

Introduction: Don't skip this

This is not a book about what maps *are*. Over the past twenty or so years, we and others have pretty convincingly demonstrated that maps are neither what they seem nor proclaim themselves to be. But having established this, we face another question: if maps *are* but partial truths masquerading as the whole story, lies layered on top of lies, nests of interests advancing one cause at the expense of others, then how is it that maps have the demonstrable power to organize social energies so as to bring into being the visions of the world they posit?

That is to say, while in a sense we and others have “decoded” the map, having done so leaves us as far as ever from understanding *how* the map does what it does. The question is no longer whether maps have power. That's settled: they do. Now the question is where the power comes from.

This book is our answer to that question.

When we began our quest in the mid-1980s we were a practicing cartographer (Fels) and a sometime historian of cartography (Wood) who had come together in mutual frustration with the state of theory in cartography. At the time this was dominated by two ideas: that maps were representations—pictures—of the world; and that they were best thought about as a problem in communications engineering—that is, as a conduit connecting a sender (ultimately the world) to a receiver (the map user). To us these ideas seemed to capture little of the nature or power of the map. They were inept when it came to capturing the roles maps had historically played in the extension of empire and the construction of national identities. Because of this, others who were equally dissatisfied with the state of cartographic theory came at the issue from a historical perspective.

Our interest, however, lay in the work done by contemporary maps. So in 1986, we took a semiological approach to what has become accepted as a classic “deconstruction” of the North Carolina state highway map, an analysis that one of us (Wood) generalized in 1992 in *The Power of Maps*, both a Smithsonian exhibition and a book. We were not alone as we traveled in this direction. Brian Harley, to whom, following his untimely death, *The Power of Maps* was dedicated, had in particular blazed a path into the thicket of map theory using tools sharpened by Michel Foucault and Jacques Derrida. Jeremy Black brought a historian's—in fact, a historiographer's—imagination to the issue. Dennis Cosgrove, Anne Godlewska, and Mathew Edney brought that of contemporary geographers with commitments that ranged from iconology to subaltern studies. Alan MacEachren also took a semiological approach, but came at the problem from within cartography. David Turnbull subjected maps to the scrutiny of the sociology of scientific knowledge.

All this work—our own especially—appealed to us as a kind of intellectual sleight. That is, all of us were saying things like, “the interests the map represents are embodied in it as presences and absences ...” (Wood) or “cartography was primarily a form of political discourse concerned with the acquisition and maintenance of power ...” (Harley) or “the space-annihilating science of cartography played an important role in the imposition of nationalist ideology ...” (Godlewska).¹

But how? *How* did the map do these things?

Following Steven Shapin and Simon Schaffer, Turnbull suggested thinking about maps as what Ludwig Wittgenstein called “forms of life.” Turnbull uses the term to mean

... a set of conventional linguistic practices and social structures that are “given,” without which there can be no talk, knowledge, or social relations. These “givens” structure what it is possible to ask and what it is possible to answer. They lay down the criteria for what is to count as knowledge. From this constructivist perspective, knowledge can be seen as a practical, social and linguistic accomplishment, a consequence of the bringing of the material world into the social world by linguistic and practical action.²

We couldn't have agreed more, but for us the problem has become to say precisely what the linguistic and practical actions *are* that constitute the “form of life” we call a map.

That is, so what if the map is primarily a form of political discourse? What is it *about* this discourse that allows, even encourages people to act on it? *How* is it that maps annihilate space? So a map *does* mislead? What is it about a map that all but *obligates* people to follow it? *How can* a map embody an absence?

That the map has been increasingly conceptualized as a social construction has had no effect at all on the way maps are used. With every passing day maps are more implicated in the shape our lives take than ever before. What we're asking is, how does the map get away with it?

What follows, therefore, does *not* plow old ground. Though they may at times seem familiar, both ground and plow are decidedly new. Not that we reject the work we have been describing. Far from it. But we hope we integrate it in a more productive way by giving it an epistemological foundation capable of bearing weight. Our plow has five blades:

1. We start by replacing the whole idea of the map as a representation with that of the map as a system of propositions. Too long

has the eye reigned over cartographic theory. The map is not a picture. It is an argument. Basic here is what we call a *posting*, the fundamental cartographic proposition that *this is there*. Each posting encapsulates a powerful existence claim—*this is*—that gains enormous power by being *posted*, that is, from the indexicality vouchsafed by the sign plane of the map.³ Multiple postings participate in the construction of a territory, which facilitates the transmission of authority. *Everything* about a map, from top to bottom, is an argument. In taking this position we are not only following a course dictated by our earlier work, but aligning ourselves with the gradual shift from representational to performative idioms broadly characteristic of the work of Ian Hacking, Bruno Latour, Andrew Pickering, and others.⁴

2. What gives the posting its uniquely powerful ability to make existence claims is the social assent that is given to the proposition—*this is there*—that it embodies. This happens because every instance of map use constitutes an act of validation. This validation—all but automatic—is shaped by antecedent validations that have been performed in situations ranging from map learning exercises in school, through successfully using a map to find your way around, to watching Colin Powell point to sites of weapons of mass destruction on a map of Iraq. (The whole process is similar to what Steven Shapin and Simon Schaffer write about as the production of facts by witnessing and reporting.⁵) To claim that *this is there* is to make a powerful claim precisely because it implies the ability to perform an existence test: *you can go there and check it out*. Having done so in the past, you know the outcome. (Besides, who would fake such a challenge?) The assent given to the postings spreads to the territory that the postings mutually construct, and this endows the map with an intrinsic factuality whose social manifestation is the authority the map carries into public action.
3. Complementing this reconstruction of the map as a system of propositions is our adoption of a cognitive linguistics model for map reading. Cognitive linguistics is an exciting new approach to language with powerful connections to cognitive neuroscience. Instead of imagining that people somehow *perceive* map *information*, we show how they actually *construct* the meaning of the map *on the fly* in a process analogous to the way they construct meaning in conversation, in both cases directed toward an end *in action*, that is, toward doing something. This “cognitive cartographics” makes it clear that the principles underlying the graphic design of maps, far from being essentially aesthetic, are wholly at the service of the map’s construction of knowledge, a construction built in *real time* by the map readers and typically validated on the spot (as evidenced by its use).
4. Clarifying our understanding of the graphic design of the map is our adoption of what, by analogy with Gerard Genette’s clarifying distinction between *text* and *paratext*,⁶ we propose to call the *map* and the *paramap*. As a *paratext* is everything that surrounds and extends a *text* in order to present it (title, table of contents, foreword, etc.), so the *paramap* consists of everything that surrounds and extends a map in order to present it (title, legend,

text, photos, ancillary maps, associated texts, etc.). As the distinction illuminates the rhetorical power of the *paramap*, it underscores the logical primacy of the map (or maps) proper, for it is only there where postings, with their unique power to establish, can be made. Ultimately, it is the *interaction* between map and *paramap* that propels the map into action.

