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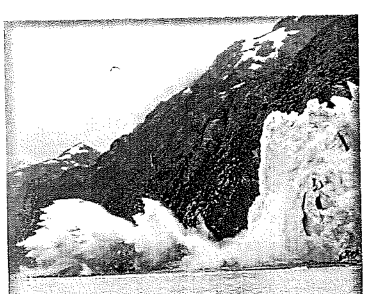
WHY GEOGRAPHY MATTERS

THREE CHALLENGES FACING AMERICA

CLIMATE CHANGE, THE RISE OF CHINA, AND GLOBAL TERRORISM



Harm de Blij

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READING MAPS AND FACING THREATS

It is often said that a picture is worth a thousand words. If that is true, then a map is worth a million, and maybe more. Even at just a glance, a map can reveal what no amount of description can. Maps are the language of geography, often the most direct and effective way to convey grand ideas or complex theories. The mother of all maps is the globe, and no household, especially one with school-age children, should be without one. A globe reminds us of the limits of our terrestrial living space when about 70 percent of its surface is water or ice, and much of the land is mapped as mountains or desert. A globe shows us that the shortest distance between the coterminous United States and China is not across the Pacific Ocean but over Alaska and the Bering Sea. A globe tells us why Northern Hemisphere countries dominate the affairs of the world: most habitable territory lies north of the equator.

Cartography, the drawing of maps, has come a long way since ancient Mesopotamians 5,000 years ago scratched grooves in moist clay to represent rivers and fields and let the sun bake it into clay tablets. The evolution of cartography is a stirring story well told by John N. Wilford in *The Mapmakers* (Wilford, 1981), and the saga continues. During the first period of the still-continuing age of discovery, explorers, mercenaries, speculators, and adventurers sailed from Europe into the unknown, and those who survived brought back pieces of the great global puzzle for cartographers to fit into their maps.

Magellan and his crew were the first to circumnavigate the world (1519–1522), building on Cabral's impressions of the coast of Brazil and proving the vastness of the Pacific; the Italian Battista Agnese's 1544 map of the world was soon renowned for its beauty as well as its novelty; and the Flemish mathematician and cartographer Gerardus Mercator formulated a grid for the evolving map of the world that allowed navigators to plot a straight-line compass bearing, the Mercator Projection (1569). This was a momentous innovation, and the name Mercator remains famous to this day—as well as another of his inventions, the concept of the atlas (which he named after a Greek titan) as a collection of maps.

It is well to remember, however, that Europeans were not the only mapmakers of the time. The Chinese were making maps perhaps 3,000 years ago, and their fleets, larger than anything Europe had floated, were plying Asian and African coasts before Magellan made his epic journey. When Captain Cook traversed the Pacific in the eighteenth century, the local islanders showed him the way through maps made of sticks, fibers, and shells. The ancient Maya and the Inca also made maps. Mapmaking was not a European monopoly.

But the Europeans did collect and assemble the information necessary to create the first representative maps of the entire world rather than just their own realm, and they got better at it as time went on. From Vasco da Gama at sea to Burton and Speke on land, "discoveries" (a word to which, these days, the descendants of the discoverees tend to object) were made at ground or from water level. The explorers and their improving equipment, ranging from compass to sextant and from astrolabe to chronometer, eventually achieved remarkable accuracy and amazing interpretive detail. Nineteenth-century maps tend to represent science, not art, although many were still hand colored for clarity. But the twentieth century witnessed the revolution that would transform cartography and is still under way: the introduction of photography from airplanes, the launching of image-transmitting orbital satellites, and the coming of the computer age.

In the process, the very definition of the term "map" has changed. In traditional works on cartography such as *The Nature of Maps* by Arthur H. Robinson and Barbara B. Petchenik (1976) or P. C. and J. O. Muehreke's *Map Use* (1997) the authors define a map as "a graphic representation of the milieu" or "any geographical image of environment." But today we see maps of the brain, of human DNA, of ozone holes in the atmosphere, of Mars, of galaxies. High technology, in the words of Stephen S. Hall, "has completely stolen cartography from the purely terrestrial domain" (Hall, 1993).

Well, not entirely. Scientists may use "maps" of chromosomes, regions of the brain that activate when music is heard, or galactic realms where the cosmic action is, but we still use maps for planning a trip, for getting around, for checking on the weather, for getting a sense of where something important in the country or the world is taking place. Unfortunately, surveys show that many Americans are unable to make full use of such traditional maps, even simple ones in commercial road atlases. They have trouble dealing with the standard properties of ordinary maps, such as scale, orientation (direction), and symbols. They find it difficult to relate the legends of maps to the contents of the maps themselves. It is also easy to be confused by the effects of certain map projections, for example the Mercator map, which has the asset of directional utility, but at the cost of shape and size. On a Mercator map, Greenland looks bigger than South America when, in fact, South America is eight times as large as Greenland. Don't plan your overseas trip with a Mercator map!

MAP SCALE

There is no escaping it: a map, if it encompasses a section (or all) of the Earth's surface, must represent a rounded surface on a flat piece of paper. The larger the segment of the globe thus represented, the greater the problem. It hardly matters when it comes to a map of a small town, where the curvature of the Earth has little effect. But a map of the entire United States needs substantial "flattening," and a map of the entire world requires some complicated manipulation to avoid crippling distortion.

The larger the area represented on our flat piece of paper, the smaller the scale of the map and the less the detail it can display. This is one of those apparent contradictions in the language of geography: you would think that a map of a whole continent is a large-scale map, because it covers such a large area, but in fact it is a small-scale map. A page-size map of a city block or suburban street where you live covers a small area, yet it is a large-scale map. At this large scale, you can show individual houses, streets, and sidewalks. Most of this detail would be lost, however, if the page were to contain a map of an entire city. Now the scale would be smaller, and only major urban areas and arteries could be shown. Put an entire state on the page, and the city becomes little more than an irregularly shaped patch. In turn, the state becomes just an outline if the page must contain the whole country, with very little detail possible.

Each time, in the example above, we made the map's scale smaller to accommodate an ever larger area on our page. Thus, in addition to the legend and its symbols, we should examine the scale of any map we read. Our expectations of what the map can tell us are based in part on the scale to which it is drawn.

Why is scale smaller when the area represented becomes larger? Because scale refers to a ratio: the ratio of a distance or area on a map to the actual, real-world distance or area it represents. To simplify, let us use the number one for the distance on the map. On our map of a city block or suburban street, 1 inch would represent about 200 feet, or 2,400 inches, so the scale would be 1:2,400. This ratio can also be represented as a fraction: 1/2,400. To get the whole city on the page, 1 inch would have to represent 2 miles, or 126,720 inches. Now the ratio (1:126,720) becomes a much smaller fraction:

1/126,720. As maps go, 1:126,720 still is a pretty large-scale map. To get an entire medium-sized state on our page, our scale would have to drop to about 64 miles to the inch, or 1:4,000,000. And for the whole United States, the scale would be 1:40,000,000.

The scale of map, therefore, tells us much about its intended use. When a developer lays out a new subdivision or a planner considers the placement of a new shopping center, large-scale maps are needed. The useful road maps made available by the American Automobile Association and by state tourist offices are at medium scales. Maps of world distributions (of, say, population growth by country) can be presented at small scales. The map's function is the key to its scale.

DISTANCE

A good map is likely to display its scale in one of two (sometimes both) ways: as the fraction just discussed, or as a bar graph, usually in kilometers as well as miles. Using this feature apparently is difficult for many map readers, so road maps also show point-to-point distances along highways, for example between exits on interstates. Again, the larger the scale, the more accurate the distances you derive from the bar graph. On a small-scale map of the world, distortion invalidates it for all but the most general impressions.

One way to gauge distances using the bar-graph scale on a map of, say, a country or a state is to mark the distance on the map along the edge of a piece of paper, and then to transfer this to the scale. Recently, following a lecture in Texas, someone asked me how large the "Sunni Triangle" in Iraq is, in square miles. I had a general idea, but when I got back to my office I took my Oxford University Press *Atlas of the World*, marked the distances from Baghdad to Ramadi and from Ramadi to Tikrit, and calculated it (I had estimated 3,000 square miles, and was off by about 200). That bar-graph scale can be very useful indeed.

