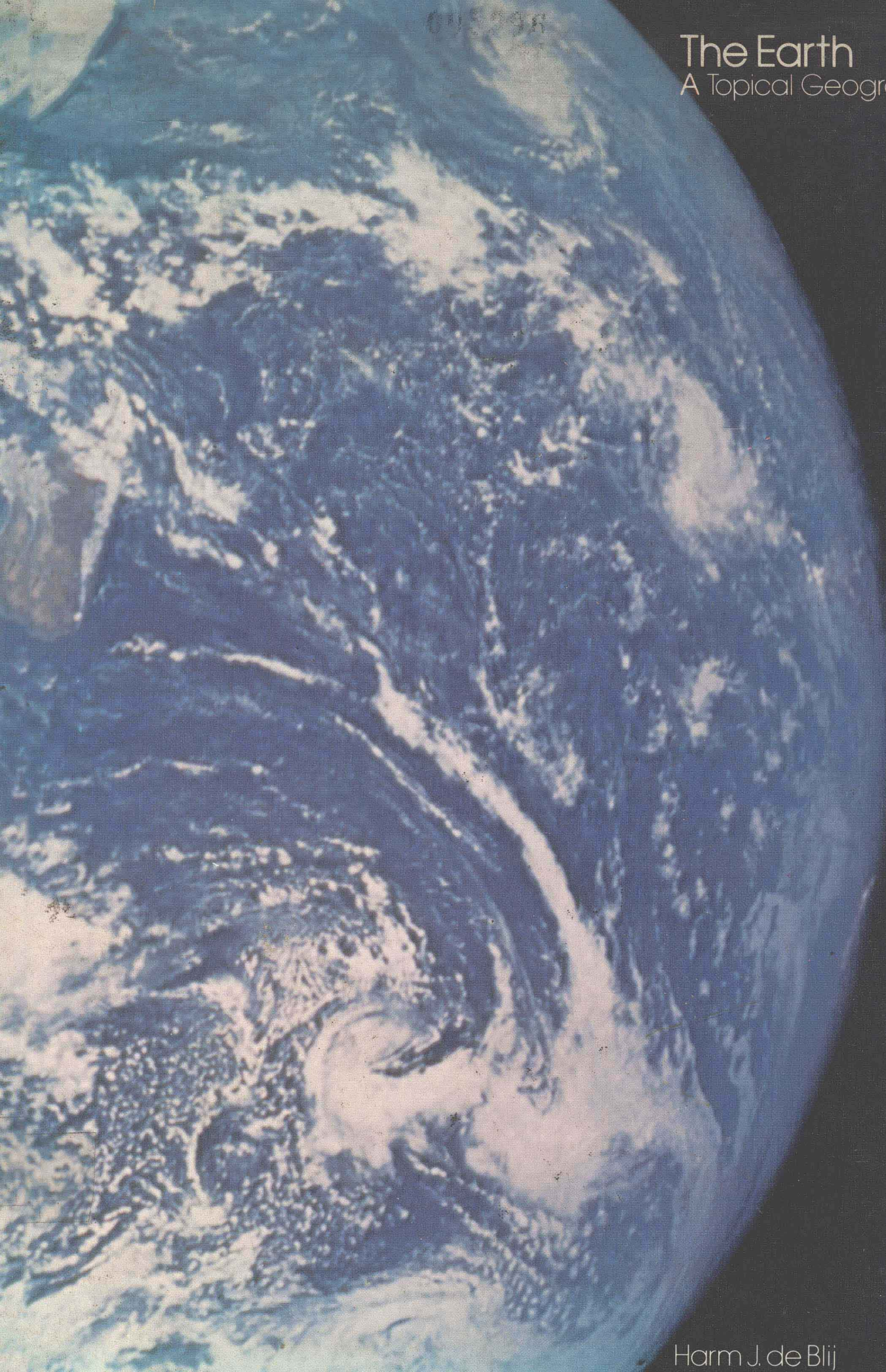

The Earth
A Topical Geography 2ed

Harm J. de Blij

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Preface

This book introduces geography and geographers in broad perspective. It begins with a series of chapters that focus on the physical world and the ways geographers have studied landscapes and the forces that forge them. Patterns of climate and weather, vegetation and soils, and the distribution of the earth's resources are highlighted in these chapters on physical geography, but not without reference to peoples and societies. The second part of *The Earth: A Topical Geography* centers on human geography, beginning with a discussion of world population and focusing next on a set of topics that includes cultures, farming, cities, industries, and political expressions.