5. Finally, we focus our analysis on maps of nature to make our case as strongly as we can. Instead of working with the maps that have been the mainstay of “social construction of the map” analysis—that is, with maps of exploration and discovery, maps of empire and nation building, political maps, and others in which the interests of the map (their involvement in the acquisition and maintenance of power) is comparatively straightforward—we attempt to answer our question about how it is that maps do what they do—lead to social action—by looking at maps of species habitat, the Grand Canyon, the migration of birds, plate tectonics, and the Milky Way. Here we see that it is through their spatialization of nature that maps have made their contribution, facilitating nature’s accommodation within the spatiality of the modern state.

This nature that maps spatialize turns out not to be unitary, but a many-faced subject of unceasing social negotiations. Indeed we quickly realized that maps proposed the existence of no fewer than eight *different* natures—these related to, but different from, the “ways of knowing” described by John Pickstone.⁷ While we have listened to Clarence Glacken, T. J. Clark, William Cronon, Steven Shapin and Simon Schaffer, Bruno Latour, Paula Findlen, and others in our efforts to make sense of the propositions about nature thrown at us by our maps, we have listened even more carefully to the arguments the maps made themselves. What do our maps propose nature to be? What existence claims do our maps advance with their powerful indexicality? What connections do they propose through the natural territories they produce? What social actions do the maps incite?

The spatialized nature we found in our maps is a nature with many faces. It is a nature that can be threatened and that can threaten; a nature that can inspire awe and be cuddled; a nature that can be collected and systematized; a nature that is unknowably remote and underfoot. These are the natures, respectively, of conservationists and disaster relief organizations, IMAX and stuffed toy companies, The Nature Company and university science departments, space-age portraits of the earth and topographic surveys. Our maps, through the connections they propose between nature and society, indict us and caution us, humble us and inflate us, arouse our cupidity and our curiosity, fan our anxieties and our sense of competence. At once they incite us to change our ways before we wipe nature out *and* to buy insurance against its next attack; to stand in open-mouthed humility before the majesty of nature *and* to swaddle ourselves in its warmth; to buy specimens of rocks and butterflies *and* to advance environmental science; to tremble in anticipation of nature’s future *and* to visit it in the parks we have set aside for it. In these shifting perspectives nature and humankind seem alternately masters of each other. Bully and victim, owner and pet, subject and object, doubt and assurance

exchange position with the folding up of one map and the unfolding of another. In the end, what the maps seem to reveal most is our profound ambivalence about our place in the universe.

Our book falls into two parts. The first opens with a chapter that lays out this argument in greater detail, passes through a second chapter that spells out the propositional logic of the map, and concludes with a third in which we try to read the nature of an individual map. In the second part of the book, we devote a chapter to each of the eight natures proposed by our maps, as we do so exploring in greater depth the power of the propositional logic of the map, and the cognitive construction of nature that maps promote.

A NOTE ABOUT THE MAPS

Because we're interested in the natures of maps, we attend to as wide a variety of maps as we can. We concern ourselves with everything from the little thumbnail maps that can appear in magazine advertisements to the large sheets issued by specialist scientific organizations. Each is a part of the larger map culture and has been made with the existence of others in mind.

Our interest is overwhelmingly, if not exclusively, on popular maps, and so we devote a lot of attention to maps published by the U.S. Geological Survey and the National Geographic Society. There are a couple of reasons for this. In the first place, the National Geographic Society is the largest geographic society in the world, by a very great margin, and its magazine is read around the world. For years subscribers have received a beautiful large map folded up in every other issue. Among sheet maps these are, without competition, the most widely distributed—and probably the most broadly influential—in the world.

Furthermore, they are available everywhere. In the pages that follow we attempt to describe the maps we deal with as well as we can, and have included figures of most. Although the figures will illuminate the discussion a great deal, they cannot take the place of the real thing. One important reason for dwelling on *National Geographic* maps is because you can so easily find them, for fifty cents or a dollar, in nearly any Goodwill, Salvation Army, or other thrift store. Used book dealers sell them too. Some even give them away. In the back of this book we've provided a list of every map we discuss. Take it with you to the nearest thrift shop, used-book store, or weekend flea market, stock up on the *National Geographic* maps we treat, and follow our discussions with the real maps in hand. U.S. Geological Survey maps are also readily available. With the maps in hand, not only will you find everything we say more interesting, but you'll be in a much better position to second-guess, query, or disagree with the positions we take.

AND SPEAKING OF THE NATIONAL GEOGRAPHIC SOCIETY...

Because of its dominant position in popular discourse about geography, the National Geographic Society has endured its share of criticism. Though we are both members of the National Geographic

Society—Wood has been a subscriber, with brief interruptions, for over forty years—we are in full agreement with Catherine Lutz and Jane Collins' reading of *National Geographic* as a conservative arbiter of taste, wealth, and power.⁸ While we do extend their analysis of *Geographic* photography with ours of cartography, our interest is focused on neither the magazine nor the society. We are interested in either only insofar as either informs our reading of their maps.

Gilles Fauconnier, the cognitive linguist, has observed that "Language data suffers when it is restricted to language."⁹ This is not just because language depends on highly structured background knowledge, conversational meaning, negotiations, and so on, but because it leads to action. The same has to be said of maps. Map study suffers when it is restricted to maps. Maps, too, depend on highly structured background knowledge, associated texts and contexts, interactions with other maps and media, and are also directed toward ends in action. Most of the maps we deal with are enormously complicated, and our readings of them are deep and extended. Given the central role maps play in our society, we are dismayed that maps aren't routinely given the rich, critical reviews that novels and films receive every day, and we advance our readings as examples of what might be accomplished.

