch and Swedish settlers were less successful in colonizing the Delaware valley hearth area than were the English Quakers and Germans who arrived in the late 17th and early 18th centuries. The latter were joined by Finns, Welsh, and Scotch-Irish, each of whom contributed to the diversity of stone, brick, frame, and log housing of the district. Urban Quakers, arriving with the memory of the Great London Fire of 1666 still fresh in mind, built in red brick small versions of the Georgian-style houses then becoming fashionable in England. Germans, Scandinavians, and particularly, eastern Finns introduced the first New World log houses in the 17th century in Delaware and New Jersey. It was they, not the English colonists, who gave America that frontier symbol.

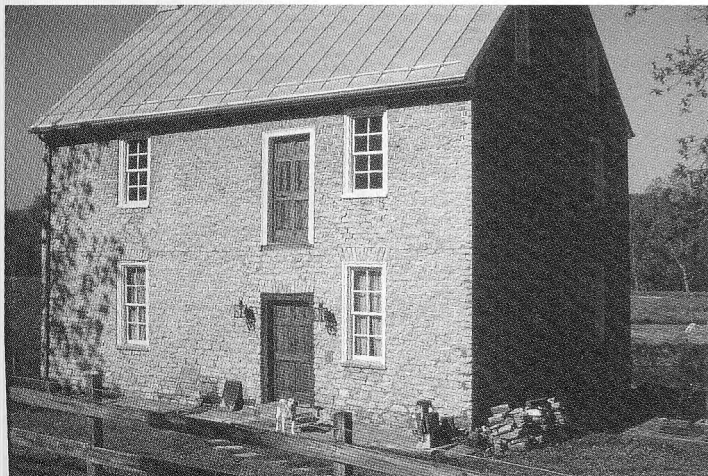
The Delaware Valley hearth (sometimes called the Pennsylvania hearth) is particularly noted for two vernacular house designs. The *four-over-four house*—so called in reference to its basic two-story floor plan with four rooms up and four down—was an amalgam of Georgian and Germanic

house design wedded to a smaller Quaker plan (Figure 7.11a). The classic *I house* almost always was a “two-over-two” arrangement (7.11b).

A famous and widespread contribution of the Delaware Valley hearth to American architecture was not a house style but a barn—or rather a series of related designs of the German bank barn. Unlike the earlier English and Dutch barns that were essentially crop oriented, the bank barn combined animal shelter with the grain storage and threshing functions. The variously named German, Pennsylvania, Dutch, or Schweizer (Swiss) barn—in its several versions—was carried from its Pennsylvania origins to the continental interior and from the southern Appalachians northward to Ontario (Figure 6.23). Perhaps no other hearth region had as widespread an influence on American vernacular architecture as did the Pennsylvania hearth. Migrants from there carried their material culture southwestward along the Great Valley of Virginia, as well as due west into the Ohio Valley.

Chesapeake Bay

The area of dominantly English and Scotch-Irish settlement around Chesapeake Bay was rural and nearly devoid of large cities. Its settlers initially introduced wood-framed houses, though brick construction became increasingly common. Both building types featured raised foundations, outside end chimneys, and one-deep floor plans. Kitchens were often detached, and by the 18th century adaptation to the more southerly temperature conditions was reflected in added front porches and front-to-rear ventilation passages. Popular throughout the Middle Atlantic hearth regions, the classic *I house* was also part of the vernacular architecture of the Chesapeake Bay hearth (Figure 7.11b); it was early carried



(a)



(b)

FIGURE 7.11 House types of the Middle Atlantic hearths. (a) Four-over-four house; (b) the traditional or classic *I house*, with its two rooms on each floor separated by central hallways, had a varying number of façade openings and, usually, end chimneys located in the standard gable roof, but all symmetrically organized. This brick version, characteristic of the Upper South, has a detached summer kitchen.

(a) Courtesy of John A. Jakle.

into the Upper South and, after the 1850s, into the interior. Sometimes of brick but overwhelmingly of frame construction, its builders and building materials were brought by the new railroads to Indiana, Illinois, and Iowa (the *I's* after which the house was named).

The Southern Hearths

Both climate and a new ethnic cultural mix altered the form of vernacular housing in the southern hearths along the Atlantic Coast and in the Gulf and Delta areas. Although local responses to these influences varied, the overall result was housing in a different style for different needs in the South than in the North.

The Southern Tidewater

Along the southeastern Atlantic coastal region of South Carolina and Georgia, English and Huguenot settlers faced problems of heat, humidity, and flooding not encountered farther to the north. The malaria, mosquitos, and extreme heat plaguing their inland plantations during the summer caused the wealthy to prefer hot-season residence in coastal cities such as Charleston, where sea breezes provided relief. The result was the characteristic *Charleston single house*, a name related to its single row of three or four rooms ranged from front to back and lined on the outside of each floor by a long veranda along one side of the structure (Figure 7.12). Set with its narrow end facing the street, the house was often raised on stilts above marshy land and to prevent flooding from hurricanes. The *Huguenot-plan house* introduced by French settlers was a square, hipped-roof design, usually two-story with a double file of rooms. Mostly brick in its later versions, the Huguenot-plan house was diffused throughout the southeast from its Tidewater origins.

The Mississippi Delta

The French, dominant in the Lower St. Lawrence Valley far to the north, established their second North American culture hearth in New Orleans and along the lower Mississippi during the 18th century (Figure 7.8). There, French influences from

Nova Scotia and the French Caribbean islands—Haiti, specifically—were mixed with Spanish and African cultural contributions. Again, heat and humidity were environmental problems requiring distinctive housing solutions. The *grenier house* emerged as the standard design for rural Louisiana. Usually of frame construction with cypress siding, the structures were raised on posts or pillars several feet off the ground for cooling and protection against floodwaters, ground rot, and termites.

The *shotgun house* is a simple, inexpensive, and efficient house style identified with the Delta area but owing its origin to Africa by way of Port-au-Prince, Haiti, and introduced into America by free Haitian blacks who settled in the Delta before the middle of the 19th century. The shotgun house is easily recognized in both urban and rural settings by its narrow gable front, its considerable length of three or four rooms, and its front-to-back alignment of all room door openings (Figure 7.13). Quickly and cheaply made of sawed lumber, they found favor far beyond the delta area as affordable urban and rural housing.



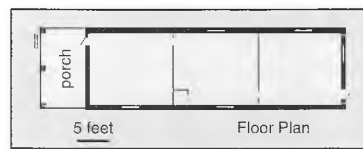
FIGURE 7.12 The Charleston single house.



(a)

FIGURE 7.13 (a) Shotgun cottages in Claiborne County, Mississippi; (b) one variant of a shotgun cottage floor plan.

(a) Courtesy of John A. Jakle.



(b)

Interior and Western Hearths

Other immigrant groups, some from the eastern states, others from abroad—and all encountering still different environmental circumstances and building material sources—made their impress on local areas of the interior and North American West. Settlers of many different origins on the Great Plains initially built sod dugouts or rammed earth houses in the absence of native timber stands. Later, after the middle of the century, “balloon frame” construction—utilizing newly available cheap wire nails and light lumber milled to standard dimensions—became the norm in the interior where heavy timbers for traditional post and beam construction were not available. The strong, low-cost housing the new techniques and materials made possible owed less to the architectural traditions of eastern America than it did to the simplicity and proportional dimensions imposed by the standardized materials. Midwest vernacular house types developed—including the one-story gabled rectangle, double-wing, and two-story foursquare farmhouses, quickly constructed by local carpenters or the farmers themselves.

The thick-walled *Spanish adobe house*, long and single-storied with a flat or low-pitched earth-covered roof entered Anglo America through the Hispanic borderlands (Figure 6.11) but in most of its features owed more to indigenous Pueblo Indian design than to Spanish origins. In the Far West, Hispanic and Russian influences were locally felt, although housing concepts imported from the humid East predominated. In the Utah area, Mormon immigrants established the *central-hall house*,—related to both the I house and the four-over-four house—as the dominant house type.

A variety of ethnic and architectural influences met and intermingled in the Pacific Northwest. French Canadians produced a closely knit ethnic settlement on the Willamette River at French Prairie (between Salem and Portland, Oregon). Chinese came to the coal mines of Vancouver Island in the 1860s; later, thousands were employed in the construction of the Northern Pacific Railroad. By the 1870s an architecturally distinctive Chinatown was centered around the foot of Yesler Way and Occidental Avenue in Seattle, and similar enclaves were established in Tacoma, Portland, and other urban centers. But most immigrants to the British Columbia–Washington–Oregon regions were of North American not foreign birth, and the vast majority on the United States side came from midwestern roots, representing a further westward migration of populations whose forebears (or who themselves) were part of the Middle Atlantic culture hearths. Some—the earliest—carried to the Oregon and Washington forested regions the “midland” American backwoods pioneer culture and log-cabin tradition first encountered in the Delaware Valley hearth; others brought the variety of housing styles already well represented in the continental interior.

Architectural Diffusions

These vernacular architectural origins and movements were summarized by the cultural geographer Fred Kniffen, who thought that house types of the eastern United States and ultimately of much of Anglo America could be traced to three source regions on the Atlantic Coast, each feeding a separate diffusion stream: New England, Middle Atlantic, and Southern Coastal (Figure 7.14). *New England*, he argued, gave rise to a series of evolving house types based on a simple English original, variants of which spread westward with the settlers across New York, Ohio, Indiana, and Illinois and into Wisconsin and Iowa.

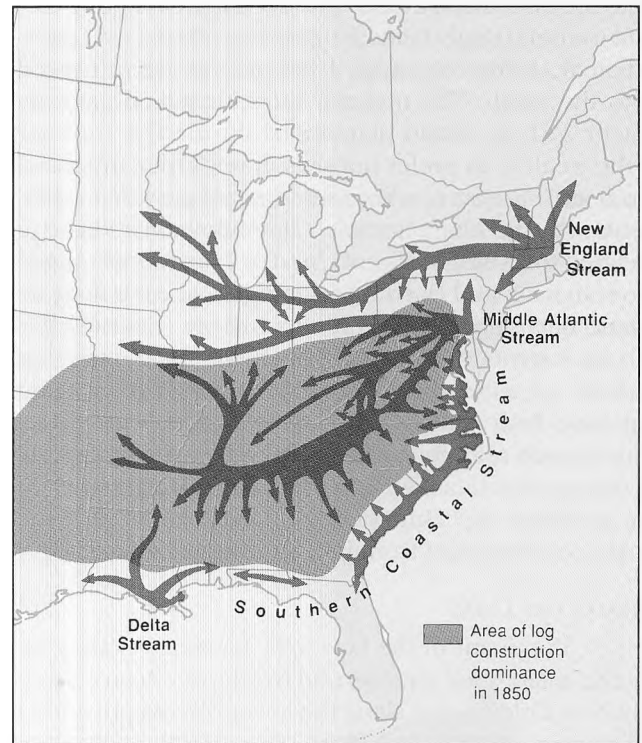
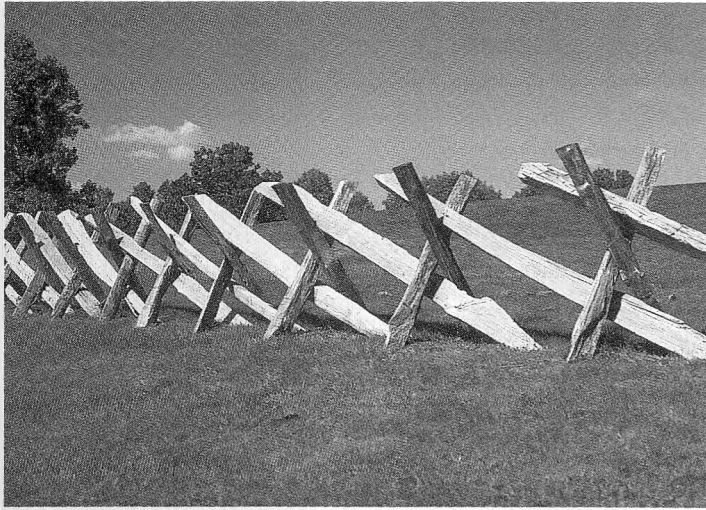


FIGURE 7.14 Architectural source areas and the diffusion of building methods from the Atlantic Seaboard hearths. The map emphasizes log and frame construction as of 1850. The variation in the width of stream paths suggests the strength of the influence of the various hearths on vernacular housing away from the coast. The Southern Coastal Stream was limited in its influence to the coastal plain. The Delaware Valley hearth not only exerted a strong influence on the Upland South but also became—along with other Middle Atlantic hearths—the dominant vernacular housing influence in the lower Middle West and the continental interior. By 1850 and farther to the west, new expansion cores were emerging around Salt Lake City, in coastal California, and in the Willamette Valley area of Oregon—all bearing the imprint of housing designs that first emerged in eastern hearths.



(a)



(b)



(c)



(d)

FIGURE 7.16 Folk fencing of the eastern United States. (a) A buck fence; (b) a wattle or woven fence; (c) the angled-rail, snake, or worm fence; (d) a post-and-rail fence.

The angled-rail, "snake," or "worm" fence was a dominant American fence form for much of the 19th century until increasing labor costs and wood scarcity made it uneconomical. Its earlier attraction was its ease of construction—it required no post holes—and its use of abundant farm-produced wood; it was widely found in the South and in the eastern portion of the Middle West (Figure 7.16c). Indeed, wherever the backwoods pioneers temporarily settled, the zigzag log fence enclosed their forest clearings. The design was carried into the Pacific Northwest from Oregon to British Columbia, to be replaced only as new generations of farmers appeared and farm woodlots were reduced.

The post-and-rail fence, a form that consumed less land and fewer rails than did the angled fence, was particularly popular in southern New England and the Delaware Valley areas (Figure 7.16d). After the establishment of an American steel industry during the last half of the 19th century—and in the grasslands of the Great Plains—wire fencing,

barbed wire in particular, became the commonly encountered form of stock enclosure or crop protection. Briefly, however, both sod fences and hedge fences (the Osage orange in particular) were popular from the forest margin westward to the mountains.

Nonmaterial Folk Culture

Houses burn, succumb to rot, are remodeled beyond recognition, or are physically replaced. Fences, barns, and outbuildings are similarly transitory features of the landscape, lost or replaced by other structures in other materials for other purposes as farms mechanize, consolidate, no longer rear livestock, are abandoned, or are subdivided for urban expansion. The folk housing and farm buildings that seem so solid a part of the built environment are, in reality, but temporary features of it.



Whatever may be folk societies' regional differences based on the varying environments they occupy or the differing cultures they express, all have in common an economy of self-sufficiency based on family or small group cooperative effort. In the hearth regions and along the diffusion paths of settlement in Anglo America, the basic subsistence unit was the individual household. The husband and wife were equal partners in the enterprise, producing their own food, clothing, housing, furniture, and such necessary household goods as candles and soap. Beverly Sanders describes the gender division of labor in colonial households throughout much of the eastern hearth regions and the complex and arduous tasks assigned to women, who of necessity were masters of a wide range of folk crafts, artifacts, and skills. The essentials of women's responsibilities did not change in later years in the settlement of the United States or Canadian prairies or of the Northwest.

By and large the man was responsible for building the house and furniture, clearing the land and planting crops, [and] slaughtering the larger animals. The woman was responsible for feeding and clothing all household members, manufacturing household necessities, housecleaning, nursing and child care. . . .

Feeding a family involved far more than just cooking. The first care . . . was tending the fire. Throughout the year, the woman had to produce most of the food as well as cook it. She generally planted and tended a kitchen

garden in which grew vegetables that could be stored in cold cellars for the winter, and others that could be dried. Fruits such as apples and berries were dried or preserved. The homemaker also cared for the barnyard animals. In order to have a chicken in the kettle for dinner, [she] had to slaughter, pluck and clean the fowl the same day. When cows and pigs were slaughtered she had the gigantic task of salting the beef to preserve it, and smoking the pig meat into ham and bacon. . . . Homemakers pickled a wide variety of foods. . . .

Like food, clothing had to be made "from scratch." Fur and leather were popular materials for clothing [on the frontier] because they didn't need to be woven into cloth. Making linen cloth from the flax plant was a painstaking process that could take as long as sixteen months—from planting flax to spinning and bleaching thread. In wool making, the fleece from the sheep was cleaned, oiled and then combed to draw out the fibers to be spun into thread. Women wove the linen and woolen threads into cloth on a hand loom. . . . Clothing took a long time to make because it was generally worked on in odd hours that women could spare from more pressing chores. . . .

[C]andle making had to be done during the busy autumn season before the long dark winter set in. Most were made from tallow, a rendered animal fat which was melted with boiling water in a large heavy kettle. Rows of candle wicks . . . were dipped into the melted tallow, cooled, then dipped again and again. . . . Since candles were always scarce, they were stored

away very carefully, and used very sparingly.

The most unpleasant chores of all were the cleaning of houses, clothing and people. Water was scarce and had to be carried into the house from a nearby stream. The cleaning agent—a soft soap—was manufactured by a tedious process that involved the combination of animal grease and lye, a caustic substance derived from ashes. . . . The busy homemaker could not possibly do laundry and housecleaning every day, but rather set aside special days for it once a month, or even once in three months. . . .

Here is one day's work in the year 1775, set down in the diary of . . . a Connecticut girl:

Fix'd gown for Prude,—Mend
Mother's Riding-hood,—Spun
short thread,—Fix'd two gowns for
Welsh's girls,—Carded tow,—Spun
linen,—Worked on
Cheesebasket,—Hatchle'd flax
with Hannah, we did 51 lbs.
apiece,—Pleated and ironed,—
Read a Sermon of Dodridge's,—
Spooled a piece,—Milked the
cows,—Spun linen, did 50 knots,—
Made a Broom of Guinea wheat
straw,—Spun thread to whiten,—
Set a Red dye,—Had two Scholars
from Mrs. Taylor's,—I carded two
pounds of whole wool and felt
Nationally,—Spun harness twine,—
Scoured the pewter.