This book is the second edition of *Man Shapes the Earth: A Topical Geography,* and its structure is only slightly modified. The principal objective always was to present, in easily readable language, a set of prominent subjects of geographical interest. Together these topics provide considerable coverage of the field and constitute a quite comprehensive introduction to physical, human, general systematic, and small-scale regional contents of the discipline. Each of the twelve chapters stands by itself as a learning unit, and in such a way that if one is deleted or a substitution is made, none of the others will be damaged or continuity seriously impaired.

This new edition incorporates several significant changes. In keeping with the times, a more appropriate title was chosen. An introductory chapter was added to provide some insight into the evolution of geography as a discrete field of study and to identify some prominent names and ideas. Again, this beginning chapter is not a prerequisite for the substantive chapters beginning with "Landscapes: Sculpturing the Surface," with which some readers may prefer to start. In addition, the section on world realms has been moved to the final chapter, since it was repeatedly identified as a discontinuity in the heart of this top-

ical—not primarily regional—geography.

Other changes in this edition will be apparent from a cursory examination. Twelve narrative-style bibliographies have been added as a guide to additional reading; an attempt has been made to draw attention by staying away from mere listings. Items mentioned in the text are given full bibliographic detail in these new sections. The new layout permits more effective use of the "asides" that were an innovation of the first edition. New cartography has been created and a glossary added.

The most substantial changes are nevertheless incorporated in the text itself. The material on landscapes, climates, soils, vegetation, and resources has been almost completely rewritten. Modern classifications are employed; a new section on conservation was added to the chapter on resources. In Part II, the chapter on cultural geography was largely rewritten and reorganized, an essay on the oceans was introduced, and coverage was enhanced.

Acknowledgments

This second edition of *Man Shapes the Earth: a Topical Geography* has benefited from the constructive suggestions of numerous colleagues and students, and it would be impossible to do justice to the entire contents of the revision file. Notes, scribbles, comments made verbally, and detailed commentaries all eased the work. I am especially grateful to Dr. David Icenogle for his insightful reviews of every individual chapter and of the final draft as a whole. His detailed comments and measured evaluations formed an indispensable ingredient of this new edition and his work is reflected by virtually every page of this book. I am equally appreciative of the enormously productive and incisive comments written by Professor Paul D. McDermott. His attention to balance changed the content of several chapters and made me aware of some biases to be countered. Several suggestions made by Professor Elizabeth A. Ross also proved to be most useful. A review

of a chapter in another book of mine, by Professor Eric Kemp Petiprin, alerted me to some needed work on a section of this one as well. Dr. James Curtis, Dr. David Greenland, Dr. Martin Glassner, Dr. David Baker, Dr. Timothy McNaught, Professor Sydney U. Barnes, Dr. Alan Best, and Mr. David Nystrom have directly or indirectly contributed to this effort, and I am very grateful for their assistance; all the shortcomings of this book are, of course, solely my responsibility.

Several of the illustrations in the chapter on landscapes were redrawn from another Wiley publication, William L. Donn's *The Earth: Our Physical Environment,* and I appreciate the willingness of author and publisher to allow this use of the original art.

The completion of the manuscript of a book is only one step in the creation of a published volume, and what matters next is the capability of the people who undertake this work. The copyediting of this manuscript was done by H. L. Kirk, who contributed greatly to its quality and whose detailed correspondence was a challenge and a pleasure. Mr. Kirk's work went far beyond routine copyediting; his valuable suggestions improved clarity and precision (and taught me a bit of English grammar in the process). I am grateful also to Managing Editor Ron Nelson and to Stella Kupferberg, who did the picture research for the volume. The design is the work of E. A. Burke, Design Director.