NOTES

1. For Wood, the relationship between absences and presences was the key to the map's power to articulate a claim. See *The Power of Maps* (New York: Guilford Press, 1992), especially the introduction and first chapter ("Maps Work by Serving Interests"). Harley's understanding of "discourse" was comparatively narrow, limited to "those aspects of a text which are appraisive, evaluative, persuasive, or rhetorical," an emphasis he got from reading Robert Scholes. The notion that map discourse could be concerned with the acquisition and maintenance of power he got from Michel Foucault. See Harley's early formulation of these ideas in his "Maps, Knowledge and Power," in *The New Nature of Maps: Essays in the History of Cartography* (Baltimore, Md.: Johns Hopkins University Press, 2001), 51–81. Godlewska at this time was especially concerned with the role played by geography in the expansion of empire, especially with its ability to harness tools, like maps, capable of annihilating the greater and greater distances, geographic and social, that empire was obligated to span. See Godlewska, "Napoleon's Geographers (1797–1815): Imperialists and Soldiers of Modernity," in *Geography and Empire*, ed. Godlewska and Smith (Oxford: Blackwell, 1994), 34.

2. Turnbull, *Maps Are Territories: Science is an Atlas* (Geelong, Victoria: Deakin University Press, 1989), 10.

3. With Ferdinand de Saussure (*Course in General Linguistics*, New York: McGraw-Hill, 1966) we take a sign to be the union of a concept of some kind—that is, of an element from the plane of content (say "house")—with a mark of some kind—that is, with an element from the plane of signification (say a ■). This union of "house" and ■ takes place on the plane of the sign or sign plane. Only on this sign plane is a ■ understood as a house. The *cartographic* sign plane differs from other sign planes by virtue of the convention that locations on the cartographic sign plane are themselves signs. Their content is "location x,y in the world," their mark nothing other than their location x,y on the map. When a ■ is located on the cartographic sign plane the ■ is understood not as any house but as the house in the world at that location. That is, the cartographic sign plane acts as an index to which house in the

world the ■ is a sign of, meeting in this way the conditions for the indexical sign function set by Charles Sanders Peirce. See chapter 2, notes 1 and 2.

4. While almost anything by these three is worth reading, we have been especially influenced in our work here by Hacking's *The Social Construction of What?* (Cambridge, Mass.: Harvard University Press, 1999); Latour's *We Have Never Been Modern* (Cambridge, Mass.: Harvard University Press, 1993) and his *Pandora's Hope* (Cambridge, Mass.: Harvard University Press, 1999); and especially by Pickering's *The Mangle of Practice: Time, Agency, and Science* (Chicago: University of Chicago Press, 1995).

5. Shapin and Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1985). See especially the section "Witnessing Science," pp. 55–60.

6. Genette, *Paratexts: Thresholds of Interpretation* (Cambridge: Cambridge University Press, 1997).

7. Pickstone isolates natural history, analysis, and experimentalism as three distinct "ways of knowing" characteristic of the modern period. He pulls

his thoughts on these themes together in his *Ways of Knowing: A New History of Science, Technology and Medicine* (Chicago: University of Chicago Press, 1995).

8. The notion among certain classes that reading *National Geographic* gave one social cachet has long been understood. The *Geographic* marketed the magazine on this assumption from shortly after its inauguration, and commentators like Paul Fussell, for example, took it for granted (as in Fussell's *Class: A Guide Through the American Status System*. New York: Simon & Schuster, 1983, 144–45). Lutz and Collins put the assertion on a firm statistical foundation in their *Reading National Geographic* (Chicago: University of Chicago Press, 1993). Also see the chapters, "Science, Culture, and Expansionism in the Making of the *National Geographic*" and "Negotiating Success at the *National Geographic*" in Susan Schulten's *The Geographical Imagination in America, 1880–1950* (Chicago: University of Chicago Press, 2001), 45–59 and 148–75.

9. Fauconnier, *Mappings in Thought and Language* (Cambridge, Mass.: MIT Press, 1999)

The nature of maps

The nature of maps: an ambiguous phrase.

Furthermore, a comparatively famous one. In 1976, Arthur Robinson and Barbara Bartz Petchenik used it for the title of a book they subtitled *Essays Toward Understanding Maps and Mapping*. In 1991, J. B. Harley added “New” to the phrase to give the book he was proposing the title, *The New Nature of Maps: Essays in the History of Cartography*.¹

Harley’s was an explicitly subversive gesture. Although Harley died before he was able to write the introduction that would have justified his title, he gave his publisher the following description of his intentions:

The dominant view of modern Western cartography since the Renaissance has been that of a technological discipline set on a progressive trajectory. Claiming to produce a correct relational model of terrain, maps are seen as the epitome of representational modernism, rooted in the project of the Enlightenment, and offering to banish subjectivity from the image. Cartographers have thus promoted a standard scientific model for their discipline, one in which it is claimed that a mirror of nature can be projected through geometry and measurement. Furthermore, this model for maps has colored the critical values of historians of cartography; they often assess early maps by this modern yardstick, thereby excising from the accepted canon of mapping not only maps from the pre-modern era but also those from other cultures that do not match Western notions of accuracy.

The essays in this book—through historical examples and by a critical examination of the practices of modern cartography—seek to offer an alternative view of maps. Drawing on ideas in art history, literature, philosophy, and the study of visual culture, they subvert the positivist model of cartography, replacing it with one that is grounded in iconological and semiotic theory of the nature of maps. The interest of maps is shown to lie not so much in mimetic value but as simulacra which nevertheless may exert a profound influence upon the way space is conceptualized and organized within different societies. The theme of power—whether military, administrative, religious, or economic—is inscribed on the land through cartography is dissected and the nature of the political unconscious in maps is explored and illustrated. In new introductory and concluding essays aspects of this debate will be updated. The conclusion addresses the ultimate cartographic paradox: the map is not the territory, yet it often precedes, and even becomes that territory.²

Despite their differences, Harley’s and Robinson and Petchenik’s ideas about the nature of maps—and certainly Harley intended his first paragraph to be a description of Robinson and Petchenik’s

nature of maps—refer to the nature of *maps*, that is, to the nature, or inherent character, of *maps* as distinguished from the nature of *painting*, *sports*, or *small dogs*. But with equal grace the phrase can refer to the *nature* of maps, that is, to concepts of the natural—as distinguished from the cultural—figured by and brought into being on and by maps.

