success among larger but often sparsely inhabited western states (some of which have only one congressman anyway). Indeed, your map creates the impression that well over half the country is using the Klutz system, when in fact twenty-six of fifty states use another vendor's system or the time-honored tradition of paper map, pencil, eraser, and the smoke-filled back room. Of course, if most of their success had been in the East, a map could have been linked to the slogan "Get with it, America—there's still lots of room for a Klutz!"

Like other artwork in commercial advertising, maps can be clever and catchy as well as contrived and deceptive. In most cases, though, the consumer recognizes the map as a playful put-on and appreciates being in on the joke. The ad map thus is further evidence of the map's enormous flexibility and appeal. Less benign, of course, are maps hawking remote building lots and doubtful mineral rights as well as many other maps that attempt to advocate or seduce. The next two chapters treat the use of maps as tools for real-estate developers and political propagandists.

Chapter 6

Development Maps (or, How to Seduce the Town Board)

Without maps, urban and regional planning would be chaotic. Detailed maps describe the relative size, shape, and spacing of a plan's components and suggest how well they interrelate. Maps of a planned shopping mall, for instance, would show the overall shape of the building, the sizes and general layouts of individual stores and public spaces, the size and locations of parking areas, and entrances to the parking lots and the mall building. Public officials use these maps to assess the impact of the proposed mall on nearby neighborhoods, traffic, and established businesses. Overlaying the mall plans onto topographic and soils maps reveals the mall's likely effects on wildlife, wetlands, and streamflow, as well as potential difficulties with sinkholes, unstable soils, or a high water table.

Even with maps, many cynics would argue, urban and regional planning is chaotic. As an inherently selective view of reality, the map often becomes a weapon in adversarial negotiations between developers and the local planning board. After all, the developer might have millions of dollars invested, whereas nearby residents probably don't want a new mall in their backyards, and planning boards often reflect local fears and biases. The developer's maps thus attempt to impress residents of more distant neighborhoods with the mall's elegance and convenience and to demonstrate that it will harm neither wildlife nor property values. If they use them at all, the residents' maps will focus on habitat destruction, traffic congestion, visual blight, noise, and trash. Because the developer has deeper pockets, the antimall maps will not look as nice as the promall maps, which suppress dumpsters, litter, and

abandoned cars but optimistically portray skinny saplings as mature shade trees.

This chapter examines the role of maps in city and regional planning, especially as a tool of persuasion. It begins with a concise introduction to the part mapping plays in zoning and environmental protection, examines how developers might manipulate maps to enhance their cases, and concludes with a short example of how an overtaxed homeowner can use maps to argue for a reduced real-property assessment.

Zoning, Environmental Protection, and Maps

Zoning refers to the legal process municipalities use to control land use and land subdivision for development. Although legislation controlling the operation and powers of local planning and zoning boards varies from state to state, in general zoning laws allow regulation of the height, size, character, and function of buildings; the minimum size of a building lot and the location of the building on the lot; and associated improvements such as outbuildings, driveways, and parking lots. This system of laws, hearings, and enforcement procedures, which gained wide acceptance early in the twentieth century, is essential for effective urban planning.

Community planning boards commonly work with three principal maps: (1) an *official map* to show existing rights-of-way, administrative boundaries, parks and other public lands, and drainage systems; (2) a *master plan* to indicate how the area should look after several decades of orderly development; and (3) a *zoning map* to show current restrictions on land use. Figure 6.1 shows the legend and a portion of a typical zoning map for a town far enough from a major city to still have working farms. The various categories reflect differences in the density of people and dwelling units, whether the area is generally open to the public and offers a pleasant view, and the likelihood that noise, litter, or other nuisances might affect adjoining areas. For each zoning category listed in the key, a set of restrictions applies to define precisely what kinds of structures and activities are permitted. In an R-1 residential district, for instance, a lot must have a minimum size of 5,000 square feet and a minimum width of 45 feet and may contain a single-family home that covers no more than 50 percent of

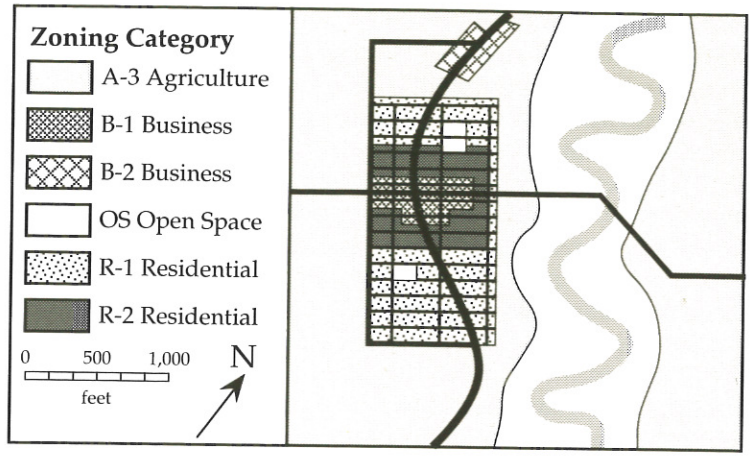


FIGURE 6.1. Portion of a zoning map of a small community in a largely rural area.

the lot and is set back at least 20 feet from the front of the lot and 5 feet from each side.

Zoning boards spend considerable time hearing requests for *variances* so that property owners can do things that otherwise would violate the zoning ordinance. For example, a homeowner might want to add a room or a garage that would encroach within 10 feet of the property line. Or a business might want to purchase and raze a neighboring structure, grade the land, and make a parking lot. Zoning laws recognize that any improvement affects far more than just the ground underneath, but these laws also allow exceptions that meet community approval and are not too obnoxious. The zoning board must examine plans describing proposed alterations, then solicit and listen to the opinions of neighbors and other interested citizens. A board can grant or deny variances as proposed, grant modified variances with specific restrictions added, or grant temporary variances. The applicants or their neighbors can appeal the board's decision to a board of zoning appeals or to the court.

Major modifications of the zoning map are treated as modifications of the master plan and require a hearing before the planning board. Housing developments, new subdivisions, shopping malls, large stores, and other types of development

that add or alter streets or affect municipal services such as water and sewage require planning board approval. The developer of a shopping mall must demonstrate, for instance, that runoff from the mall's parking lots will not cause flooding and that existing roads can carry the increased traffic. Sometimes the developer must work with the county or state highway department in planning new access roads, to be paid for directly or through an "impact tax." The developer of a subdivision must provide a map describing lot boundaries and showing roads and utility lines.

Planning boards are very concerned with housing density, that is, the number of dwellings per acre. Many municipalities specify a minimum lot size as large as three or five acres, ostensibly to "preserve the environment," but often to exclude low-income families unable to afford such expensive housing. But sometimes a planning board will approve a development of town houses or clusters of four or more dwellings with sufficient open space to meet a minimum *average* lot-size requirement. Maps are a convenient format for describing the developer's proposal and are an essential part of any subdivision hearing.

Growing concern about environmental degradation in the 1960s led to a substantial increase in environmental regulations and in the number and size of public agencies that monitor compliance. Although practices vary from place to place, state or municipal environmental quality review boards prepare inventories of vegetation, wetlands and other sensitive wildlife habitats, surface water, groundwater, soils, slope, geology, and historic sites. Commonly compiled using soil survey maps, aerial photography, or existing topographic maps, these *environmental resource inventories* are used to assess the likely adverse effects of highways, shopping malls, residential tracts, landfills, industrial plants, and other types of development. If the inventory is accurate, town or county planners can quickly tell whether a proposed project is likely to affect a fragile wetland habitat or contribute significantly to the extinction of a rare plant.

Large projects, whether public or private, commonly require an *environmental impact statement* (EIS). The developer usually must supplement information in the environmental resource inventory with field measurements compiled by an environmental consulting firm of civil engineers, landscape architects, geologists, and biologists. The list of possible impacts the EIS might address includes air pollution, water pollution, public health, hydrology, erosion, geologic hazards such as earthquakes and landslides, wildlife in general, flora (especially rare plants), fauna (especially endangered species), aesthetic and scenic values of both the natural landscape and the built environment, solid waste, noise, the social environment, economic conditions, recreation, public utilities, transportation, and the risk of accidents. An EIS must identify the types and severity of plausible impacts, the areas affected, and alternative strategies with a lesser impact.

Because preparing an EIS is costly and time-consuming, in many cases a shorter, less comprehensive *environmental assessment* can demonstrate that the impact will be minimal, that the project will comply with environmental regulations, and that an EIS is not necessary. Environmental resource inventories can enable local or state environmental review boards to evaluate the environmental assessment and either approve the project or require a full EIS.

Maps are an important part of an EIS or environmental assessment. Environmental scientists commonly transfer all map information to a common base for ready comparison. Sometimes a computerized geographic information system (GIS) is used to store the data and generate final plots. Detailed, oversize maps might accompany the EIS in an appendix, to supplement smaller-scale, more generalized maps in the body of the report. (How many readers bother to compare the large-scale maps with their small-scale generalizations, positioned much closer to the analytical and persuasive parts of the report?) Potentially significant sources of error are the transfer of information from the source map to the common base and the generalization of these small-scale maps. (When the alternatives are equally valid, can the consultant resist the temptation to draw the line that favors the client's case?) Additional problems arise when boundaries and other data are transferred from unrectified aerial photographs (see chap. 3)—in hilly areas these lines are probably not accurate unless the mapmaker used a stereoplotter. Persons opposing a project might well begin by taking the EIS into the field and checking its supporting maps against the features portrayed.

Sometimes the data simply cannot reflect what the developer or the compliance agency would like them to show. As examples, floodplains defined locally by a single elevation contour tend to include either too much or too little of the real floodplain, and soil survey maps might not reliably reflect the depth to bedrock, an important indicator of where septic tanks and leach fields are unsuitable. When using soils maps to compile maps for an environmental assessment, the developer should resist the temptation, illustrated in figure 6.2, to alter categories, replace a technical definition with a questionable interpretation, or "inadvertently" omit small parcels of land whose presence might disqualify a larger tract. Both the developer and the review panel should be aware that soils maps are based on a soil scientist's interpretation of the land surface and a limited number of subsurface core samples. Moreover, soils maps generally do not show patches smaller than the head of a pencil, which at 1:20,000 would cover several generous building lots. When the developer's consulting engineer carries out a special field survey, a map should show the actual locations of the subsurface core samples to allow the viewer to verify that the map is neither much more nor much less generalized than the data it represents.