The conversion of manuscript into printed book was capably directed by Elizabeth Doble, Production Supervisor, whose interest in the project and attention to detail are evident throughout. The illustrations were prepared by Jerry McCarthy and his staff; the cartography was drawn by Jacaranda-Wiley in Australia.

I am especially appreciative of the assistance of Karen Grant, Administrative Assistant in the office of the Geography Editor. Throughout the two years this book has been in preparation, Ms. Grant handled a variety of details with consistent efficiency and sustained dependa-

ble communications that ensured this work's progress. Editor I. L. Cooper secured reviews, arranged for the cartography, and handled problems of coordination. I also thank Ann Renzi (Design), Teri Leigh (Picture Research) and John Balbalis and Ed Starr (Illustration) for their assistance.

Much of this book was written while I was travelling in Africa, Asia, and the Pacific. Ordinary words can but inadequately express my gratitude to my wife, Bonnie, who eased the most difficult circumstances, helped in countless ways, and, simply, made this book's completion possible and meaningful.

Harm J. de Blij

Coral Gables, Florida
August, 1979

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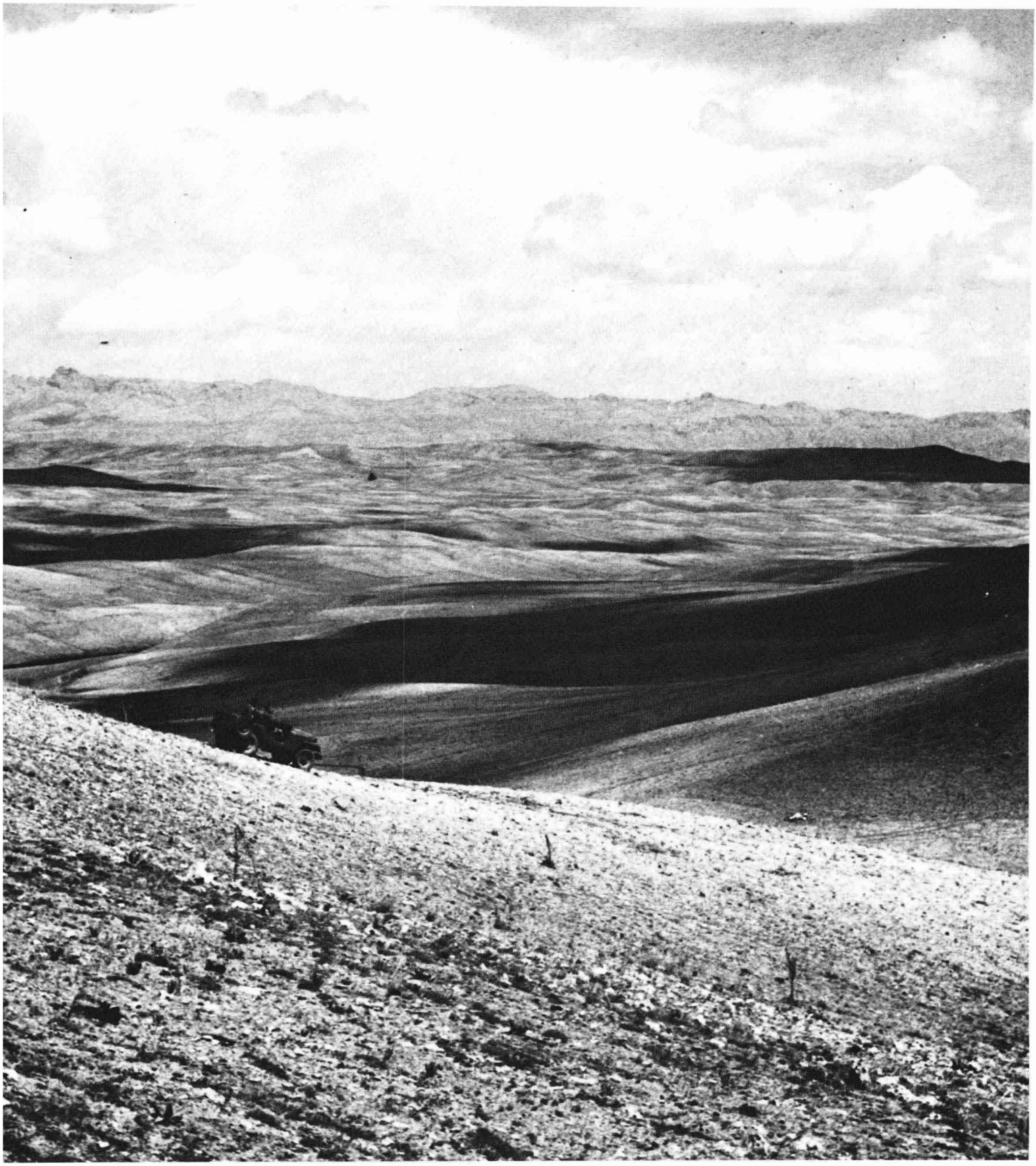
The Earth