It is our intention both to insert ourselves into this history of ideas about the nature of the map *and* to embrace the ambiguity of the phrase, to explore the nature of *maps* by exploring the *nature* of maps and the *nature* of maps by exploring the nature of *maps*. We contend there can be little understanding of the one project except in the light of the other. We will show that the *nature* maps bring into being is one—actually it is a multitude—dependent on the nature of *maps*, while the nature of *maps* is best understood through its mapping of *nature*. This follows from the very idea of nature, which is about the intrinsic, the essence, the physical, the out-of-doors, the forces of the physical world, the primitive, the untouched-by-civilization, the uninfluenced-by-artificiality: the real. Nature wants to be the just-born, the innate, the native, the naïve, the untutored, the untaught, the unsophisticated, the unpolluted, the apolitical, the above-all-else *nonideological*. This is the one-word way Harley described what he’d been writing in those essays of his—an “inquiry into ways in which maps are ideological constructions and have been used as a classic form of power/knowledge in past societies.”³

In the years since Harley wrote these words—and since we published “Designs on Signs” and *The Power of Maps*⁴—it has grown apparent that many people (if by no means all) are willing to accept maps as ideological constructions when it comes to zoning, school attendance districts, legislative districts (people love to say “gerrymander”), and national boundaries. But, then, the subjects of such maps are understood to be human constructions *in the first place*. There is nothing (it is said) natural about political boundaries; all are ideological creations. In this way, the ideological construction gets displaced from the map to its subject. The map itself remains uncontaminated; it is recovered as (what it claimed to be all along) no more than a conduit through which the ideological content—as *all* map content—passes undistorted, or if at all, then by no more than the “white lies” necessitated by the difficulties of printing the world on paper.

We reject this sophistry in all its parts.

THE STRUCTURE OF THE MAP’S CONSTRUCTION OF KNOWLEDGE

By focusing our attention on the *nature* of maps, that is, on what above all is supposed to be free of ideological construction—mapped wildlife, earthquakes, hurricanes, mountains, canyons, birds, butterflies, pinnacled, ecosystems, landforms, vegetation, topography—we show that it is the *map*, hardly alone, in collaboration with other sign systems, which

creates ideology, transforms the world *into* ideology, and by printing the world on paper *constructs the ideological*. It doesn't matter what has the map's attention. Whatever its subject is will be turned into something it isn't and in the process inescapably, unavoidably made ideological. At a minimum, at the most atomistic, it will be a construction, an invention, a conception, something drawn not from the world but from the mind of men and women; for maps are made not of wildlife, earthquakes, hurricanes, mountains, canyons, birds, but of *signs*—these themselves composed of marks and concepts.

The map: a field of concepts. There can be no escaping this.

But it's worse, much worse, for as slippery as these conceptual atoms may be, to make a map they must be aggregated into molecules and macromolecules of meaning in which constructions, interests, and ideologies enter at every point. But no sooner have we realized this than we find ourselves dealing with the nature of the *map*. We will show that the map is nothing more than a vehicle for the creation and conveying of authority about, and ultimately over, territory. We will demonstrate that the authority the map claims is the social manifestation of what the map presents as its "intrinsic" and "incontrovertible" factuality. We will spell out the way this factuality is constructed through the social assent given to the propositions maps embody. We will show how these propositions take the form of connections made among conditions, states, processes, and behaviors. Finally, we will make clear the way these connections are realized through the fundamental spatial/meaning propositions we propose to call *postings*. The posting is a proposition of the form, "*this is there*."

By uniting an existence claim and a location, the posting locks together the *nature* of the map and the nature of the *map*. It is here, at the level of the posting where it is claimed that *this* of nature *is*—a waterfall or cliff, sequoia or syncline, high pressure cell or coral reef, mountain range or river—and that it is *there*—at this bend in the river or on that face of the mesa, in this grove or beside that anticline, in this system of winds or surrounding that island, rising above that plain or draining that basin—that the *this* takes on its *there* form, and the *there* takes on its *this* form. It is with the posting that nature is made spatial. The claims, that it *is*, and that it is *there*, reinforce each other. The *there* claim implies a reality test, that you can go there and look, a test that rises to the level of a challenge: "Why would we put it there if it weren't so? Check it out if you want!" Insisting that something is *there* is a uniquely powerful way of insisting that something *is*. Mapped things—no matter how conceptually daunting—possess such extraordinary credibility that they're capable of propelling into popular discourse abstruse abstractions cantilevered from abstruse abstractions: high pressure cells, El Niño, seafloor spreading, thermohaline circulation.

"You don't believe it? Check it out."

This is there—that tree—and *this is there* and *this is there*: through spatial magic the existence of the tree is transmuted into the existence of a forest, the existence of the forest is transfigured into the existence of an ecosystem, the existence of the ecosystem is transmogrified into the existence of nature. Nature. In space. As a spatial thing.

But the map can't leave well enough alone. It wouldn't be a map if it did. If it stopped at this atomic level—at the level of spatialized thing—the map would amount to a kind of spatial ontology. What makes the map a *map* is its exploitation of spatialized things—themselves propositions

(this is there)—as the subjects of yet higher order propositions (this is there and *therefore it is also*. . .). The map *is* these propositions. Technically, a proposition is a statement in which the subject is affirmed or denied by its predicate (this is there). Take this ginseng plant. The map affirms of this ginseng plant (the proposition's subject) that it *is*, and therefore that it is also *in*, which is to say *of*, the Great Smoky Mountains National Park (the proposition's predicate). It could be the other way around (there is this). The map equally affirms of the park (the new proposition's subject) that it *is*, and therefore that it also *contains* ginseng (the new proposition's predicate). Either way the map *links* the plant and the park.