Source: Beverly Sanders, *Women in the Colonial Era and the Early American Republic 1607-1820* (Newton, MA: WEEA/Education Development Center, 1979) pp. 18-21.

Third, food habits are not just matters of sustenance but are intimately connected with the totality of *culture* or *custom*. People eat what is available and also what is, to them, edible. Sheep's brains and eyeballs, boiled insects, animal blood, and pig intestines, which are delicacies in some cultures, may be abominations to others unfamiliar with the culture that offers them as special treats to

guests. (For a special case of folk food habit, see "A Taste for Dirt.") Further, in most societies food and eating are considered a social, not just a personal, experience. Among Slavic peoples, to offer a guest bread and salt is a mark of esteem and welcome, and the bountiful and specially prepared meal as the mark of hospitality is common in nearly all cultures.



Hundreds of millions of people throughout the world eat dirt, usually fine clays, in a custom—called *geophagy*—so widespread it is usually considered to be within the range of normal human behavior. The practice is particularly common in sub-Saharan Africa, where hundreds of farmer and herder cultures consume dirt and, in some cases, sand. Africans brought as slaves to the United States carried the habit with them, and it is now prevalent among their descendants in the American South. It is also found widely in Asia, the Middle East, and parts of Latin America.

Wherever the custom is practiced, it is most common among pregnant women, though it may be more usual than reported among males as well. Some data indicate that from 30% to 50% of expectant mothers in large areas of Africa and among rural blacks in sections of the American South eat clay, as do hundreds of millions of

women elsewhere in the world. Since dozens of animal species also consume clay, it is usually assumed that geophagy can supply minerals otherwise deficient in diets or can counteract nausea or diarrhea. (One of the most popular and widely available commercial remedies for diarrhea is based upon the clay *kaolin*). Heavy, chronic clay consumption can also cause serious ailments, including intestinal blockages, anemia, growth retardation, and zinc deficiency among some practitioners of the habit, however. As a folk food, clay may be specially selected for flavor (a sour taste is preferred). It is often mixed with bread dough or with vinegar and salt and baked, cooked, or smoked like bacon. It may also be used as a condiment or neutralizer. Nearly all varieties of wild potatoes growing in the Andes Mountains of South America (where the potato is native) contain toxic chemicals, as do some of the species cultivated and regularly eaten by the Indian populations there. To counteract intestinal distress caused by

consuming the tubers, Indians either leach out the chemicals or, commonly, eat the potatoes with a dip made of clay and a mustardlike herb. That practice may have made it possible to domesticate this important food crop. Amerindians of the southwestern United States similarly use clay as a condiment with toxic wild tubers and acorns.

Like many other folk customs, geophagy is identified with specific groups rather than universally practiced. Like others, it seems to persist despite changes in the earlier dietary circumstances that may originally have inspired it and despite (in the United States) growing social pressure condemning the habit. Southern relatives may send favored varieties of clay to women who have moved to northern cities. Others, yielding to refined sensibilities, may substitute Argo starch, which has similar properties, for the clay consumption habits of their culture group.

The interconnections between the folk, the ethnic, and the customary in food habits and preferences are evident in the North American scene of mixed settlement and environmental diversity. Of course, the animals and plants nurtured, the basic recipes followed and flavorings added, and the specialized festive dishes of American folk groups have ethnic origins. Many originated abroad and were carried to and preserved in remote New World areas. Many were derived from the larder of the Amerindians and often varyingly used in different regional contexts. Turkey, squash, pumpkin, and cranberries were among them, as was the corn (maize) that appeared with time as southern grits, southwestern tortillas, and everywhere south of Pennsylvania the American replacement for wheat in the making of bread. Such classic American dishes as Brunswick stew, the clambake, smoked salmon, cornflakes, and beef jerky were originally Indian fare. Gradually, the environmental influences, isolation, and time spans implicit in the concept of folk culture created culinary distinctions among populations recognized as American rather than ethnic immigrants.

Shelves of cookbooks mark the general recognition of folk cuisines of the United States. Broad categories of New England, Creole, Southern, Chesapeake, Southwestern, and other regional cookery may be further refined into cook-

books containing Boston, Pennsylvania Dutch, Charleston, New Orleans, Tidewater, and other more localized recipes. Specific American dishes that have achieved fame and wide acceptance developed locally in response to food availability. New England seafood chowders and baked beans; southern pone, johnnycake, hush puppies, and other corn-(maize-) based dishes; the wild rice of the Great Lakes states; Louisiana crayfish (crawfish); southern gumbo; and salmon and shellfish dishes of the Pacific Coast are but a few of many examples of folk foods and recipes originally and still characteristic of specific cultural areas but subsequently made part of national food experience. Others, once locally known, effectively disappear as the culture or foodstuff source is lost. The "fern pie" of Oregon's frontier past and "pigeon pie" made with the now-extinct passenger pigeon are among many examples.

Drink

In the United States, drink also represents an amalgam between ethnic imports and folk responses and emphases. A colonial taste for rum was based on West Indian and Tidewater sugarcane and molasses. European rootstock was introduced, with mixed results, to develop vineyards in most seaboard settlements; the native scuppernong grape was

tried for wine making in the South. Peach, cherry, apple, and other fruit brandies were distilled for home consumption. Whiskey was a barley-based import accompanying the Scots and the Scotch-Irish to America, particularly to the Appalachians. In the New World the grain base became native corn (maize), and whiskey making became a deeply rooted folk custom integral to the subsistence economy.

Whiskey also had cash economy significance. Small farmers of isolated areas far from markets converted part of their corn and rye crops into whiskey to produce a concentrated and valuable commodity conveniently transportable by horseback over bad roads. Such farmers viewed a federal excise tax imposed in 1791 on the production of distilled spirits as an intolerable burden not shared by those who could sell their grain directly. The tax led, first, to a short-lived tax revolt, the Whiskey Rebellion of 1794, in western Pennsylvania and, subsequently, to a tradition of moonshining—producing untaxed liquor in unlicensed stills. Figure 7.18 suggests the close association between its isolated Appalachian upland environment and illicit whiskey production in east Tennessee in the 1950s.

Folk Music

North American folk music began as transplants of familiar Old World songs carried by settlers to the New World. Each group of immigrants established an outpost of a European musical community, making the American folk song, in the words of Alan Lomax, “a museum of musical antiques from many lands.” But the imported songs became Americanized, hybridization between musical traditions occurred, and American experience added its own songs of frontier life, of farming, courting, and laboring (see “The American Empire of Song”). Eventually, distinctive American styles of folk music and recognizable folk song cultural regions developed (Figure 7.19).

The *Northern* song area—including the Maritime Provinces of Canada, New England, and the Middle Atlantic states—in general featured unaccompanied solo singing in clear, hard tones. Its ballads were close to English originals, and the British connection was continuously renewed by new immigrants, including Scots and Irish. The traditional ballads and current popular songs brought by British immi-

grants provided the largest part of the Anglo-Canadian folk song heritage. On both sides of the border, the fiddle was featured at dances, and in the States, fife-and-drum bands became common in the early years of the Republic.

The *Southern Backwoods and Appalachian* song area, extending westward to east Texas, involved unaccompanied, high-pitched, and nasal solo singing. The music, based on English tradition and modified by Appalachian “hard-scrabble” life, developed in isolation in upland and lowland settlement areas. Marked by moral and emotional conflict with an undercurrent of haunting melancholy, the backwoods style emerged in the modern period as the roots of the distinctive and popular genre of “country” music.

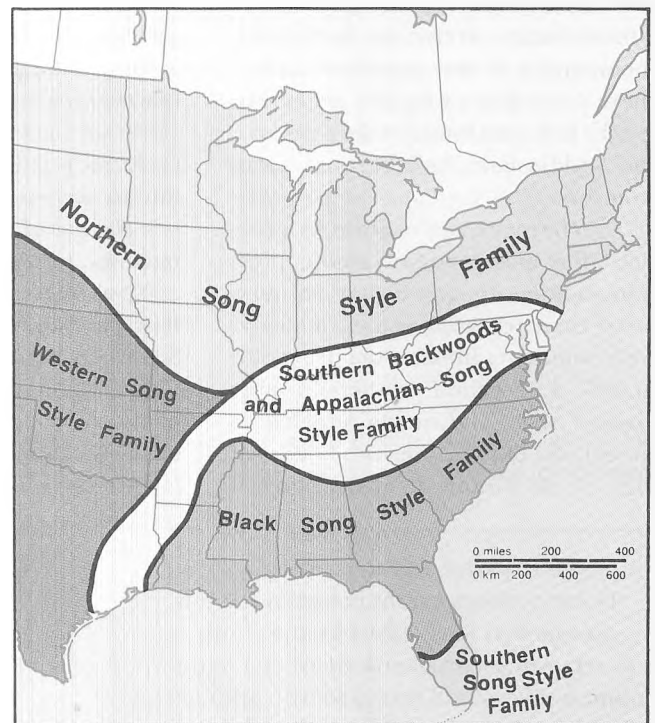


FIGURE 7.19 Folk song regions of eastern United States. Alan Lomax has indirectly outlined folk culture regions of the eastern United States by defining areas associated with different folk song traditions.

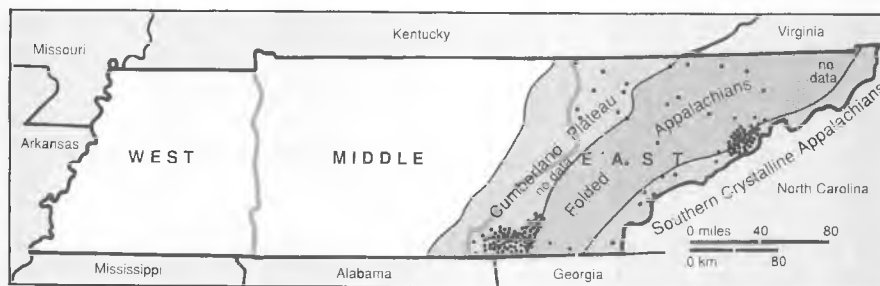


FIGURE 7.18 In the mid-1950s, official estimates put weekly moonshine production at 24,000 gallons in mountainous eastern Tennessee, at 6000 gallons in partially hilly middle Tennessee, and at 2000 gallons in flat western Tennessee. The map shows the approximate number of stills seized each month at that time in east Tennessee. Each dot indicates one still.



he map sings. The chanteys surge along the rocky Atlantic seaboard, across the Great Lakes and round the moon-curve of the Gulf of Mexico. The paddling songs of the French-Canadians ring out along the Saint Lawrence and west past the Rockies. Beside them, from Newfoundland, Nova Scotia, and New England, the ballads, straight and tall as spruce, march towards the West.

Inland from the Sea Islands, slave melodies sweep across the whole South from the Carolinas to Texas. And out on the shadows of the Smoky and Blue Ridge mountains the old ballads, lonesome love songs, and hoedowns

echo through the upland South into the hills of Arkansas and Oklahoma. There in the Ozarks the Northern and Southern song families swap tunes and make a marriage.

The Texas cowboys roll the little doughies [*sic*] north to Montana, singing Northern ballads with a Southern accent. New roads and steel rails lace the Southern backwoods to the growl and thunder of Negro chants of labour—the axe songs, the hammer songs, and the railroad songs. These blend with the lonesome hollers of levee-camp mule-skinners to create the blues, and the blues, America's *cante hondo*, uncoils its subtle, sensual melancholy in the ear of all the states, then all the world.

The blues roll down the Mississippi to New Orleans, where the Creoles mix the musical gumbo of jazz—once a dirty word, but now a symbol of musical freedom for the West. The Creoles add Spanish pepper and French sauce and blue notes to the rowdy tantara of their reconstruction-happy brass bands, stir up the hot music of New Orleans and warm the weary heart of humanity. . . . These are the broad outlines of America's folk-song map.

"Introduction" from *Folk Songs of North America* by Alan Lomax. Copyright © 1960 by Alan Lomax. Used by permission of Doubleday, a division of Bantam Doubleday Dell Publishing Group, Inc.

The northern and southern traditions abutted in a transition zone along the Ohio Valley but blended together across the Mississippi to create the *Western* song area. There, factual narrative songs reflected the experiences of cowboy, riverman, sodbuster, and gold seeker. Natural beauty, personal valor, and feminine purity were recurring themes. Many songs appeared as reworked lumberjack ballads of the North or other modifications from the song traditions of the eastern United States.

Imported songs are more prominent among the traditional folk tunes of Canada than they are in the United States; only about one-quarter of Canadian traditional songs were composed in the New World. Most native Canadian songs—like their U.S. counterparts—reflected the daily lives of ordinary folk. In Newfoundland and along the Atlantic Coast, those lives were bound up with the sea, and songs of Canadian origin dealt with fishing, sealing, and whaling. Particularly in Ontario, it was the lumber camps that inspired and spread folk music. Anglo Canadian songs show a strong Irish character in pattern and tune and traditionally were sung solo and unaccompanied.

The *black* folk song tradition, growing out of racial and economic oppression, reflects a union of Anglo American folk song, English country dancing, and West African musical patterns. The African American folk song of the rural South or the northern ghetto was basically choral and instrumental in character; hands and feet were used to establish rhythm. A strong beat, a leader-chorus style, and deep-pitched mellow voices were characteristic.

Lomax dealt with and mapped only English-language folk song styles. To round out the North American scene, mention must also be made of French Canadian river and fur trader songs of the Northeast and the strong Mexican American musical tradition still vital and spreading in the Southwest.

Different folk music traditions have metamorphosed and spread in the 20th century as distinctive styles of popular music. Jazz emerged in New Orleans in the later 19th century as a union of minstrel show ragtime and the blues, a type of southern black music based on work songs and spirituals. Urban blues—performed with a harsh vocal delivery accompanied by electric guitars, harmonicas, and piano—was a Chicago creation, brought there largely by artists from Mississippi. Country music spread from its southern white ancestral areas with the development of the radio and the phonograph in the 20th century. It became commercialized, electrified, and amplified but remained at core modified folk music (Figure 7.20). Bluegrass style, a high-pitched derivative of Scottish bagpipe sound and church congregation singing tradition, is performed unamplified, true to its folk origins. Bluegrass identification with commercial singing groups bearing identities derived from place names emphasizes the ties of the people, the performers, and the land in the folk tradition.

As these examples of musical style and tradition show, the ethnic merges into the folk, and the folk blends into the popular—in music and in many other elements of culture. On the other hand, Anglo American religious folk songs

Folk medicines, cures, and health wisdom in the United States have been best developed and preserved in the Upland South and Southern Appalachia, along the Texas-Mexican boundary in the Hispanic borderlands, and in the rural West among both white and Indian populations. But primitive peoples everywhere have their known cures and their folk wisdoms in matters medicinal, and all of us in our everyday references may unknowingly include reminders of that knowledge: "The hair of the dog that bit you" was not originally a recommendation for treating a hangover but an accepted remedy for curing the bite of a mad dog.

The Oral Folk Tradition

Folklore is the oral tradition of a group. It refers to ways of talking and interacting and includes proverbs, prayers, common expressions, and particularly, superstitions, beliefs, narrative tales, and legends. It puts into words the basic shared values of a group and informally expresses its ideals and codes of conduct. Folklore serves, as well, to preserve old customs and tales that are the identity of the folk group. The Brothers Grimm recorded German fairy tales early in the 19th century to trace the old mythologies and beliefs of the German people, not for the entertainment of the world's children.

Immigrant groups settling in the Americas brought with them different well-developed folklore traditions, each distinctive not only to the ethnic group itself but even to the part of the home country from which it came. In the New World, the established folklores of home areas became intermixed. The countries of North and South America contain many coexisting and interacting folklore traditions brought by early European colonizers, by transported African slaves, and by later diversified immigrant groups from both Europe and Asia.

The imported folk traditions serve to identify the separate groups in pluralistic societies. In some instances, the retention of folk identity and belief is long term because particular groups—Pennsylvania Dutch, Old Order Amish, and the Hasidim of Brooklyn, for example—isolate themselves from mainstream American culture. Other groups—in Appalachia, the Missouri Ozarks, and the Louisiana bayous—may retain or develop distinctive folklore traditions because isolation was thrust on them by remoteness or terrain.

Where immigrant groups intermixed, however, as in most New World countries, *syncretism*—the merging or fusion of different traditions—is characteristic. Old World beliefs, particularly in magic, begin to recede and are lost to later generations. Proverbs begin to be shared, common short jokes replace long folk tales as both entertainment and devices of instruction or ridicule of deviant behavior, and literacy reduces dependence on the reports and repetitions of knowledgeable elders. **Folkways**—the learned behavior shared by a society that prescribes accepted and common modes of conduct—become those of the country as a whole as acculturation and popularization dictate the ways of life of all.

With the passage of time, too, a new folklore of legend, myth, and hero develops. In the United States, Washington and the cherry tree, Patrick Henry's plea for liberty, the exploits of Jim Bowie or Davy Crockett, the song of John Henry the steel-driving man, or tales of Paul Bunyan become the common property and heritage of all Americans—a new national folklore that transcends regional boundaries or immigrant origins.

Folk Cultural Regions of Eastern United States

A small set of hearths or source regions of folk culture origin and dispersal have been recognized for the eastern United States. They are indicated in Figure 7.22. The similarity of the hearth locations and diffusion routes to the pattern of ethnically based architectural regions and flows shown in Figure 7.14 is unmistakable and a reminder that in the American context, "folk" and "ethnic" are intertwined and interchangeable when traced back to first settlement. Frontier settlers carrying to new, interior locations the artifacts and traditions of those hearth areas created a small set of indistinctly bounded eastern folk cultural regions (Figure 7.23). Although they have become blurred as folk traditions have died, their earlier contributions to American folk diversity remain clear.