A Topical Geography

part 1

Physical Geography



one

Geography!

Geography is a modern science with traditions that extend to the dawn of scientific inquiry and research. Geographical questions occupied the philosophers of ancient Egypt and China; later, the scholars of ancient Greece borrowed the ideas of their predecessors and transmitted them, along with their own, to the Mediterranean realm. In turn, the Romans built upon the scientific foundations the Greeks had laid, and the products of Roman scholarship spread through much of Europe. Certain of these early concepts, supplemented by exploration, map making (cartography), and systematic description of particular places and regions, formed the foundations of modern geography when it emerged, in several stages, during the nineteenth and twentieth centuries.

The scope of geographical inquiry ranges far and wide. No body of facts belongs exclusively to geography. Rather, geographers are united by an interest in *spatial* relationships on and near the surface of the earth. The location of people, places, things, and events *relative to each other* constitutes a central theme in geography, and geographers have devised methods to analyze and solve many of the problems involving some aspect of relative location. Geographers therefore focus on such questions as the effect of *distance* on migration patterns, the influence of wind *direction* on the expansion of a desert, the relationship between the rate of *diffusion* (spreading) of a new idea and the *density* of the population through which it spreads, the impact of low *accessibility* on the development of a frontier farming area. In one way or another, aspects of relative location dominate in the language of geography: region, pattern, proximity, isolation, distribution, remoteness, concentration, core, periphery, shape, clustering, and so on.

Such terminology might suggest that geography is exclusively a social science, but this is not the case. Many geographers apply their locational interest to physical phenomena, seeking to learn more about the earth's surface itself, or about the climate and weather that affect it. Physical geographers, too, often are attracted by especially interesting patterns and clusters, by forms and shapes. Why does a regional river system fail to conform to the structures of the rocks below? Why does a corner of West Africa experience a monsoon-type deluge of rain every year, when other stretches of the coast do not?

Virtually all geographical research and study contributes to our understanding of the earth as humanity's habitat. After several million years of gradual evolution, during the past ten thousand years human communities experienced revolutionary changes that witnessed the domestication of plants and animals; the development of villages, towns, and cities; the growth of transport networks; and unprecedented exploitation of the earth's resources. During the last two hundred years these changes have accelerated almost unimaginably, fueled by the industrial revolution and its aftermath and accompanied by explosive population increases. In the process the earth has been—and continues to be—transformed, reshaped by its human occupants. Plains are plowed and planted, rivers are diked and dammed, hills are topped and terraced. The expanding "asphalt jungle" claims ever more of the countryside. By studying the earth's surface, its natural environments, and its human populations in geographic perspective, geographers (physical as well as human) contribute to the comprehension of the interactions between human societies and the lands upon which they depend.