In so doing it connects the plant to the system of rules and regulations that is just another way of saying "national park." The park is not a collection of trees, shrubs, and other wildlife. That would just be a forest. The park is a way of *relating* to trees, shrubs, and other wildlife. These ways of relating are codified in rules and regulations. Some of these forbid the culling of ginseng. To cull ginseng in the Great Smoky Mountains National Park is therefore to poach. To cull ginseng outside the park, say across the road in a national *forest* (Pisgah or Nantahala), or on private land, is either to harvest or to steal, depending on how the map in question links the *theres* of the plants in question to the relevant systems of rules and regulations, codes and laws (to the relevant property rights—see figure 1.1). In the national forest, where trees can be cut, animals hunted, and plants gathered and sold, anyone can get a permit to cull ginseng. Poaching from private land, on the other hand, is a larceny.⁵

Note how that at this point a territory has been invoked. It has a national park, national forests, and parcels of private property. These are all equivalently subjects of different propositions made by the maps that invoke the territory. It is through the simultaneous affirmation of these propositions that the territory *as such* is brought into being. What assures us that the propositions are true? That they state facts? Only the *social assent given them*, the confirmation by the courts and by the court of public opinion, the voice of newspapers, and friends: "You shouldn't have been in the park. You should have stayed in the forest on the other side of the road."

SOCIAL ASSENT AND REFERENCE AUTHORITY

The continual assent given to the propositions made by maps endows them with the authority that is uniquely that of *reference objects*. These include catalogs, calendars, concordances, encyclopedias, directories, phone books, dictionaries (*Merriam-Webster's*, the *OED* [look it up!]), thesauruses (*Roget's!*), glossaries (at the end of every textbook), textbooks (*Organic Chemistry*—no subtitle), the *National Geographic*, the *Times* (*New York, London, Los Angeles*), *TV Guide*, style guides (*The Chicago Manual of Style* [*fifteenth edition!*], Turabian, Strunk and White), cookbooks, field guides, travel books ("What does the *Mobil Guide* say?"), footnotes, citations, legal citations, priests, eye witnesses, constitutions, parliamentary procedures.⁶ All of these constitute objectifying resources that permit a claimant to insist that, "It is not I, not I who says this, but—" before dropping, like a tombstone, the name of some revered reference object (*Langenscheidt's*, *Groves*, the *Britannica*, *Larousse*,

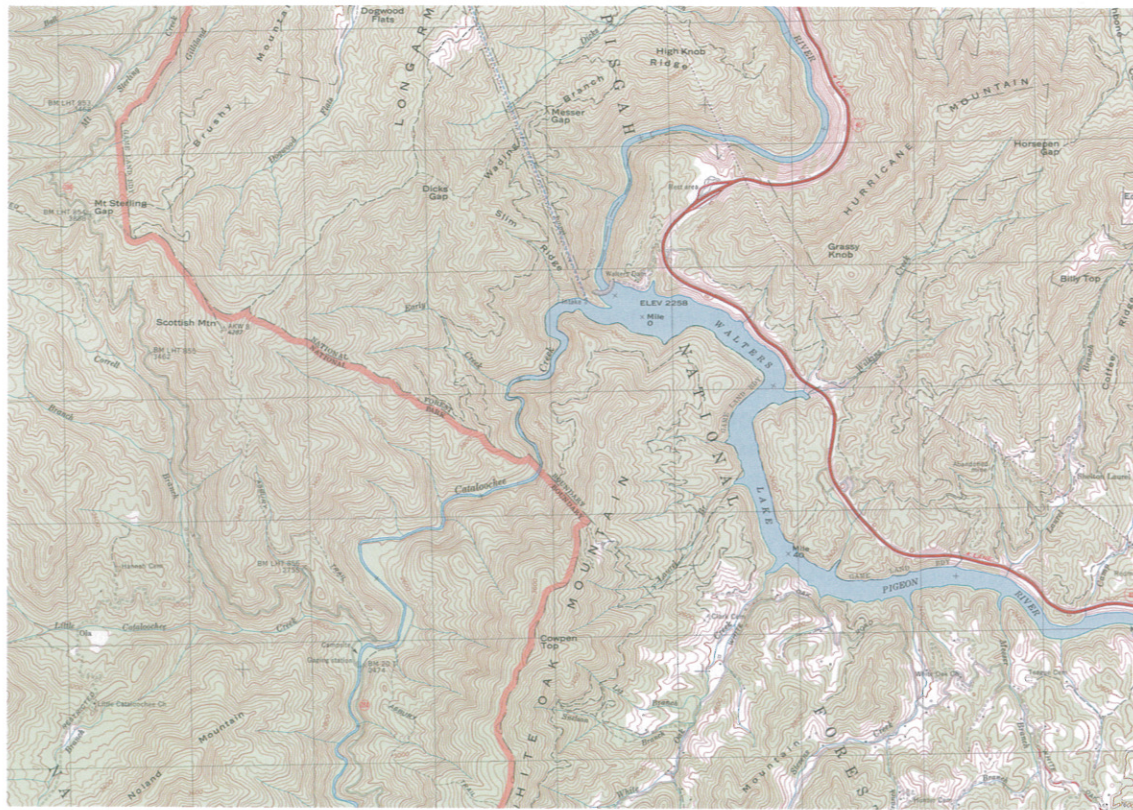


Figure 1.1

This detail of the *Cove Creek Gap*, NC, topographic quadrangle map describes, among much else, the border between the Great Smoky Mountains National Park and the adjacent national forest land (the thick orange line). With a permit, you may harvest ginseng in the national forest, but harvesting in the national park (or on private land) is against the law. The map not only invokes territory, but also civil code. (See the whole map in figure 11.1 on page 208.)

Courtesy of USGS, 1997.

Merck). Maps, too, are objectifying resources: the maps of Hammond, Bartholomew, Rand-McNally, Esselte, the National Geographic Society, AAA, Mobil, Michelin, the United States Geological Survey, other national mapping services, state highway maps, the Thomas Guides, Falk's, bus maps, maps of metro lines. Maps objectify by winnowing out our personal agency, replacing it with that of a reference object so constructed by so many people over so long a time that it might as well have been constructed by no one at all ("It is not I who says this, but . . . *the entire human race*"). Citation enhances a source's authority but also the authority of the one who cites it. The reflected light is blinding. Opposition is extinguished.