From the small *Mid-Atlantic* region, folk cultural items and influences were dispersed into the North, the Upland South, and the Midwest. Southeastern Pennsylvania and the Delaware Valley formed its core and the Pennsylvania Dutch determined much of the Mid-Atlantic region's character. The eastern Finns added their log-building techniques and subsistence life-styles. Furniture styles, log-building techniques, decorative arts, house and barn types, and distinctive "sweet" cookery were among the purely European imports converted in the Mid-Atlantic hearth to American folk expressions.

The folk culture of the *Lowland South*, by contrast, derived from English originals and African admixtures. French influences in the Louisiana coastal extension and some down slope migrations from the highland areas add to the amalgam. Dogtrot and I houses became common; English cuisine was adapted to include black-eyed peas, turnip greens, sweet potatoes, small-bird pies, and syrups from sugarcane and sorghum. African origins influenced the widespread use of the banjo in music.

The *Upland South* showed a mixture of influences carried up from the Tidewater and brought south from the Mid-Atlantic folk region along the Appalachian highlands by settlers of German and Scotch-Irish stock. The sheltered isolation of the Upland South and its Ozark outlier encouraged the retention of traditional folk culture long after it had been lost in more accessible and exposed locations. Log houses and farm structures, rail fences, traditional art and music,

PATTERNS OF POPULAR CULTURE

In 1728, Mary Stith of Virginia wrote to a friend, then in England, "When you come to London pray favour me in your choice of a suit . . . suitably dressed with . . . whatever the fashion requires." In the 1750s, George Washington wrote to his British agent, Thomas Knox, to request "two pair of Work'd Ruffles . . . ; if work'd Ruffles shou'd be out of fashion send such as are not . . .," noting "whatever Goods you may send me . . . you will let them be fashionable." In the 1760s, he asked another agent, Charles Lawrence, to "send me a Suit of handsome Cloth Cloaths. I have no doubts but you will choose a fashionable coloured Cloth as well as a good one and make it in the best taste. . . ." The American gentry might be distant and isolated, but they did not wish to be unstylish. The leading American women's magazine of the middle 19th century was *Godey's Lady's Book*, featuring hand-colored pictures of the latest foreign and American fashions in clothing and articles about household furnishings in the newest styles. Its contents influenced ladies of fashion in cities and towns throughout the settled United States. The Montgomery Ward and Sears, Roebuck catalogs appearing in the late 19th century served the same purpose for more ordinary goods, garments, and classes of customers.

Awareness of style and desire to copy the clothing, the manners, the new dances and entertainments, as they developed in the "fashion capitals" to which men and women looked for leadership, are nothing new to the 20th century. Indeed, the concept of style has been ascribed to the economic transformations in western Europe beginning in the 11th century that opened up the continent to long-distance travel and commerce, and introduced, through new production techniques, a wider variety of cloth and clothing possibilities than formerly known. The example in dress and manners of the rich and noble in leading capital cities was soon brought back by merchants and travelers to even the smallest provincial towns. Popular culture, based on fashions, standards, or fads developed in centers of influence and prestige, became a new and important reality over wide areas and across social strata.

By general understanding, popular culture stands in opposition to folk or ethnic culture. The latter two suggest individuality, small group distinctiveness, and above all, tradition. **Popular culture**, in contrast, implies the general mass of people, primarily but not exclusively urban based, constantly adopting, conforming to, and quickly abandoning ever-changing common modes of behavior and fads of material and nonmaterial culture. Popular culture presumably substitutes for and replaces folk and ethnic differences.

From another point of view, the distinctions between the three classes of culture are not that clear and precise. Popular culture has been defined as "our way of life"—how we act (and why), what we eat and wear, how we amuse ourselves, what we believe, whom we admire. Such a definition is appropriate as well for members of recognizable folk and ethnic groups. The distinction, if one is to be made, must be based on the universality of the "way of life" described. Ethnic culture is preserved as behavioral norms—along with material and nonmaterial components—that set a recognizable national, social, or religious minority group apart from a majority culture; their way of life is not accepted by the mass society among which they live. Folk culture, too, affects small groups; it is individually and community oriented, self-sufficient, reinforcing, and only slowly altered from within. Isolation or tradition keeps it separate and distinctive.

Popular culture then becomes the way of life of the mass of the population, reducing though perhaps not eliminating regional folk and ethnic differences. In so doing, it becomes both a leveling and a liberating force. It serves to obliterate those locally distinctive life-styles and material and nonmaterial cultures that develop when groups remain isolated and ethnocentric. Uniformity is substituted for differentiation, and group identity is eroded. At the same time, however, the individual is liberated through exposure to a much broader range of available opportunities—in clothing, foods, tools, recreations, and life-styles—than ever were available in a cultural environment controlled by the restrictive and limited choices imposed by custom and isolation. Although broad areal uniformity may displace localisms, it is a cultural uniformity vastly richer in content and possibilities than any it replaces.

That uniformity is frequently, though not exclusively, associated with national populations: the American or Canadian way of life distinguished from the English, the Japanese, or others. Even these distinctions are eroding as popular culture in many aspects of music, movies, sports (soccer, for example), and the like becomes internationalized (Figure 7.24). Popular culture becomes dominant with the wide dissemination of common influences and with the mixing of cultures that force both ethnic and folk communities to become aware of and part of a larger homogeneous society.

Initially, the printing press was the unifying agent. Later, industrialization, urbanization, television and national advertising, increased leisure time, and decreased self-sufficiency became the devices that in all advanced societies erode traditional differentiations and standardize behavior



FIGURE 7.24 Soccer has become the world's most popular sport, with a television audience approaching 2 billion worldwide for the quadrennial World Cup soccer finals. The game here is being played in Madrid, Spain.

among the general population and within the great number of subcultures (such as that of college students) that have emerged. The result is a material and nonmaterial cultural mix that is not necessarily better or worse than the folk and ethnic cultures lost. It is, however, certainly and obviously different from the traits and distinctions of the past.

National Uniformities

Landscapes of popular culture tend to acquire uniformity through the installation of standardized facilities. National motel chains announced by identical signs, advertised by repetitious billboards, and featuring uniform facilities and services may comfort travelers with the familiar but also deny them the interest of regional contrast. Fast-food restaurants—franchised, standardized, and merchandized as identical—carry single logos, building designs, and menus across cultural boundaries and national borders (Figure 7.25). They provide the assurance of the known and the tolerable but insulate the palate from the regionally distinctive. Even food outlets identified with ethnics have lost their cultural char-



FIGURE 7.25 Western fast-food chains, classics of standardized popular culture, have gone international—and bilingual—as this restaurant row in Shenyang, China reveals.

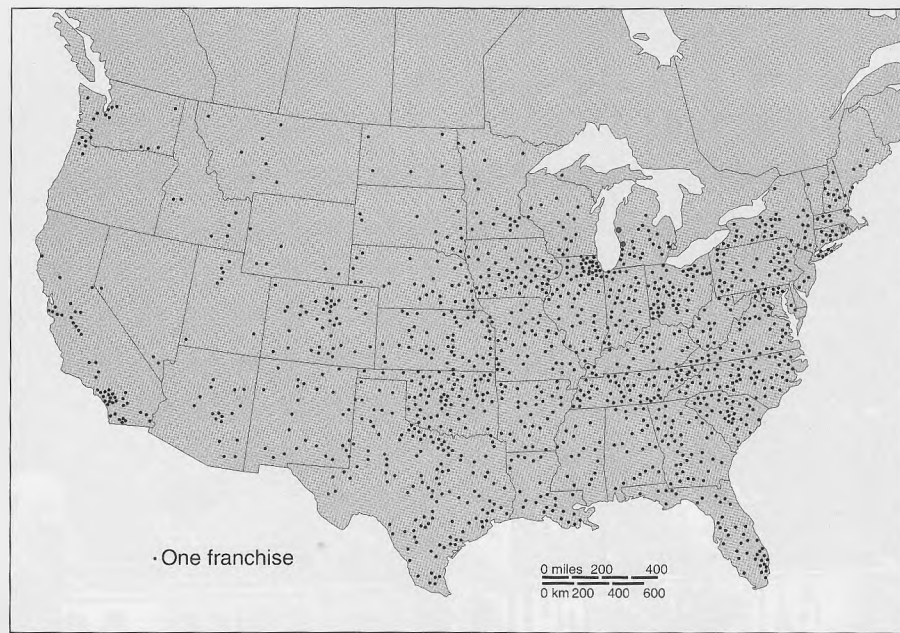


FIGURE 7.26 The locations of pizza parlors of a single national chain.

acter. The pizza has become American, not Italian (Figure 7.26), just as the franchised Mexican American taco and burrito have escaped their regional and ethnic confines and been carried nationwide. Chain gas stations, discount stores, and other enterprises carry on the theme of familiarity of outlet and standardization of product and service wherever one resides or journeys.

Many of these elements of popular culture are oriented toward the automobile, the ubiquitous means of local and interregional travel (Figure 7.27). Advertisements' distinctiveness of design assures instant recognition, and their clustering along highways and main streets guarantees that whatever the incidence of regional character still remaining, the public face of town and highway is everywhere the same (Figure 7.28).

The Shopping Mall

That sameness of popular culture has been carried indoors into the design, merchants, and merchandize of the shopping mall. Major regional malls have been created in every part of North America that boasts a metropolitan population large enough to satisfy their carefully calculated purchasing-power requirements. Local and neighborhood malls extend the concept to smaller residential entities. With their mammoth parking lots and easy access from expressways or highways, America's 38,000 large and small malls are part of

the automobile culture that helped create them after World War II. Increasingly, however, they stand in standardized separation from the world of movement and of regional contrast. Enclosed, temperature controlled, without windows or other acknowledgment of a world outside, they cater to a full range of homogenized shopping and consuming wants with a repetitive assemblage of brand name products available in a uniform collection of national chain outlets.

Some assume monumental size, approximating the retail space contained in the central business districts of older medium-sized and large cities (Figure 7.29). For example, the West Edmonton Mall in Edmonton, Alberta, was at its completion in 1986 the world's largest shopping mall; it contains 836 stores, 110 restaurants, 20 movie theaters, a 360-room hotel, plus such other recreational features as roller coasters, carousels and other rides, a miniature golf course, a 600-foot water slide, and a hockey rink. A slightly smaller U.S. counterpart opened in Bloomington, Minnesota in 1992. More recently, expansion of established malls has outpaced development of new ones and by the end of 1995 both Woodfield Mall near Chicago and the King of Prussia mall near Philadelphia claimed the "world's largest" title after their renovation and enlargement. Malls are, it has been suggested, an idealized, Disneyland version of the American myth of small-town sanitized intimacy, itself a product of popular culture.

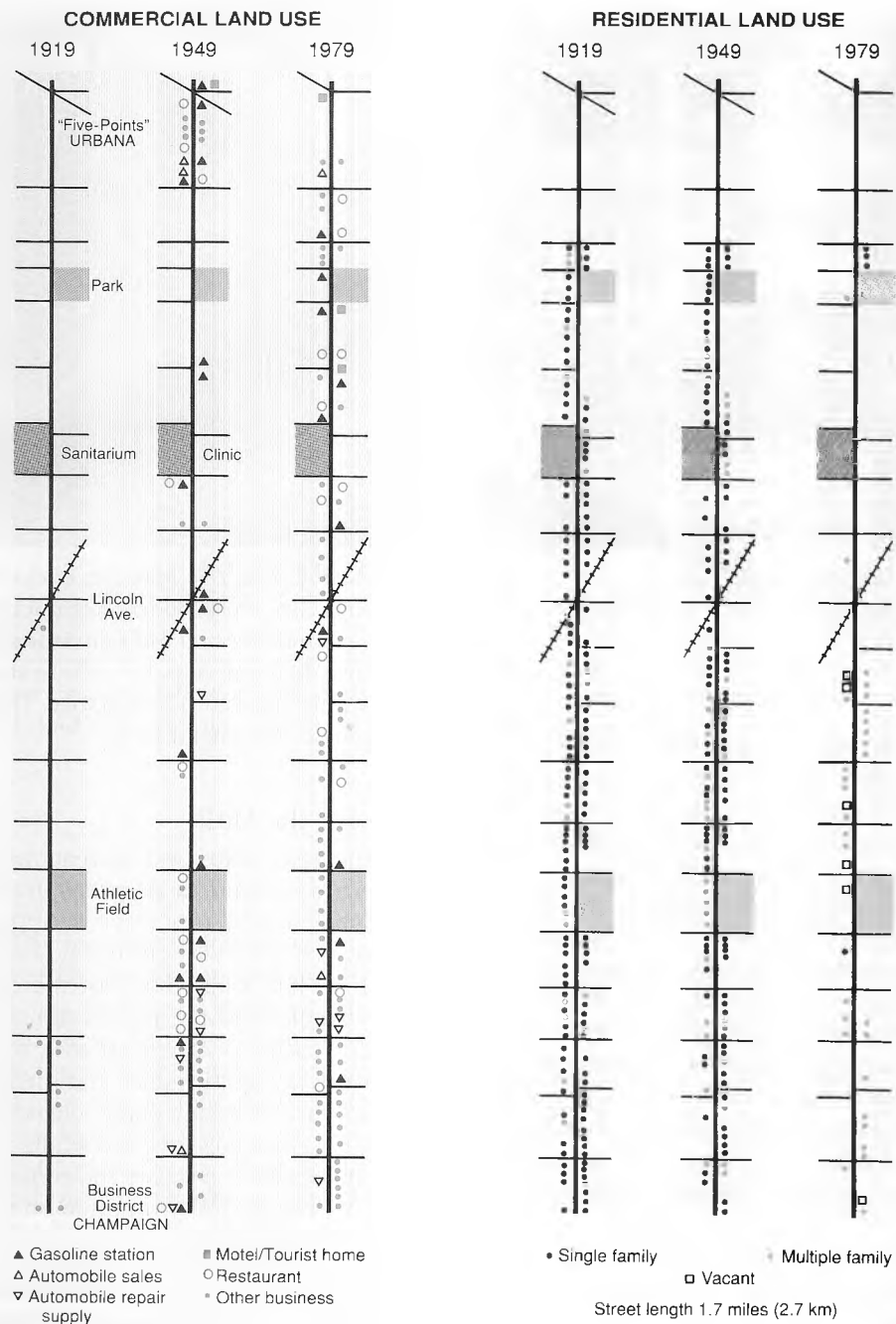


FIGURE 7.27 A street transformation. A residential street becomes a commercial strip in Champaign-Urbana, Illinois. After 60 years of automobile traffic on this main arterial street, residential land use has been replaced almost entirely by commercial uses, all depending on drive-in customer access or catering to automotive needs themselves. The major change in land use came after 1949.

Source: John A. Jakle and Richard L. Mattson, "The Evolution of a Commercial Strip," *Journal of Cultural Geography* 1 (Spring/Summer 1981): 14, 20. Redrawn by permission.

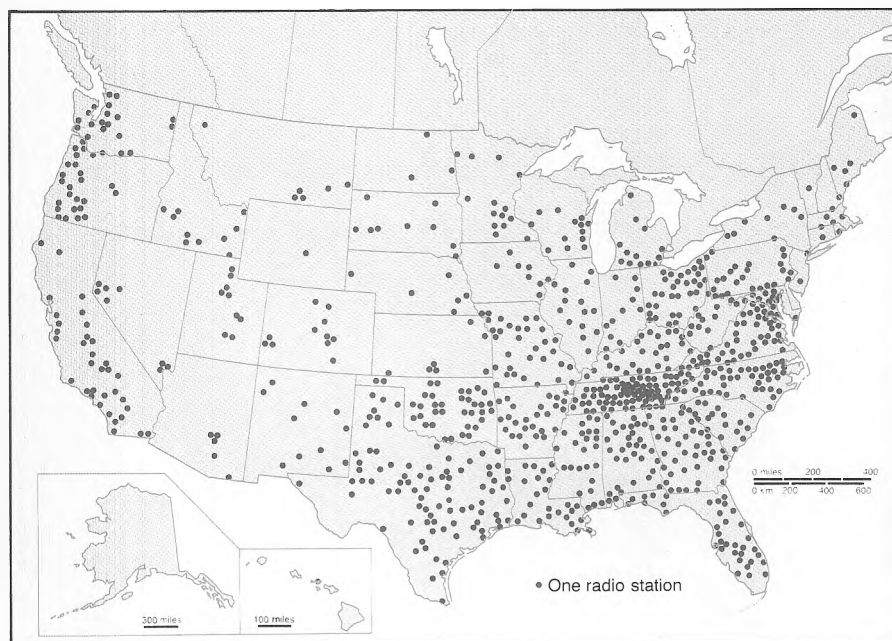


FIGURE 7.30 Country music radio stations. Although still most heavily concentrated in the Upland South, radio stations playing only country music had become a national commonplace by the late 1970s.

Diffusion Tracks

Popular culture is marked by the nearly simultaneous adoption over wide areas of an artifact or a nonmaterial element. Knowledge of an innovation is widely and quickly available; television and the national press inform without distance constraints. Mass manufacturing and imitative production place desired items, as Zelinsky discovered, in every store in a remarkably short time. For fads particularly, the tracing of diffusion tracks is difficult and probably meaningless. Recognizable culture hearths and migration paths are not clearly defined by the myriad introductions into the ever-changing popular culture pool. It is not particularly revealing to know that the origin of the Frisbee is apocryphally traced to the pie tins of the old Frisbie Baking Co. of Bridgeport, Connecticut, manufactured in plastic and carried as a game toy by college students throughout the United States, or that the Rubik's Cube puzzle was an invention of a Hungarian architect. The one has nothing to do with a New England culture hearth nor the other with East European ethnic influences.

