

## GEOGRAPHY AND YOU

H O W  
 M A P S  
 L I E

*Never head down a little pink line to deception.*

BY LEAH FLECKENSTEIN

**T**hrough the 1940s, British school children studied maps of the Empire. At that time, "the empire" sprawled across nearly a quarter of the globe in uniform hues of pale pink, blue, or yellow. Hanging against the classroom wall, Britain's territory seemed even more extensive by a coy cartographic trick. Australia made a dual appearance at each end of the map. After all, a little extra coverage never harmed patriotism.

Such tiny deceptions are common in maps. Like any interpretation of data, maps can reflect the desires of their creators. That is why, for example, the earliest maps showed the cartographer's own country at the center of the universe.

Wishful thinking can produce another type of deception. Think of the blue, blue water on maps that beckon tourists to vacation spots. Bending the truth can encourage people to share a vision. Why else would developers illustrate proposed shopping malls with landscapes devoid of dumpsters but replete with full-grown trees?

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"Most decent maps are collections of little lies," says Mark Monmonier, a professor of geography in the Maxwell School of Citizenship and Public Affairs. Monmonier is the author of *How to Lie With Maps*, which discusses deceptions that are inherent in maps. The critically acclaimed book also reviews methods of creating maps that interpret census data or that are used to influence planning boards.

"What people have to remember," he says, "is that any given map is just one way, out of many, to present the information. Maps look impressive. People believe in them when they should be more critical."

### Innocent Deceptions

**O**n the most benign level, the "lies" maps tell are practical omissions. Since maps are scale models of reality—say of a large city or several states—too much detail is cumbersome. In shrinking reality so it can be effectively stored in a glove compartment, map-makers omit features by necessity. Depending on scale, streets may vanish or suburbs be swallowed by their neighboring city.

Beyond just trying to fold a road map back into its original neat rectangle (or

crumpling it into a wrecked tangle), most people, at one time or another, have been frustrated by a map. As an example, Monmonier points out the widespread tendency to show highway interchanges that drivers can't actually make.

"Not all big lies told by maps are deliberate or devious," he adds. "Ignorance, mistakes, and even a bit of mischief account for many cartographic lies."

There are examples of map-maker whimsy, such as the Michigan football fan who created the towns Goblu (Go Blue) and Beatosu (Beat Ohio State University) on a 1979 Michigan highway map.

A mortifying and costly mistake occurred when Seattle was omitted altogether from the American Automobile Association's road map. "It fell through the editing crack," explained an embarrassed official. Disconcerting, too, was the disappearance of Ottawa from an airline tourist map.

More likely to affect the average map user are oversights, such as inclusion of "paper" streets—roads that were planned but never built—and "trap" streets inserted by map-making companies to catch unwary plagiarists.

One reason American maps are not

all they should be, Monmonier says, is the unwillingness of the public to pay top dollar for quality maps. Years of free highway maps paved the way for a sort of take-maps-for-granted attitude.

European countries, he says, generally produce better-quality maps. Not only do they have more companies that undertake the expensive cartographic process, but their countries are smaller.

## Political Plotting

In the United States, it is the U.S. Geological Survey that is officially in charge of mapping the country. The entire 3.5 million square miles (with the exception of Alaska) is depicted on a series of maps at a one-inch-to-2,000-foot scale.

The maps are supposed to be updated every 10 years, but because map-making is so expensive and the coverage so expansive, that task is far behind. Found in stationery stores or stacked in map drawers in libraries, these maps are used by hunters, developers, hikers, politicians, and scientists for a multitude of purposes.

"Topographical maps show very strong biases," says Monmonier. "There is a lot they aren't showing, like certain military installations or what kind of neighborhood is being depicted. Camp David isn't labeled on topographical maps, though it is clearly identifiable."

The omission that burns him up the most is the determined absence of known waste dumps.

"We have Super Fund sites that hold toxic waste, but these sites aren't shown because they might embarrass polluters or local officials. Some claim that, as these dumps will be 'cleaned up soon,' they shouldn't be featured. That excuse doesn't wash because there are a lot of other temporary structures shown on topographical maps." He points out that "temporary structures" such as off-shore shipwrecks, drive-in movie theaters, and abandoned railways are regular features on topographical maps.