"You don't believe the map? Check it out!"

This authority, apparently descriptive, is inherently prescriptive. The phone book is not a guide to numbers from which one may feel free to pick and choose (though plenty evidently do): it *tells* you what to dial, it *prescribes* the number. A street directory *gives* you the address. There is no "Hmmm" here as there is over the choices a thesaurus offers or among the shades of meaning provided by decent dictionaries, where even so there is little hemming or hawing over spelling. The dictionary is *absolutely* prescriptive about spelling, a social fact we acknowledge—that we *dramatize*—in the annual rite of the National Spelling Bee. Among the mutual validations—spellers validating the authority of the dictionary, dictionary validating the speller's spelling—the prescriptive, the authoritative, is hard to miss.

Here: in this morning's paper there is an article about the new legislatively mandated North Carolina social studies curriculum.⁷ The large, colorful photo illustrating the story is an overhead shot of an eighth-grade girl crouched over the state's transportation map (figure 1.3). Her left hand, forefinger extended, is on the transportation map, while her right hand transfers features—interstate highways

and state and national forests—to a small outline map of the state. She is a human pantograph, literally reproducing—and by reproducing affirming—the existence (the *this-ness*) of state and national forests. As she traces their location (their *there-ness*), she simultaneously reproduces—and by reproducing affirms—the existence of North Carolina as a *state* of state and national forests. North Carolina's *there-ness* is established later, in an exercise caught in another color photo on an inside page, where another student uses a globe to establish the state's coordinates. In all of this the map's authority is absolutely taken for granted.

The newspaper validates, with its literally glowing presentation, this power of the map to establish, almost in the religious sense, the following: the world as a sphere; North Carolina as a state of roads and forests; and the state and national forests as enclaves of green (the students color them green). It is these validations—the newspaper's, the curriculum's, the school's, the girl's—repeated uncountable times (hundreds and hundreds of times in this classroom alone)—that makes the map the potent vehicle it is for the creation and conveyance of authority about, and ultimately over, territory.

THE PARAMAP TELLS US HOW TO READ THE MAP

The map itself—the piece of paper covered with ink—*insists* on this authority. Rare is the map that fails to advertise *in itself* its claims to be taken authoritatively. This advertisement takes the form of what, by analogy with Gerard Genette's coinage of "paratext," we propose to call the *paramap*. Genette distinguishes paratext into *peritext* and *epitext* (thus, the *perimap* and *epimap*). "In other words," Genette says, "for those who are keen on formulae, *paratext* = *peritext* + *epitext*."⁸



Figure 1.2
Reference objects are presumed to tell the truth. We learn to trust them from an early age.

Courtesy of Comstock Images—Education 1 Disc/Jupiterimages

The *peritext* consists of all the verbal and other productions that surround and extend a text in order to present it: the quality of the paper, the quality of the binding, the character of the type, that of the printing, the dust jacket copy, the series indication (if any), the author name (anonymous, pseudonymous, with titles, without, etc.), and the work's title, together with whatever dedications, inscriptions, epigraphs, prefaces, forewords, intertitles, notes, and illustrations there may be.⁹ The *epitext* consists of all the paratextual elements “not materially appended to the text within the same volume, but circulating, as it were, freely, in a virtually limitless physical and social space”—for example, advertisements, the letters publishers send out with review copies, promotional appearances by the author, interviews, lectures and so on, again, *surrounding* the text in order to present it, in order to shape its reception.¹⁰ We have in hand, for example, a book club flyer, “Bonus Book Selections: Choose from a Wide Range of Reader Favorites” advertising *The Smithsonian Atlas of the Amazon*.¹¹ Copy promising an “exhaustively researched volume” is decorated with a cover shot, an inset map, and a blue bubble enthusing, “More than 150 Color Maps!” The exclamation point, the large number, the assurances that the book is a “Reader Favorite,” that it’s been “exhaustively researched,” and its institutional affiliation with the Smithsonian conspire to position the atlas as authoritative and desirable. In Genette’s terms, the flyer is a piece of the *epitext*; it also happens to be a piece of the *epimap* of every map in the atlas.¹²

The *perimap* carries out its labor closer in. “Australia Under Siege,” a map supplement from the National Geographic Society, smothers its primary map (equivalent to Genette’s “text”) with seventeen ancillary maps, a timeline, a chart, four graphs, five photographs, twenty-seven blocks of type, several dozen call-outs, legends, titles, scales, and credits.¹³ The map’s construction of Australia as a biological horn of plenty besieged by its human inhabitants is largely a function of this rich *perimap*, though the *epimap*—the accompanying article in the *National Geographic* and its paratext (the title, “Australia—A Harsh Awakening,” the blurb on the contents page with its “now barren fields of salt and dwindling marsupial populations,” the note “From the Editor,” the photographs with *their* titles and captions [“A graveyard

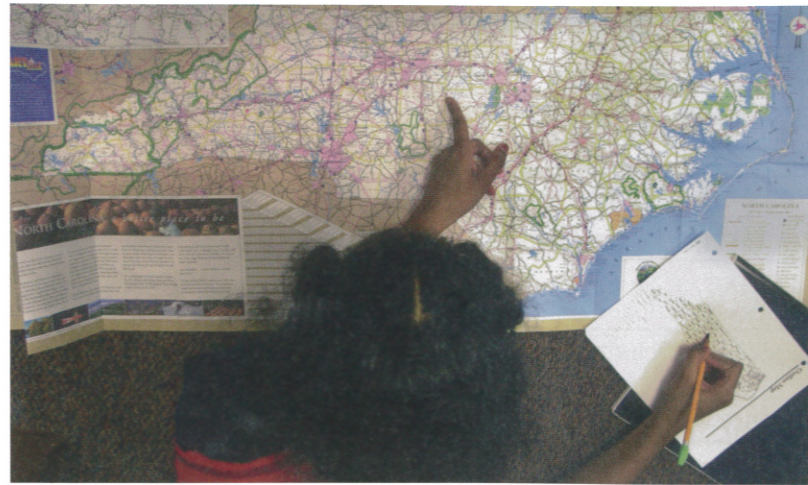


Figure 1.3
An eighth-grade girl uses the state highway map as a reference object in her social studies class, affirming both the authority of the map and the subjects of the map’s attention.