Zoning cases and environmental quality reviews often move from the administrative hearing to the courtroom. When deliberations escalate to the judicial level, maps become important as exhibits, together with aerial photographs, drawings

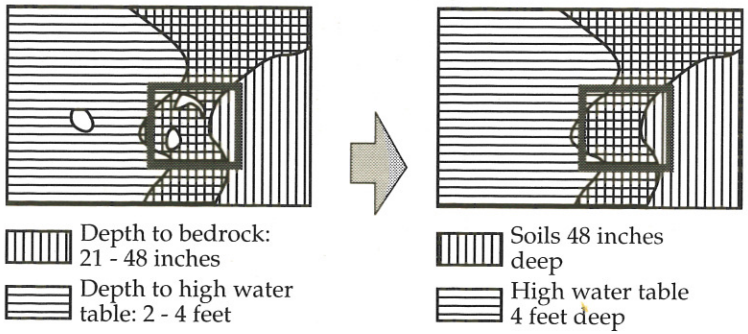


FIGURE 6.2. Creative generalization and interpretation of the soils map and categories on the left can yield the more favorable cartographic representation on the right.

and architect's renderings, scale models, ground-level photographs, movies, and videotapes. The courtroom audience usually is more sophisticated and less harried than the local planning or zoning board, and both parties commonly employ technical experts to testify as well as to advise in cross-examination. Ploys that might have impressed a volunteer group of business people, farmers, teachers, and homemakers can fail or backfire, and exhibits must be easily defended as well as convincing and persuasive. Opposing sides often differ principally in their interpretation of identical exhibits.

Maps are indispensable exhibits in land-use cases, which cannot be prepared and presented without them. A minimal presentation would include the master plan, a detailed zoning map of the affected area, and an enlarged aerial photograph or two. Attorneys and witnesses often use a marking pen or tape to identify locations, and they require multiple copies of most exhibits so that these marked-up materials can become part of the record. The attorney carefully marks each exhibit for introduction as evidence, identifies its source, calls an appropriate witness to explain it, and reviews in advance the scope of the witness's testimony and plausible counterarguments by the opponent.

Although topographic maps, air photos, and zoning maps tolerate no embellishment, the developer has considerable license in the design and content of site plans and architect's renderings. A particularly interesting and forceful graphic is the *concept diagram*, a schematic, somewhat stylized map intended to demonstrate the general layout and functional relationship of a plan's main elements. The example in figure 6.3, which illustrates the interchange concept for a downtown transportation center, shows how the developer or planner uses lines to subdivide space, highlight patterns of movement, and suggest revitalization of the central city. Concept diagrams have a compelling, mysterious attraction and can be highly persuasive when explained by an enthusiastic architect. These maps encourage the viewer to want to see the plan work, not to wonder whether it will work. Once the concept diagram has convinced the audience that a project is functional and feasible, the presenter can introduce three-dimensional models, sketches, and other persuasive renderings to show how the finished project should look. Like most utopian

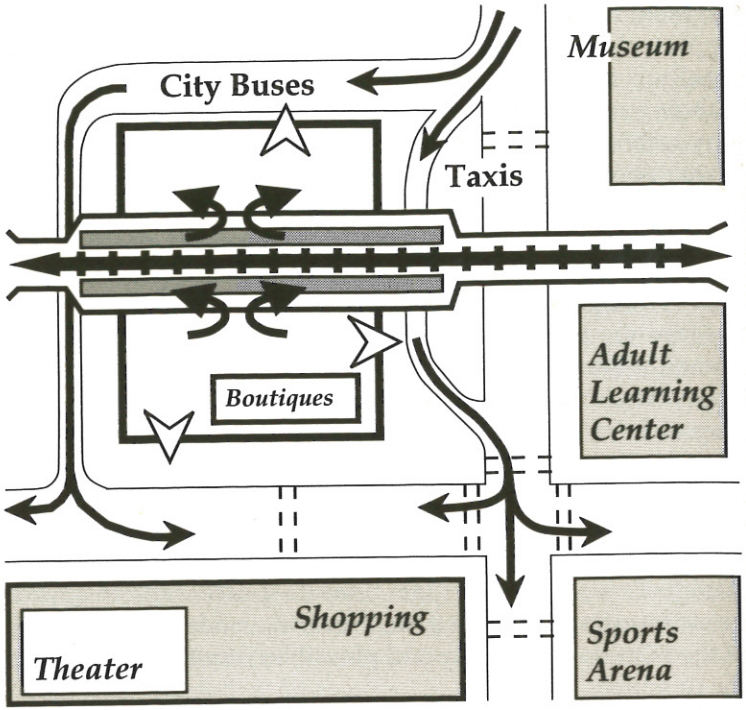


FIGURE 6.3. A concept diagram for a proposed downtown transportation center with rail, bus, and taxi service.

views of the future, these maps and pictures feign realism with selective detail.

Eleven Rules for Polishing the Cartographic Image

With the following eleven rules the developer can play down the adverse impact of a proposed project and enhance its visual appearance and presumed benefits. These guidelines work best before a town zoning or planning board and are least effective in state or federal court. (It would be a shame, after all, for the truly cynical land developer or waste-treatment consultant not to take advantage of the public's graphic naïveté and appalling ignorance of maps.)

1. *Be shrewdly selective.* Don't show what you'd rather they not see. Omit potentially embarrassing features that

might evoke unpleasant images of litter, congestion, and noise. Omit dumpsters and other trash containers, traffic signs, loitering teenagers, and trucks. In sketches and scale models either omit people and cars altogether or show only smartly dressed people and late-model cars and station wagons. Never admit the possibility of dying shrubbery, trampled turf, or anything remotely suggesting a plume of smoke. Above all, keep the image clean and sufficiently generalized so that such omissions don't appear unnatural.

2. *Frame strategically.* Avoid unfavorable juxtaposition, and crop the maps and sketches to forestall fears of illness or diminished property values. If a neighboring site is unattractive or likely to be unfavorably affected, leave it out. If the proposed development adjoins a park or another attractive site, leave it in. If a neighboring property might also be improved, include it but show it too as newly developed. Never show the school or homes bordering a proposed landfill, solid waste treatment facility (the new term for municipal incinerator), or brewery.

3. *Accentuate the positive.* Choose favorable data and supportive themes for maps. If, for instance, a proposed landfill will have a high fence or unobtrusive entrance, by all means show it. If a new mall would displace an existing eyesore, a set of "before" and "after" maps is useful. Favorable interpretations of data or source maps also help.

4. *If caught, have a story ready.* Computer errors, a stupid drafting technician's use of the wrong labels, or the accidental substitution of an earlier version of the map make plausible excuses.

5. *Minimize the negative.* If you can't eliminate them entirely, at least don't emphasize features you'd rather have ignored. Note that the train station in figure 6.3 doesn't call attention to exhaust from idling buses and taxis.

6. *Dazzle with detail.* After all, a detailed map is a technically accurate map, right? Details are useful distractions.

7. *Persuade with pap.* Try highly simplistic maps, or maps with fire hydrants, mailboxes, and any other irrelevant minutiae that might camouflage potentially embarrassing details.

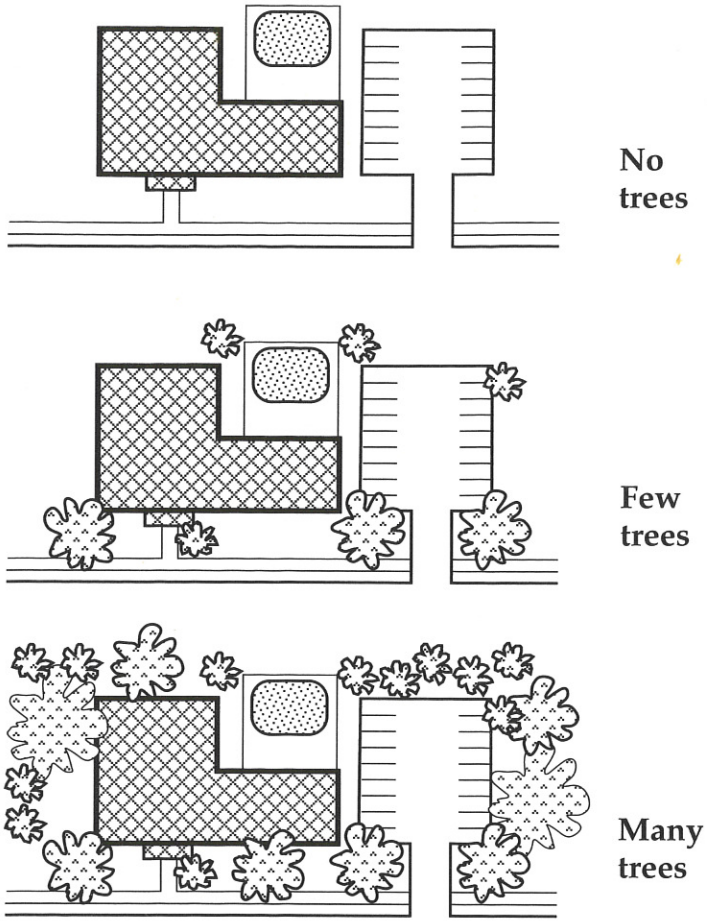


FIGURE 6.4. Tree symbols add visual appeal to an otherwise barren developer's plan.

8. *Distract with aerial photographs and historical maps.* These make great conversation pieces and are excellent distractions for people eager to exclaim, "Hey, there's my house!"

9. *Generalize creatively.* Filter or enhance details to prove your point. A little selective omission or massaging of contours, soils boundaries, or even property lines might well pass for cartographic license.

10. *Enchant with elegance.* And don't forget the architect's cartographic friend, the tree stamp. As figure 6.4 demonstrates, symbolic trees can convert a mundane proposal into a pleasant neighborhood asset, and the more of these hypothetical trees, the better. After all, it takes much less time and effort to stamp or paste treelike symbols onto the map than to plant the real thing. And in twenty years those anemic saplings you will plant might even resemble the healthy shade trees in the picture.

11. *When all else fails, try bribery.* Not under-the-table monetary payoffs, of course, but such institutional bribery as decent-paying jobs for the unemployed, good profits and well-paying jobs for contractors and construction workers, a larger tax base or "payments in lieu of taxes" for local government, prestige, and promises of amenities elsewhere in the community for teenagers, young families, and senior citizens. Or try another area, where citizens and their representatives are less aware of graphic trickery.