Love Canal is one stunning example of an ignored waste dump. A 1946 map of Niagara Falls, New York, shows the infamous canal as a thin line, with no indication that it had been used for chemical waste since 1942. In the mid-fifties the canal was filled in, homes were built in the area, and a public

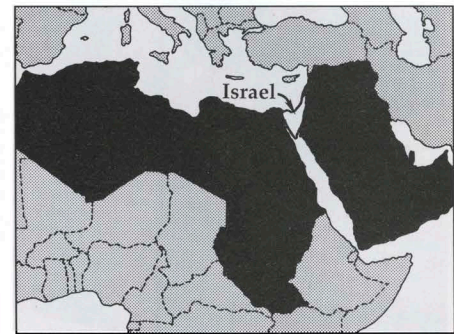
## MAPS USED FOR PROPAGANDA

The German Library of Information published a weekly news magazine, *Facts in Review*, between 1939 and 1941 to garner sympathy for Germany. This map, published two years before Germany invaded the Baltic states, boasted of voluntary efforts to bring German citizens back to their homeland from foreign countries.

These maps, while always in black-and-white, effectively used shading to strengthen its assertions. In his book, *How to Lie With Maps*, Mark Monmonier observes that, "The map's pictorial symbols dramatize the repatriation by showing proud, brave, obedient Germans clutching their suitcases and lining up to board ships sent to 'lead [these] lost Germans back home to the Reich.' To the east in stark, depressing black looms the Soviet Union, and to the south in pure, hopeful white lies Germany."



## VIEWS OF THE MIDDLE EAST



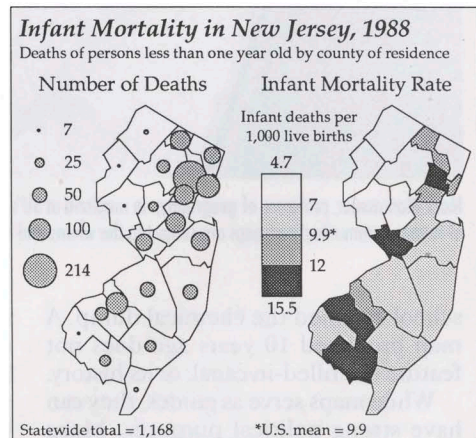
Labeled as "The Arab World," the map on the left, which appears in a 1990 pamphlet promoting an atlas of Jordan, is self-described as a "political one" in the caption. Perhaps that explains the absence of Israel, the unlabeled territory south of Lebanon (through which passes the label "Palestine"). The outlines of Jordan mark its old territory, claiming the West Bank which Israel conquered in 1967. The fact that the countries are all the same color carries an obviously political message.

The map on the right, also shows all Arab countries the same shade. In this instance, though, the effect is one of unified menace. Israel looks small and defenseless in this map produced by the Jewish National Fund of Canada during the 1973 war. While the map is accurate in comparing land mass, it does not give a sense of Israel's strong support from other sympathetic countries at the time.