Geography, then, is a physical (natural) science as well as a social science. Some would argue that it is also a very lively art. And indeed, geography's bibliography includes some memorable literature ranging from vibrant regional descriptions and exciting accounts of early and modern explorations to impressionistic discussions of geographical dimensions in art and music. Geography's many lineages have produced a field with few limits and countless opportunities. ■

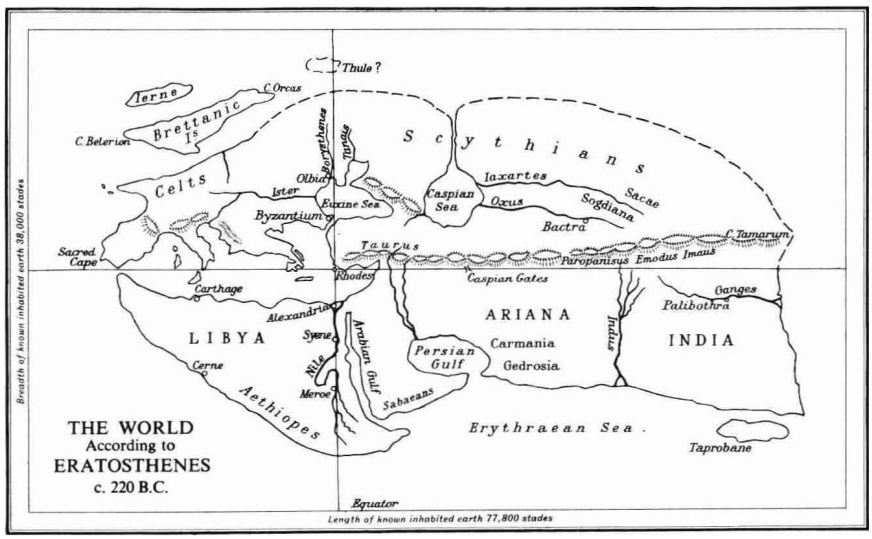
Origins

The first scholar known to have used the designation *geo* (earth) *graphy* (description) was Eratosthenes, a Greek scholar who was born in Libya in about 276 B.C. and who did most of his research in North Africa. But although he gave geography its name and early identity, Eratosthenes was not the first geographer. More than two thousand years before his lifetime, Middle Eastern cartographers had drawn the first simple maps. Centuries before Eratosthenes called it geography, Homer had written in his *Odyssey* about the qualities and properties of distant places and regions. And Plato and Aristotle, who also lived and worked before Eratosthenes, raised crucial geographical questions long before the field of geography itself achieved a separate identity.

Aristotle undoubtedly was the more geographically minded of these two great Greek philosophers. Born in 384 B.C., Aristotle studied at the school Plato had founded near Athens but did not accept all of Plato's teachings. Plato was the mathematician; Aristotle concerned himself more with purposes, reasons, and ideals. Geographers often refer to Aristotle's essay entitled *The Ideal State*

Cartography is more than five thousand years old: this map of rivers and fields in northern Mesopotamia was drawn in clay about 3800 B.C.

as an example of his political and geographical thinking. In this essay Aristotle discussed the geography of a well-functioning national state, with a well-defined territory protected to some degree by inaccessibility, a population neither too small (and thus weak) nor too large (and so ungovernable), and cities that function as market centers with external trade connections, but "well situated in regard to both sea and land." Aristotle also speculated about the effect of the natural environment on the behavior of people, a question that still interests social scientists today. The peoples of Europe north of the Mediterranean, he reasoned, were conditioned by the cold climate to be "full of spirit" but lacking in intelligence and skill. These northerners would be free but poorly organized politically, and certainly not capable of ruling others. And the peoples of warmer Asia he viewed as "intelligent and inventive" but wanting in drive and spirit, and thus destined to live as the subjects of others. Between the Europeans and the Asians lived the Greeks, who had it all—intelligence, skill, good government, and freedom.