Your Turn: The Assessment Review

Like words and numbers, maps are anybody's weapon, and they can also help the homeowner appeal an unfairly high tax assessment. But whether the advice that follows is useful will depend upon how the area where you buy estimates real-estate values.

In most areas, the municipality computes the yearly tax on "real property" by multiplying the assessed value of a building and lot by the established local tax rate. The total value of land and buildings in the area and its estimated expenses for schools, government operations, welfare, and debt service determine the tax rate. Each parcel's assessed value is someone's guess of what the property is worth. In areas with "full-value assessment," this guess is an estimate of the current fair market value of the property. In other areas the assessed value is supposed to be a fixed percentage of the fair market value. But other factors, some political, often influence the guessing.

Assessment practices vary widely. Some jurisdictions rigorously apply a set of guidelines, or formulas, based on measurements such as lot size, area of the dwelling, and number of bedrooms and bathrooms. Other jurisdictions filter these

objective criteria through the subjective judgment of an assessor or assessment board. Since location is an important part of a property's worth, assessors not slavishly governed by formulas will consider scenic values and other less tangible amenities as well as recent sale prices of nearby properties.

Because housing values change over time in response to inflation, new amenities and nuisances, and shifting perceptions of which neighborhoods are good and which aren't, assessors usually spend more time reassessing old properties than evaluating new ones. Some areas reassess yearly or on a regular cycle of every two, three, or four years, whereas others reassess more randomly, according to the judgment of the assessor.

A common practice is to reassess only when a property is sold or altered by a major structural change such as adding a room or a fireplace. In these areas assessments tend to favor long-term residents who bought property many years ago and have made no major improvements. Widespread reassessment would tend to hurt these people, especially if their neighborhoods have not deteriorated. Because long-term residents tend to oppose new assessment practices that might be fairer and also to vote regularly, a directly elected assessor or one appointed by the town board is likely to reflect their interests. The result is an assessment scheme aptly called "soak the newcomer" or "Welcome, stranger."

Fear not, though, for assessments, like zoning decisions, can be appealed. In larger municipalities, a formal appeal might even require the services of an attorney. Towns and villages, more likely to reassess mostly newcomers, have a more relaxed approach—an annual "grievance day" that might even be a week or a month long. Residents come before the board to "grieve," that is, to challenge their assessments. Yet a successful appeal will depend not on griping about the assessor's incompetence or the cost and quality of municipal services but on demonstrating convincingly that the proposed assessment clearly is out of line. In short, you need to do some research.

The assessor's office is a good place to begin. To show that you have been overassessed, you might compare your assessment with those of other properties in the neighborhood, especially similar houses. Come prepared with the addresses of properties whose records you want to examine. Workers in the assessor's office will help you locate a description of each property and its assessment history. These records show note-

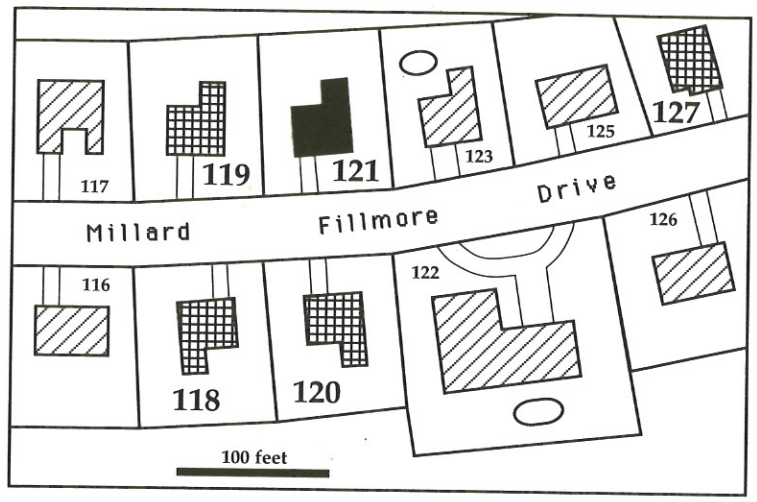


FIGURE 6.5. A map showing your home and nearby houses used for comparison.

worthy improvements and special features and list the sizes of the lot, the living area, and perhaps individual rooms. If your assessment is not radically different from those of similar dwellings, you probably have no case—but count yourself fortunate to have been treated fairly from the outset. Yet if your assessment is well above those of similar properties nearby, an appeal could save you considerable money, especially if you stay for several years.

Present your appeal using two types of evidence: facts showing that the properties you think are similar are indeed so, and comparative figures demonstrating your new assessment is too high. (Should you find that one of the similar properties is also taxed unfairly, you might ask your neighbor for support in a joint appeal.) Three kinds of exhibits can help establish similarity: a map of the neighborhood, a poster with photographs and street addresses, and tables or charts comparing your house with the others for type of construction (wood frame, brick, stone, . . .), number of rooms, area of living space, year of construction, and lot size. Figure 6.5, a typical neighborhood map compiled by tracing street, lot, and foundation lines from the assessor's maps, can show both similarity and proximity. If presented in a large poster, this

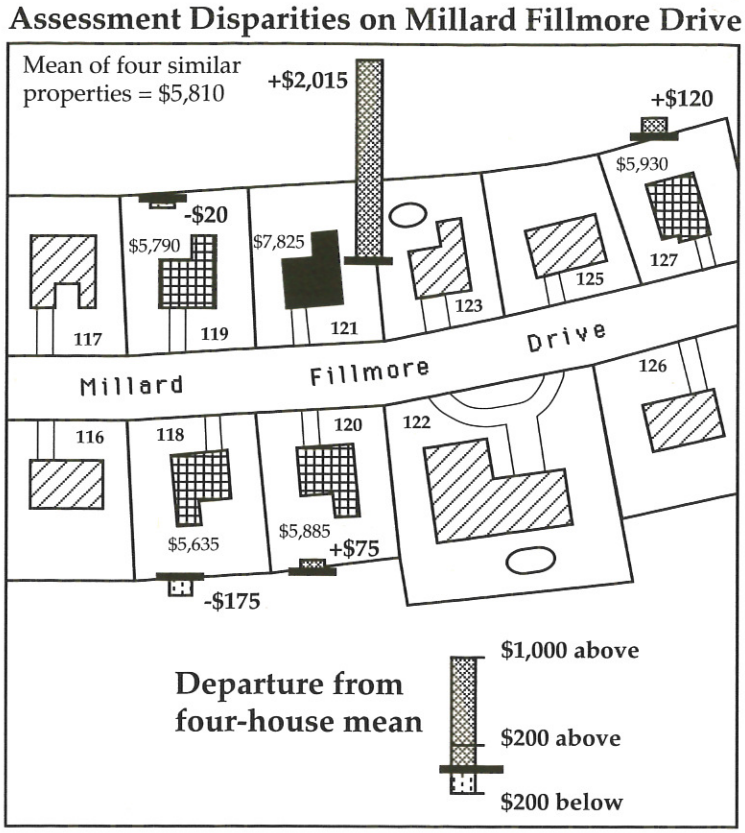


FIGURE 6.6. A map showing disparities in assessed value between your house and similar properties in the neighborhood.

map makes a good prop for discussing other data that you provide in a table, with a copy for each board member. As an able propagandist, you naturally choose a title such as "Similar Properties in the Neighborhood" to reinforce your point.

Having convinced the board that these houses are similar to your own, you now present a map dramatizing disparities in assessment. As in figure 6.6, the mean assessment for the group of similar properties (excluding yours) can be a useful basis for graphic comparison as well as a subtle hint of a fair assessment for your own parcel. As a referent, this mean assessment also allows you to use symbols that focus on *differences*

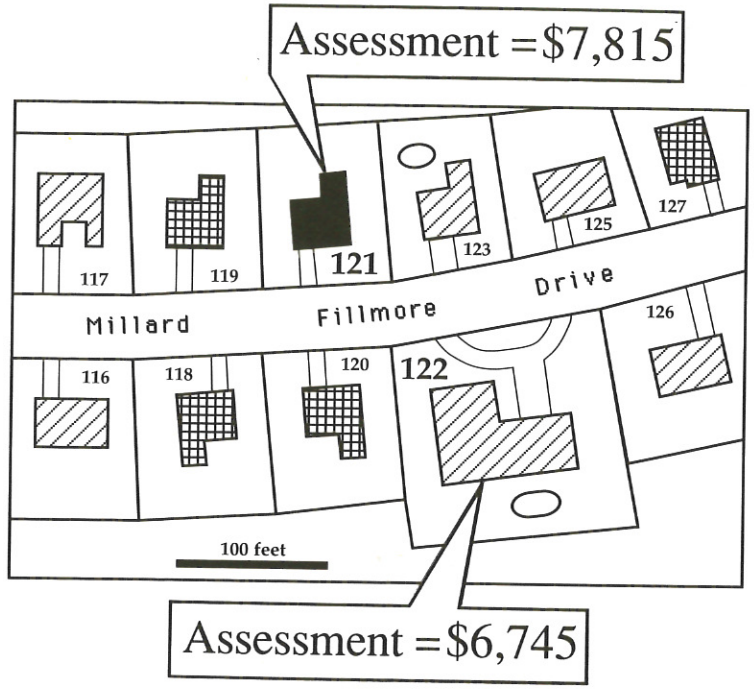


FIGURE 6.7. A map to demonstrate that your proposed assessment ought not be the highest in the neighborhood.

in assessments, so that comparative bar symbols more effectively represent unfairness. If you can win the argument for similarity, this map can win your case for a lower assessment.

If your proposed assessment exceeds that of any of your neighbors, you might want to lead by comparing your property with the parcel having the next highest assessment. For this presentation use a simple map showing lot locations, addresses, and assessments. As figure 6.7 illustrates, the map's symbols and labels should show board members that you know about assessments in your neighborhood and that you have a legitimate grievance. Then introduce photographs and tables showing that your house is much more modest in appearance,

size, and amenities than the one with the second highest assessment. If the assessor has flagrantly been playing "soak the newcomer," your exhibits will send a clear message that you are fully prepared to embarrass the board unless they make an appropriate adjustment. If you use tact, most of time they will.