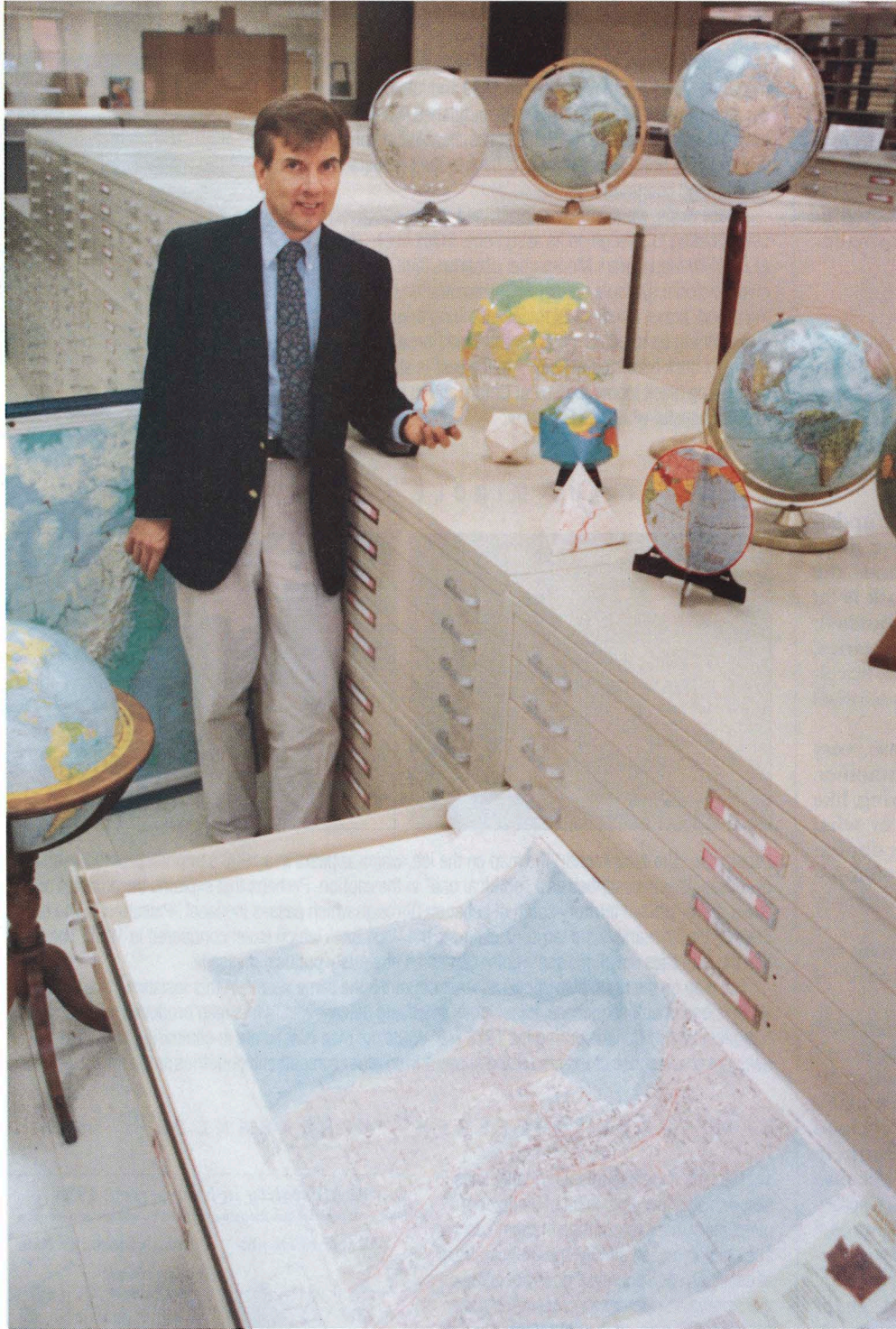
## SAME DATA, DIFFERENT APPEARANCES

These maps depicting infant mortality rates in New Jersey show the benefit of using complementary maps to examine the same data. The map on the left simply shows the number of deaths in each county. It does not compare that number to population or overall number of births. The map on the right does. A choropleth or "patch" map, it sets data break-off points and uses gradations indicative of, in this case, four levels of categorization.

While the map on the left appears to indicate an alarming death rate in the northeast corner of the state (note the overlapping cluster of circles), putting those numbers into context shows that the mortality rate is equally serious mid-state and in the southwest.



STEVE SARTORI



Mark Monmonier, professor of geography, in mapland at SU's Bird Library. The author of *How to Lie With Maps* warns that, like any form of human communication, maps are subject to the whims and biases of their creators.

school spanned the chemical dump. A map produced 10 years ago does not feature the filled-in canal, or its history.

While maps serve as guides, they can have strong political purposes. Maps are used to claim territory (Argentina

still shows the Falkland Islands on its national stamps) or to disclaim territory (recent maps from Latvia and Estonia don't show the overshadowing Russian border).

Sometimes countries have differing

foreign militaries—for the accuracy of their maps. This scheme was abandoned as costs mounted and satellite technology punctured such duplicity easily.

interpretations. The territory of Kashmir is shown on both Indian and Pakistani maps as belonging to their respective countries, while more impartial sources show the disputed boundary with a dotted line.

Most chilling are the propaganda maps, especially those produced by Nazi Germany. In his book, Monmonier states: "No other group has exploited the map as an intellectual weapon so blatantly, so intensely, so persistently, and with such variety."

The Nazis' deliberate manipulation of apparently standard maps prior to World War II was intended to direct sympathy toward Germany and away from the Allies. One map uses a comparison of British territory (13 million square miles) to Germany's (264,000 square miles) to imply Allied greed. The caption under the tiny map of Germany queries the reader, "The Aggressor Nation?" (For other examples of propaganda maps see the sidebar on page 37.)