Courtesy of *The News & Observer*, Raleigh, N.C.

of skeletons with gray arms raised in good-bye”], the “Behind the Scenes” item, and the later letters to the editor)—contributes to the construction substantially.

Ignoring the *paramap*, as contemporary cartography textbooks do (except for titles, legends, and scale bars, it’s like the *paramap* doesn’t exist), makes it much easier for such texts to ignore the claims of ideological construction to which the *paramap* is the essential guide. As a way of suggesting what’s at stake we ask, “Would the projection promoted by German historian Arno Peters have stirred an iota of interest had it not been for its *paramap*?”

This is easy to answer, since *except for its paramap* the Peters projection (figure 1.5) is identical to James Gall’s 1885 Orthographic Projection (figure 1.6), which never attracted any attention at all. But then Gall’s *perimap* said, “Gall’s Orthographic Projection/ Equal-area Perfect/ for Physical Maps, chiefly statistical,” and its *epimap* more of the same at greater length.¹⁴ Whereas Peters’ *perimap* said, among much, *much* else (in large type along the margins of the map):

Five thousand years of human history have brought us to the threshold of a new age. It is an age typified by science and technology, by the end of colonial domination, by a growing awareness of the interdependence of all nations and all peoples.

Such a moment in history demands that we look critically at our understanding of the world. This understanding is based, to a significant degree, on the work of map-makers of the age when Europe dominated and exploited the world. Surprisingly, maps still reflect that bygone era.

The new map, the work of German historian Arno Peters, provides a helpful corrective to the distortions of traditional maps. While the Peters Map is superior in its portrayal of proportions and sizes, its importance goes far beyond questions of cartographic accuracy. Nothing less than our world view is at stake.

Paramap	
Perimap	Epimap
Titles	Accompanying article(s)
Photographs	Advertisements that refer to the map
Illustrations	Marketing copy
Charts, graphs, timelines	Letter from the editor
Legends, scale bars, north arrows, other standard cartographic elements	Letters to the editor about the map
Callout text, blurbs	Behind the scenes info (how the map was created)
Credits	
Borders, decorative elements	

Table 1.1
The paramap can be broken down into perimap elements and epimap elements.



Figure 1.4
Perimap elements of "Australia Under Siege," a *National Geographic* map scrutinized in chapter 4.
Courtesy of NG Maps/National Geographic Image Collection.

THE PETERS WORLD MAP

Five thousand years of human history have brought us to the threshold of a new age. It is an age of science and technology, and an age of growing interdependence of all nations and peoples.

Such a moment in history demands that we look critically at our understanding of the world. This understanding is based, to a significant degree, on the work of map-makers of the age when Europe dominated and exploited the world. Surprisingly, some maps still reflect that bygone era.

This new map, the work of the German historian Arno Peters, provides a helpful corrective to the size distortions of these maps. While the Peters Map is superior in its portrayal of proportions and sizes, its importance goes far beyond questions of cartographic accuracy. Nothing less than our world view is at stake.

MAP PROJECTION: Showing the round earth as a flat map.

Cartographers can "project" the round globe of the earth onto a flat surface in many ways. The Peters Projection belongs to the category of maps that retain true proportions of area. Each country's area (as well as the areas covered by water) can be directly compared.

All north-south and east-west lines on the Peters Map run at right angles thus preserving characteristics that are present on the globe itself.

Other map projections emphasize different qualities. For example, Mercator's projection features lines of constant compass bearing for navigation.

The Peters sets forth all countries in their true size. Dr. Peters asserted that his projection thus treated all people fairly.

In this complex and interdependent world in which the nations now live, the peoples of the world deserve the most accurate possible portrayal of the actual sizes of their countries. The Peters map achieves that goal.

PETERS PETERS MAP SERVICES

ODT, Incorporated
1-800-736-1293
www.odt.org



Figure 1.5

Arno Peters' map of the world. The notorious press conference in Bonn at which Peters announced his map was held in May 1973. The German Lutherans first published versions of the full-size map in 1974 in German. The first English language version was in 1983. The map shown here, heavily revised following Peters' death in 2002, was released in December 2005. Map dimensions (WxH): 50in. x 35in.

The Peters World Map was produced with the support of the United Nations Development Programme. For maps and other related teaching materials contact ODT, Inc., P.O. Box 134 Amherst, Mass. 01004, USA (800-736-1293; Fax 413-549-3503; e-mail odtstore@ODT.org.

... In the complex and interdependent world in which the nations now live, the peoples of the world deserve the most accurate possible portrayal of their world. The Peters Map is that map for our day.¹⁵

Peters' perimap essentially accused cartographers of producing distorted maps in the service of a discredited European colonialism—of being ideologists in a bad cause—and positioned his map as a unique antidote. Next to the UN seal in the map's lower right-hand corner it said, "This map is produced with the support of the United Nations Development Program."

Cartographers flipped! Driving them even more insane was an epitext, Peter's inflammatory book, *The New Cartography*.¹⁶ The most reputable review of *The New Cartography*—Arthur Robinson's—opened with, "The review of a book such as *The New Cartography* would ordinarily be short since much of it is misrepresentation, is illogical and erroneous, and one's initial reaction is simply to dismiss it as being worthless." The review nevertheless proceeded to eviscerate Peters for another eight pages.¹⁷ As a scholar and a gentleman, Robinson did not stoop to mudslinging, but characterizations like, "Arno Peters, the German architect of this novel map, was in fact not a cartographer at all but a journalist and propagandist for leftist causes who had mastered 'the art of writing press releases,'" etc., etc.,¹⁸ by other critics made them sound like right-wing ideologues on an AM talk show. An entrenched profession attacked *everything*—especially the claim that the map was new (Peters hadn't known about Gall)—but remarkably,

the critics didn't confine themselves to Peters' paramap or even the rechristened Gall-Peters projection: they launched an attack against *rectangular world maps in general*.