There is one map on which you can measure distances with complete confidence: a globe. Take a piece of string or tape, and you can measure the shortest distances between places on the planet using the scale provided. That exercise can be interesting as well as troubling. Interesting, because when you lay that string from, say, New York to Beijing or from Los Angeles to Singapore along what geographers call a "great circle" route, that route may not lie where you expected it to. Troubling, because these shortest-distance routes also reveal how close some of our adversaries are to American cities. When the North Koreans began testing rockets and fears rose that such a rocket might deliver a nuclear weapon, strategists on both sides looked at the globe and calculated that Anchorage, Alaska and Honolulu, Hawaii lay just 3,500 and 4,500 miles respectively from North Korean territory. The technology of war is shrinking the protective cushion of distance.

DIRECTION

A third element displayed by a map has to do with orientation. Foreign visitors to the United States often comment on Americans' good sense of direction. Europeans, many of whom come from the old, mazelike cities of their realm, are not used to directions that say "go four blocks east on 23rd Street and three blocks north on Fifth Avenue." They may be walking in an American city's square or rectangular downtown street pattern, but their awareness of north, south, east, or west is not part of their customary personal navigation. In most European cities, compass directions simply aren't useful when it comes to finding the way. Americans, on the other hand, are brought up with reference to the compass rose. Ask about someone's home suburb, and the first reaction often includes a directional reference: "Rosewood lies about six miles west of the city."

But this does not mean that directions cannot be confusing, even to American map readers. It is convention that north lies at the top of a map, south at the bottom, east to the right, and west to the left. Yet some maps are not aligned this way, and even experienced map readers can be confused if this is not made clear by a prominent "north arrow" pointing in some direction other than upward. So in addition to checking the legend's symbols, a map reader needs to check the map's general orientation.

The compass rose consists of more than the four main directions. Midway between north and east the direction is northeast, and between northeast and east it is east-northeast. These refinements are of use mainly in navigation. Which leads us to a useful extension of the compass rose to our wrist watch. Imagine that you are standing on the deck of a boat, headed in a certain direction. That direction may be west-northwest or south-southeast. You spot a school of dolphins, just off to the right of your course, ahead of the bow. Rather than calling out the compass-rose direction, a quicker directional reference would be "Dolphins at one o'clock!" Using the clock so that you are always moving toward twelve o'clock is a great way to share quick information on the highway. "Elk in the meadow at three o'clock!" will have all faces pointed in the proper direction; "Elk over on the right!" is far less specific. When I took students to Africa on safari, we always practiced this method—often with excellent results when the moment of observation was brief.

One final point involving direction. Why is it that the world is always represented in such a way that Europe and Asia and North America are at the top, and Australia and Antarctica are at the bottom? Again, this is a matter of convention. While it is logical to use the Earth's two poles as top and bottom of any world map, nothing in nature specifies that the North Pole should be at the top of the map and the South Pole at the bottom. What is now universal practice developed from the work of the earliest cartographers, who lived in the Northern Hemisphere and who started at the top of their page. Most of what was to be discovered turned out to lie to the east, west, and south of their abodes, and so Africa, South America, and Australia came to occupy the bottom half of the evolving world map. It has been that way ever since, except in Australia and New Zealand. There they pointedly draw maps that put "Down Under" on top of the world.

SYMBOLS

Getting the most out of reading a map involves interpreting the symbols that make many maps look dauntingly complicated. These symbols range from simple dots or circles to mark the location of towns and cities on small-scale maps to terrain representation by means of contour lines on larger-scale maps. The United States Geological Survey (USGS) for a very long time has published a set of Quadrangle sheets in the 7.5 Minute Series covering all of the United States, and if you have not seen the map that covers your home area, you are in for a pleasant surprise, whether you live in a city or in the countryside, in flat or mountainous areas. These USGS maps are not in fact geologic maps, but surface maps: they show in remarkable detail the slopes and streams, roads and paths, forests and lakes, towns and farms, and virtually all else in the natural and cultural landscape. Some even show individual houses. Like a good book, such a map is hard to put down once you have started "reading" it.

USGS and other relatively large-scale maps do require some study of legend and symbol. They show forested areas, generally built-up areas, the location of major electrical overhead transmission lines as well as oil and gas pipelines, power stations and railroad stations, bridges and beaches. Some symbols are obvious, others take some getting used to. But that is the case with all intricate maps that display lots of information.

A major challenge for cartographers is the depiction of hills and valleys, slopes and flatlands collectively called the topography. This can be done in

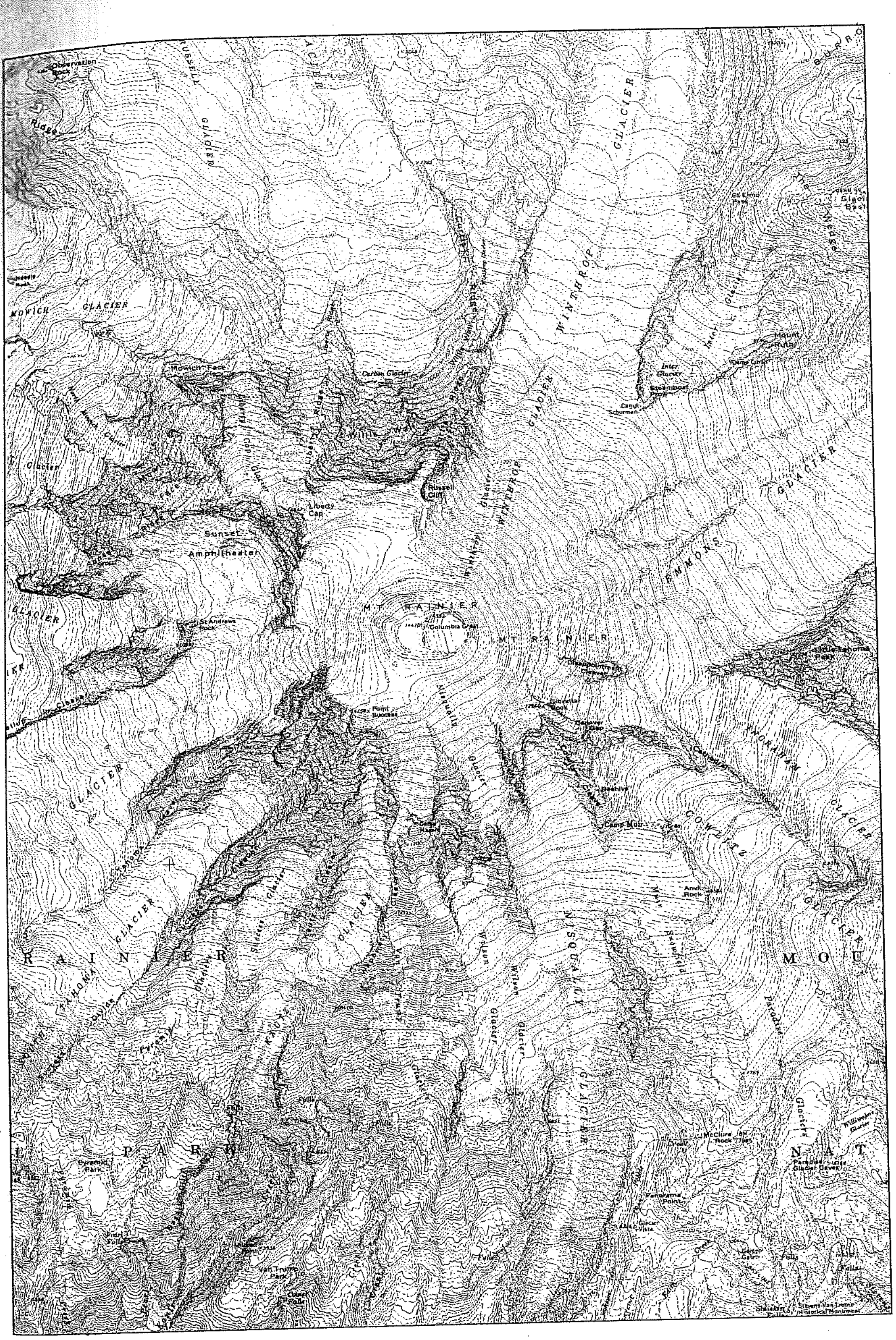

Observation Rock
Ridge
GLACIER
WINTHROP
Mowich Face
Carbon Glacier
Russell Cliff
Liberty Cap
Sunset
Amphitheater
MT RAINIER
Columbia Crest
MT RAINIER
Inter Glacier
Steamboat Prow
Mount Ruth
EMMONS
St Andrews Rock
Point Success
Gibraltar
Camp Muir
COWLITZ
Anvil Rock
NISQUALLY
RAINIER
MOU
PARK
NAT
Panorama Point
Paradise

Fig. 2-1

various ways. One is to create an image of sunlight and shadow so that wrinkles of the topography are alternately lit and shaded, creating a visual representation of the terrain. Another, technically more accurate way is to draw contour lines, as is done on the USGS Quadrangle sheets (Fig. 2-1). A contour line connects all points that lie at the same elevation. A round hill rising above a plain, therefore, would appear on the map as a set of concentric circles, the largest at the base and the smallest near the crest. When the contour lines are bunched closely together, the hill's slope is steep; if they lie farther apart, the slope is gentler. Contour lines can represent scarps, hollows, valleys, and ridges of the local topography. At a glance, they reveal whether the relief in the mapped area (the vertical distance between high and low points) is great or small: a "busy" contour map means lots of high relief.