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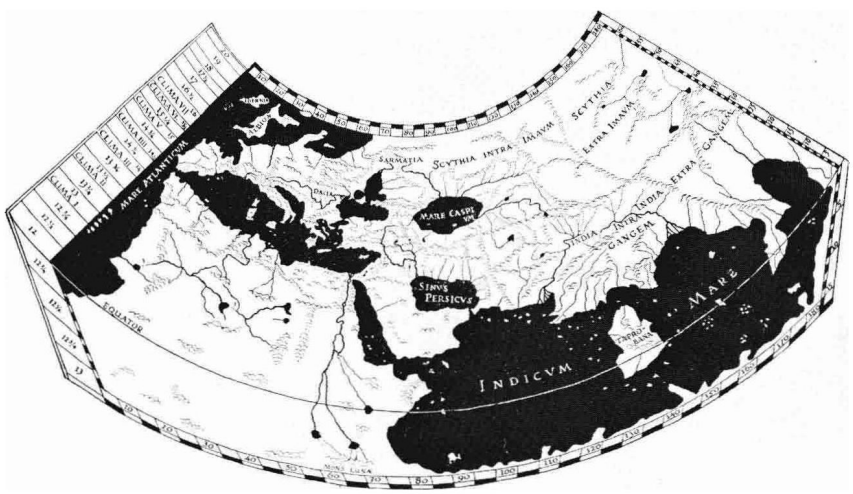
Eratosthenes' map of the known world, constructed about 220 B.C.



Ptolemy's map of the world constituted a summary of Greek and Roman geography. This map has a specific (conical) projection, a major innovation; note also the climatic-latitudinal zones on the left side.

The ancient philosophers studied geographical questions along with other problems, thus contributing to the foundations of many scientific fields that would emerge centuries later. Aristotle was an astronomer, mathematician, physicist, and geologist as well as a political scientist, historian, geographer, and philosopher. Eratosthenes gave geography its name, but he is best remembered for his calculations of the circumference of the earth. Eratosthenes—scientist, poet, librarian, explorer, and cartographer—wrote a book on the regional geography of the known earth in which he developed Aristotle's ideas further. A round earth, Eratosthenes reasoned, would have an extremely hot equatorial zone, two very cold polar zones, and, between these opposites, two temperate zones of which the known inhabited world was one. He even gave latitudinal limits for these proposed environmental regions, a major innovation.

Many of the contributions of ancient Greece's philosophers have been lost, but fortunately the work of Strabo survived almost completely. To Strabo, who was born in 63 B.C. in present-day Turkey, geography was no mere sideline. He must have been one of the world's first professional geographers, determined as he was to write a compendium of the field that would set down everything that had been achieved and establish new directions. He traveled to Rome, studied in the library where Eratosthenes had worked centuries earlier in Alexandria, and read everything geographical that had been written. Based

on this research he wrote a seventeen-volume *Geography,* a monumental work that still constitutes a guide to the field in ancient times. Ironically, Strabo's great effort attracted rather little attention when it first appeared; it was to become a classic, but not until centuries later. Today it remains a window to the geography of ancient Greece.

The Romans did not carry the Greek tradition in geography very much further. One Roman scholar with geographical inclinations was Pliny the Elder (born A.D. 23), who single-handedly assembled and wrote the world's first encyclopedia. Pliny studied in Rome, then entered the army, and followed his service with a period of law study. But he was attracted to research on science and history, and eventually he produced a giant, thirty-seven-book *Natural History* (numerous other writings were lost). Part of this encyclopedic work consists of a compendium of current geographical knowledge (Books III through VI), including valuable descriptions of ancient cities that have since withered or been destroyed.

In the second century Ptolemy produced an eight-volume *Guide to Geography.* But although Ptolemy worked for many years in the library at Alexandria, his *Guide* does not even mention Strabo's major work, and it has other shortcomings as well. For example, Ptolemy's calculations of the latitude and longitude of places were highly inaccurate because the figure he used for the circumference of the earth was about 30 percent less than its true value. The Greeks had done better before him, but he failed to use their evidence. In other respects, as in the analysis of the role of climate, vegetation, relief, and river systems of the countries it describes, Ptolemy's *Guide* also is inferior to much that had been written earlier. His work nevertheless had great importance since it served for centuries as a source of information to navigators and travelers. Ptolemy's miscalculation of the proximity of Asia westward from Europe was one of the factors that induced Columbus, thirteen centuries later, to attempt his first transatlantic voyage. ■