Although the tone of this chapter is cynical, the intent is to make you skeptical about how some people use maps, not cynical about maps in general. Understanding cartographic manipulation is important to being an informed citizen able to evaluate a wide range of proposals for altering the landscape and the environment. In viewing maps it is essential to remember that a particular view of reality (or a future reality) is not the only view and is not necessarily a good approximation of truth.

Chapter 7

Maps for Political Propaganda

A good propagandist knows how to shape opinion by manipulating maps. Political persuasion often concerns territorial claims, nationalities, national pride, borders, strategic positions, conquests, attacks, troop movements, defenses, spheres of influence, regional inequality, and other geographic phenomena conveniently portrayed cartographically. The propagandist molds the map's message by emphasizing supporting features, suppressing contradictory information, and choosing provocative, dramatic symbols. People trust maps, and intriguing maps attract the eye as well as connote authority. Naive citizens willingly accept as truth maps based on a biased and sometimes fraudulent selection of facts.

Although all three manipulate opinion, the propagandist's goals differ from those of the advertiser and the real-estate developer. Both the advertiser and the political propagandist attempt to generate demand, but the advertiser sells a product or service, not an ideology. Both the advertiser and the propagandist attempt to lower public resistance or to improve a vague or tarnished image, but the advertiser's objectives are commercial and financial, whereas the propagandist's are diplomatic and military. Both the real-estate developer and the political propagandist seek approval or permission, but the developer is concerned with a much smaller territory, often uninhabited, and seldom acts unilaterally without official sanction. Although both the real-estate developer and the propagandist face opponents, the developer usually confronts groups of neighboring property owners, environmentalists, or historic preservationists, whereas the propagandist commonly confronts a vocal ethnic minority, another country, an alliance of countries, an opposing ideology, or a widely accepted

standard of right and wrong. Because propaganda maps are more likely to be global or continental rather than local, the political propagandist has a greater opportunity than either the advertiser or the real-estate developer to distort reality by manipulating the projection and framing of the map.

This chapter explores the map's varied and versatile role as an instrument of political propaganda. Its first section examines how maps function as political icons—symbols of power, authority, and national unity. Next the chapter looks at how map projections can inflate or diminish the area and relative importance of countries and regions, and how a map projection can itself become a rallying point for cartographically oppressed regions. A third section examines the manipulations of Nazi propagandists, who used maps to justify German expansion before World War II and to try to keep America neutral. A final section focuses on a few favorite symbols of the cartographic propagandist: the arrow, the bomb, the circle, and place-names.

Cartographic Icons Big and Small: Maps as Symbols of Power and Nationhood

The map is the perfect symbol of the state. If your grand duchy or tribal area seems tired, run-down, and frayed at the edges, simply take a sheet of paper, plot some cities, roads, and physical features, draw a heavy, distinct boundary around as much territory as you dare claim, color it in, add a name—perhaps reinforced with the impressive prefix "Republic of"—and presto: you are now the leader of a new sovereign, autonomous country. Should anyone doubt it, merely point to the map. Not only is your new state on paper, it's on a map, so it must be real.

If this map-as-symbol-of-the-state concept seems farfetched, consider the national atlases England and France produced in the late sixteenth century. Elizabeth I of England commissioned Christopher Saxton to carry out a countrywide topographic survey of England and Wales and to publish the maps in an elaborate hand-colored atlas. In addition to providing information useful for governing her kingdom, the atlas bound together maps of the various English counties and asserted

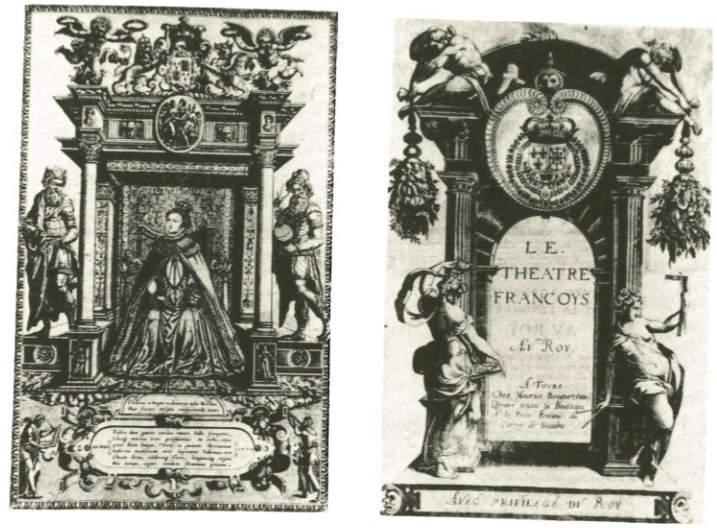


FIGURE 7.1. Engravings reflect the iconic significance of maps and atlases as national symbols in Christopher Saxton's 1579 *Atlas of England and Wales* (left) and Maurice Bouguereau's 1594 *Le théâtre françoys* (right).

their unity under Elizabeth's rule. Rich in symbolism, the atlas's frontispiece (fig. 7.1, left) was a heavily decorated engraving that identified the queen as a patron of geography and astronomy. A few decades later, Henry IV of France celebrated the recent reunification of his kingdom by commissioning bookseller Maurice Bouguereau to prepare a similarly detailed and decorated atlas. Like Saxton's atlas, *Le théâtre françoys* includes an impressive engraving (fig. 7.1, right) proclaiming the glory of king and kingdom. In both atlases regional maps provided geographic detail and a single overview map of the entire country asserted national unity.

The spate of newly independent states formed after World War II revived the national atlas as a symbol of nationhood. Although a few countries in western Europe and North America had state-sponsored national atlases in the late nineteenth and early twentieth centuries, these served largely as reference works and symbols of scientific achievement. But between 1940 and 1980 the number of national atlases

increased from fewer than twenty to more than eighty, as former colonies turned to cartography as a tool of both economic development and political identity. In the service of the state, maps and atlases often play dual roles.

Perhaps the haste of new nations to assert their independence cartographically reflects the colonial powers' use of the map as an intellectual tool for legitimizing territorial conquest, economic exploitation, and cultural imperialism. Maps made it easy for European states to carve up Africa and other heathen lands, to lay claim to land and resources, and to ignore existing social and political structures. Knowledge is power, and crude explorers' maps made possible treaties between nations with conflicting claims. That maps drawn up by diplomats and generals became a political reality lends an unintended irony to the aphorism that the pen is mightier than the sword.

Nowhere is the map more a national symbol and an intellectual weapon than in disputes over territory. When nation A and nation B both claim territory C, they usually are at war cartographically as well. Nation A, which defeated nation B several decades ago and now holds territory C, has incorporated C into A on its maps. If A's maps identify C at all, they tend to mention it only when they label other provinces or subregions. If nation B was badly beaten, its maps might show C as a disputed territory. Unlike A's maps, B's maps always name C. If B feels better prepared for battle or believes internal turmoil has weakened A, B's maps might more boldly deny political reality by graphically annexing C.

Neutral countries tread a thin cartographic line by coloring or shading the disputed area to reflect A's occupation and perhaps including in smaller type a note recognizing B's claim. If A and B have different names for C, A's name appears, sometimes with B's name in parentheses. (Even when recapture by B is improbable, mapmakers like to hedge their bets.) Cartographic neutrality can be difficult, though, for customs officials of nation B sometimes embargo publications that accept as unquestioned A's sovereignty over C. If A's rule is secure, its censors can be more tolerant.

Consider, for example, the disputed state of Jammu and Kashmir, lying between India, Pakistan, and China. Both India and Pakistan claimed Kashmir, once a separate monarchy, and went to war over the area in August 1965. Figure 7.2, a U.S. State Department map, shows the cease-fire line of fall

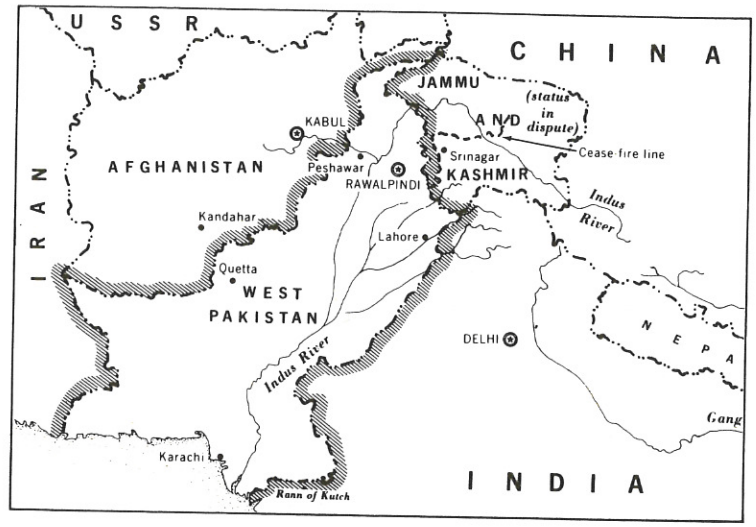


FIGURE 7.2. Disputed India-Pakistan boundary and the territory of Jammu and Kashmir, as portrayed in the 1965 *Area Handbook for Pakistan*, published by the U.S. government.

1965, which placed Pakistan in control of northwestern Kashmir and showed India in control of the southern portion. (China occupied a portion of northeastern Kashmir.) Nonetheless, Indian and Pakistani maps continued to deny political reality. A 1984 Pakistani government tourist map (fig. 7.3, lower), for instance, included Kashmir in Pakistan, whereas a map (fig. 7.3, upper) in an Indian government tourist brochure ceded the entire territory to India. American and British atlases attempted to resolve the dispute with notes identifying the area occupied by Pakistan and claimed by India, the area occupied by India and claimed by Pakistan, three areas occupied by China and claimed by both India and Pakistan, the area occupied by China and claimed by India, and the area occupied by India and claimed by China. And for years publishers found it difficult to export the same books on South Asian geography to both India and Pakistan.

Even tiny maps on postage stamps can broadcast political propaganda. Useful both on domestic mail to keep aspirations alive and on international mail to suggest national unity and determination, postage stamp maps afford a small but numerous means for asserting territorial claims. As shown in

FIGURE 7.3. Official government tourist maps show Kashmir as a part of India (above) and as a part of Pakistan (below). In reality, India controls the southern part of the state of Kashmir, Pakistan controls the northwestern part, and China controls three sections along the eastern margin.