In the United States, contour lines are still measured in feet; in most of the rest of the world, where metric measures prevail, they are in meters. One reason the United States had been slow in this global conversion has to do not only with long-term cartographic practice, but with something more far reaching: the Ordinance of 1785. According to this decree, land north of the Ohio River and west of Pennsylvania was laid out in a vast township-and-range system based on six-mile "township" squares along parallel, east-west baselines before it was opened to purchase by farmers. Eventually the system allocated most of the land between the Appalachians and the Rockies, creating the rectangular cultural landscape familiar to anyone who has flown over or driven through Midwestern States. For more than two centuries all the titles and other legal documents pertaining to this vast expanse of the United States have been expressed in English measures; converting it all from miles and acres into kilometers and hectares would be impractical. So nonmetric practice continues here, grooved ineradicably into the soil.

MAP PROJECTIONS

This brings us to the interesting topic of map projections. Earlier I mentioned Mercator and his milestone navigation-friendly projection, without saying exactly what a map "projection" is but pointing out that projections inevitably distort the reality on the ground (Greenland's huge size on the Mercator projection is a case in point). The fact is that you can manipulate map projections to exaggerate, diminish, distort, and otherwise modify any representation of any part of the Earth's surface. Countries can be made to look larger, compared to others, than they really are. Places can be made to look closer to you than they really are. Maps can be used for propaganda purposes, or worse.

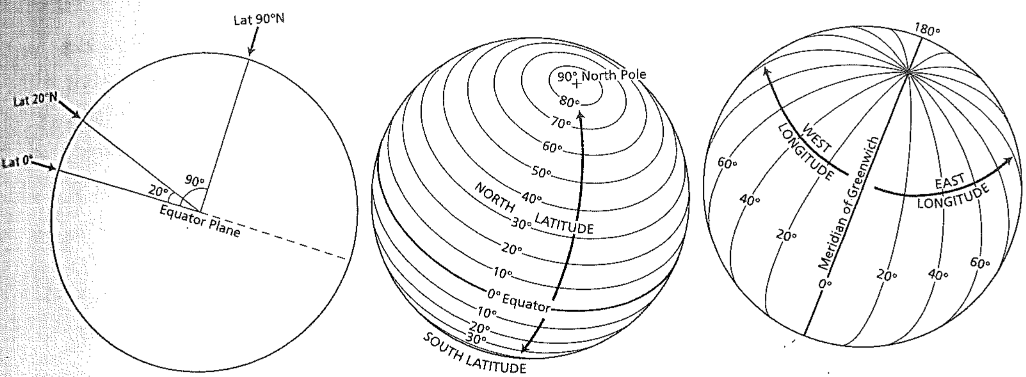


Fig. 2-2

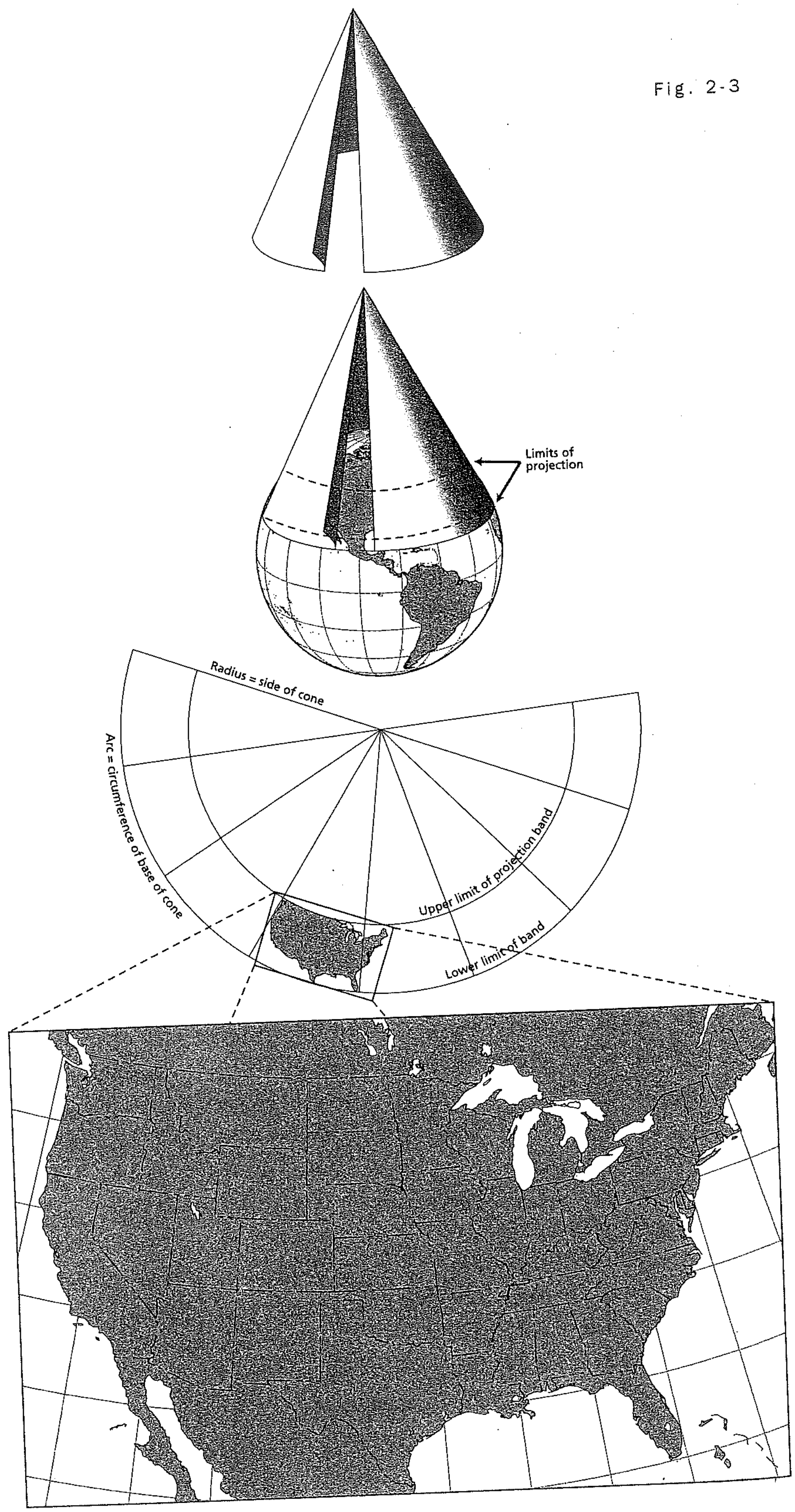
They can be used to stimulate fear, intimidation, aggression, anger, or, at the very least, misjudgments among their readers. So, with any map as with the written word, reader beware!

For centuries mapmakers have grappled with the problem of representing our spherical Earth on a flat surface. To get the job done, they constructed an imaginary grid around the planet, using the poles of rotation and the globe-bisecting equator as their starting points. Since a full circle has 360 degrees, the Earth is divided, pole to pole, by meridians (Fig. 2-2). Of course a starting meridian, or prime meridian, was needed, the zero-degree meridian. This decision was made when the British Empire was at its zenith, and so, not surprisingly, the prime meridian was established as the line of *longitude* running through the Greenwich Observatory near London. That turned out to be a fortunate choice, because the 180-degree line, which would divide the globe into Western and Eastern Hemispheres, lay on the opposite side of the world from London—right in the middle of the Pacific Ocean.