Some more lasting popular changes have been recorded and do provide useful insight into the nature of diffusion and the sequence of acceptance and adoption of new cultural elements. The New Orleans origin of jazz, its up-river movement, and the gradual acceptance by white sophisticates of a new black musical form trace for us the origin, the diffusion path, and the adoption sequence of a major introduction. Cricket as a popular sport followed the spread of empire as British influences were implanted across the world. The names settlers and town founders gave to their communities provide another expression of popular culture and its diffusion (Figure 5.17). Professor Zelinsky has investigated the origin and spread of classical town names in the United States, documenting on the map America's 19th-century attraction to the Greco-Roman world. Neoclassical public architecture, Latin state mottoes, Latin and Greek personal names, and classical town nomenclature were all part of that Classical Revival. Figure 7.31 summarizes the patterns of innovation and dispersal that he discovered.

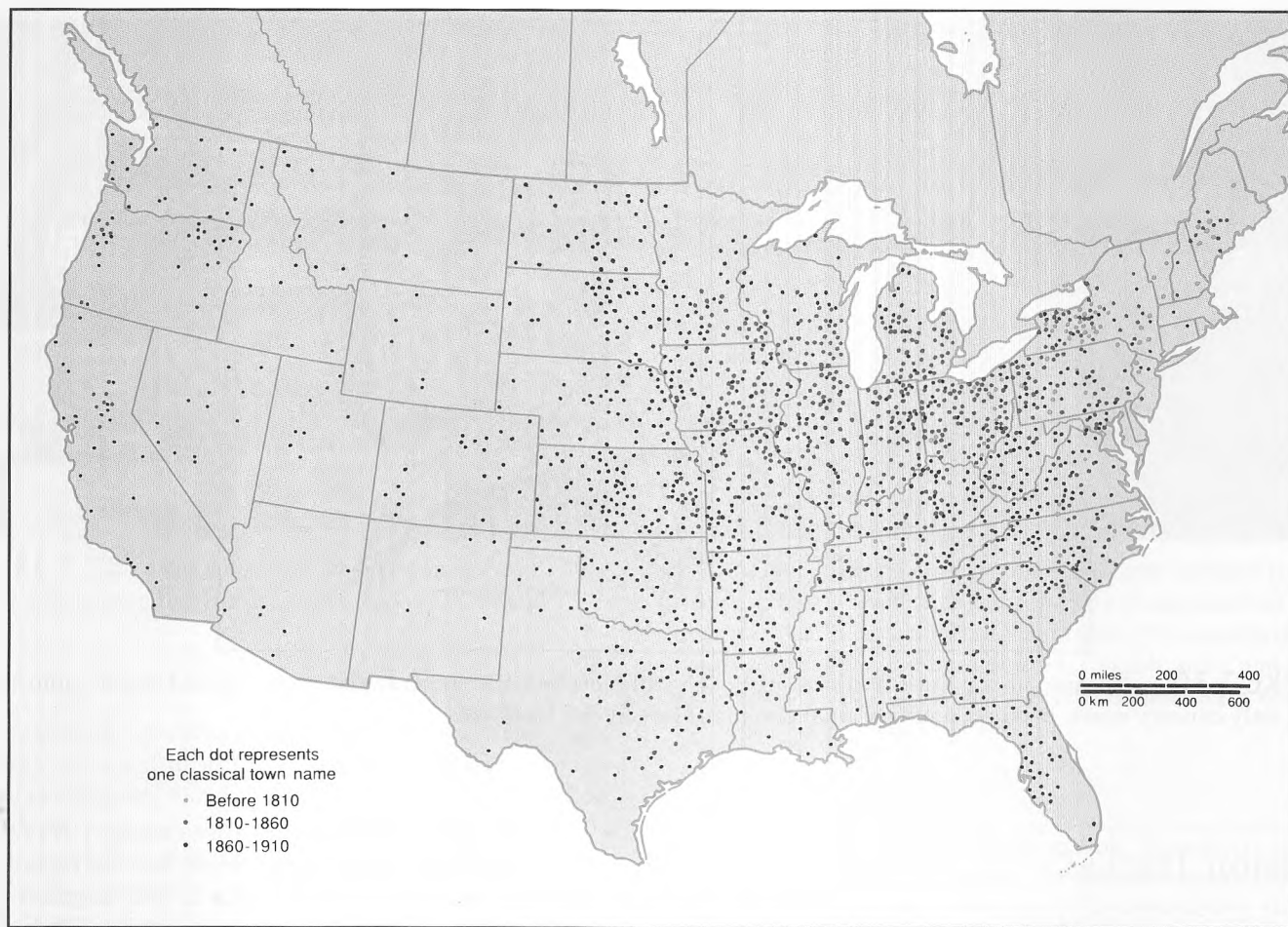


FIGURE 7.31 Classical town names. A permanent reminder of popular culture: the diffusion of classical town names in the United States to 1910.

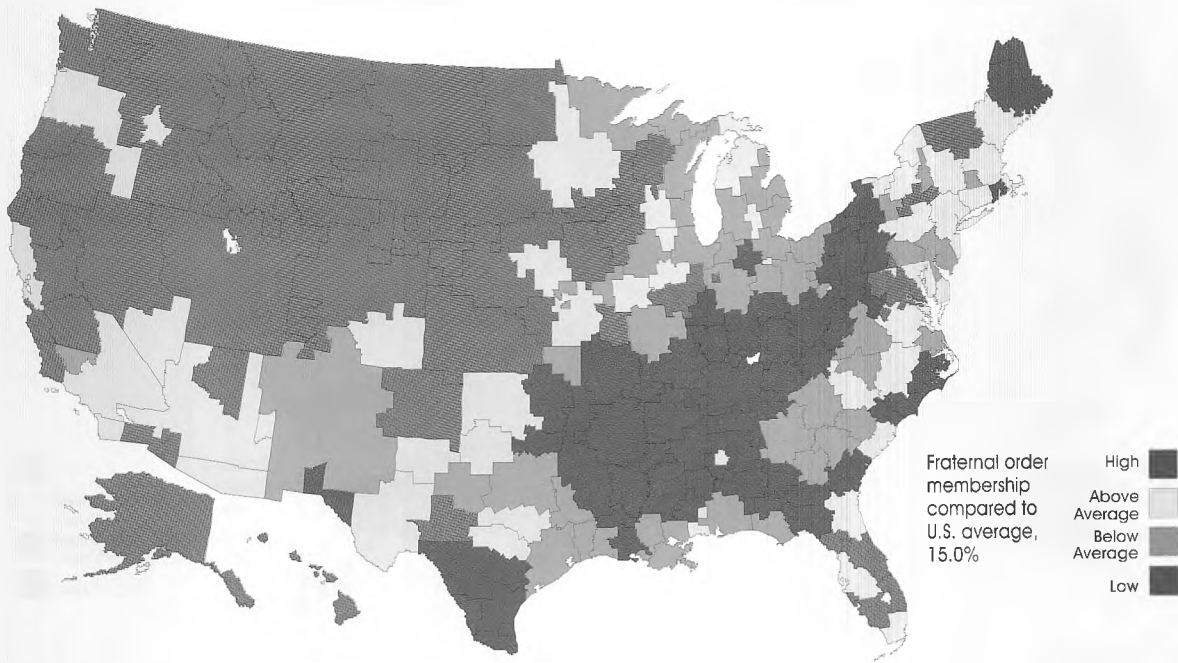
Regional Emphasis

The uneven distribution of classical place-names suggests that not all expressions of popular culture are spatially uniform. Areal variations do exist in the extent to which particular elements in the general cultural pool are adopted. These variations impart an aspect of regional differentiation of interest to geographers.

Spatial patterns in sports, for example, reveal that the games played, the migration paths of their fans and players, and the landscape evidence of organized sports constitute

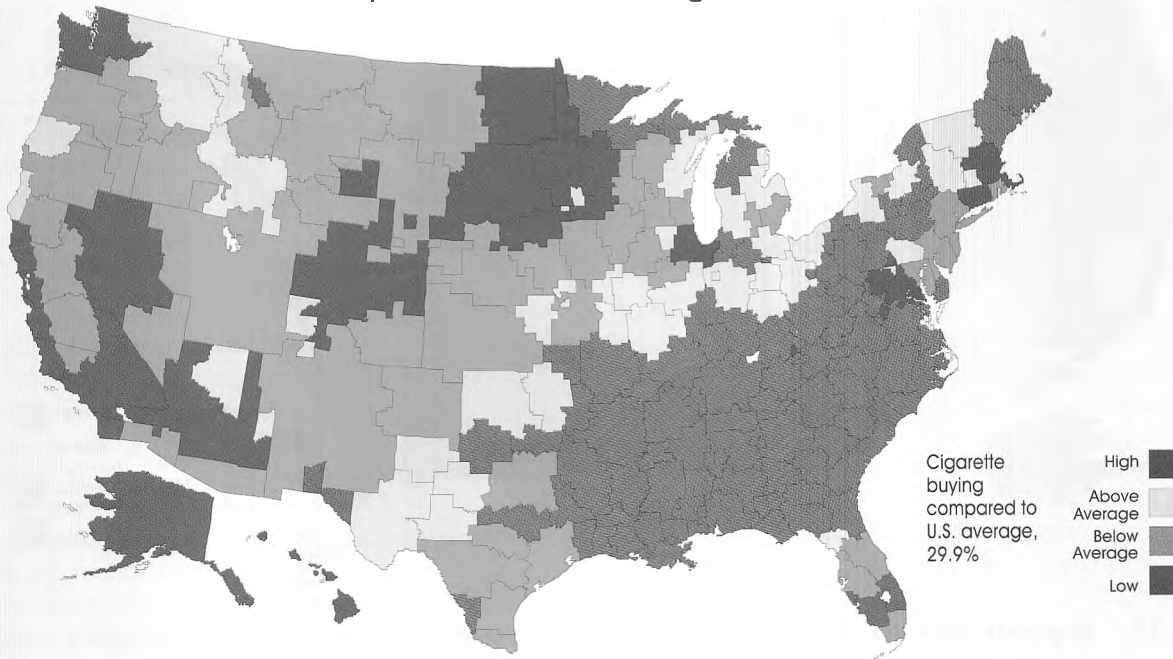
regional variables, part of the areal diversity of North American—and world—life. Figure 7.32*a*, for example, shows that television interest in professional baseball is not universal despite the sport's reputation as “the national pastime.” Studies and maps of many encountered regional differences in food and drink preferences, leisure activities, and personal and political tastes—a sampling is presented in Figure 7.32—are suggestive of the growing interest in how people behave and respond, not as echoes of the distant past but as participants in a vibrant and changing contemporary world that still retains evidence of regional contrast along with the commonalities of popular culture.

Members of Fraternal Orders



(c)

People Who Smoke Cigarettes



(d)

FIGURE 7.32 (continued)

Vernacular Regions

Ordinary people have a clear view of space. They are aware of variations from place to place in the mix of phenomena, both physical and cultural. They use and recognize as meaningful such common regional names as Corn Belt, Sunbelt, and "the Coast." More important, people individually and collectively agree on where they live. They occupy regions that have reality in their minds and that are reflected in regional journals, in regional museums, and in regionally based names employed in businesses, by sports teams, or in advertising slogans.

These are **vernacular** or **popular regions**; they have reality as part of folk or popular culture rather than as political impositions or scholarly constructs. Geographers are increasingly recognizing that vernacular regions are

significant concepts affecting the way people view space, assign their loyalties, and interpret their world. One geographer has drawn the boundaries of the large popular regions of North America on the basis of place names and locational identities found in the white pages of central-city telephone directories (Figure 7.33). The 14 large but subnational vernacular regions recognized accord reasonably well with cultural regions defined by more rigorous methods. However, particularly in the West, that accordance is not clearly demonstrated by comparison of the vernacular regions with Figure 6.29. Another, more subjective cultural regionalization of the United States is offered in Figure 7.34. The generalized "consensus" or vernacular regions suggested are based on an understood "sense of place" derived from current population and landscape characteristics as well as on historical differences that impart distinctive regional behaviors and attitudes.

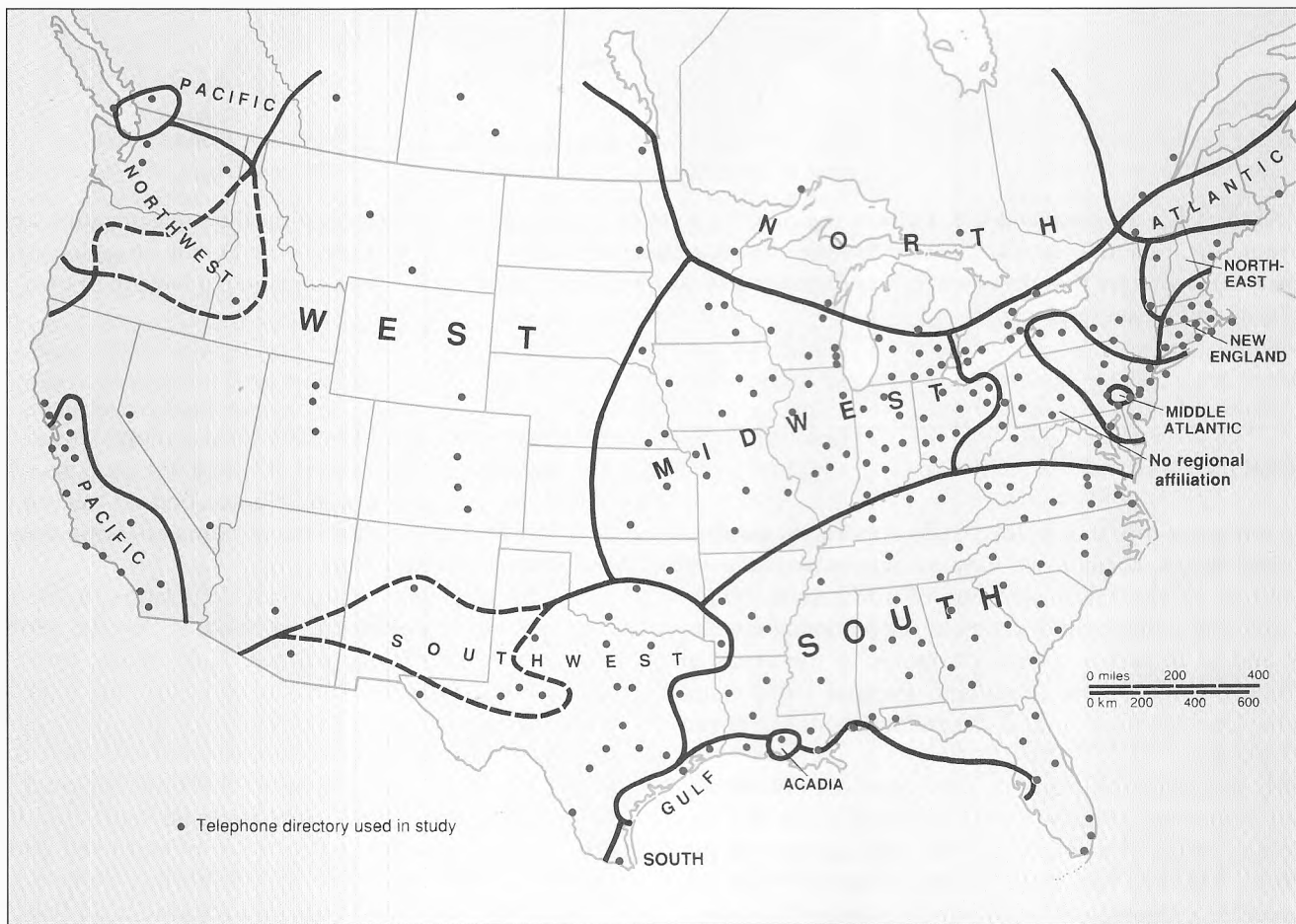
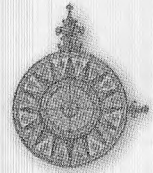
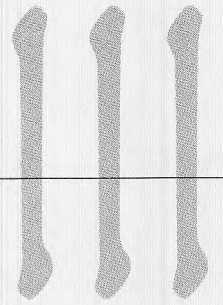


FIGURE 7.33 Vernacular regions of North America as determined by names of enterprises listed in central city telephone directories. Regions are those in which a given term or a cluster of closely related terms (e.g., Southern, Southland, Dixie) outnumber all other regional or locational references.