FIGURE 7.4. Subtle and not-so-subtle cartographic propaganda on Argentinian postage stamps.

figure 7.4, Argentinian postage stamps have touted that nation's claims not only to the Falkland Islands and the British-held islands to their east but also to Antarctica. Like all official maps of Argentina, these postage stamps deny the legitimacy of British occupation with their Spanish label "Islas Malvinas." Postage stamps bearing maps are also useful propaganda tools for emergent nations and ambitious revolutionary movements.

Size, Sympathy, Threats, and Importance

Sometimes propaganda maps try to make a country or region look big and important, and sometimes they try to make it look small and threatened. In the former case, the map might support an appeal to fairness: the Third World is big, and therefore it deserves to consume a larger share of the world's resources, to exercise more control over international political bodies such as UNESCO (the United Nations Educational, Scientific, and Cultural Organization), and to receive greater respect and larger development grants from the more developed nations of the West and the Communist world. In the latter case, the map might dramatize the threat a large state or group of states poses for a smaller country. Figure 7.5, for instance, portrays a cartographic David-and-Goliath contest between tiny Israel and the massive territory of the nearby oil-rich Arab nations. Even though the map's geographic facts are accurate, a map comparing land area tells us nothing about Israel's advanced technology, keen military preparedness, and alliances with the United States and other Western powers.

Some map projections can help the propagandist by making small areas bigger and large areas bigger still. No projection has been as abused in the pursuit of size distortion as that devised by sixteenth-century atlas publisher and cartographer Gerardus Mercator. Designed specifically to aid navigators, the Mercator projection vastly enlarges poleward areas so that straight lines can serve as *loxodromes*, or *rhumb lines*—that is, lines of constant geographic direction. (If the navigator's compass shows true north rather than magnetic north, rhumb lines can be called lines of constant compass direction.) As figure 7.6 shows, the navigator finds the course by drawing a straight

FIGURE 7.5. Map showing the encirclement of Israel by neighboring Arab nations, redrawn from a map published during the 1973 war by the Jewish National Fund of Canada.

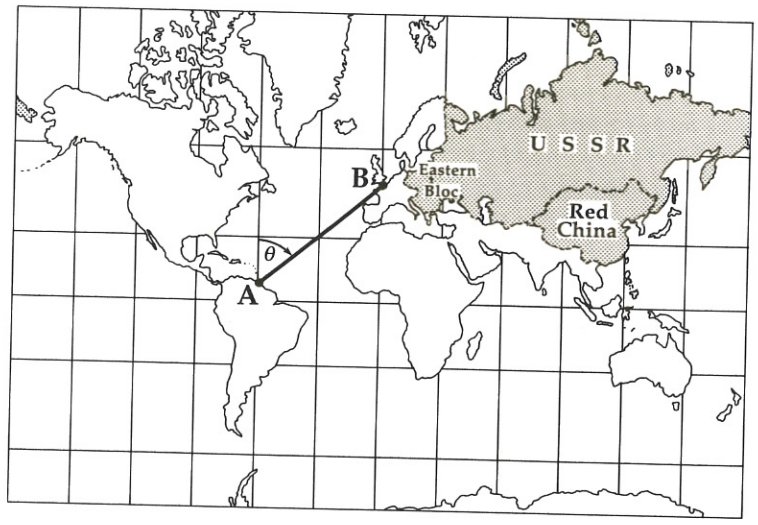


FIGURE 7.6. Mercator world map showing the bearing angle Θ for a rhumb line from A to B and the areal exaggeration of Red China and in particular the USSR. Designed to aid navigators, the Mercator also has served political propagandists seeking to magnify the Communist threat.

line from origin A to destination B and then reading the angle θ from the meridian to the rhumb line. If one consistently follows this bearing from A, one will eventually reach B. For this convenience the navigator must sacrifice a shorter but less easily followed great-circle route and endure the areal distortion caused by the progressive increase poleward of north-south scale. In fact, the projection shows little of the area within the Arctic Circle and the Antarctic Circle because its poles are infinitely far from its equator. Ever wary of icebergs anyway, navigators for centuries have avoided polar waters and accepted as only a minor liability the Mercator projection's gross areal exaggeration. Yet for decades the John Birch Society and other political groups intimidated by Communist ideology and Stalinist atrocities have reveled in the Mercator's cartographic enhancement of the Soviet Union. Birch Society lecturers warning of the Red menace commonly shared the stage with a massive Mercator map of the world with China and Russia printed in a provocative, symbolically rich red.

Although equal-area map projections (as in figs. 2.5 and 2.6) have been available at least since 1772, when Johann Heinrich Lambert published his classic *Beiträge zum Gebrauche der Mathematik und deren Anwendung*, Mercator's projection provided the geographic framework for wall maps of the world in many nineteenth- and early twentieth-century classrooms, and more recently for sets of television news programs and backdrops of official briefing rooms. Perhaps distracted by concerns with navigation, exploration, and time zones, cartographically myopic educators and set designers presented a distorted world view that diminished the significance of tropical areas to the advantage of not only Canada and Siberia but western Europe and the United States as well. The English especially liked the way the Mercator flattered the British Empire with a central meridian through Greenwich and prominent far-flung colonies in Australia, Canada, and South Africa. Some British maps even gave the Empire an added plug by repeating Australia and New Zealand at both the left and right sides of the map.

Yet in the early 1970s this subtle and probably unwitting geopolitical propaganda served as a convenient straw man for German historian Arno Peters, who published a "new" world map based on an equal-area projection similar to one described in 1855 by the Reverend James Gall, a Scottish clergyman. As figure 7.7 shows, the Gall-Peters projection gives tropical continents a mildly attenuated, stretched look, which probably explains why geographers and cartographers have adopted more plausible equal-area maps and why the basic texts on map projections Peters consulted had ignored Gall's contribution. Indeed, Lambert and other cartographers had developed numerous equal-area map projections, including many that distorted shape much less severely than does the Gall-Peters version.

But Dr. Peters knew how to work the crowd. A journalist-historian with a doctoral dissertation on political propaganda, Peters held a press conference to condemn the Mercator world view (as well as all nonrectangular projections) and to tout his own projection's "fidelity of area" and more accurate, "more egalitarian" representation of the globe. By calling attention to the Mercator's slighted portrayal of most Third World nations and blaming a stagnation in the development of cartography, Peters struck responsive chords at the World Council of Churches, the Lutheran Church of America, and various United Nations bodies. Religious and international development organizations welcomed Peters and his "new cartography," with the greater fairness and accuracy it promised. They also pub-

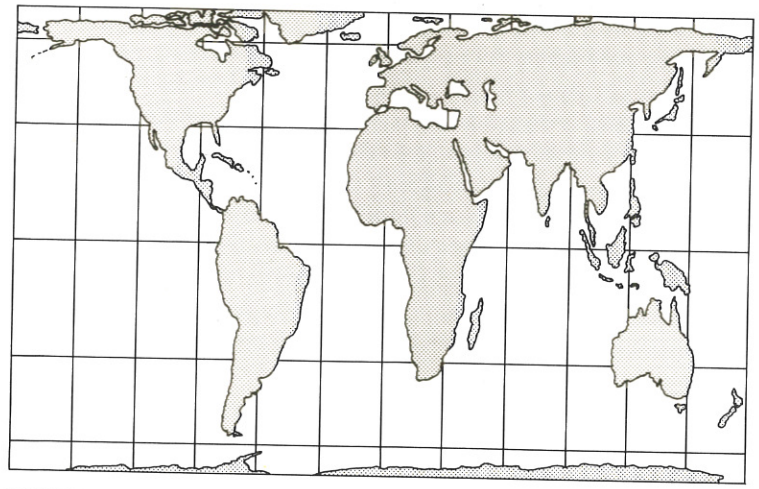


FIGURE 7.7. The Peters projection or, more accurately, the Gall-Peters projection.

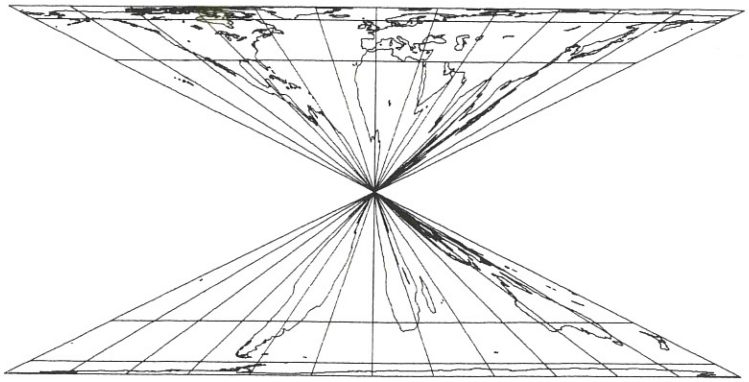


FIGURE 7.8. Like all equal-area projections, this hourglass equal-area map projection John Snyder devised as a joke has area fidelity but distorts shape.

lished large and small versions of the Peters projection, hung it on their walls, and used it in their press releases and publications. Perhaps because journalists also like to champion the oppressed and can't resist a good fight, the press repeated Peters's claims and reported the success of his bandwagon. Academic cartographers became both puzzled and enraged—puzzled that the media and such prominent, respected institutions could be so gullible and ignorant, and enraged that these groups not only so persistently repeated Peters's preposterous assertions but so obstinately refused to look at cartography's writings, accomplishments, and rich history.

Not all cartographers lacked a sense of humor. U.S. Geological Survey cartographic expert John Snyder, himself a developer of several useful as well as innovative map projections, offered yet another equal-area projection to underscore his cartographic colleagues' point that an equal-area map is not necessarily a good map. As shown in figure 7.8, Snyder's hourglass equal-area projection does what the Peters projection does and the Mercator doesn't—it preserves areal relationships. But it also demonstrates dramatically that areal fidelity does not mean shape fidelity.

Ironically, by succumbing to Peters's hype, UNESCO and other organizations sensitive to Third World problems loyally backed the wrong projection and missed an enormous propaganda opportunity. By accepting uncritically the rather dubious assumption that a map responsive to people should accurately represent land area, these groups not only demonstrated

a profound cartographic naïveté but also ignored a more humanistic type of map projection that actually makes some Third World populations appear justifiably enormous. How much more convincing their media blitz might have been had they supported a demographic base map, or area cartogram, similar to figure 2.10, on which the area of each country is scaled according to number of inhabitants. Indeed, an area cartogram would be more effective than the Peters projection in boosting the importance of China, India, and Indonesia and in revealing the less substantial populations of Canada, the United States, the Soviet Union, and other comparatively less crowded countries. But perhaps a more subtle internal need motivated leaders of UNESCO and the World Council of Churches, for the Peters projection is comparatively kinder to the low and moderate population densities of Africa, Latin America, and the Middle East—indeed, a cynic might note the influence of African diplomats in UNESCO and the inherent interest of the World Council of Churches in concentrated Christian missionary activity in Latin America and central Africa.