Stagnation: A.D. 500-1500

In Europe, the systematic study of geography progressed little during the thousand years following the breakdown of the Roman Empire. While research, exploration, and the development of geographical traditions continued in China, and Arab scholars were translating Greek and Roman works for the libraries of the rising Moslem world, geography during Europe's Middle Ages was a dormant field. Cartographic practices deteriorated, scholarship stagnated. Strands of geographical interest were kept alive by the reports and descriptions from European travelers to distant lands, but there was no one to synthesize such new information into a new world view. Still, speculations about undiscovered lands and oceans and increasing maritime traffic sustained the attention of some scholars and mapmakers, and by the fifteenth century there were signs that the long period of dormancy was coming to an end.

In large measure this was due to the progress made by geographers and other scholars in the Moslem world and in China. Europe still held to ideas developed by the ancient Greeks, but the Arabs had translated the Greek works and built their scholarship on those foundations, correcting many misconceptions in the process. For example, the ancient Greeks believed that the earth's equatorial zone was so hot that human life there would be impossible (after all, the sun had scorched black the skins of peoples living even as far from the equator as North Africa). But the Arabs sailed southward along the East African coast, reaching Zanzibar and Moçambique before the close of the tenth century, thus crossing the equator and proving equatorial regions to be habitable. Arab travelers (ibn-Batuta prominent among them) brought back to Moslem universities information from as far away as West Africa and Eastern Europe. Arab scholars could therefore improve on Greek concepts and correct

Roman misinterpretations. Eventually physical and human geography emerged as discrete fields of Arab scholarship, and Arab geographers made giant strides in the interpretation of the evolution of mountain ranges and the deposition of sediments, and in the analysis of the atmospheric processes that produce particular weather patterns.

In China, too, geography made progress while it lagged in Europe. Record-keeping was a hallmark of early Chinese scholarship, and during the Han Dynasty (206 B.C.–A.D. 220) China embarked upon the world's first population census. Centuries of weather records, data on river regimes, soil productivity, and other long-term information provided Chinese scholars opportunities to analyze patterns and processes; ancient Chinese geography was marked by more precision and less speculation than the geography of ancient Greece. Moreover, while the Greek and Roman worlds remained comparatively confined, Chinese explorers discovered the Mediterranean civilizations in the second century B.C., so that Chinese scholars had firsthand accounts of a far wider world than did the Greeks or the Romans. Marco Polo did not reach China until fourteen centuries after the Chinese geographer Chang Ch'ien visited Europe.

■

Revival

Greek works, translated into Arabic and then revised by Arab scholars, were translated once again (into Latin) and hence found their way into Christian Europe. This was one of several stimuli that revived scholarship in general and geography in particular in Europe; another was the increased pace of exploration during the fifteenth century and the need for more accurate information and better maps. Beginning with the Portuguese voyages along African coasts, European navigators from Columbus to Cook traversed oceans, charted coastlines, and penetrated lands hitherto unknown to Europe. An avalanche of new information confronted European scientists, and at the same time old scientific assumptions were challenged. From the beginning of the sixteenth century a state of turmoil stirred European scholarship as Copernicus challenged Ptolemy's concept of an earth-centered universe, and in the seventeenth century Kepler, Galileo, and Newton ushered in a scientific revolution that is still continuing today.

But even in those days of scholarly ferment and scientific revolution, it was possible for one scholar to make substantial contributions to several different fields. Leonardo da Vinci, in the ancient Greek tradition but with unprecedented genius, was a painter, sculptor, architect, and engineer. Galileo studied medicine but was a mathematician, astronomer, and physicist. In England, William Petty was trained in medicine, taught anatomy at Oxford, and produced (in 1685) a detailed geography of Ireland including an atlas that remained the standard of reference for that country for more than a century. In Germany and the Netherlands, Bernhard Varen (also known as Varenius) turned from a career in medicine to geography, and in his brief lifetime (1622 to 1651) produced two impressive works. The first of these, *Description of the Kingdom of Japan* (1649), was a regional geography of Japan and Siam (Thailand)