Chapter 1

INTRODUCTION

Not only is it easy to lie with maps, it's essential. To portray meaningful relationships for a complex, three-dimensional world on a flat sheet of paper or a video screen, a map must distort reality. As a scale model, the map must use symbols that almost always are proportionally much bigger or thicker than the features they represent. To avoid hiding critical information in a fog of detail, the map must offer a selective, incomplete view of reality. There's no escape from the cartographic paradox: to present a useful and truthful picture, an accurate map must tell white lies.

Because most map users willingly tolerate white lies on maps, it's not difficult for maps also to tell more serious lies. Map users generally are a trusting lot: they understand the need to distort geometry and suppress features, and they believe the cartographer really does know where to draw the line, figuratively as well as literally. As with many things beyond their full understanding, they readily entrust mapmaking to a priesthood of technically competent designers and drafters working for government agencies and commercial firms. Yet cartographers are not licensed, and many mapmakers competent in commercial art or the use of computer workstations have never studied cartography. Map users seldom, if ever, question these authorities, and they often fail to appreciate the map's power as a tool of deliberate falsification or subtle propaganda.

Because of personal computers and electronic publishing, map users can now easily lie to themselves—and be unaware of it. Before the personal computer, folk cartography consisted largely of hand-drawn maps giving directions. The direction giver had full control over pencil and paper and usually

had no difficulty transferring routes, landmarks, and other relevant recollections from mind to map. The computer allows programmers, marketing experts, and other anonymous middlemen without cartographic savvy to strongly influence the look of the map and gives modern-day folk maps the crisp type, uniform symbols, and verisimilitude of maps from the cartographic priesthood. Yet software developers commonly have made it easy for the lay cartographer to select an inappropriate projection or a misleading set of symbols. Because of advances in low-cost computer graphics, inadvertent yet serious cartographic lies can appear respectable and accurate.

The potential for cartographic mischief extends well beyond the deliberate suppression used by some cartographer-politicians and the electronic blunders made by the cartographically ignorant. If any single caveat can alert map users to their unhealthy but widespread naïveté, it is that *a single map is but one of an indefinitely large number of maps that might be produced for the same situation or from the same data*. The italics reflect an academic lifetime of browbeating undergraduates with this obvious but readily ignored warning. How easy it is to forget, and how revealing to recall, that map authors can experiment freely with features, measurements, area of coverage, and symbols and can pick the map that best presents their case or supports their unconscious bias. Map users must be aware that cartographic license is enormously broad.

The purpose of this book is to promote a healthy skepticism about maps, not to foster either cynicism or deliberate dishonesty. In showing how to lie with maps, I want to make readers aware that maps, like speeches and paintings, are authored collections of information and also are subject to distortions arising from ignorance, greed, ideological blindness, or malice.

Examining the misuses of maps also provides an interesting introduction to the nature of maps and their range of appropriate uses. Chapter 2 considers as potential sources of distortion the map's main elements: scale, projection, and symbolization. Chapter 3 further pursues the effects of scale by examining the various white lies cartographers justify as necessary generalization, and chapter 4 looks at common blunders resulting from the mapmaker's ignorance or oversight. Chapter 5 treats the seductive use of symbols in advertising maps, and chapter 6 explores exaggeration and suppression in maps prepared for development plans and environmental impact statements. Chapters 7 and 8 examine distorted maps used by governments as political propaganda and as "disinformation" for military opponents. The next two chapters are particularly relevant to users of mapping software and electronic publishing: chapter 9 addresses distortion and self-deception in statistical maps made from census data and other quantitative information, and chapter 10 looks at how a careless or Machiavellian choice of colors can confuse or mislead the map viewer. Chapter 11 concludes by noting maps' dual and sometimes conflicting roles and by recommending a skeptical assessment of the map author's motives.

A book about how to lie with maps can be more useful than a book about how to lie with words. After all, everyone is familiar with verbal lies, nefarious as well as white, and is wary about how words can be manipulated. Our schools teach their pupils to be cautious consumers who read the fine print and between the lines, and the public has a guarded respect for advertising, law, marketing, politics, public relations, writing, and other occupations requiring skill in verbal manipulation. Yet education in the use of maps and diagrams is spotty and limited, and many otherwise educated people are graphically and cartographically illiterate. Maps, like numbers, are often arcane images accorded undue respect and credibility. This book's principal goal is to dispel this cartographic mystique and promote a more informed use of maps based upon an understanding and appreciation of their flexibility as a medium of communication.

The book's insights can be especially useful for those who might more effectively use maps in their work or as citizens fighting environmental deterioration or social ills. The informed skeptic becomes a perceptive map author, better able to describe locational characters and explain geographic relationships as well as better equipped to recognize and counter the self-serving arguments of biased or dishonest mapmakers.

Where a deep mistrust of maps reflects either ignorance of how maps work or a bad personal experience with maps, this book can help overcome an unhealthy skepticism called *cartophobia*. Maps need be no more threatening or less reliable than words, and rejecting or avoiding or ignoring maps is akin to the mindless fears of illiterates who regard books as

evil or dangerous. This book's revelations about how maps *must* be white lies but may *sometimes* become real lies should provide the same sort of reassuring knowledge that allows humans to control and exploit fire and electricity.

Chapter 2

Elements of the Map

Maps have three basic attributes: scale, projection, and symbolization. Each element is a source of distortion. As a group, they describe the essence of the map's possibilities and limitations. No one can use maps or make maps safely and effectively without understanding map scales, map projections, and map symbols.