Propaganda Maps and History: In Search of Explanation and Justification

Although propaganda cartography is probably not much younger than the map itself, the Nazi ideologues who ruled Germany from 1933 to 1945 warrant special mention. No other group has exploited the map as an intellectual weapon so blatantly, so intensely, so persistently, and with such variety. Nazi propaganda addressed especially to the United States presented a selective and distorted version of history designed to increase sympathy for Germany, decrease support for Britain and France, and keep America out of World War II, at least until Axis forces had conquered Europe. The examples discussed in this section are from a weekly news magazine, *Facts in Review,* published in New York City during 1939, 1940, and 1941 by the German Library of Information.

The sympathy theme of Nazi cartopropaganda often recalled Germany's defeat in World War I—a humiliation followed by an economic depression that helped the National Socialists to power. Figure 7.9, which compared the German plight in

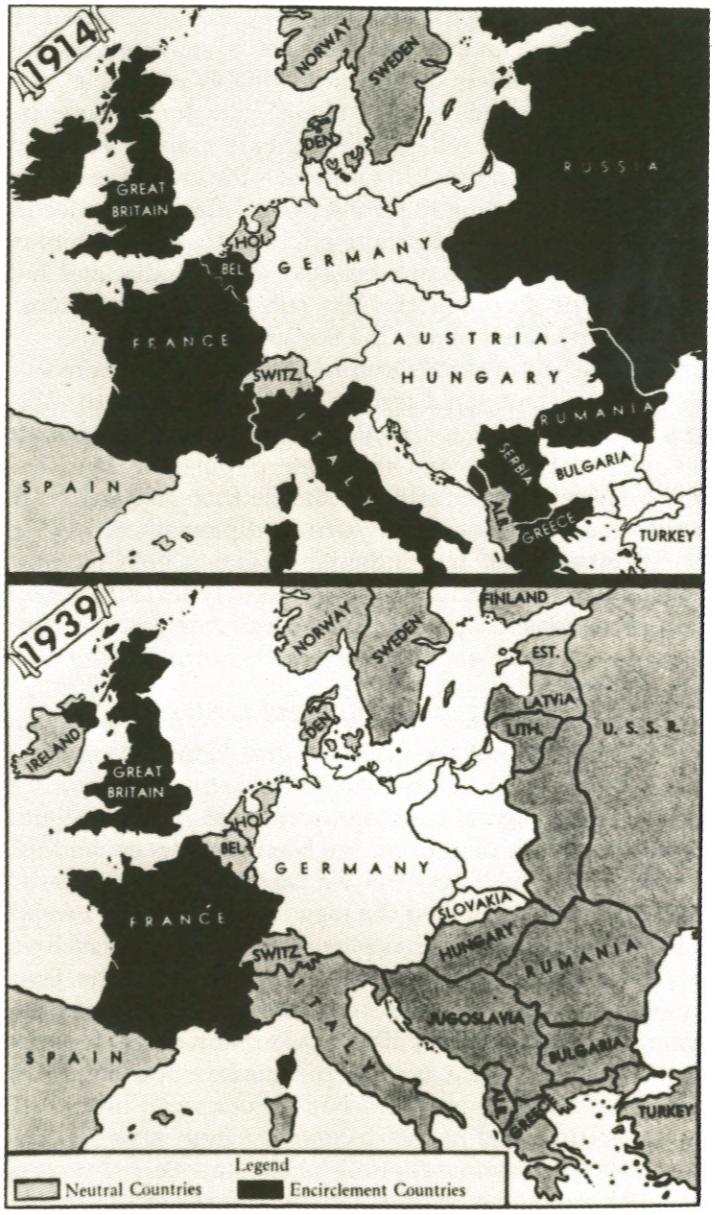


FIGURE 7.9. "Then and Now! 1914 and 1939" (*Facts in Review* 1, no. 17 [8 December 1939]: 1).

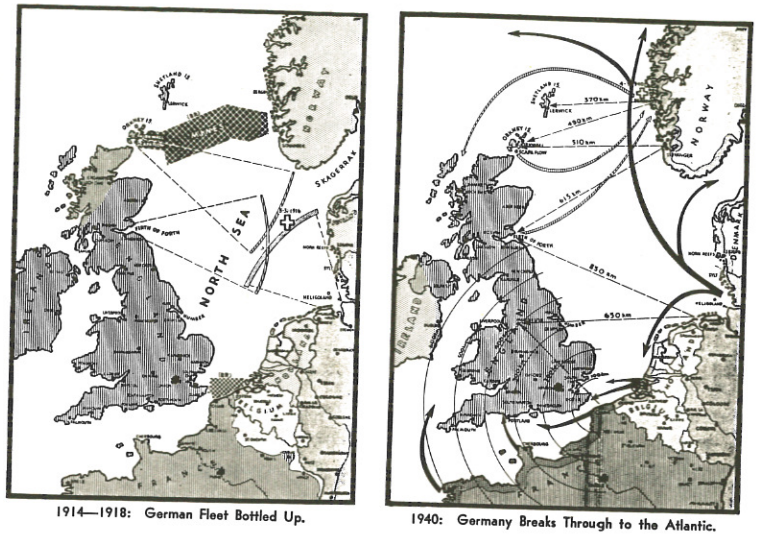


FIGURE 7.10. "The War in Maps" (*Facts in Review* 3, no. 16 [5 May 1941]: 250).

1914 with that of 1939, invoked a persistent anti-British theme. These two maps formed much of the front page of *Facts in Review* for 8 December 1939. A caption to the left of the 1914 map noted the encirclement that "provided the necessary basis for Britain's successful Hunger-blockade," whereas the caption for the 1939 map alluded to Britain's failed attempts to repeat the encirclement and proclaimed that "the path of industrial and economic cooperation to the East and the Southeast lies open!" Note, though, that the 1939 map conveniently groups Germany's main allies at the time, Mussolini's Italy and Stalin's Russia, with Switzerland and other "neutral countries."

In early 1941, another map attempted to explain and justify Germany's western advance against England into France, Belgium, and Holland by comparing Germany's strategic disadvantage in 1914 with the more favorable situation in 1940. Figure 7.10 contrasts the German navy "bottled up" by the British in the North Sea in 1914 through 1918 with the German navy that in 1940 had "[broken] through to the Atlantic." Hitler had not yet turned against Stalin, and the map's caption noted that whereas Germany had to fight on two, and later three, fronts in 1914, "Today no such danger exists. The British blockage is ineffective and, instead, the blockaders them-

selves are being blockaded." Arcs reinforce the blockade theme of the 1914–18 map, and bold arrows dramatize Germany's freer access to the Atlantic on the 1940 map.

Other Nazi maps attempted to divert sympathy from Britain. Captioned "A Study in Empires," the charts in figure 7.11 compare the 264,300 mi² on which Germany's 87 million inhabitants "must subsist" with the 13,320,854 mi² that Britain, with only 46 million people, "has acquired." How can little Germany be the aggressor nation? the left panel asks. In contrast, the right panel suggests a note of greed in Britain's conquest of 26 percent of the world's land area. The map's caption sounds a further chord of grievance by noting that the British Empire "includ[es] the former German colonies."

Facts in Review's editors also used maps to cast doubt on England's probity. In the issue of 30 November 1940, a story headlined "British Bombings—A Record of British Truthfulness" reported that on 24 November a British bomber apparently lost its way to Genoa and bombed Marseilles, France.

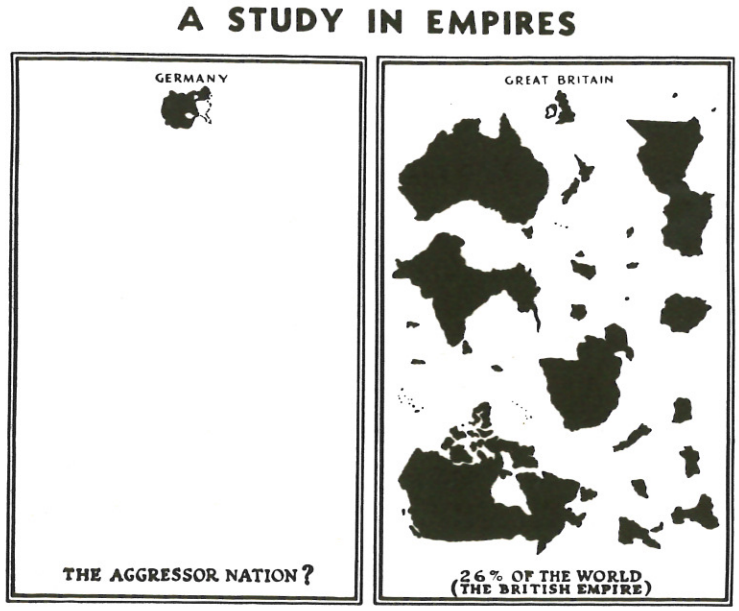


FIGURE 7.11. "A Study in Empires" (*Facts in Review* 2, no. 5 [5 February 1940]: 33).