- Glassie, Henry. *Folk Housing in Middle Virginia*. Knoxville: University of Tennessee Press, 1975.
- Gordon, Jean, and Jan McArthur. "Popular Culture, Magazines and American Domestic Interiors, 1898-1940." *Journal of Popular Culture* 22, no. 4 (1989):35-60.
- Goss, John. "The 'Magic of the Mall': An Analysis of Form, Function, and Meaning in the Contemporary Retail Built Environment." *Annals of the Association of American Geographers* 83, no. 1 (1993):18-47.
- Hart, John Fraser. *The Look of the Land*. Englewood Cliffs, NJ: Prentice-Hall, 1975.
- Hart, John Fraser, and Eugene Cotton Mather. "The American Fence." *Landscape* 5, no. 3 (1957):4-9.
- Howe, Barbara J., Dolores A. Fleming, Emory L. Kemp, and Ruth Ann Overbeck. *Houses and Homes: Exploring their History*. Nashville, TN: American Association for State and Local History, 1987.
- Jackson, Edgar L., and Denis B. Johnson, eds. "The West Edmonton Mall and Mega-Malls." Feature Issue of *The Canadian Geographer/Le Géographe Canadien* 35, no. 3 (1991).
- Jackson, John B. *Discovering the Vernacular Landscape*. New Haven, CT: Yale University Press, 1984.
- Jakle, John A., Robert W. Bastian, and Douglas K. Meyer. *Common Houses in America's Small Towns: The Atlantic Seaboard to the Mississippi Valley*. Athens: University of Georgia Press, 1989.
- Johnson, Paul. *The Birth of the Modern: World Society 1815-1830*. New York: HarperCollins, 1991.
- Jordan, Terry. "Perceptual Regions in Texas." *Geographical Review* 68 (1978):293-307.
- Jordon, Terry G., and Matti Kaups. "Folk Architecture in Cultural and Ecological Context." *Geographical Review* 77 (1987):52-75.
- Jordan, Terry G., and Matti Kaups. *The American Backwoods Frontier*. Baltimore and London: Johns Hopkins University Press, 1989.
- Kimber, Clarissa T. "Plants in the Folk Medicine of the Texas-Mexico Borderlands." *Proceedings of the Association of American Geographers* 5 (1973):130-133.
- Kniffen, Fred B. "American Cultural Geography and Folklife." In *American Folklife*, edited by Don Yoder, pp. 51-70. Austin: University of Texas Press, 1976.
- Kniffen, Fred B. "Folk Housing: Key to Diffusion." *Annals of the Association of American Geographers* 55 (1965):549-577.
- Kniffen, Fred B., and Henry Glassie. "Building in Wood in the Eastern United States: A Time-Place Perspective." *Geographical Review* 56 (1966):40-66.
- Kraybill, Donald B. *The Riddle of Amish Culture*. Baltimore: Johns Hopkins University Press, 1989.
- Lewis, Pierce F. "Common Houses, Cultural Spoor." *Landscape* 19, no. 2 (January 1975):1-22.
- Lomax, Alan. *The Folk Songs of North America in the English Language*. Garden City, NY: Doubleday, 1960.
- Luedtke, Luther S., ed. *Making America: The Society & Culture of the United States*. Chapel Hill: University of North Carolina Press, 1992.
- Mather, Eugene Cotton, and John Fraser Hart. "Fences and Farms." *Geographical Review* 44 (1954):201-223.
- Meinig, Donald W. "The Mormon Culture Region: Strategies and Patterns in the Geography of the American West, 1847-1964." *Annals of the Association of American Geographers* 55 (1965):191-220.
- Meinig, Donald W. *The Shaping of America: A Geographical Perspective on 500 years of History*. Vol. 1: *Atlantic America, 1492-1800*; Vol 2: *Continental America, 1800-1867*. New Haven, CT: Yale University Press, 1986 and 1993.
- Miller, E. Joan Wilson. "The Ozark Culture Region as Revealed by Traditional Materials." *Annals of the Association of American Geographers* 58 (1968):51-77.
- Mitchell, Robert D., ed. *Appalachian Frontiers Settlement, Society, and Development in the Preindustrial Era*. Lexington: University Press of Kentucky, 1991.
- Morgan, John. *The Log House in East Tennessee*. Knoxville: University of Tennessee Press, 1990.
- Noble, Allen G. *Wood, Brick, and Stone: The North American Settlement Landscape*. Vol. 1: *Houses*, Vol. 2: *Barns and Farm Structures*. Amherst: University of Massachusetts Press, 1984.
- Noble, Allen G., and Richard K. Cleek. *The Old Barn Book*. New Brunswick, NJ: Rutgers University Press, 1995.
- Noble, Allen G., and Gayle A. Seymour. "Distribution of Barn Types in Northeastern United States." *Geographical Review* 72 (1982):155-170.
- Oliver, Paul. *Dwellings: The House across the World*. Austin: University of Texas Press, 1987.
- Paredes, Americo. *Folklore and Culture on the Texas-Mexican Border*. Austin: University of Texas Press, 1995.
- Peterson, Fred W. *Homes in the Heartland: Balloon Frame Farmhouses of the Upper Midwest, 1850-1920*. Lawrence: University Press of Kansas, 1992.
- Price, Edward T. *Dividing the Land: Early American Beginnings of Our Private Property Mosaic*. Chicago: University of Chicago Press, 1995.
- Price, Edward T. "Root Digging in the Appalachians: The Geography of Botanical Drugs." *Geographical Review* 50 (1960):1-20.
- Purvis, Thomas L. "The Pennsylvania Dutch and the German-American Diaspora in 1790." *Journal of Cultural Geography* 6, no. 2 (1986):81-99.
- Rapaport, Amos. *House Form and Culture*. Englewood Cliffs, NJ: Prentice-Hall, 1969.
- Roark, Michael, ed. *French and Germans in the Mississippi Valley: Landscape and Cultural Traditions*. Cape Girardeau: Southeast Missouri State University, 1988.
- Rooney, John F., Jr., and Richard Pillsbury. *Atlas of American Sport*. New York: Macmillan, 1992.
- Rooney, John F., and Richard Pillsbury. "Sports Regions." *American Demographics* 14 (November 1993):30-39.
- Rooney, John F., Jr., Wilbur Zelinsky, and Dean R. Louder, eds. *This Remarkable Continent: An Atlas of United States and Canadian Society and Cultures*. College

DYNAMIC PATTERNS OF THE SPACE ECONOMY

PART



*A container ship at dock in Rotterdam harbor,
The Netherlands.*

desert. The unequal distribution of useful mineral deposits gives some regions and countries economic prospects and employment opportunities that are denied to others. Forestry and fishing depend on still other natural resources unequal in occurrence, type, and value.

Within the bounds of the environmentally possible, *cultural considerations* may condition economic or production decisions. For example, culturally based food preferences rather than environmental limitations may dictate the choice of crops or livestock. Maize is a preferred grain in Africa and the Americas, wheat in North America, Australia, Argentina, southern Europe and Ukraine, and rice in much of Asia. As we saw in Figure 5.18, pigs are not produced in Muslim areas.

Level of *technological development* of a culture will affect its recognition of resources or its ability to exploit them. **Technology** refers to the totality of tools and methods available to and used by a culture group in producing items essential to its subsistence and comfort. Preindustrial societies have no knowledge of or need for the iron ore or coking coal underlying their hunting, gathering, or gardening grounds. *Political decisions* may encourage or discourage—through subsidies, protective tariffs, or production restrictions—patterns of economic activity. And, ultimately, production is controlled by *economic factors* of demand, whether that demand is expressed through a free market mechanism, government instruction, or the consumption requirements of a single family producing for its own needs.

Categories of Activity

Regionally varying environmental, cultural, technological, political, and market conditions add spatial details to more generalized ways of classifying the world's productive work. One approach to that categorization is to view economic activity as ranged along a continuum of both increasing complexity of product or service and increasing distance from the natural environment. Seen from that perspective, a small number of distinctive stages of production and service activities may be distinguished (see Figure 8.2).

Primary activities are those that harvest or extract something from the earth. They are at the beginning of the production cycle, where humans are in closest contact with the resources and potentialities of the environment. Such activities involve basic foodstuff and raw material production. Hunting and gathering, grazing, agriculture, fishing, forestry, and mining and quarrying are examples. **Secondary activities** are those that add value to materials by changing their form or combining them into more useful—therefore more valuable—commodities. That provision of *form utility* may range from simple handicraft production of pottery or woodenware to the delicate assembly of electronic goods or space vehicles (Figure 8.3). Copper smelting, steelmaking, metalworking, automobile production, textile and chemical industries—indeed, the full array of *manufacturing and processing industries*—are included in this phase of the production process. Also included are the production of *energy* (the “power company”) and the *construction* industry.

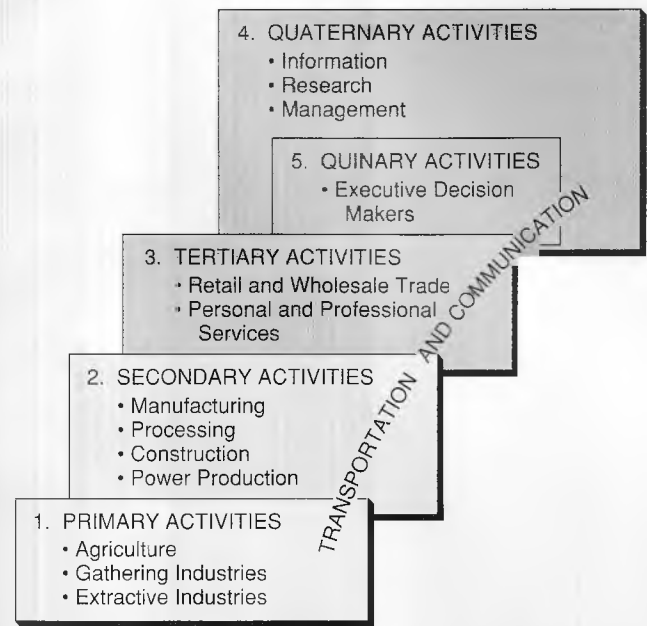


FIGURE 8.2 The categories of economic activity. The main sectors of the economy do not stand alone. They are connected and integrated by transportation and communication services and facilities not assigned to any single sector but common to all.

Tertiary activities consist of those business and labor specializations that provide *services* to the primary and secondary sectors, to the general community, and to the individual. These include financial, business, professional, clerical, and personal services. They constitute the vital link between producer and consumer, for tertiary occupations importantly include the wholesale and retail *trade* activities necessary in highly interdependent societies. Tertiary activities also provide essential information to manufacturers: the knowledge of market demand without which economically justifiable production decisions are impossible.

In economically advanced societies many individuals and some entire organizations are engaged in the processing and dissemination of information and in the administration and control of their own or other enterprises. The term **quaternary** is applied to this fourth class of economic activities, which is composed entirely of services rendered by “white collar” professionals working in education, government, management, information processing, and research. Sometimes, a subdivision of these management functions—**quinary activities**—is distinguished to recognize high-level decision-making roles in all types of large organizations, public and private. Transportation and communication services and facilities cut across the general categories of economic activity, unite them, and make possible the spatial interactions that all human enterprise requires (discussed in Chapter 3).

The term *industry*—in addition to its common meaning as a branch of manufacturing activity—is frequently employed as a substitute identical in meaning to *activity* as a designation of these categories of economic enterprise. That

Although the former sharp contrasts in economic organization are becoming blurred and national economic orientations are changing, the evident contrasts between subsistence, planned, and commercial systems have differently affected national patterns of livelihood, production, and economic decision making. Indeed, both approaches to economic classification—by types of activities and by organization of economies—help us to visualize and understand world economic geographic patterns. In the remainder of this chapter we will center our attention on the primary industries. In Chapter 9 we will consider secondary through quinary activity patterns.

Primary Activities: Agriculture

Before there was farming, *hunting* and *gathering* were the universal forms of primary production. These preagricultural pursuits are now practiced by at most a few thousands of persons worldwide, primarily in isolated and remote pockets within the low latitudes and among the sparse populations of very high latitudes. The interior of New Guinea, rugged areas of interior Southeast Asia, diminishing segments of the Amazon rain forest, a few districts of tropical Africa and northern Australia, and parts of the Arctic regions still contain such preagricultural people.

Their numbers are few and declining, and wherever they are brought into contact with more advanced cultures, their way of life is eroded or lost.

Agriculture, defined as the growing of crops and the tending of livestock whether for the subsistence of the producers or for sale or exchange, has replaced hunting and gathering as economically the most significant of the primary activities. It is spatially the most widespread, found in all world regions where environmental circumstances permit (Figure 8.5). Crop farming alone covers some 15 million square kilometers (5.8 million sq. mi.) worldwide, about 10% of the earth's total land area. In many developing economies, at least three-fourths of the labor force is directly involved in farming and herding. In some, such as Nepal in Asia and Rwanda and Niger in Africa, the figure is more than 90%. In highly developed commercial economies, on the other hand, agriculture involves only a small fraction of the labor force: less than 10% in most of Western Europe, 5% in Canada, and less than 3% in the United States (for the world pattern of the agricultural labor force, see Figure 10.11). Indeed, a declining number or proportion of farm workers, along with farm consolidation and increasing output, are typical in all present-day highly developed commercial agricultural systems. On the other hand, agriculture remains a major component in the economies of many of the world's developing countries, producing for domestic

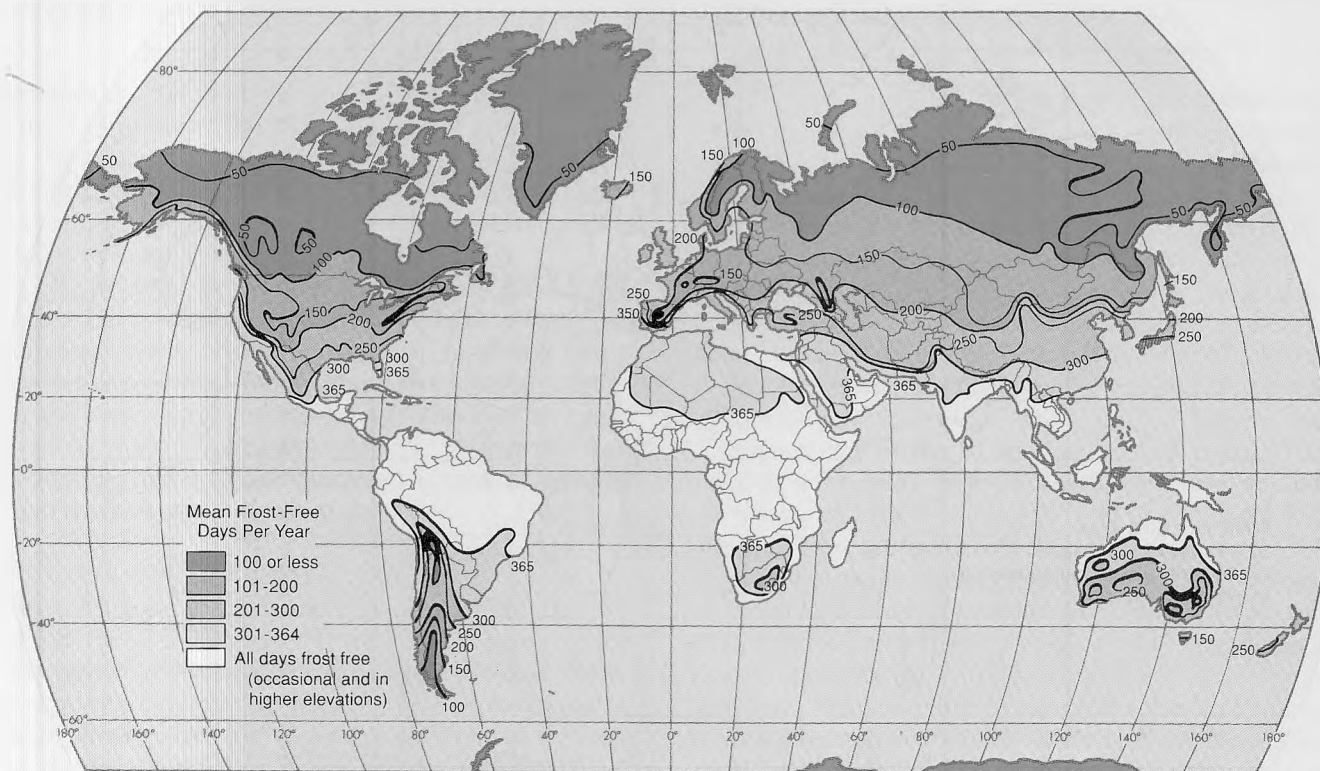


FIGURE 8.5 Average length of growing season. The number of frost-free days is an important environmental control on agriculture, as is the availability of precipitation sufficient in amount and reliability for crop production. Since agriculture is not usually practicable with less than a 90-day growing season, large parts of Russia and Canada have only limited cropping potential. Except where irrigation water is available, arid regions are similarly outside of the margins of regular crop production.

Courtesy Wayne M. Wendland.

markets and providing a major source of national income through exports (Figure 8.6).

It has been customary to classify agricultural societies on the twin bases of the importance of off-farm sales and the level of mechanization and technological advancement. *Subsistence*, *traditional* (or *intermediate*), and *advanced* (or *modern*) are usual terms employed to recognize both aspects. These are not mutually exclusive but rather are recognized stages along a continuum of farm economy variants. At one end lies production solely for family sustenance, using primitive tools and native plants. At the other is the specialized, highly capitalized, near-industrialized agriculture for off-farm delivery that marks advanced economies. Between these extremes is the middle ground of traditional agriculture, where farm production is in part destined for home consumption and in part oriented toward off-farm sale either locally or in national and international markets. We can most clearly see the variety of agricultural activities and the diversity of controls on their spatial patterns by examining the "subsistence" and "advanced" ends of the agricultural continuum.

Subsistence Agriculture

By definition, a *subsistence* economic system involves nearly total self-sufficiency on the part of its members. Production for exchange is minimal, and each family or close-knit social

group relies on itself for its food and other most essential requirements. Farming for the immediate needs of the family is, even today, the predominant occupation of humankind. In most of Africa, south and east Asia, and much of Latin America, the majority of people are primarily concerned with feeding themselves from their own land and livestock.

Two chief types of subsistence agriculture may be recognized: *extensive* and *intensive*. Although each type has several variants, the essential contrast between them is realizable yield per unit of area used and, therefore, population-supporting potential. **Extensive subsistence agriculture** involves large areas of land and minimal labor input per hectare. Both product per land unit and population densities are low. **Intensive subsistence agriculture** involves the cultivation of small landholdings through the expenditure of great amounts of labor per acre. Yields per unit area and population densities are both high (Figure 8.7).

Extensive Subsistence Agriculture

Of the several types of *extensive subsistence* agriculture—varying one from another in their intensities of land use—two are of particular interest.