The meridians are the "vertical" lines of the Earth's grid; they converge on the poles and are farthest apart at the equator. The "horizontal" lines, called parallels, meet nowhere: they form equidistant rings around the globe, starting at the equator. These parallels, too, are numbered by degree: the equator, being neither north nor south, is zero degrees *latitude*. Then the numbers go up. Mexico City lies just below 20 degrees north latitude; Madrid, Spain, just above 40; St. Petersburg, Russia, at 60; and Russia's northern islands around 80. The North Pole, of course, lies at 90 degrees, the highest latitudinal point on Earth.

So why is a globe or map grid called a projection? Because that's exactly what it is. You can imagine this by considering an open wire grid with a light bulb at the center and a cylinder of paper wrapped around it. The parallels and meridians would throw shadows onto the paper, creating a kind of

Fig. 2-3


Limits of projection
Radius = side of cone
Arc = circumference of base of cone
Upper limit of projection band
Lower limit of band

projection—not a usable one, but now it becomes a matter of manipulating the light source or the paper. If you put a neon tube inside, pole to pole, you would get something close to the Mercator projection. If you made a conical "hat" of the paper and put it on the Northern Hemisphere, rather than a cylinder all around the globe, you would get less distortion—but only half the world. Indeed, some projections are called "cylindrical" and others "conical." If you want to produce a comparatively low-distortion map of the United States, you would use a conical projection (Fig. 2-3). Projections designed to minimize the distortion of shape are easier to devise for limited latitudinal areas like the coterminous United States than for the world as a whole, but some remarkable, inventive projections have been created nevertheless. By "interrupting" such projections in the oceans, where losing parts of the depicted surface matters less, the shape of the continents is remarkably preserved (see, for example, Fig. 5-2, page 98). Projections designed to keep continents and countries as close to their shape and size as possible are called equal-area projections.

To identify what geographers call the absolute location of a place (as opposed to relative location, about which more later), we must state the degrees, minutes, and seconds north or south latitude and east or west longitude. That seems cumbersome at first, but when you get used to it you can quickly pinpoint the remotest spot on the globe (atlas indexes provide these data for hundreds of thousands of locations). Importantly, no two places have exactly the same location. The recent invention of Global Positioning System (GPS) technology now makes it possible for scientists (for example, archeologists) to record the location of a discovery, leave it, and relocate it even if a sandstorm has changed the terrain unrecognizably. From submerged wrecks at sea to cave entrances on land, from a single dwelling in an isolated village to a gravesite in an overgrown valley, GPS equipment records coordinates that are unique to each. This is one of those "how did we ever do without it" inventions that have radically changed scientific research over the past few decades.

To return to the global grid of parallels and meridians, Figure 2-2 suggests an important reality: latitude and longitude lines cross at right angles. Long before the modern grid was laid out, Mercator realized the implications of this, creating his navigator's chart when much of the world was still to be "discovered." What Mercator probably did not foresee was that his projection, once all lands had been identified and mapped, would be used for other purposes as well (Fig. 2-4). The Russians, Europeans, and Canadians loved it. Leaders and teachers in midlatitude countries liked a map that boosted the size of their homelands.

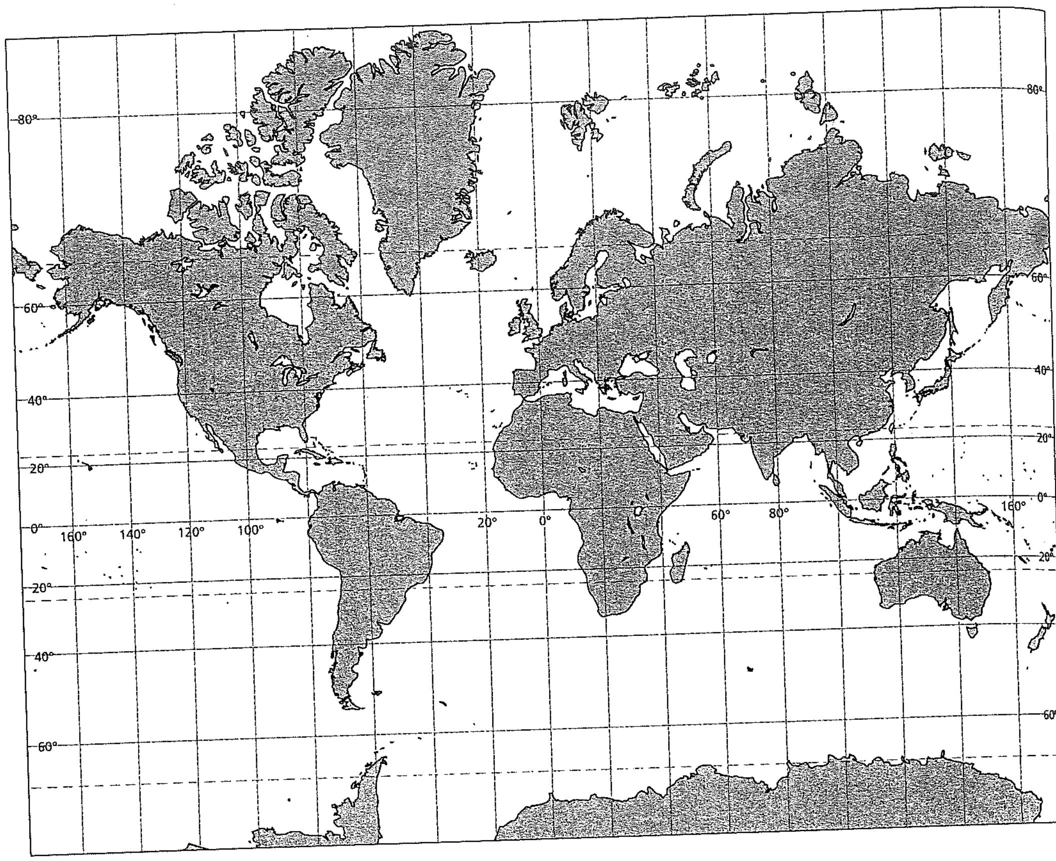


Fig. 2-4

For nearly a century, the National Geographic Society often used the Mercator projection to display world political changes. Then, during the 1980s, the Society's leaders decided to adopt a different projection as their standard world map, a projection constructed by the American geographer Arthur Robinson (a number of other less-distorting projections were also in use at the time). As editor of the Society's scientific journal, called *National Geographic Research*, at the time, I was invited to the news conference where the change from Mercator to Robinson was announced (Fig. 2-5). When it came time for questions, a reporter from a local news organization rose and asked, "Why has it taken you so long to make this change? It seems to me that the old map reduces the size of Africa and other tropical areas, and it's a kind of cartographic imperialism!" She had a point: the Mercator projection gives not only the United States but also the former colonial countries a huge boost in size. But, as the Society's representative said in response, the biggest "loser" from Mercator to Robinson was the Soviet Union. It "shrank" by as much as 47 percent!

MANIPULATING MAPS

By bending the Earth's grid lines in certain ways, therefore, we can make continents or countries look bigger than they really are, or smaller, or shaped differently. Cartographic deception, intended or accidental, is more common than you might think. The misuse of maps has a long history. The Nazis were masters at it. The Communists could match them. Advertisers, politicians of may stripes, activists promoting their causes, and others have used misleading maps in pursuit of their objectives.

Sometimes the misuse of maps is unintended, simply a reflection of our general geographic illiteracy. It was painful to receive last year a copy of a book titled *Middle East for Dummies* with a map of the region on the cover more than 30 years out of date, still showing the diamond-shaped "Neutral Zone" that once lay between Saudi Arabia and Iraq, just west of Kuwait. Saudi Arabia and Iraq agreed in 1973 to establish a boundary down the middle of this historic remnant, eliminating it from the political landscape. But there it was, on the cover of a 2004 book. Dummies indeed (Davis, 2004).