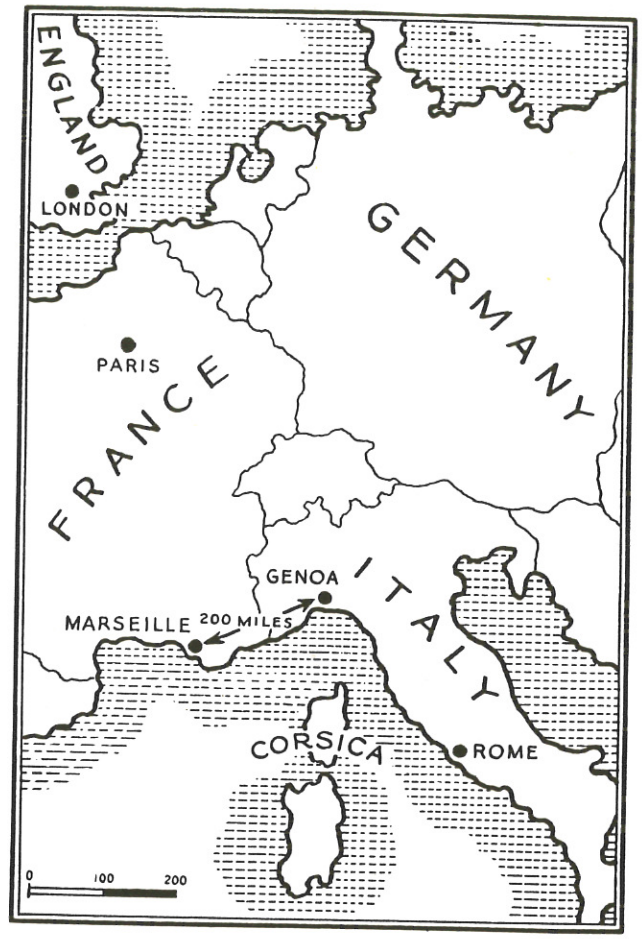
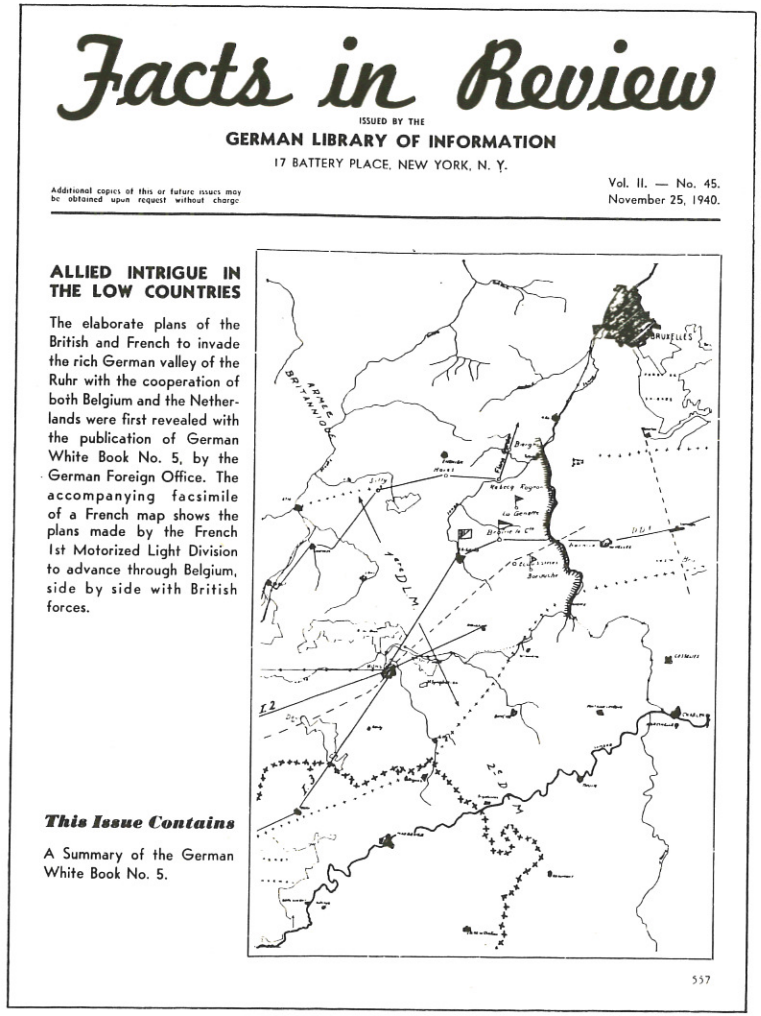


FIGURE 7.12. "Marseille 'Mistaken' for Genoa" (*Facts in Review* 2, no. 46 [30 November 1940]: 566).

Early British news reports not only had denied the bombing but had blamed the Germans. A map (fig. 7.12) located both cities, and its caption reeked with sarcasm: "Marseille was 'mistaken' for Italy's Genoa, more than 200 miles away!" The story developed a bumbling-British theme by noting the dropping of anti-Italian leaflets, casualties of six dead and twelve wounded ("These 18 persons were exclusively women"), the protests of the Vichy government, and England's



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Vol. II. — No. 45.
November 25, 1940.

ALLIED INTRIGUE IN THE LOW COUNTRIES

The elaborate plans of the British and French to invade the rich German valley of the Ruhr with the cooperation of both Belgium and the Netherlands were first revealed with the publication of German White Book No. 5, by the German Foreign Office. The accompanying facsimile of a French map shows the plans made by the French 1st Motorized Light Division to advance through Belgium, side by side with British forces.

This Issue Contains

A Summary of the German White Book No. 5.

FIGURE 7.13. "Allied Intrigue in the Low Countries" (*Facts in Review* 2, no. 45 [25 November 1940]: 557).

"somewhat lame story that fog and inexperience caused the crew of the British plane to drop their bombs over this noncombatant city."

Nazi propagandists also used facsimile maps to prove their opponents' treachery and justify Germany's advancing western front. Nonskeptical Americans were thought likely to

accept the largely illegible, hand-labeled map (fig. 7.13) on the *Facts in Review* cover for 25 November 1940 as convincing evidence of British and French plans to "invade the rich German valley of the Ruhr with the cooperation of both Belgium and the Netherlands." Germany, the map implied, had merely done to them first what they had been plotting to do to her.

Another plot revealed in *Facts in Review* justified the partition of Poland among Germany and Russia. Captioned "Polish Delusions of Grandeur," figure 7.14 shows in bold black a much reduced German state. Offended and outraged, the editors revealed that "this map, published in the Posen newspaper, 'Dziennik Poznanski,' after the receipt of Chamberlain's 'blank check,' revived dreams of extending the Polish dominion to the Weser River." Although a newspaper map hardly constitutes official state policy, the map suggests to the politically naive that the 1939 invasion amply repaid the Poles for even daring to think of annexing German territory.

Useful for representing one's opponents as the bad guys, maps can also advertise oneself as the good guy. Accompanying a story headlined "Repatriation: Background for Peace,"

FIGURE 7.14. "Polish Delusions of Grandeur" (*Facts in Review* 2, no. 28 [8 July 1940]: 294).

FIGURE 7.15. "Repatriation: Background for Peace" (*Facts in Review* 1, no. 16 [30 November 1939]: 3).

figure 7.15 shows Germany the Peacemaker quietly reducing ethnic friction in the Baltic states by evacuating 80,000 to 120,000 Germans. As *Facts in Review* proudly observes, "Germany is not afraid to correct mistakes of geography and history." 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.

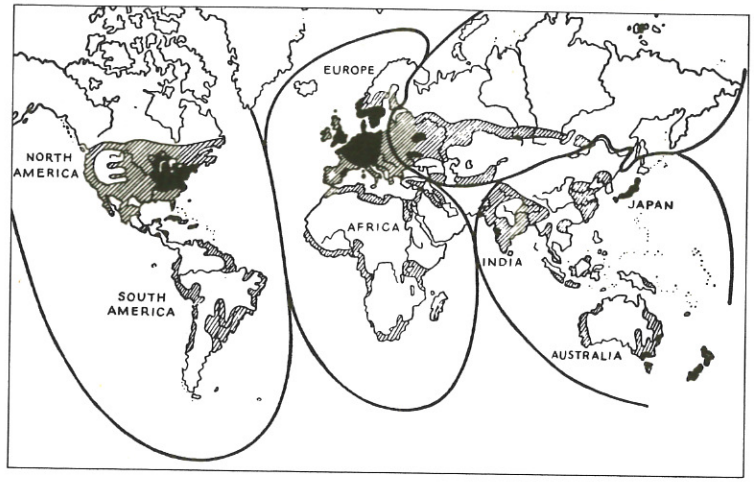

FIGURE 7.16. "Spheres of Influence" (*Facts in Review* 3, no. 13 [10 April 1941]: 182).

In trying to persuade the United States to remain neutral, Nazi cartographic propagandists flattered both isolationism and Monroe Doctrine militarism. Titled "Spheres of Influence," figure 7.16 uses bold lines to send a clear message to Americans: stay in your own hemisphere and out of Europe. Faintly resembling the lobes of Goode's interrupted projection (fig. 2.6), familiar to many students, the map also supported a geopolitical theater for Germany's Pacific ally, Japan. How successful the Nazi cartographic offensive might have been is moot, for the United States entered the war on the side of England after Japan attacked Pearl Harbor, Hawaii, on 8 December 1941.

Arrows, Circles, Place-Names, and Other Cartographic Assault Weapons

Few map symbols are as forceful and suggestive as the arrow. A bold, solid line might make the map viewer infer a well-defined, generally accepted border separating neighboring nations with homogeneous populations, but an arrow or a set of arrows can dramatize an attack across the border, exaggerate a concentration of troops, and perhaps even justify a "preemptive strike." As figure 7.17 demonstrates, arrow symbols

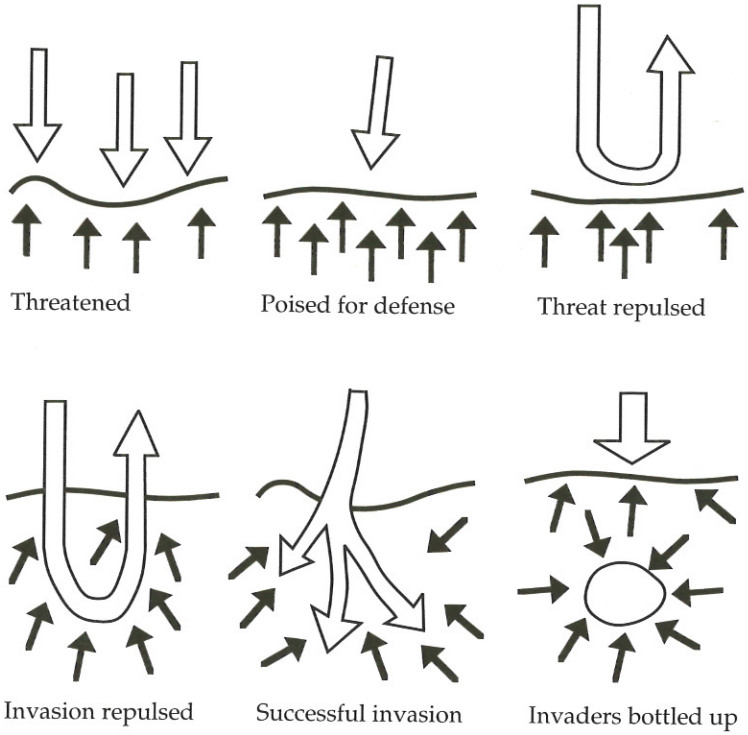

FIGURE 7.17. Arrow symbols portraying a variety of maneuvers and stalemates.

can vary in size, number, and arrangement to portray a range of military confrontations, from overwhelming threats and courageous standoffs to invasions with varying degrees of success. During World War II and the Korean War, many American newspapers used daily battlefield maps with forceful and suggestive arrows to give their readers a generalized blow-by-blow account of the Allied forces' victories and defeats. As figure 7.18 demonstrates, prominent arrows and black areas portraying captured territory could dramatize the threat of an advancing enemy.