Nomadic herding, the wandering but controlled movement of livestock solely dependent on natural forage, is the most extensive type of land use system (Figure 8.7). That is, it requires the greatest amount of land area per per-

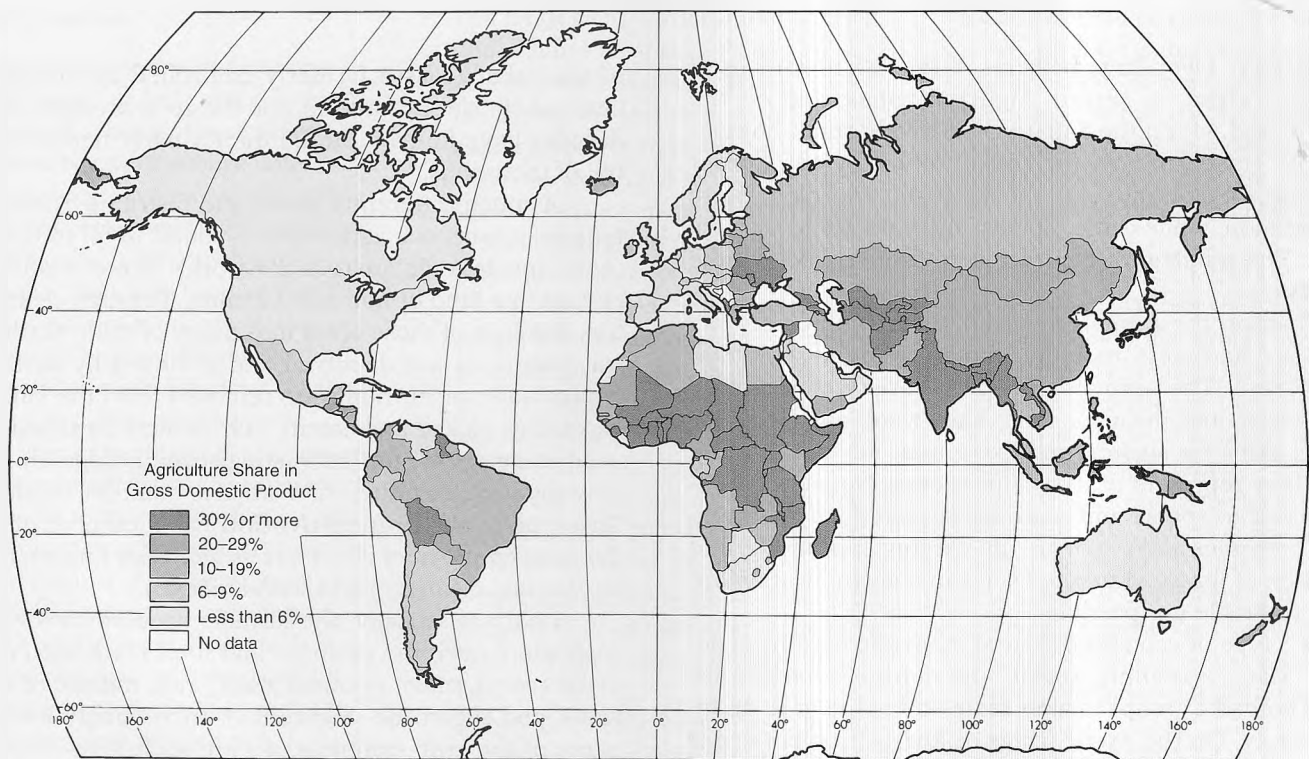


FIGURE 8.6 Share of agriculture in gross domestic product. Agriculture contributes 30% or more of gross domestic product (the total output of goods and services produced by an economy) of at least 50 countries worldwide. Most of them have developing economies, and collectively those 50 states—comprising some 31% of world population—average less than US \$400 in per capita national income.

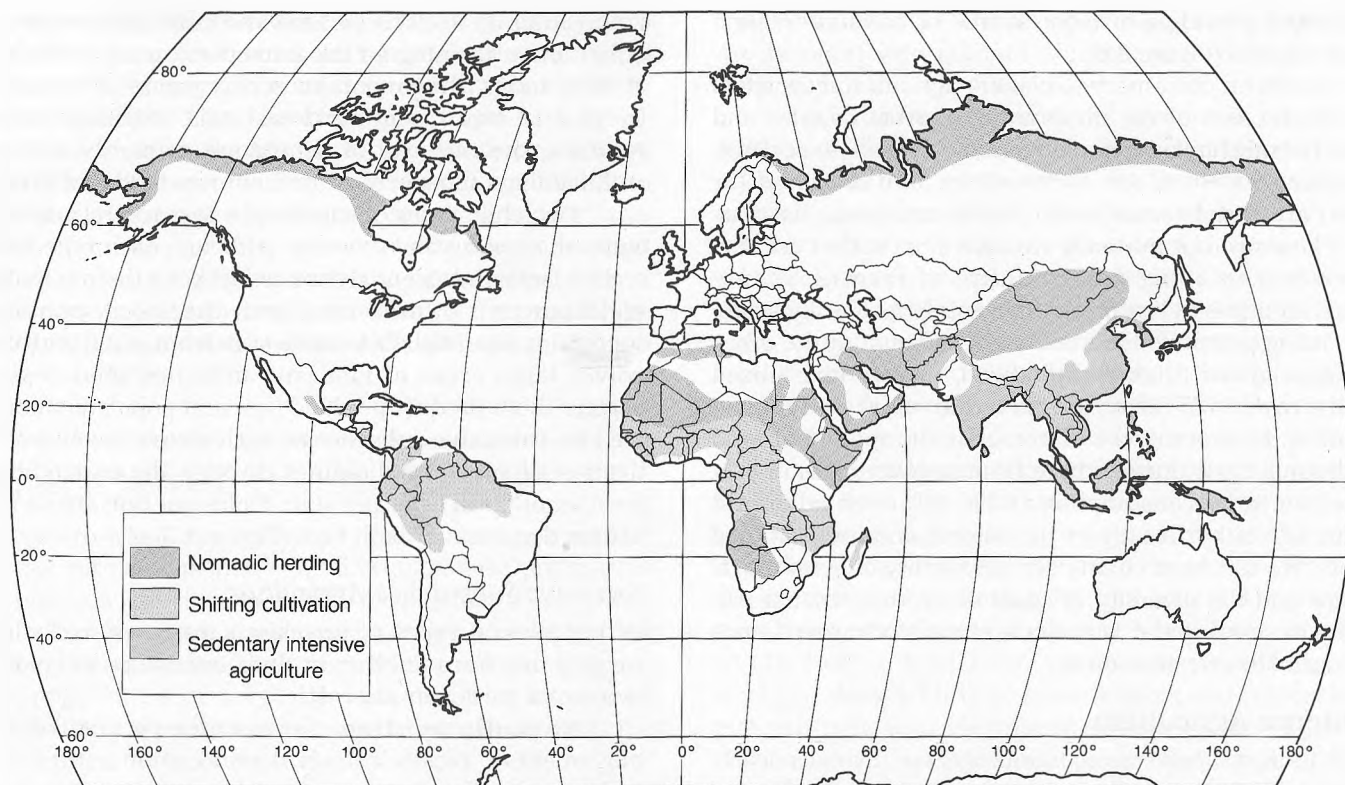


FIGURE 8.7 Subsistence agricultural areas of the world. Nomadic herding, supporting relatively few people, was the age-old way of life in large parts of the dry and cold world. Shifting or swidden agriculture maintains soil fertility by tested native practices in tropical wet and wet-and-dry climates. Large parts of Asia support millions of people engaged in sedentary intensive cultivation, with rice and wheat the chief crops.

son sustained. Over large portions of the Asian semidesert and desert areas, in certain highland zones, and on the fringes of and within the Sahara, a relatively small number of people graze animals for consumption by the herder group, not for market sale. Sheep, goats, and camels are most common, while cattle, horses, and yaks are locally important. The reindeer of Lapland were formerly part of the same system.

Whatever the animals involved, their common characteristics are hardiness, mobility, and an ability to subsist on sparse forage. The animals provide a variety of products: milk, cheese, and meat for food; hair, wool, and skins for clothing; skins for shelter; and excrement for fuel. For the herder, they represent primary subsistence. Nomadic movement is tied to sparse and seasonal rainfall or to cold temperature regimes and to the areally varying appearance and exhaustion of forage. Extended stays in a given location are neither desirable nor possible.

As a type of economic system, nomadic herding is declining. Many economic, social, and cultural changes are causing nomadic groups to alter their way of life or to disappear entirely. On the Arctic fringe of Russia, herders under communism were made members of state or collective herding enterprises. In northern Scandinavia, Lapps (Saami) are engaged in commercial more than in subsistence livestock farming. In the Sahel region of Africa on the margins

of the Sahara, oases formerly controlled by nomads have been taken over by farmers, and the great droughts of recent decades have forever altered the formerly nomadic way of life of thousands.

A much differently based and distributed form of extensive subsistence agriculture is found in all of the warm, moist, low-latitude areas of the world. There, many people engage in a kind of nomadic farming. Through clearing and use, the soils of those areas lose many of their nutrients (as soil chemicals are dissolved and removed by surface and groundwater or nutrients are removed from the land in the vegetables picked and eaten), and farmers cultivating them need to move on after harvesting several crops. In a sense, they rotate fields rather than crops to maintain productivity. This type of **shifting cultivation** has a number of names, the most common of which are *swidden* (an English localism for "burned clearing") and *slash-and-burn*.

Characteristically, the farmers hack down the natural vegetation, burn the cuttings, and then plant such crops as maize (corn), millet (a cereal grain), rice, manioc or cassava, yams, and sugarcane (Figure 8.8). Increasingly included in many of the crop combinations are such high-value, labor-intensive commercial crops as coffee, which provide the cash income that is evidence of the growing integration of all peoples into exchange economies. Initial yields—the first and second crops—may be very high, but they quickly be-



FIGURE 8.8 An African swidden plot burning. Any stumps or trees left in the clearing will remain after the burn.

SWIDDEN AGRICULTURE

The following account describes shifting cultivation among the Hanunóo people of the Philippines. Nearly identical procedures are followed in all swidden farming regions.

When a garden site of about one-half hectare (a little over one acre) has been selected, the swidden farmer begins to remove unwanted vegetation. The first phase of this process consists of slashing and cutting the undergrowth and smaller trees with bush knives. The principal aim is to cover the entire site with highly inflammable dead vegetation so that the later stage of burning will be most effective. Because of the threat of soil erosion the ground must not be exposed directly to the elements at any time during the cutting stage. During the first months of the agricultural year, activities connected with cutting take priority over all others. It is estimated that the time required ranges from 25 to 100 hours for the average-sized swidden plot.

Once most of the undergrowth has been slashed, chopped to hasten drying, and spread to protect the

soil and assure an even burn, the larger trees must be felled or killed by girdling (cutting a complete ring of bark) so that unwanted shade will be removed. The successful felling of a real forest giant is a dangerous activity and requires great skill. Felling in second growth is usually less dangerous and less arduous. Some trees are merely trimmed but not killed or cut, both to reduce the amount of labor and to leave trees to reseed the swidden during the subsequent fallow period.

The crucial and most important single event in the agricultural cycle is swidden burning. The main firing of a swidden is the culmination of many weeks of preparation in spreading and leveling chopped vegetation, preparing firebreaks to prevent flames escaping into the jungle, and allowing time for the drying process. An ideal burn rapidly consumes every bit of litter; in no more than an hour or an hour and a half, only smoldering remains are left.

Swidden farmers note the following as the benefits of a good burn:

- (1) removal of unwanted vegetation, resulting in a cleared swidden;
- (2) extermination of many animal and

some weed pests; (3) preparation of the soil for dibble (any small hand tool or stick to make a hole) planting by making it softer and more friable; (4) provision of an evenly distributed cover of wood ashes, good for young crop plants and protective of newly planted grain seed. Within the first year of the swidden cycle, an average of between 40 and 50 different types of crop plants have been planted and harvested.

Nearly 5% of the world's people are still predominantly engaged in tropical shifting cultivation on more than one-fifth of the world's land area (Figure 8.7). Since the essential characteristic of the system is the intermittent cultivation of the land, each family requires a total occupance area equivalent to the garden plot in current use plus all land left fallow for regeneration. Population densities are traditionally low, for much land is needed to support few people. Here as elsewhere, however, population density must be considered a relative term. In actuality, although crude (arithmetic) density is low, people per unit area of *cultivated* land may be high.

The most critical feature of swidden agriculture is the maintenance of soil fertility and structure. The solution is to pursue a system of rotation of 1 to 3 years in crop and 10 to 20 in woody or bush fallow regeneration. When population pressures mandate a reduction in the length of fallow period, productivity of the region tends to drop as soil fertility is lowered, marginal land is utilized, and environmental degradation occurs. The balance is delicate.

Source: Based on Harold C. Conklin, *Hanunóo Agriculture*, FAO Forestry Development Paper No. 12.

Shifting cultivation is one of the oldest and most widely spread agricultural systems of the world. It is found on the islands of Kalimantan (Borneo), New Guinea, and Sumatra (Sumatra) in Indonesia. It is now retained, however, only in small parts of the uplands of South Asia in Vietnam, Thailand, Myanmar, and the Philippines. Nearly the whole of Central and West Africa away from the coasts, Brazil's Amazon basin, and large portions of Central America are all known for this type of extensive subsistence agriculture.

It may be argued that shifting cultivation is a highly efficient cultural adaptation where land is abundant in relation to population and levels of technology and capital availability are low. As those conditions change, the system becomes less viable. The basic change, as noted in Chapter 4, is that land is no longer abundant in relation to population in many of the less developed wet, tropical countries. Their growing populations have cleared and settled the forestlands formerly only intermittently used in swidden cultivation. The **Boserup thesis**, proposed by the economist Ester Boserup (1910–), is based on the observation that population increases necessitate increased inputs of labor and technology to compensate for reductions in the natural yields of swidden farming. It holds that population growth independently forces an increased use of technology in farming and—in a reversal of the Malthusian idea (page 125) that the supply of essential foodstuffs is basically fixed or only slowly expandable—requires a conversion from extensive to intensive subsistence agriculture.

Intensive Subsistence Systems

More than one-half of the people of the world are engaged in intensive subsistence agriculture, which predominates in areas shown in Figure 8.7. As a descriptive term, *intensive subsistence* is no longer fully applicable to a changing way of life and economy in which the distinction between subsistence and commercial is decreasingly valid. While families may still be fed primarily with the produce of their individual plots, the exchange of farm commodities within the system is considerable. Production of foodstuffs for sale in rapidly growing urban markets is increasingly vital for the rural economies of "subsistence farming" areas and for the sustenance of the growing proportion of national and regional populations no longer themselves engaged in farming. Nevertheless, hundreds of millions of Indians, Chinese, Pakistanis, Bangladeshis, and Indonesians plus further millions in other Asian, African, and Latin American countries remain small-plot, mainly subsistence producers of rice, wheat, maize, millet, or pulses (peas, beans, and other legumes). Most live in monsoon Asia, and we will devote our attention to that area.

Intensive subsistence farmers are concentrated in such major river valleys and deltas as the Ganges and the Chang Jiang (Yangtze) and in smaller valleys close to coasts—level areas with fertile alluvial soils. These warm, moist districts are well suited to the production of rice, a crop that under ideal conditions can provide large amounts of food per unit of land. Rice also requires a great deal of time and attention, for planting rice shoots by hand in standing fresh water is a tedious art (Figure 8.9). In the cooler and drier portions of



FIGURE 8.9 Transplanting rice seedlings requires arduous hand labor by all members of the family. The newly flooded diked fields, previously plowed and fertilized, will have their water level maintained until the grain is ripe. This photograph was taken in India. The scene is repeated wherever subsistence wet-rice agriculture is practiced.

Asia, wheat is grown intensively, along with millet and, less commonly, upland rice.

Rice is known to have been cultivated in parts of China and India for more than 7000 years. Today, wet, or lowland, rice is the mainstay of subsistence agriculture and diets of populations from Sri Lanka and India to Taiwan, Japan, and Korea. It is grown on over 80% of the planted area in Bangladesh, Thailand, and Malaysia and on over 50% in 6 other Asian countries. Almost exclusively used as a human food, rice provides 25% to 80% of the calories in the daily diet of over 2.8 billion Asians, or half the world's population. Its successful cultivation depends on the controlled management of water, relatively easy in humid tropical river valleys with heavy, impermeable, water-retaining soils though more

difficult in upland and seasonally dry districts. Throughout Asia the necessary water management systems have left their distinctive marks on the landscape. Permanently diked fields to contain and control water, levees against unwanted water, and reservoirs, canals, and drainage channels to control its availability and flow are common sights. Terraces to extend level land to valley slopes are occasionally encountered as well (see Figure 4.23).

Intensive subsistence farming is characterized by large inputs of labor per unit of land, by small plots, by the intensive use of fertilizers, mostly animal manure, and by the promise of high yields in good years (see "The Economy of a Chinese Village"). For food security and dietary custom, some other products are also grown. Vegetables and some

THE ECONOMY OF A CHINESE VILLAGE



The village of Nanching is in subtropical southern China on the Zhu River delta near Guangzhou (Canton). Its pre-communist subsistence agricultural system was described by a field investigator, whose account is here condensed. The system is found in its essentials in other rice-oriented societies.

In this double-crop region, rice was planted in March and August and harvested in late June or July and again in November. March to November was the major farming season. Early in March the earth was turned with an iron-tipped wooden plow pulled by a water buffalo. The very poor who could not afford a buffalo used a large iron-tipped wooden hoe for the same purpose.