My colleague Mark Monmonier of Syracuse University's Geography Department has written a series of superb books on many aspects of maps, including deliberate deceptions. His first, *How to Lie with Maps*, points out that while some cartographic distortion is actually intended to deceive or misinform, other maps owe their misleading content to sloppy cartography, poor map design, and inexperience on the part of the mapmakers (Monmonier, 1991). You can confirm this by keeping track of maps in the otherwise

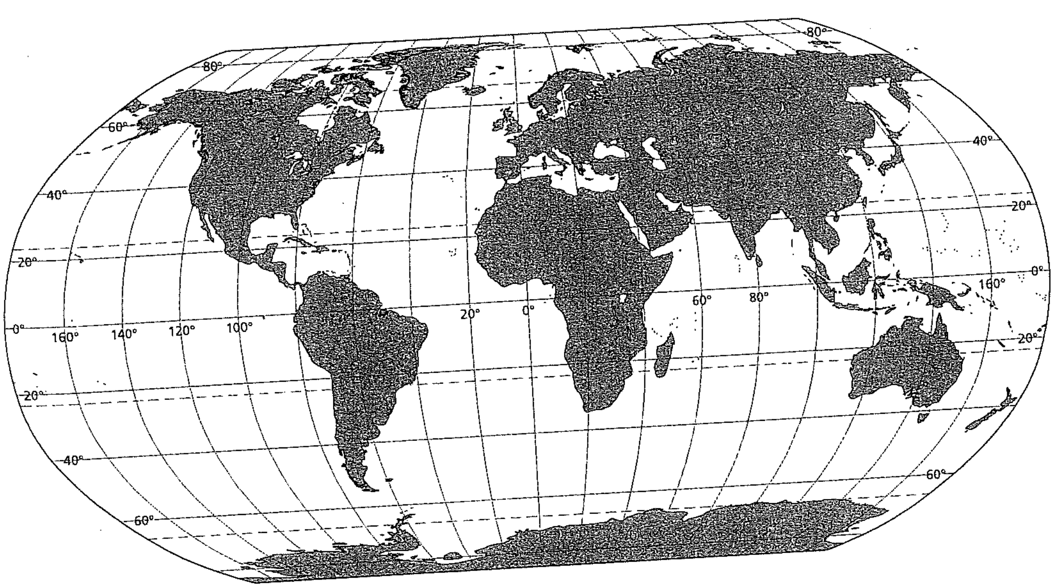


Fig. 2-5

punctilious *New York Times*: chances are that a map on Tuesday will be followed by a correction on Wednesday. The problem, as I found out at ABC and NBC, is that maps are often drawn by people whose background is in art, not cartography. Their maps violate all kinds of rules and conventions because they never had any formal training in a geography department's cartography course. Every school of art or design should make a course in introductory cartography mandatory. Every major newspaper should have someone on its staff with some formal knowledge of mapmaking.

There are encouraging indications that this is beginning to happen. The *New York Times* is publishing more sophisticated, thematic maps, based on extensive independent research, to support stories about major international developments. *USA Today* uses color maps to chronicle social change in America. Occasionally newspapers invite geography graduate students with cartographic skills to apply for positions as interns. All this can only enhance their readers' geographic literacy.

As Monmonier points out, there is power in cartography. Imagine that you are opposed to the building of some installation, say a power station, or a waste dump, or a jail, in or near your neighborhood. You plan to distribute a map at the public meeting where this issue is to be discussed. How to enhance the impact of that map? Obviously, the distance from this new facility to the homes most immediately affected by it is a key factor. You can represent this by drawing concentric circles to reflect the anticipated impact—but the map will have much more effect if you make the lines ever thicker as they approach the NIMBY "victims." Now the map conveys the threat far more effectively.

Monmonier's sharp eye spots another, rather less serious, form of deception—a bit of mischief on the part of a cartographer wielding his or her bit of unchecked power. Scanning a 1979 road map of Michigan and northern Ohio, he noted a couple of hamlets with unusual names: Goblu and Beatosu. Take the road past these places, and you will find that they don't exist. The cartographer, obviously a Wolverine fan, must have been carried away by an approaching Michigan-Ohio State football game. Just don't plan to stop for gas at Goblu or Beatosu.

If you have read about hurricanes, tornadoes, earthquakes, volcanic eruptions, floods, or other natural disasters, or perhaps experienced one or more of these terrifying events, you have probably asked yourself where it is safest to live on this continent. In *Cartographies of Danger*, Monmonier warns us that natural disasters aren't all we should be concerned about (Monmonier, 1997). His maps of hazard zones around nuclear power stations, large incinerators, natural-gas pipelines, and other risk-generating facilities in the cultural landscape remind us that we are also a danger to ourselves, especially when we circumvent rules and regulations designed to protect us.

THE EVER-CHANGING MAP

I have limitless admiration for cartographers. They draw boundaries and put names on maps, go to bed at night, and wake up in the morning to find that boundaries have shifted, new countries have formed, and names have changed. Their job is never done. Prepare an atlas, and it will—especially these days—be out of date before it is published.

What is happening today is not really new. During the age of exploration, new information kept arriving on the drawing tables of European cartographers, and maps had to be revised constantly. But in the period following decolonization and before the collapse of the Soviet empire, there was a certain stability, and map changes were—comparatively—few.

Then, during the 1990s, cartographers faced a flood of new names for cities, towns, and other features in the former Soviet Union, followed by another surge of changes emanating from collapsing Yugoslavia. This came hard on the heels of China's momentous transition from the old spelling to the Pinyin system. I had a foretaste of this when the Society's Research Committee, on which I served, made a month-long visit to China in 1981. It took some getting used to, reading Beijing for Peking, Xizang for Tibet, Guangzhou for Canton. A colleague in Guangzhou smiled when he asked what we Americans were going to do now, familiar as we were with "Cantonese cuisine." Guangzhouese cooking? It would never do! Just don't change the name of Sichuan, we said. At least we can still pronounce it, and we love the taste.

The changes in the Soviet Union produced some similar conundrums. When the Ukraine became independent, its leaders changed the name of the famous old capital, Kiev, to Kyyiv. Chicken Kyyiv?

When the National Geographic Society published the revised version of the sixth edition of its *Atlas*, long known for its place-name coverage, it contained approximately 10,000 changes, yet it was out of date when it hit the streets. The veritable flood of new names continued through the end of the decade, and into the new century. South Africa delimited nine new provinces. India added three new states. But some of the new names were not generally approved, for example the Turkish Republic of Northern Cyprus, recognized only by the Turks, and the Republic of Somaliland, a breakaway province of Somalia. Ever heard of a country called Puntland? That's still another part of Somalia where the people, eager to stay out of the conflicts and chaos that prevail in the south (where the capital is located), proclaimed autonomy.

Cartographers not only add or change names, they must also decide what they will and will not put on their maps, and their decisions can produce great controversy. When Yugoslavia collapsed and its "republics" became sovereign states, the Greeks objected vehemently to one of them: Macedonia. The Greeks argued that the name of one of their historic provinces could not simply be appropriated by a neighboring country. The Macedonians said that they had lived in a political entity of that name for generations. The Greeks proposed that Macedonia be called Former Yugoslav Republic Of Macedonia (FYROM). The Macedonians called that ridiculous. So what's a cartographer to do? Whatever goes on the map will stir up anger somewhere. Cartographers cannot please everybody.

My colleague Ki-Suk Lee of Seoul National University reminded me of this when he told me that my use of the name Sea of Japan for the waters between the Korean Peninsula and the islands of Japan was unacceptable to Koreans. For centuries before there was a Japan at all, he wrote me, Koreans had been referring to this body of water as the East Sea, and at a professional meeting soon thereafter he presented an impressive research paper to support his case. At least I was able to compromise in this instance, which is not always possible. My books (including this one) give it both names, East Sea first, Sea of Japan below between brackets. My books, by the way, sell better in South Korea than they do in Japan.

Trying to be even-handed in situations like this can get you into a lot of trouble. Just ask the people at National Geographic Maps, publishers of the eighth edition of the National Geographic *Atlas of the World* (2005). In every previous edition, the water body between Iran and the Arabian Peninsula had been mapped as the Persian Gulf. After the appearance of the seventh edition, however, a professor from a university in the United Arab Emirates wrote to the Society, arguing that this water body is referred to as the Arabian Gulf in his part of the region, and demanded that the next edition of the *Atlas* show it as the Arabian Gulf, not the Persian Gulf. After much deliberation, it was decided to use both names, with Persian Gulf above and Arabian Gulf, in brackets, below. When the *Atlas* was published, the reaction in Iran and among Iranians everywhere was outrage. Tehran prohibited National Geographic researchers or photographers from entering the country and Iranians in the United States launched a wave of criticism—probably the first time in decades that Iranian rulers in Iran and Iranian exiles abroad agreed on anything. And this campaign had serious impact: on the Amazon.com Web site, it lowered the "rating" of the *Atlas* from five points to two, and anyone unfamiliar with the background might assume that the *Atlas* was not worth its cost, with serious financial consequences for the publisher of this excellent volume. What will National Geographic Maps do in the ninth edition?