If you're looking at a map produced by the Soviet Union between 1939 to 1969, you'd best not trust it to get you from Lenin's tomb to Red Square. The security police bolstered a systematic fake map campaign, which reached its peak during the Cold War. Although officials kept the real versions under lock and key, they disseminated the false versions abroad as well as in their own country to create distrust—especially among

## Home Soil

In the U.S., maps that serve political purposes are common. As the Bush administration tackles the reapportionment of wetlands, generalized maps will be used to evaluate huge tracts of land that may, or may not, be opened to developers.

Cartographers have little influence over that process, as maps are compared with satellite and aerial photos of the same area. But even impartial maps can be cropped, "simplified," or embellished with distracting detail.

"Generalized maps can provide a quick and dirty way to define any large area," Monmonier says. "The smaller your scale, the more you can hide."

Recent focus on congressional redistricting in New York City and other large urban centers has been in the news this summer. Despite the claims by some groups of unfair reapportionment, Monmonier says this is a hard process to corrupt.

"Congressional redistricting is closely regulated by the courts and has very strict guidelines," he explains. "Although these maps can be corrupted to some extent, it would be hard to say whether redrawn lines are deliberate attempts solely to break up political groups. Of course, those involved in redistricting want to keep incumbents in office. But they can't just carve in a slice of a neighboring district. If district 'A' has 45,000 constituents and district 'B' has 40,000 constituents, you can bet the circuit court judge will refuse those boundaries."

## The Data's In

While maps are most commonly used to show terrain, maps also show data. Census figures, employment gains and losses, health statistics and thousands of other data are all regularly transformed into data maps.

This, says Monmonier, is where the real danger for misinterpretation and self-deception awaits.

"User friendly" mapping software is one of the biggest boondoggles for the unwary map reader. Lightning-fast reconfigurations can uncover the most favorable relationship between data and their maps. [See the map on page 37 for an example of manipulated infant-mortality statistics.]

"Anyone interested in public poli-

cy—voters, administrators, politicians, consumers, or marketers should know that while maps based on census data can provide useful information, they can also communicate flagrant distortion," Monmonier warns.

Because statistical maps often display data collected on the basis of large areas—counties, states, or countries—the biggest problems occur with inaccurate appearances of uniformity. For example, if a county has one big town sprouting from an otherwise rural area, statistics from the town will be spread thinly over the entire territory. A naïve reader or analyst will be mistaken if he or she uses that "spread out" information to make assumptions on individual households.

Another way to change the face of the data map is to change the "breaks" between levels. For example, if a marketing company wanted to show a suburban area as being "high-income," it might create a choropleth—or "patch"—map to make its point, with differently shaded areas indicating levels of mean income. The key consideration is how the data are grouped. If only three income levels are used, and the top one begins as low as, say, \$20,000, the reader would be presented with a map that looks impressive but not truly reflecting "high income."

Gray-scale tones can be effective in data maps because the different intensities—from white, to gray, to black—connote objectively. Color, however, is far more subjective.

"Colors mean different things to different people," Monmonier points out. "If you asked 10 different people to put colors 'in order' to reflect intensity, you'd have 10 different results."

With this in mind, color can confuse viewers, or can be another way to influence emotions. While many colors fail miserably on most data maps (weather maps are a major exception), traditional cartography takes advantage of the common perception that light yellow means "desert," brown means "high altitude," green means "vegetation," and blue "ocean." Viewers would have a subtle change in perception if, for example, California is portrayed as pale

yellow on one map and verdant green on another.

"People respond emotionally to some colors, such as blue and red," Monmonier states. "Red, for instance, is associated with fire, warning, heat, blood, anger, courage, power, love, military force, and Communism."

## Comparison's Sake

For those interested in viewing maps with a more critical eye, Monmonier stresses again that maps are just as prone to errors or misinterpretation as any large body of data. The best way to remove bias, he says, is to compare many maps featuring the same data. He sees future atlases as being "graphic scripts" that can compare many maps in sequence.

He's working on his own graphic script—a project he calls "atlas touring." Now up and running on a Macintosh

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computer, the program allows map comparison of an area over a period of time. While the program might fall into the trap of providing maps or graphs for contrived purposes, Monmonier says the advantage with atlas touring is that the user has control over the information.

Monmonier hopes his tool eventually will be used to chronicle social changes, diseases, and environmental concerns.

"If you have layers upon layers of data, all hung on essentially the same framework, you'll be more likely to spot trends in, say, cancer rates," he explains.

"With these types of tools, viewers don't have to settle for one freeze frame and have that be the sum of their knowledge. They can see one hundred maps using the same data to get the most complete picture." He pauses, thoughtfully. "Maps are not going to stand still much longer." ■