Scale

Most maps are smaller than the reality they represent, and map scales tell us how much smaller. Maps can state their scale in three ways: as a ratio, as a short sentence, and as a simple graph. Figure 2.1 shows some typical statements of map scale.

Ratio scales relate one unit of distance on the map to a specific distance on the ground. The units must be the same, so that a ratio of 1:10,000 means that a 1-inch line on the map represents a 10,000-inch stretch of road—or that 1 centimeter represents 10,000 centimeters or 1 foot stands for 10,000 feet. As long as they are the same, the units don't matter and need not be stated; the ratio scale is a dimensionless number. By convention, the part of the ratio to the left of the colon is always 1.

Some maps state the ratio scale as a fraction, but both forms have the same meaning. Whether the mapmaker uses 1:24,000 or 1/24,000 is solely a matter of style.

Fractional statements help the user compare map scales. A scale of 1/10,000 (or 1:10,000) is larger than a scale of 1/250,000 (or 1:250,000) because 1/10,000 is a larger fraction than 1/250,000. Recall that small fractions have big denomi-

poor contrast in value easily hides a label on a black-and-white screen.

Personal computers are another source of bad maps in color. Lacking experience with electronic displays and additive colors, amateur mapmakers often mimic printed maps on a computer. Yet color monitors have dark backgrounds instead of the more familiar white, and video graphics with large amounts of white can "bloom" and irritate the eye. Moreover, color palettes can severely limit the colors and grays available and thus force the use of color by precluding an ordered range of graytones. Moreover, the problem need not lie with the machinery—programmers with no training in cartography and little sense of graphic design have been highly successful in writing and marketing mapping software. With no guidance and poorly chosen standard symbols, users of mapping software are as accident-prone as inexperienced hunters with hair-trigger firearms. If you see one coming, look out!

Chapter 11

EPILOGUE

The preceding chapters have explored the wide variety of ways maps can lie: why maps usually must tell some white lies, how maps can be exploited to tell manipulative lies, and why maps often distort the truth when a well-intentioned map author fails to understand cartographic generalization and graphic principles. The wise map user is thus a skeptic, ever wary of confusing or misleading distortions conceived by ignorant or diabolical map authors.

Let me conclude with a cautionary note about the increased likelihood of cartographic distortion when a map must play the dual role of both informing and impressing its audience. Savvy map viewers must recognize that not all maps are intended solely to inform the viewer about location or geographic relationships. As visual stimuli, maps can look pretty, intriguing, or important. As graphic fashion statements, maps not only decorate but send subtle or subliminal messages about their authors, sponsors, or publishers. Some advertising maps, for instance, announce that a power company or chain restaurant is concerned about the city or region, whereas free street guides attest to the helpfulness of a real estate firm or bank. A flashy map, in color with an unconventional projection, touts its author's sense of innovation, and cartographic window dressing in a doctoral dissertation or academic journal suggests the work is scholarly or scientific. An ornate print of an eighteenth-century map of Sweden not only decorates a living room wall but proclaims the household's pride in its Scandinavian heritage. A world map behind a television newscaster reinforces the network's image of excellence in global news coverage, and a state highway map is a convenient vehicle for a political message from the governor, image-building photos of the state's

tourist attractions, and a cartographic statement about tax dollars well spent on roads, recreation sites, and forest preserves. A local map titled "Risk of Rape" can shock and can advocate more diligent police patrols and stricter sentencing. A cartogram comparing wealth or life expectancy among the world's nations can foster complacent pride or evoke compassionate guilt.

Maps with dual roles are not inherently bad. Indeed, some perfectly correct maps exist primarily to lend an aura of truth, and others exist largely as visual decoration. The impetus for an increased use of news maps was the perception among publishers that a better "packaged," more graphic newspaper could compete effectively with television as well as with rival papers. Their motivation might not have been better reporting, but the conscious decision to use more maps has improved their coverage of many news stories in which location is important. Similarly, competition for audience attention has led to more news maps in the electronic media; local television stations offer highly informative sequences of weather maps, and network news programs usefully complement the newscaster's "talking head" with simple yet instructive maps of relative location for major news events. Maps intended to decorate or impress can educate a public appallingly ignorant about basic place-name geography. Were it not for the map's power as a symbol of geographic knowledge, we would know a great deal less about our neighborhoods, our nation, and the world.

Dual motives are risky, of course. Map authors pursuing aesthetic goals might violate cartographic principles or suppress important but artistically inconvenient information. Maps, like buildings, suffer when the designer puts form ahead of function. Map authors with propagandist motives might suppress ideologically inconvenient information as well as knowingly adopt an inappropriate projection or dysfunctional symbols. And expedient map authors distracted by a need to decorate can deliver sloppy, misleading maps. The skeptical map viewer will assess the map author's motives and ask how the need to impress might have subverted the need to inform.

Although recognizing this versatility for dual roles should enhance the informed map viewer's healthy skepticism about

the map author's expertise or motives, neither this recognition nor the map's demonstrated ability to distort and mislead should detract from an appreciation of the map's power to explore and explain geographic facts. White lies are an essential element of cartographic language, an abstraction with enormous benefits for analysis and communication. Like verbal language and mathematics, though, cartographic abstraction has costs as well as benefits. If not harnessed by knowledge and honest intent, the power of maps can get out of control.

HOW to LIE with MAPS

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For Marge and Jo