Obviously, cartographers are not likely to be out of work anytime soon. We should remember that while mapmaking has entered a new, high-technology age in the United States and in the West generally, maps are still drawn the old way in most of the world—even in the "developed" world. The maps in an atlas I recently edited, the new *Atlas of North America* published in 2005 by Oxford University Press, were drawn in England by cartographers who combined traditional and high-tech methods. Maps in geography (and other) textbooks begin as sketches on paper that are transformed into highly accurate renditions to be checked and revised, and then transmitted electronically to the publisher. Cartography still requires familiarity with design, color gradation, symbolization, and other conventions. Getting the basics right is not always easy.

THE BOARD OF GEOGRAPHIC NAMES

Who decides when the United States, through its official publications, will accept and adopt a new name or a different spelling? This is no minor matter. Our official adoption of a name proposed by one country may profoundly upset another. American approval of the new spelling of a name may make citizens of the place in question very unhappy. Geographic names can be sensitive issues.

Fortunately, the process of approval is done with the utmost care and consideration by an official committee whose members represent a wide range of expertise and experience. This is the United States Board of Geographic Names, an interagency committee that consists of nine members, each representing a branch of the United States government concerned with or affected by such issues. This nine-member board is divided into two standing committees: the Committee on Foreign Names (four members) and the Committee on Domestic Names (five members).

The Committee on Foreign Names consists of representatives from the Defense Department, the State Department, the Central Intelligence Agency, and the Library of Congress. This group considers primarily changes in, and spelling of, country names, important internal divisions (such as the "republics" inside Russia), and international features—that is, features that extend from one country into another (such as mountain ranges and rivers) and whose names may differ on opposite sides of borders. A small army of staff researchers keeps the committee abreast of changes made within countries, for example, from Leningrad to St. Petersburg, or new spellings, such as Kyyiv, which are the prerogative of the countries involved.

How does a name change or spelling change become officially approved by the United States? There are various routes. A government may send a formal communication to the United States secretary of state or to the United States Embassy in the country, requesting affirmation of a change. If consideration of the change falls within the jurisdiction of the Committee on Foreign Names, the file is considered there and either approved or deferred, pending additional information. Eventually, the approved name is codified during a quarterly meeting of the full Board.

Many names, indeed thousands of them, are changed without such request for approval. Still, the United States needs a consistent form of these for official use. Thus it is the job of the staff researchers to comb government decrees, gazettes, maps, and other sources to secure the necessary information. This information is then collected by the Defense Mapping Agency and submitted to the full Board.

To disseminate the approved names, the Board publishes the *Foreign Names Information Bulletin*, used throughout the government and elsewhere (including atlas makers and map companies) for information on accepted spellings. Only very rarely are the names published in the *Bulletin* not immediately adopted; for cartographers, this is the ultimate source.

MENTAL MAPS

I'm sure you've noticed it: some people seem to have an innate sense of direction. They can find a street or a store with the greatest of ease. They don't miss highway exits and always know where the one-way streets are.

Others are not so lucky. They get in the wrong lane, can't remember on which side of the stadium they parked their cars, lose their way trying to find the home of a dinner host.

Geographers' research has proved that when it comes to the maps in our minds, our *mental maps*, we are not born equal. Just as some people are color blind and others have perfect pitch, the brain's capacity to imagine our activity spatially varies from person to person.

I have some evidence of this in my files. Throughout my nearly 50 years of teaching, I have asked students—not only from America, but from all over the world—to draw maps of their home city, their state, or their country (and sometimes the world) on a blank piece of paper. You would be amazed at the results. Some students can draw, from memory, a remarkably accurate map not only of their city or state, but of any part of the world. Others cannot even draw the barest outlines. Not all of this is a matter of education or exposure to geography. Indications are that our capacity for what the technical people call "spatial cognition" varies quite widely.

Perhaps you have seen those funny postcards they sell in Texas, showing a map of the United States almost completely occupied by the Lone Star State, with all the others squeezed in a narrow band against the coasts and the Canadian border. Well, I have seen this sort of thing in real life—and not as a joke. During the 1960s, when I taught at one of my favorite institutions, Michigan State University, hundreds of students came from Africa to study there. Quite a few of them took my introductory geography class. I always asked my students to draw their mental map of a continent.

Almost always, the American students drew North America, and the African students drew Africa. And almost always I was impressed by the detail African students put on their maps of Africa. But class after class, year after year, I noted something interesting: many Nigerian students drew Africa the way those Texas postcards show the United States. Nigeria would occupy almost all of West Africa and much of Central Africa, too, and the other African counties would lie squashed around Nigeria's perimeter. Nigeria, to be sure, is a large country, and in fact it is the most populous country in all of Africa. But in the minds of quite a few Nigerian students, it was also the Texas of Africa. "Well, Nigerians think big," said a student from Ibadan when I asked him about this. "Let me try drawing the map again." He did, now mindful of his earlier exaggeration. But when he was finished, Nigeria still was about twice the size it should be.

Mental maps can be improved, of course, through the study of geography. My colleague Thomas Saarinen of the University of Arizona tested students' mental maps throughout the world, with fascinating results. When asked to draw a world map, for example, many students put Europe in the center of it, even when they don't live in Europe and aren't Europeans themselves. That is just one leftover of the educational systems spread worldwide in colonial times.

In general (this should not surprise us), we Americans are rather fuzzier, mental-map-wise, than many of our contemporaries. Does it matter? Geographers think so. As for me, I still remember that day in 1962, when, as a young assistant professor at MSU, I had been invited to join a group of colleagues in the State Department to discuss, with an assistant to Secretary of State for African Affairs G. Mennen Williams, a set of urgent African concerns. But the night before, President Kennedy had appeared on television with a map of Indochina, and in our Washington hotel rooms we had watched his "chalk talk" that revealed the discovery of the Ho Chi Minh Trail. The next morning at State, nobody wanted to talk about Africa. The hot issue was Indochina, and the Trail—and Laos, through which part of it lay. There was much arm waving, numerous proposals and suggestions, but the maps on the wall were of Africa, not Southeast Asia.

"May I just ask," I said as the debate swirled, "can anyone here name the six countries that border Laos? It seems to me that the layout of the region is rather important, given all these ideas."

No one could do it, and worse, no one seemed to care. "That's a waste of time," said one of my colleagues. "If we need to know that, we'll get a map and look at it."

I suggested that if you have a mistaken mental map of a place, you won't know where you're going and that if a whole cadre of decision makers had a vague mental map, we'd be in for bigger trouble than the president had intimated.

In the years since that little incident I've often thought of it and of how little we Americans, on average, really knew about the Indochina where we would wage so costly and bloody a war. Because a mental map is more than a skeleton outline. At its best, it is a store of information, not only about the layout of a place, but also about its components, its dwellings and schools, streets and paths, mosques and markets. It is a map that accrues over a lifetime, the spatial equivalent of our temporal, chronological knowledge and our simultaneous ability to place major events in historical perspective. But our mental maps are not historic, they are current, and they guide and inform our actions and decisions whether a simple excursion for pleasure or a military campaign in a distant land. How clear were they when the Iraq invasion was planned? How clear are they in this century of environmental change, China's rise, and terrorism's threat?

USES AND MISUSES OF MAPS

When geographers are asked to provide an example of the practical utility of maps in solving real-world problems, we like to go back to the story of Dr. John Snow, a London physician-geographer who lived through several of the dreadful cholera pandemics that ravaged much of the world during the nineteenth century. No one knew for sure how cholera spread, making the disease especially frightening, and many victims died within a week of infection. Dr. Snow had come to believe that contaminated water was to blame, but he had no proof of it. When the pandemic that had begun elsewhere in 1842 reached England, London's densely populated Soho District, near Picadilly Circus,

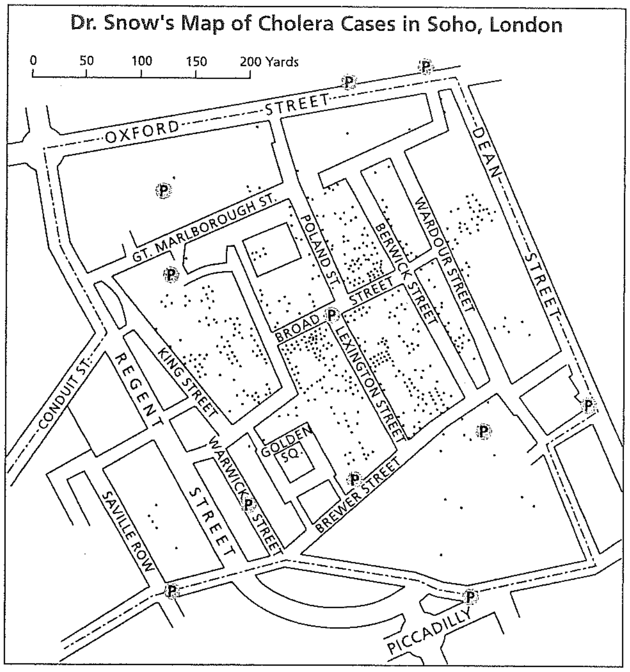


Fig. 2-6

was hard hit. Dr. Snow and his students made a large-scale street map of the area, and marked with a dot the place where each death occurred and where each new case was reported. By the time more than 500 people had died in Soho alone, the map, dated 1854, showed a concentration of victims around an intersection on Broad Street (Fig. 2-6). Now he invoked some geographic reasoning. There were several stores at that intersection, but customers might walk elsewhere if prices a few hundred yards away were lower. But when something is free, they will make a beeline for it, and what was free at this intersection was the water provided by the Broad Street pump. This accounted for the clustering of the dots around the pump, and the link between contaminated water and cholera was confirmed by the map.