A less abstract cousin of the arrow is the bomb or missile symbol. Everybody knows what it is and fears its referent. Lines of miniature missiles and stacks of ominous little red or black bombs readily impress map viewers with the comparative sizes of opposing arsenals. Orientation is also important:

bombs are stockpiled horizontally but dropped vertically, whereas missiles are stored upright but hurled horizontally. To justify an expanding defense budget, a propagandist might even stage a mininuclear attack, complete with a victorious response. Maps can even make nuclear war appear survivable.

The specter of nuclear warfare sends threatened nations and pacifists worldwide to the cartographic arsenal for an honored piece of geopolitical ordnance, the circle. Diplomats and military strategists have found the circle particularly useful in showing the striking zones of aircraft, and modern strategists find circles indispensable when discussing the range of guided missiles. Circles bring to the map a geometric

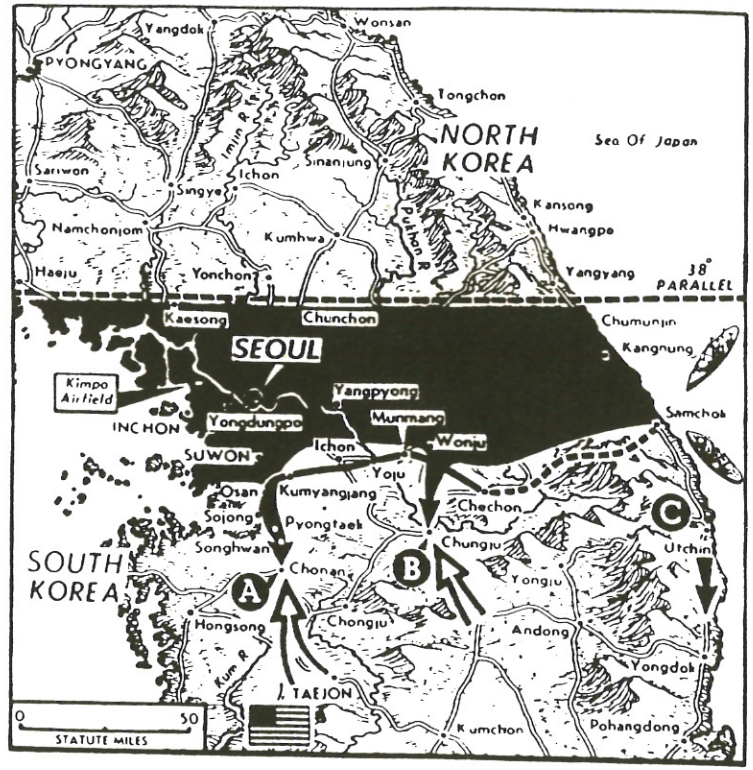

FIGURE 7.18. A 1950 Associated Press newspaper map uses black shading to mark the part of South Korea invaded by North Korean forces and arrows to portray troop movements.

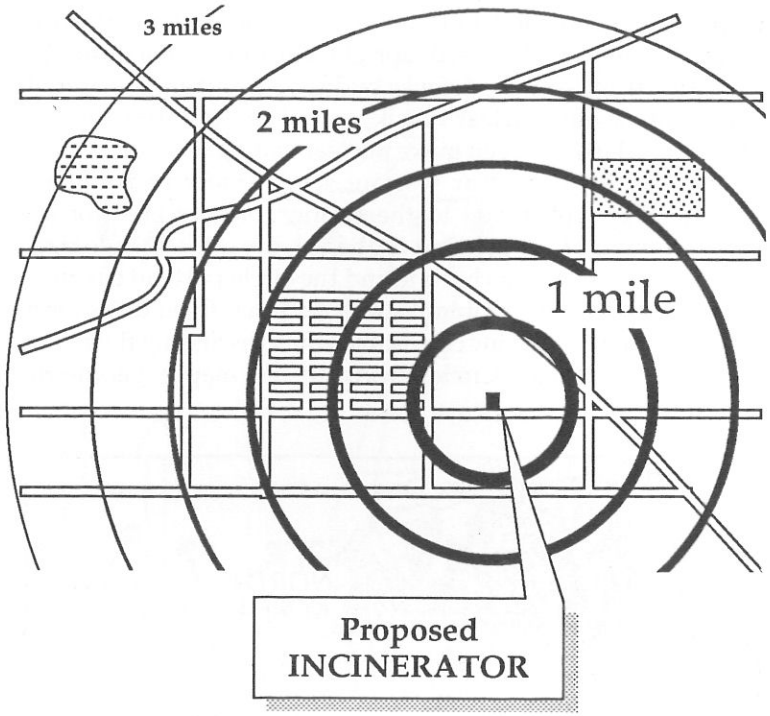

FIGURE 7.19. A local environmental protection group might seek to arouse citizen support with a propaganda map on which concentric circles have progressively more threatening labels closer to the site of a proposed incinerator.

purity easily mistaken for accuracy and authority. Yet on few small-scale maps do circles on the sphere remain circles in a two-dimensional plane. Even local environmental activists find circles useful, especially when arranged concentrically around the site of a proposed incinerator or nuclear power plant, and with ever larger, more threatening labels for closer circles, as in figure 7.19.

Naming can be a powerful weapon of the cartographic propagandist. Place-names, or *toponyms*, not only make anonymous locations significant elements of the cultural landscape but also offer strong suggestions about a region's character and ethnic allegiance. Although many maps not intending a hint of propaganda might insult or befuddle local inhabitants by translating a toponym from one language to another (as

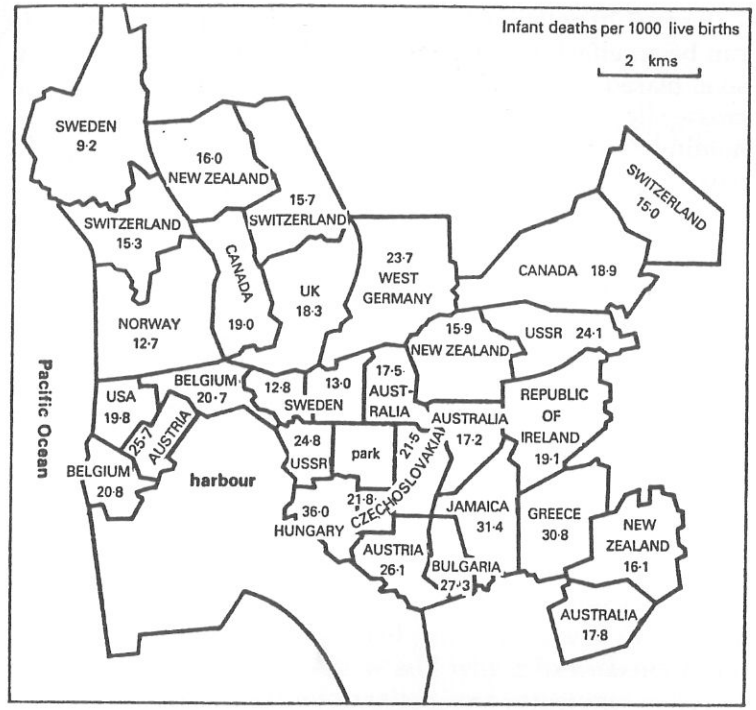

FIGURE 7.20. Dramatic map comparing infant mortality rates for parts of San Diego, California, with national rates of various countries.

from Trois Rivières to Three Rivers) or by attempting a phonetic transliteration from one language to another (as from Moskva to Moscow) and even from one alphabet to another (as in Peking or Beijing), skillful propagandists have often altered map viewers' impressions of multiethnic cultural landscapes by suppressing the toponymic influence of one group and inflating that of another.

Local social activists can also use the suggestive power of place-names to make a point cartographically. Figure 7.20, for instance, is an infant mortality map of San Diego, California, that strongly indicts intraurban inequalities in maternal and infant health care. As the map notes, some parts of the city are comparable to highly developed western European nations such as Sweden and Switzerland, whereas other neighborhoods are similar to Hungary or Jamaica. Figures

7.19 and 7.20 both demonstrate that cartographic propaganda can be an effective intellectual weapon against an unresponsive, biased, or corrupt local bureaucracy. Like guns and lacrosse sticks, maps can be good or bad, depending on who's holding them, who they're aimed at, how they're used, and why.

Chapter 8

Maps, Defense, and Disinformation: Fool Thine Enemy

Compared with military maps, most propaganda maps are little more than cartoons. A good defense establishment knows how to guard its maps and their geographic details and yet at times to leak false information the enemy might think is true. Providing some accurate information is necessary, of course, if the "disinformation" is to be credible. An intellectual weapon in political propaganda, the map is a fundamental tactical weapon for military counterintelligence and covert diplomacy.

This chapter addresses how and why governments guard maps, hide geographic information, and sometimes even distribute deliberately falsified maps. The first section discusses the very real need for cartographic security, the second examines the now-admitted excesses of Soviet cartographers who deliberately doctored their maps, and the third section explores how governments sometimes mislead their own citizens by failing to include threats to a sound environment and other possible embarrassments.

Defense and a Secure Cartographic Database

No doubt about it: mapped information often must be guarded. If knowledge is power, an enemy's knowledge of your weaknesses and strengths is a threat. Maps can also betray your plans, as Giovanni Vigliotto discovered. In 1981 an Arizona jury found this fifty-three-year-old ladies' man guilty of fraud and bigamy. Giovanni, who claimed to have married more than 105 women over thirty-three years, invariably cut short the honeymoon by absconding with his victim's cash and jewelry. Had he not left behind an annotated map when