The plowed soil was raked smooth, fertilizer was applied, and water was let into the field, which was then ready for the transplanting of rice seedlings. Seedlings were raised in a seedbed, a tiny patch fenced off on the side or corner of the field. Beginning from the middle of March, the transplanting of seedlings took place. The whole family was on the scene. Each took the seedlings by the bunch, ten to fifteen plants, and pushed them into the soft inundated soil. For the first thirty or forty days the emerald

green crop demanded little attention except keeping the water at a proper level. But after this period came the first weeding; the second weeding followed a month later. This was done by hand, and everyone old enough for such work participated. With the second weeding went the job of adding fertilizer. The grain was now allowed to stand to "draw starch" to fill the hull of the kernels. When the kernels had "drawn enough starch," water was let out of the field, and both the soil and the stalks were allowed to dry under the hot sun.

Then came the harvest, when all the rice plants were cut off a few inches above the ground with a sickle. Threshing was done on a threshing board. Then the grain and the stalks and leaves were taken home with a carrying pole on the peasant's shoulder. The plant was used as fuel at home.

As soon as the exhausting harvest work was done, no time could be lost before starting the chores of plowing, fertilizing, pumping water into the fields, and transplanting seedlings for the second crop. The slack season of the rice crop was taken up by chores required for the vegetables which demanded continuous attention, since every peasant family devoted a part of the farm to vegetable gardening. In the hot and damp period of late spring and summer, eggplant and several varieties

of squash and beans were grown. The green-leafed vegetables thrived in the cooler and drier period of fall, winter, and early spring. Leeks grew the year round.

When one crop of vegetables was harvested, the soil was turned and the clods broken up by a digging hoe and leveled with an iron rake. Fertilizer was applied, and seeds or seedlings of a new crop were planted. Hand weeding was a constant job; watering with the long-handled wooden dipper had to be done an average of three times a

livestock are part of the agricultural system, and fish may be reared in rice paddies and ponds. Cattle are a source of labor and of food. Food animals include swine, ducks, and chickens, but since Muslims eat no pork, hogs are absent in their areas of settlement. Hindus generally eat little meat, mainly goat and lamb but not pork or beef. The large number of cattle in India are vital for labor, as a source of milk and cheese, and as producers of fertilizer and fuel.

Costs of Territorial Extension

Improved health care in this century has lowered infant and crude death rates and accelerated population growth rates in countries of intensive subsistence agriculture. The rising population, of course, puts increasing pressure on the land and, following the Boserup thesis, the response has been to increase further the intensity of agricultural production. Lands formerly considered unsuitable for farming by reason of low fertility, inadequate moisture, difficulty of clearing and preparation, isolation from settlement areas, and other factors have been brought into cultivation.

To till those additional lands, a price must be paid. Any economic activity incurs an additional (called *marginal*) cost in labor, capital, or other unit of expenditure to bring into existence an added unit of production. When the value of the added (marginal) production at least equals the added cost, the effort may be undertaken. In past periods of lower population pressure, there was no incentive to extend cultivation to less productive or more expensive unneeded lands. Now circumstances are different. In many intensive subsistence agricultural economies, however, possibilities for land conversion to agriculture are limited. More than 60% of the population of the developing world lives in countries in which some three-quarters of possible arable land is already under cultivation and where undeveloped cultivable land has low potential for settlement and use.

When population pressures dictate land conversion, serious environmental deterioration may result. Clearing of wet tropical forests in the Philippines and Indonesia has converted dense woodland to barren desolation within a very few years as soil erosion and nutrient loss have followed forest destruction. In Southeast Asia, some 10 million hectares (25 million acres) of former forestland are now wasteland, covered by useless sawgrasses that supply neither forage, food, nor fuel.

The Green Revolution

Increased productivity of existing cropland rather than expansion of cultivated area has accounted for most of the growth of agricultural production over the past few decades. **Green Revolution** is the shorthand reference to a complex of seed and management improvements adapted to the needs of intensive agriculture that have brought larger harvests from a given area of farmland. Between 1965 and 1995, world cereal production rose more than 90%; over three-quarters of that increase was due to increases in yields rather than expansions in cropland. For Asia as a whole, cereal yields grew by nearly one-third between 1980 and 1992 and increased by nearly 25% in South America. These yield increases and the improved food supplies they represent have been particularly important in densely populated, subsistence farming areas heavily dependent on rice and wheat cultivation (Figure 8.10). Indeed, the proportion of malnourished fell, the Food and Agriculture Organization (FAO) tells us, from 36% to 20% of the population of developing countries between 1965 and 1995.

Genetic improvements in rice and wheat have formed the basis of the Green Revolution. Dwarfed varieties have been developed that respond dramatically to heavy applications of fertilizer, that resist plant diseases, and that can tolerate much shorter growing seasons than traditional native



FIGURE 8.10 Chief beneficiaries of the Green Revolution. In the 11 countries that were early adopters of new rice varieties and cropping technologies, average yields increased by 52% between 1965 and 1983. In the rest of the world, they actually dropped by 4% during the same period. Wheat yields increased 66% in the 9!

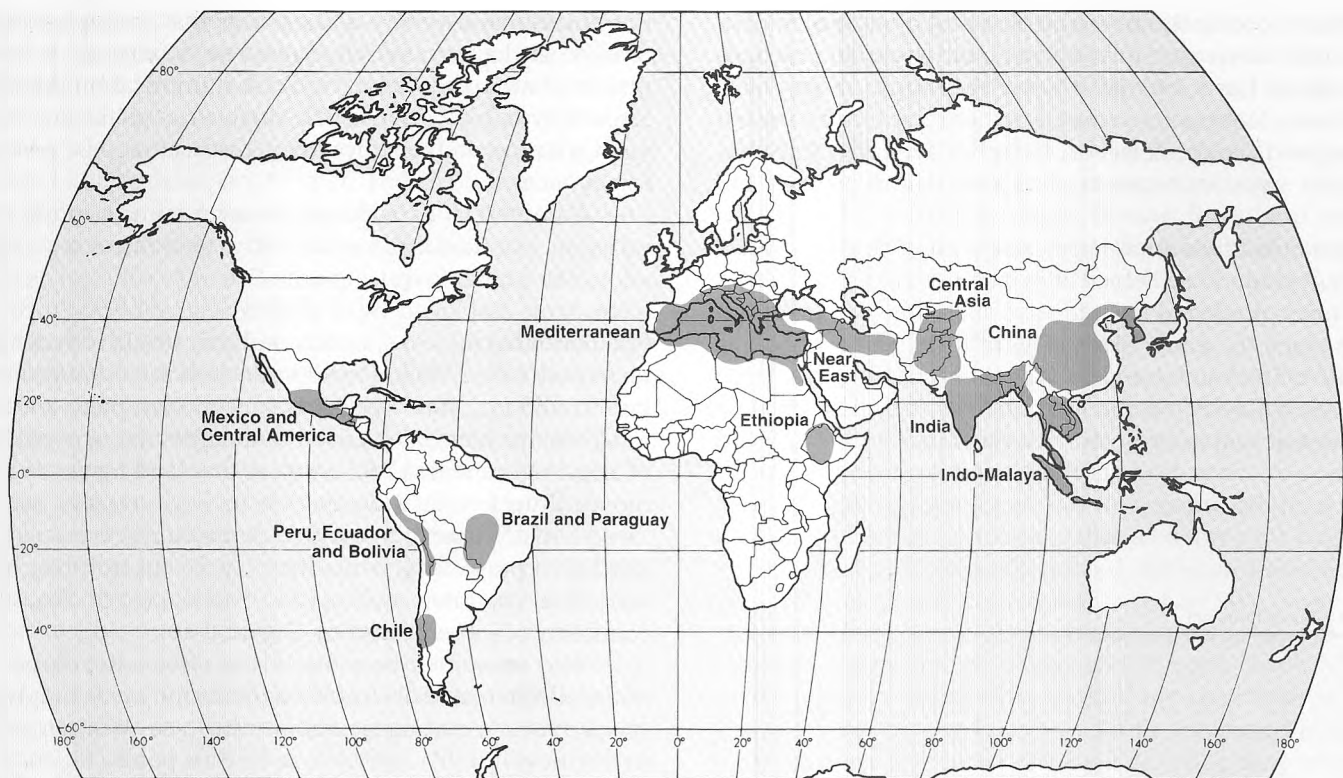


FIGURE 8.12 Areas with high current genetic diversity of crop varieties. Loss of crop varieties characterizes the commercial agriculture of much of the developed world. In place of the many thousands of species and subspecies (varieties) of food plants grown since the development of agriculture 15,000 or more years ago, fewer than 100 species now provide most of the world's food supply. Most of the diversity loss has occurred in the last century. In the United States, for example, 96% of commercial vegetable varieties listed by the Department of Agriculture in 1903 are now extinct. Crop breeders, however, require genetic diversity to develop new varieties that are resistant to evolving plant pest and disease perils. That need necessitates the protection of plant stocks and environments in those temperate and subtropical zones where food plants were first domesticated and are home to the wild relatives of our current food crops.

their own subsistence but primarily for a market off the farm itself. They are part of integrated exchange economies in which agriculture is but one element in a complex structure that includes employment in mining, manufacturing, processing, and the service activities of the tertiary and quaternary sectors. In those economies, agricultural patterns presumably mark production responses to market demand expressed through price, and are related to the consumption requirements of the larger society rather than to the immediate needs of farmers themselves.

Production Controls

Agriculture within modern, developed economies is characterized by *specialization*—by enterprise (farm), by area, and even by country; by *off-farm sale* rather than subsistence production; and by *interdependence* of producers and buyers linked through markets. Farmers in a free market economy supposedly produce those crops that their estimates of market price and production cost indicate will yield the greatest return. Theoretically, farm products in short supply will command an increased market price.

That, in turn, should induce increased production to meet the demand with a consequent reduction of market price to a level of equilibrium with production costs. In some developing countries, that equation between production costs and market price is broken and the farm economy distorted when government policy requires uneconomically low food prices for urban workers.

Where free market conditions prevail, however, the crop or the mix of crops and livestock that individual commercial farmers produce is a result of an appraisal of profit possibilities. Farmers must assess and predict prices, evaluate the physical nature of farmland, and factor in the possible weather conditions. The costs of production (fuel, fertilizer, capital equipment, labor) must be reckoned. A number of unpredictable conditions may thwart farmers' aspirations for profit. Among them are the uncertainties of growing season conditions that follow the original planting decision, the total volume of output that will be achieved (and therefore the unit cost of production), and the supply and price situation that will exist months or years in the future, when crops are ready for market.



omen farmers grow at least half of the world's food and up to 80% in some African countries. They are responsible for an even larger share of food consumed by their own families: 80% in sub-Saharan Africa and 60% in Asia. Further, women comprise between one-third and one-half of all agricultural laborers in developing countries. Despite their fundamental role, however, women do not share equally with men in the rewards from agriculture, nor are they always beneficiaries of presumed improvements in agricultural technologies and practices.

As a rule, women farmers work longer hours and have lower incomes than do male farmers. This is not because they are less educated or competent. Rather, it is due to restricting cultural and economic factors. First, most women farmers are involved in

subsistence farming and food production for the local market that yields little cash return. Second, they have less access than men to credit at bank or government-subsidized rates that would make it possible for them to acquire the Green Revolution technology, such as hybrid seeds and fertilizers. Third, in some cultures women cannot own land and so are excluded from agricultural improvement programs and projects aimed at landowners. For example, many African agricultural development programs are based on the conversion of communal land, to which women have access, to private holdings, from which they are excluded.

At the same time, the Green Revolution and its greater commercialization of crops has generally required an increase in labor per hectare, particularly in tasks typically reserved for women, such as weeding, harvesting, and postharvest work. If women are provided no re-

lief from their other daily tasks, the Green Revolution for them may be more burden than blessing. But when mechanization is added to the new farming system, women tend to be losers. Frequently, such predominantly female tasks as harvesting or dehusking and polishing of grain—all traditionally done by hand—are given over to machinery, displacing rather than employing women. Even the application of chemical fertilizers (a man's task) instead of cow dung (women's work) has reduced the female role in agricultural development programs.

If women are to benefit from the Green Revolution, new cultural norms will be required that permit them land-owning and other legal rights now denied, access to credit at favorable rates, and government assistance programs purged of traditional pro-male biases.

Beginning in the 1950s in the United States, specialist farmers and corporate purchasers developed strategies for minimizing those uncertainties. Processors sought uniformity of product quality and timing of delivery. Vegetable canners—of tomatoes, sweet corn, and the like—required volume delivery of raw products of uniform size, color, and ingredient content on dates that accorded with cannery and labor schedules. And farmers wanted the support of a guaranteed market at an assured price to minimize the uncertainties of their specialization and stabilize the return on their investment.

The solution was contractual arrangements or vertical integrations uniting contracted farmer with purchaser-

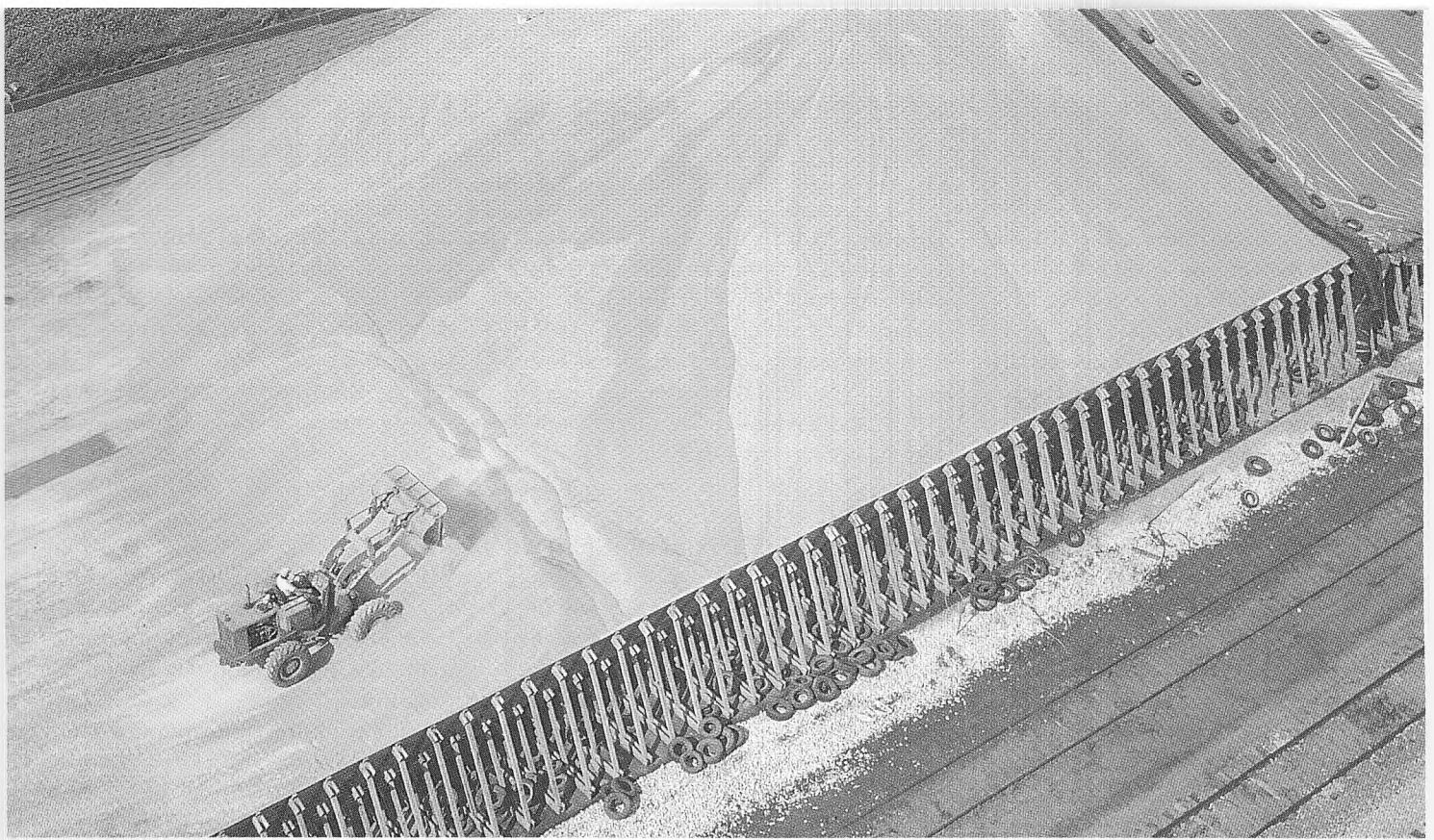


FIGURE 8.13 Open storage of 1 million bushels of Iowa corn. In the world of commercial agriculture, supply and demand are not always in balance. Both the bounty of nature in favorable crop years and the intervention of governmental programs that distort production decisions can create surpluses for which no market is readily available.

and of equally distorting effect (Figure 8.13). The result is international tension as market competition builds to dispose of unwanted farm surpluses.

A Model of Agricultural Location

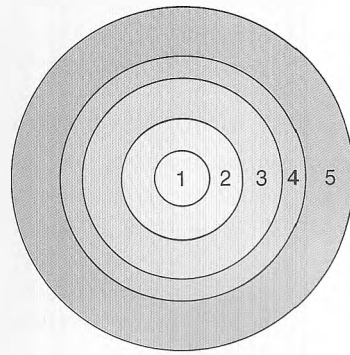
Early in the 19th century, before such governmental influences were the norm, Johann Heinrich von Thünen (1783–1850) observed that lands of apparently identical physical properties were utilized for different agricultural purposes. Around each major urban market center, he noted, there developed a set of concentric land use rings of different farm products (Figure 8.14). The ring closest to the market specialized in perishable commodities that were both expensive to ship and in high demand. The high prices they could command in the urban market made their production an appropriate use of high-valued land near the city. Surrounding rings of farmlands farther away from the city were used for less perishable commodities with lower transport costs, reduced demand, and lower market prices. General farming and grain farming replaced the market gardening of the inner ring. At the outer margins of profitable agriculture, farthest from the single central market, livestock grazing and similar extensive land uses were found.