That was not the end of the story. Dr. Snow asked city officials to remove the handle from the pump, but they first demurred, saying that this would risk a riot in Soho where people were already angry about the casualty toll from cholera. So Dr. Snow and his students did it themselves, pouring lye down the hole for good measure. Soon he had his proof: the number of deaths around the intersection plummeted, new cases dropped even more sharply, and what the map had confirmed was proven beyond a doubt. Now the authorities could advise people to boil their water and to stop worrying about touching each other or inhaling "bad air," two of the suspected causes.

Today, things are not that simple, but maps still help modern epidemiologists trace pandemics and predict future routes of diffusion. Fast worldwide travel by jet aircraft can relocate a group of individuals infected by some virus in a matter of hours, and once they have dispersed from the airport, warning them before they make contact with locals is a lost cause. On the other hand, cumulative maps of the incidence of such current maladies as Lyme disease and West Nile fever help alert potential victims to the locations of maximum risk even without pointing to remedies.

Against such constructive uses of maps stand the misuses to which they are put. I had a telling experience with this in 1990. A colleague at the University of Baghdad had sent me via a brother in Denmark an official map of Iraq showing Kuwait as the country's nineteenth province. In late July, relations between Iraq and Kuwait deteriorated rapidly, the Iraqis complaining about illegal oil wells along their joint border and massing troops in the area. By coincidence, Dante Fascell, then chair of the House Foreign Affairs Committee, had been invited to the National Geographic Society to speak to the Geographic Alliance teachers who were in Washington attending their institute. Afterward I asked Congressman Fascell about the implications of the map, the troop movements, and the oil issue. He told me not to worry. Our ambassador was on top of things, this was just a quarrel between neighbors, and the United States should not be taking sides. A few days later I happened to be in a hotel in New York for a *Good Morning America* appearance about Puerto Rican immigration the following morning, when the phone rang at two in the morning. It was my producer. "Forget about Puerto Rico," she said. "We've got a car on its way to pick you up. The Iraqis are invading Kuwait. Ever heard of Bubayan Island? Rumaylah Oil Field? We need maps. Start writing the script in the car on the way over here." By the time we sat in the conference room, I had a rough map of the border area drawn on a yellow pad, but I wished I had that map showing Kuwait as Iraq's nineteenth province. When governments start issuing maps that include the territory of neighbors, get ready. They're committing cartographic aggression, in part to see whether anyone is paying attention. Obviously that map raised no eyebrows in Washington. This may have been mistaken for a green light. Fifteen years later, the aftermath goes on.

Cartographic aggression takes several forms, some overt, as in the case of Iraq, others more subtle. In 1993 I received a book titled *Physical Geography of China*, written by Zhao Songqiao, published in 1986 in Beijing. On the frontispiece is a map of China. But that map, to the trained eye, looks a bit strange. Why? Because in the south, it takes from India virtually all of the Indian State of Arunachal Pradesh, plus a piece of the State of Assam. Now this book in not a political geography of China, nor is the matter of appropriated Indian territory ever discussed in it. China's border is simply assumed to lie deep inside India, and the mountains and valleys thus claimed are discussed as though they are routinely a part of China. Make no mistake: such a map could not, in the 1980s at least, have been published without official approval. It should put not just India but the whole international community on notice of a latent trouble spot.

TRACING THE MAPS OF AGGRESSION

In October 1996 the *New York Times* columnist Thomas Friedman wrote a column under the headline "Your Mission, Should You Accept It" that surveyed the impact on American global leadership and interests of continued cuts in the foreign affairs budget, urging President Clinton to reverse the tide through negotiations with the 105th Congress. A small diversion of military appropriation to foreign affairs, Friedman implied, could yield huge dividends.

Friedman's column reminded me of the results of earlier budget cuts, ones that directly affected geographers—and national security. When I was teaching at Michigan State in the 1960s, one of the foreign-service positions my students could apply for was that of geographic attaché, an embassy or consular assignment whose responsibilities included the monitoring and acquisition of all maps, published officially and unofficially, in the country of record. Their tasks included analysis of the maps they acquired and assessments of their significance. "Such maps," I wrote in a lengthy response the *New York Times* published, along with a drawing by Macieck Albrecht, on October 28, 1996, "provide insights into internal problems and external intentions, the latter often an early warning of aggression." But the position of geographic attaché was eliminated during earlier rounds of budget cuts, and what Friedman was complaining about was only the latest cycle of closure of embassies, consulates, and United States Information Agency libaries. So the question arises: even as countries the world over continue to publish maps that should alert our diplomatic and intelligence agencies to risks to peace and stability, who is now monitoring them? Apparently the lesson of August 1990 went unheeded.

Keeping track of the maps being published by governments of countries or, for that matter, by the governments of States, provinces, or other subunits (I have seen some tourist maps from regional governments that clearly make political points) is only one dimension of a larger task. The general public tends to equate "intelligence" with spying, but much critical information gathered by intelligence agencies comes from sources as mundane as local newspapers, magazines, pamphlets, transcripts, and other nonsecret publications. The problem is that these publications appear in languages and scripts requiring translation and interpretation, and all indications are that the number of foreign-language experts available is dwindling quite rapidly. Fluency in one foreign language and reading ability in another was a standard requirement, rigorously tested, when I was a geography graduate student in the 1950s. By the late 1960s, this had been reduced to one language plus ability in quantitative methods of data analysis. By the late 1970s, the language requirement had been dropped entirely in most graduate schools. Meanwhile, the number of graduate students heading for field research in foreign areas was dwindling as well. It became possible to write doctoral dissertations on, say, internal migration in India or agricultural policy in Japan from generally available information (census data or other government reports, for example) without ever setting foot in India or Japan or being able to converse in Hindi or Japanese. Geography was not alone in this trend, and the cumulative effect was to reduce the level of interaction and familiarity between young American scholars and non-Western colleagues and cultures. There is nothing like living for a substantial time in Mombasa or Chennai or Quito or Tunis, navigating the markets and bazaars, plying the bookshops and reading the local press, interacting with locals while gathering not only data but also what used to be called "field experience." When a government signals its priorities by cutting back on language-capable embassy staffs and cultural-information programs, the effects go far beyond a loss of cartographic inventory.

SENSING REMOTELY

When the Soviets launched Sputnik a half century ago they shook the scientific as well as the military world. Remote sensing, hitherto confined to aerial imagery (infrared photography had been the ultimate technology) expanded to incorporate new instruments that could record a much wider range of the electromagnetic spectrum, that is, the electric and magnetic energy emitted at various wavelengths by all objects on the Earth's surface. An ever-larger number of artificial satellites carrying ever-more sophisticated remote-sensing instruments orbited the planet, communicating directly with computers to create visual images never seen before. The opening pages of modern atlases carry satellite images unmatched by Earthbound cartography, dramatic depictions of topography and river systems, coastlines and glaciers, weather systems and ocean currents.

Among the most productive of these Earth-orbiting satellites has been the Geostationary Operational Environment Satellite (GOES) belonging to the

National Oceanographic and Atmospheric Administration (NOAA). It became possible to place a satellite in a geosynchronous (fixed) orbit, so that it remains stationary above the same point on the Earth's surface. From there, GOES was able to observe the oceans and coasts of the United States, watching for storms and tracking them when they occur. Today, television weather forecasters (some of whom were first trained as geographers) depend heavily on such data. On their televised maps, we can watch weather systems move across the country, a form of animated cartography unheard of just a few decades ago.