To explain why this should be so, von Thünen constructed a formal spatial model, perhaps the first developed to analyze human activity patterns. He deduced that the uses to which parcels were put was a function of the differ-

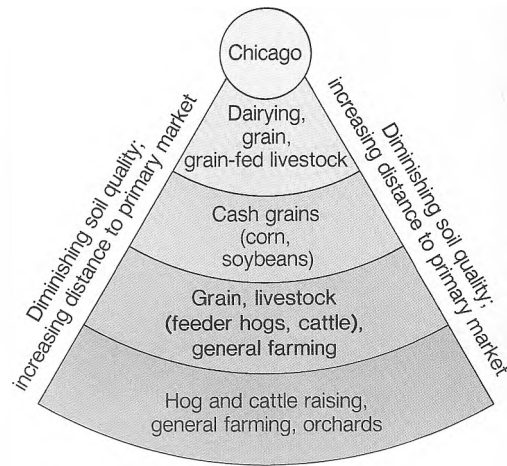
ing "rent" values placed on seemingly identical lands. Those differences, he claimed, reflected the cost of overcoming the distance separating a given farm from a central market town ("A portion of each crop is eaten by the wheels," he observed). The greater the distance, the higher was the operating cost to the farmer, since transport charges had to be added to other expenses. When a commodity's production costs plus its transport costs just equaled its value at the market, a farmer was at the economic margin of its cultivation. A simple exchange relationship ensued: the greater the transportation costs, the lower the rent that could be paid for land if the crop produced was to remain competitive in the market.

Since in the simplest form of the model, transport costs are the only variable, the relationship between land rent and distance from market can be easily calculated by reference to each competing crop's *transport gradient*. Perishable commodities such as fruits and vegetables would encounter high transport rates per unit of distance; other items such as grain would have lower rates. Land rent for any farm commodity decreases with increasing distance from the central market, and the rate of decline is determined by the transport gradient for

1. Dairying and market gardening
2. Specialty farming
3. Cash grain and livestock
4. Mixed farming
5. Extensive grain farming or stock raising



(a)



(b)

FIGURE 8.14 (a) **von Thünen's model.** Recognizing that as distance from the market increases, the value of land decreases, von Thünen developed a descriptive model of intensity of land use that holds up reasonably well in practice. The most intensively produced crops are found on land close to the market; the less intensively produced commodities are located at more distant points. The numbered zones of the diagram represent modern equivalents of the theoretical land use sequence von Thünen suggested over 150 years ago. As the metropolitan area at the center increases in size, the agricultural speciality areas are displaced outward, but the relative position of each is retained. Compare this diagram with Figure 8.18. (b) **A schematic view of the von Thünen zones in the sector south of Chicago.** There, farmland quality decreases southward as the boundary of recent glaciation is passed and hill lands are encountered in southern Illinois. On the margins of the city near the market, dairying competes for space with livestock feeding and suburbanization. Southward into flat, fertile central Illinois, cash grains dominate. In southern Illinois, livestock rearing and fattening, general farming, and some orchard crops are the rule.

transport costs are uniform in all directions away from the center, a concentric zonal pattern of land use called the **von Thünen rings** results.

The von Thünen model may be modified by introducing ideas of differential transport costs (Figure 8.16), variations in topography or soil fertility,!

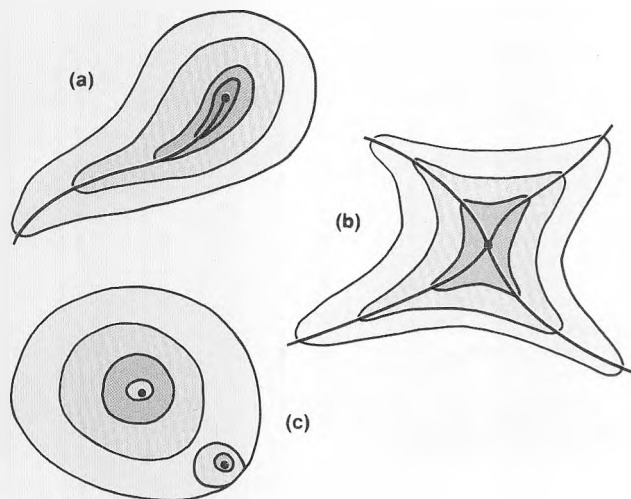


FIGURE 8.16 Ring modifications. Modifications of controlling conditions will alter the details but not change the underlying pattern of the *von Thünen* rings. For example, a change in demand and therefore market price of a commodity would merely expand its ring of production. An increase in transport costs would contract the production area, while reductions in freight rates would extend it. (a) If transport costs are reduced in one direction, the circularity—but not the sequence—of the rings will be affected. (b) If several roads are constructed or improved, land use sequences assume a star-shaped or digitate outline. (c) The addition of a smaller outlying market results in the emergence of a set of *von Thünen* rings subordinate to it.

of the required special handling, such as use of refrigerated trucks and custom packaging. This is another reason for locations close to market. Note the distribution of truck and fruit farming in Figure 8.17.

Livestock-grain farming involves the growing of grain to be fed on the producing farm to livestock, which constitute the farm's cash product. In Western Europe, three-fourths of cropland is devoted to production for animal consumption; in Denmark, 90% of all grains are fed to livestock for conversion not only into meat but also into butter, cheese, and milk. Although livestock-grain farmers work their land intensively, the value of their product per unit of land is usually less than that of the truck farm. Consequently, in North America at least, livestock-grain farms are farther from the main markets than are horticultural and dairy farms.

Normally the profits for marketing livestock (chiefly hogs and beef cattle in the United States) are greater per pound than those for selling corn or other feed, such as alfalfa and clover. As a result, farmers convert their corn into meat on the farm by feeding it to the livestock, efficiently avoiding the cost of buying grain. They may also convert farm grain at local feed mills to the more balanced feed

modern livestock rearing requires. Where land is too expensive to be used to grow feed, especially near cities, feed must be shipped to the farm. The grain-livestock belts of the world are close to the great coastal and industrial zone markets. The "corn belt" of the United States and the livestock region of Western Europe are two examples.

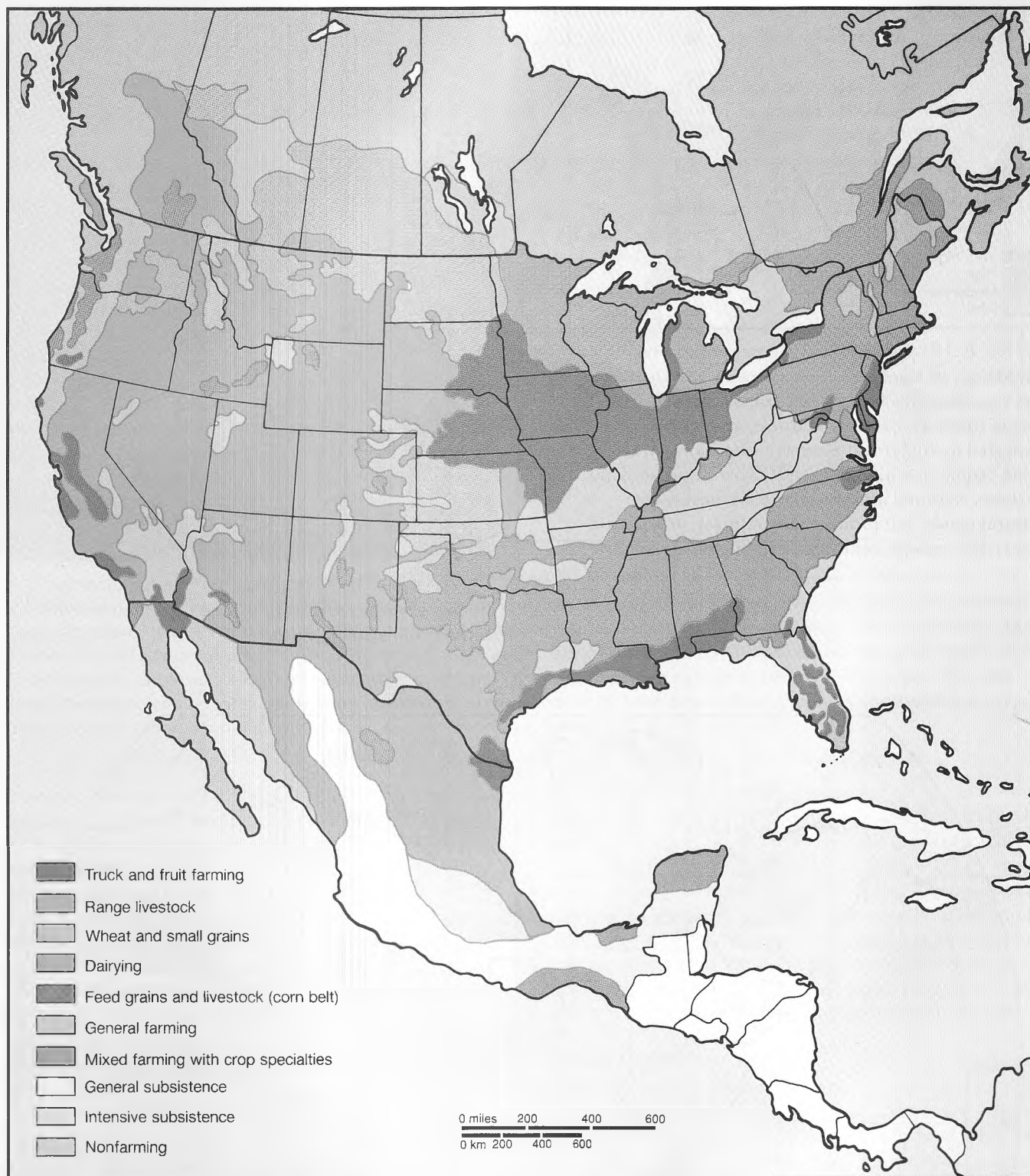


FIGURE 8.17 Generalized agricultural regions of North America.

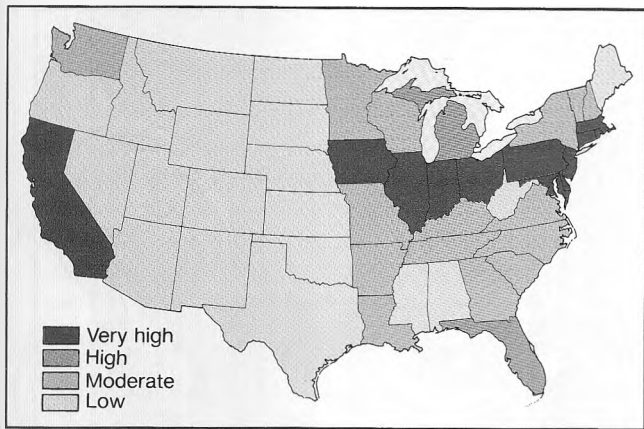


FIGURE 8.18 Relative value per acre of farmland and buildings. In a generalized way, per acre valuations support von Thünen's model. The major metropolitan markets of the Northeast, the Midwest, and California are in part reflected by high rural property valuations, and fruit and vegetable production along the Gulf Coast increases land values there. National and international markets for agricultural goods, soil productivity, climate, and terrain characteristics are also reflected in the map patterns.



FIGURE 8.19 Contract harvesters follow the ripening wheat northward through the plains of the United States and Canada.

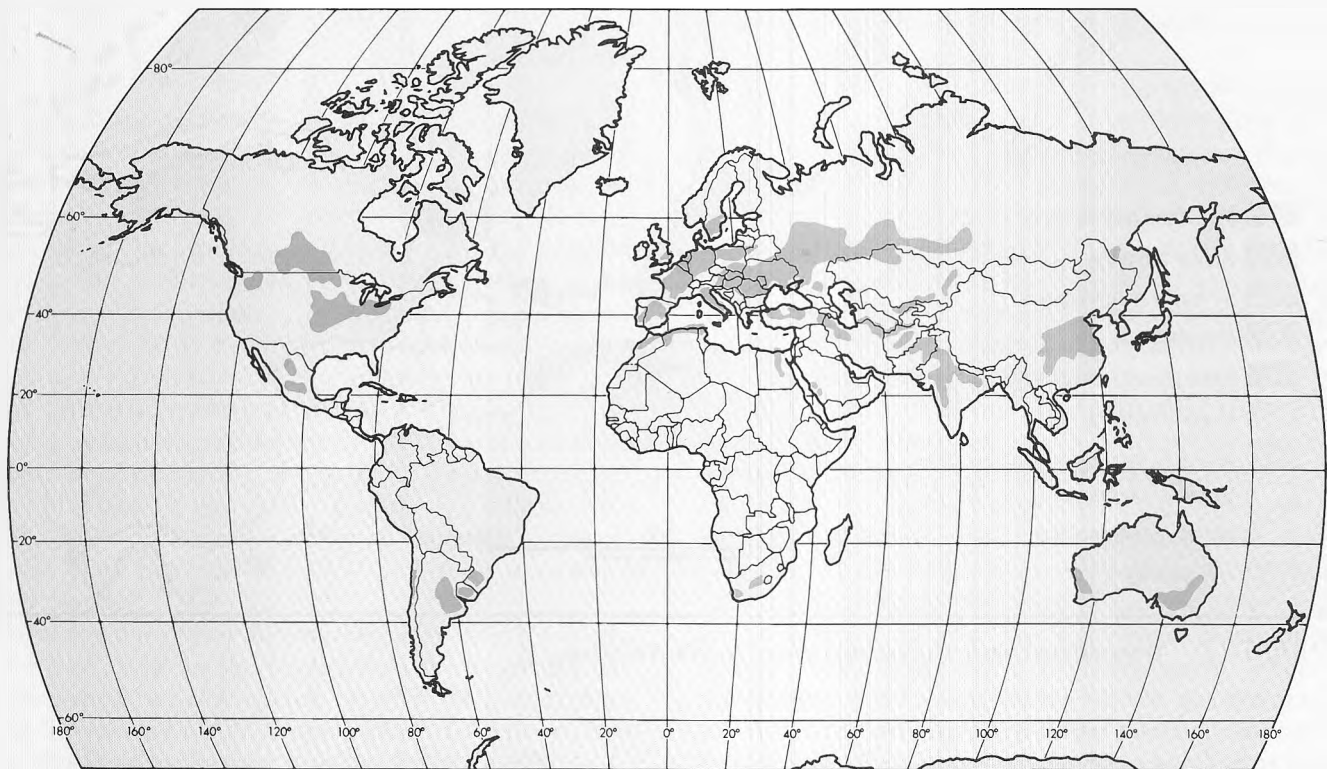


FIGURE 8.20 Principal wheat-growing areas. Only part of the world's wheat production comes from large-scale farming enterprises. In western and southern Europe, eastern and southern Asia, and North Africa, wheat growing is part of general or intensive subsistence farming. Recently, developing country successes with the Green Revolution and subsidized surpluses of the grain in Europe have altered traditional patterns of production and world trade in wheat.

farming economy, however, is known for grapes, olives, oranges, figs, vegetables, and similar commodities. These crops need warm temperatures all year round and a great deal of sunshine in the summer. The Mediterranean agricultural lands indicated in Figure 8.21 are among the most productive in the world. Farmers can regulate their output in sunny areas such as these because storms and other inclement weather problems are infrequent. Also, the precipitation regime of Mediterranean climate areas—winter rain and summer drought—lends itself to the controlled use of water. Of course, much capital must be spent for the irrigation systems. This is another reason for the intensive use of the land for high-value crops that are, for the most part, destined for export to industrialized countries or areas outside the Mediterranean climatic zone and even, in the case of Southern Hemisphere locations, to markets north of the equator.

Climate is also considered the vital element in the production of what are commonly, but imprecisely, known as *plantation crops*. The implication of **plantation** is the introduction of a foreign element—investment, management, and marketing—into an indigenous culture and economy, often employing an introduced alien labor force. The plantation itself is an estate whose resident workers produce one or two specialized crops. Those crops, although native to the tropics, were frequently foreign to the areas of plantation establishment: African coffee and Asian sugar in the Western Hemisphere and American cacao, tobacco, and rubber in Southeast Asia and Africa are examples (Figure 8.22). Entrepreneurs in Western countries such as England, France, the Netherlands, and the United States became interested in the tropics partly because they afforded them the opportunity to satisfy a demand in temperate lands for agricultural commodities not producible in the market areas. Custom and convenience usually retain the term “plantation” even where native producers of local crops dominate, as they do in cola nut production in Guinea, spice growing in India or Sri Lanka, or sisal production in the Yucatán.

The major plantation crops and the areas where they are produced include tea (India and Sri Lanka), jute (India and Bangladesh), rubber (Malaysia and Indonesia); cacao (Ghana and Nigeria), cane sugar (Cuba and the Caribbean area, Brazil, Mexico, India, and the Philippines), coffee (Brazil and Colombia), and bananas (Central America). As Figure 8.21 suggests, for ease of access to shipping, most plantation crops are cultivated along or near coasts since production for export rather than for local consumption is the rule.

peasant families under rent-free leases. Most staple crops are still sold under enforced contracts at fixed prices to government purchasers, but increasingly vegetables and meat are sold on the free market (Figure 8.24), and a slow shift from grain production to vegetables and industrial crops is occurring. Total agricultural output increased by 50% between 1980 and 1990 and even allowing for population growth, per capita gains were impressive—up by about one-third. Disturbingly, China—with 20% of the world's population but





coastlines and reaching seaward for varying distances up to 150 kilometers (about 100 miles) or more where, at about the 100-fathom (600!

flounder take dropped 75% between 1989 and 1995, oysters are largely gone from Chesapeake Bay, and grouper and red snapper were mostly memories