Also vital have been four LANDSAT satellites launched between 1972 and 1982 to provide a stream of data about the Earth and its resources. Using a battery of state-of-the-art multispectral scanners and special television cameras, LANDSAT's sensors provided new insights into geologic structures, the expansion of deserts, the shrinking of tropical forests, and even the growth and contraction of algae and other organisms crucial to food chains in the oceans. These satellites enabled the monitoring of world agriculture, forestry, ocean pollution, and a host of other environment-related human activities.

As the capacities of satellite instrumentation improved to the point that it became possible to discern objects as small as cars (and tanks) on the Earth's surface, some satellites were inevitably referred to as "spy" satellites, capable of doing what had required ground reconnaissance before. But countries with a modicum of power and influence were obviously unwilling to have foreign geosynchronous satellites hanging over their territories, so old-fashioned spying continued, as Americans were reminded in 2001 when China forced down a propeller-driven American "surveillance" plane flying just outside its territorial sea, briefly holding the crew and staff hostage on the island of Hainan and causing an international dispute. "Spy, but verify," as Ronald Reagan might have said.

MAPPING SYSTEMICALLY

Coupled with the unprecedented imagery generated by satellite-borne equipment is the equally unparalleled growth of computer versatility, including their graphic performance. Today, the map you see in your favorite magazine may well be drawn by a computer that has been instructed to manipulate information on boundaries, resources, ethnic homelands, or any other spatial feature. That information comes from a Geographic Information System (GIS). In recent years, geospatial technology has added a crucial dimension to geography.

A GIS system is essentially a collection of computers and programs that combine to collect, record, store, retrieve, analyze, manipulate, and display spatial information on a screen; of course the display can be printed out, so that it can be reproduced in atlases and journals. Because of the huge capacity of today's computers, the amount of information they hold is almost infinite. They allow you to select any area of the world and bring it to the screen at whatever scale you desire. A map of the remaining forest cover in Poland? A map of the oil reserves in Angola? The names and locations of India's new States? It is all there for the asking. This is revolutionary change indeed, but there is more. A GIS allows for a dialogue between the map and the map user; no longer is the map static and unchangeable except through laborious alterations in the subsequent editions of published books and articles. The map user asks for information; the computer guides the user toward answers. This is called interactive mapping, and it is the cornerstone of this latest revolution in cartography. Already, some automobiles carry navigation systems that guide the driver toward any address desired, in some cases providing voice as well as graphic instructions for the operator to follow. The applications of GIS are limitless.

In the process, as a recent article in the journal *Nature* asserted, "geospatial technologies have changed the face of geography . . . by combining layers of spatially referenced data with remotely sensed aerial or satellite images, high-tech geographers have turned computer mapping into a powerful decision making tool" (Gewin, 2004). The United States government is taking notice: in 2004 the Department of Labor identified geotechnology as one of the three most important emerging and evolving fields, along with nanotechnology and biotechnology. As a result, the job market for geographers is changing as well. "The demand for geospatial skills is growing worldwide, but the job prospects reflect a country's geography, mapping history and even political agenda." In the United States, the focus on homeland security has been one of the many factors driving the job market but, as Gewin points out, there is little demand as yet for remote-sensing expertise in the comparatively small and intensively mapped United Kingdom.

Quoted extensively in this important commentary is the executive director of the Association of American Geographers, Douglas Richardson, who cautions that "although technical skills are important . . . employees need a deep understanding of underlying geographic concepts. It's a mistake to think that these technologies require only technician-oriented functions." This is a crucial observation at a time when the burgeoning of GIS training and development would appear to deplete still more the pool of geography graduates who have research, cultural, and linguistic experience in the field. When concern with United States homeland security focuses on GIS technology to identify, follow, and apprehend terrorist suspects already in the country, we should remember that the roots of Islamic terrorism lie abroad, in the streets, souks, bazaars, and mosques of nations from Morocco to Malaysia where local radicals and American researchers once made mutually instructive contact. The great value of geographers' leadership in GIS should not be undermined by further withdrawal from the real world beyond the computer screen's reach.

FACING CHALLENGES

Is geospatial technology an eventual antidote to Americans' still-endemic geographic illiteracy? Probably not, because the practical side of it will remain mostly confined to domestic use. Getting navigation help to drive to a restaurant or following a storm via satellite on the Weather Channel will not significantly broaden horizons or mitigate isolationism. Much was made, during the quick overthrow of Saddam by United States armed forces in Iraq in 2003, of the role of GIS in the conduct of the campaign, from instant regional and urban cartographics to supply-line logistics. But GIS wasn't of much help when it came to the occupation phase. The geographical concept of a "Sunni Triangle" did not appear on anybody's computer screen until the tough realities of post-Saddam Iraq set in. Those United States government officials who predicted that the roadside public would greet American forces with flowers and gratitude should have unplugged their computers and spent some time in the field. In the wake of the intervention, Iraq became a destabilized haven for the very terrorists "Homeland Security" wants to constrain. Did those GIS maps show just where Iraq is situated, in the middle of the Middle East, when the cost of failure was incalculable?

In this opening decade of the twenty-first century, the United States, as the world's sole superpower, faces challenges and threats near and far. Three of these challenges are immediate or near term; others are in the wings and will emerge later. All will be met more effectively if the American public accepts a responsibility that comes with world leadership: to be better informed about the planet geographically. An informed public, able to express its views to its representatives as Americans in this democracy are, must come to play a stronger role in the affairs of state, especially foreign affairs. After allowing Robert McNamara to steer the country into the morass of Vietnam on the basis of a perception that he knew more than we did, many Americans believed that such a thing could not happen again, that the lesson of Vietnam had been learned. McNamara may have known more than most Americans about Indochina, but he did not know enough. When it came to George W. Bush's initiative toward Iraq, the American public was led to believe that intelligence had uncovered incontrovertible evidence requiring armed intervention. But did the public know any more about Iraq in 2002 than it did about Vietnam in 1962?

From my geographic perspective the three key challenges the United States faces in the quarter century ahead are (1) accelerating climate change, not subject to substantial mitigation through human intervention and therefore requiring national, coordinated preparation; (2) the rise of China as a regional, then a global force, creating the preconditions for the world's first intercultural cold war and requiring a reassessment of the United States' role and objectives in the Western Pacific, and (3) an intensification of the extremist-Islamic terrorist campaign whose widening circle first touched the United States in the 1990s and whose occasional successes cannot be allowed to debilitate the state. These three threats are all understandable in geographic context. Climate change has been a challenge to humanity as long as humans have existed on this planet, and severe environmental swings have occurred (without anthropogenic causes) quite recently. The fast-changing geography of Europe at the start of the severe cooling known as the Little Ice Age gives us a hint of what may be in store—except that the planet's population is now headed for 7 billion, not 1 billion. With reference to China, there is a serious asymmetry between what we Americans know about China and what Chinese tend to know about us. I am not sure that we are better informed about China today than we were about Vietnam in the early 1960s, with troubling implications. Whenever I am in China, whatever college or university I visit seems able to round up at short notice a substantial number of interested students whose English is not only good enough to follow my rapid-fire lecture, but who are able to ask perceptive, often tendentious questions. How many United States universities could find a few hundred American Chinese speakers on campus to hear a visitor speak in his or her native language? And as far as terrorism is concerned, we obviously need a better mental map of the Islamic world than we have. When Ronald Reagan was asked, following the disastrous terrorist attack on the marines near Beirut in 1992, why the United States had so many troops in Lebanon, he answered "we're there because of the oil" (Clarke, 2004). But there was no oil in Lebanon. Oil certainly is entwined with the terrorist threat, as is the Israeli-Palestinian conflict. However surveys show that many Americans tend to generalize about the Islamic realm in ways that obscure its diversity, variety, economic contrasts, and cultural complexity. In this diversity lies opportunity, and geography is the avenue toward understanding it.

Among currently less dangerous but nevertheless serious secondary challenges inevitably involving the United States are the social, economic, and political problems afflicting Subsaharan Africa, the still-uncertain prospects of Russia, the rise of India from regional power to global factor, and the emergence of a European superpower on the economic if not the political stage. All this should be seen against a backdrop of continued population growth, increasing competition for energy resources, and potential nuclear proliferation. It will take unequaled leadership and uncommon public awareness to ensure the stability of the world.