Like Mercator's and many others, the Gall-Peters projection produces a rectangular world, unlike those of, say, Robinson and Mollweide, which are curved (figure 1.7). At the very height of the controversy, the American Congress on Surveying and Mapping adopted a "sternly worded resolution condemning [rectangular maps] for 'showing the round earth as having straight edges and sharp corners.'"¹⁹ This preposterous (and wholly ineffectual) resolution was endorsed by the American Cartographic Association, the American Geographical Society, the Association of American Geographers, the Canadian Cartographic Association, the National Geographic Society, etc.,²⁰ and all because of the *paratext*—which few of those endorsing the resolution would even consider part of the map—of a map they universally dismissed.²¹

That the paramap should have this power is no surprise. Rare is the image that can dispense with words. Roland Barthes wondered whether *any* system of signs could do without them: "Is there," he asked, "any system of object-signs which can dispense with articulated language? Is not speech the inevitable relay of any signifying order?"²² By *relay* Barthes always understood a second-order message, a connotation parasitic on a first-order message, as a caption to a photograph (say in a fashion magazine), or the text on a map (say in the title or legend). Among what Barthes called the relay effects of speech were its ability to fix—to immobilize—perception at a given level, first of

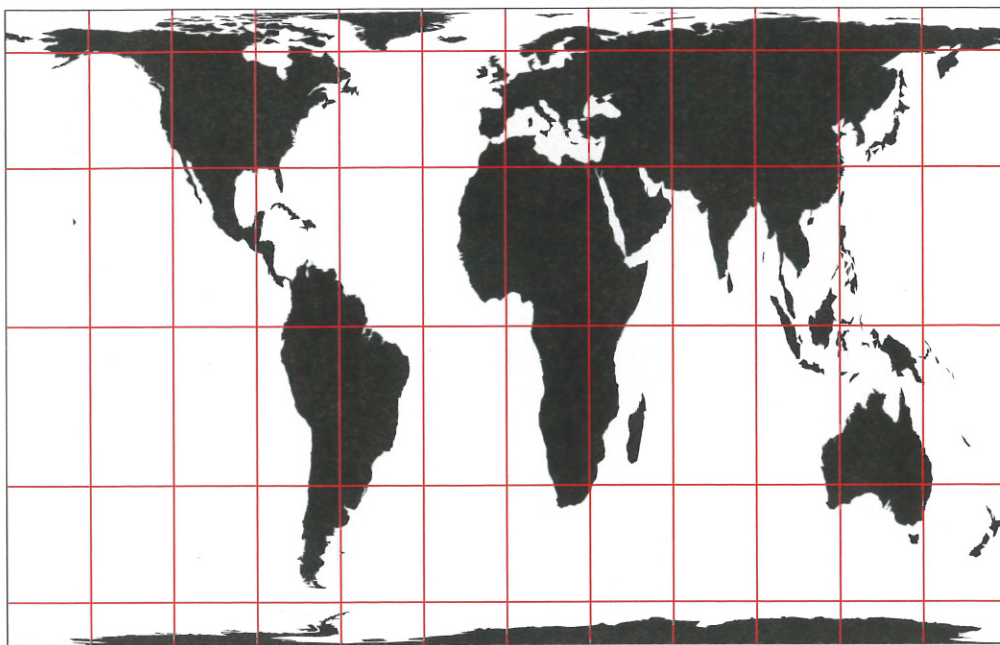


Figure 1.6
The Gall orthographic projection, originated by James Gall in 1885. As you can see, the projection is identical to Peters'. It's the perimap of the Peters map that sets it dramatically apart.

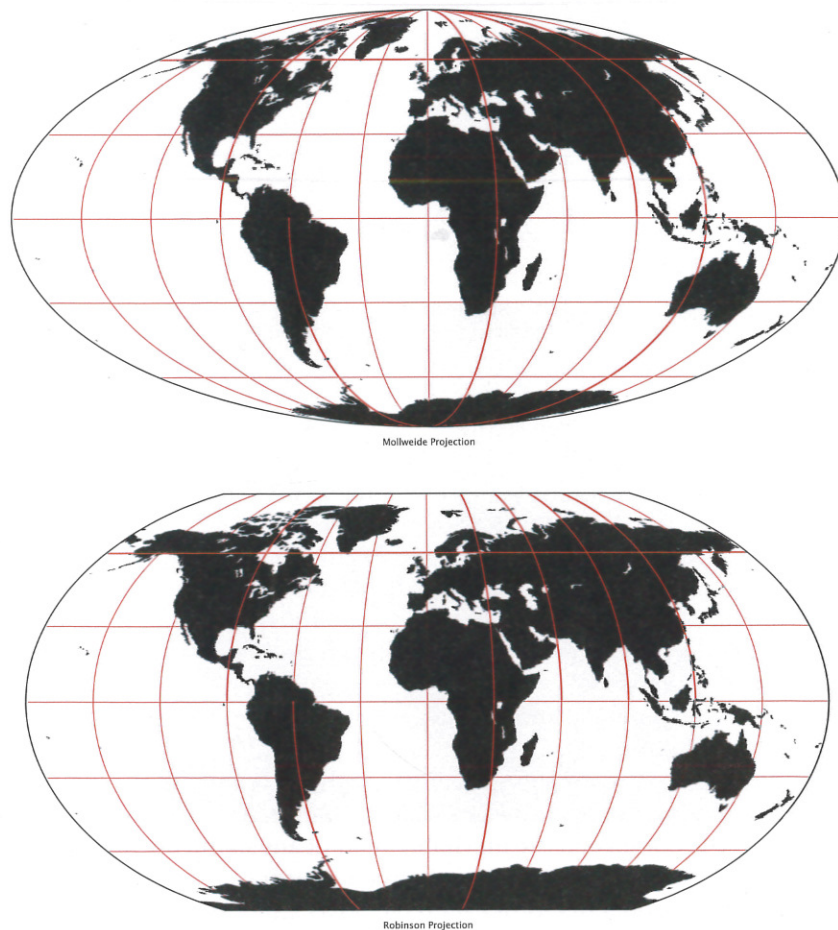


Figure 1.7
Examples of curved map projections. Shown here are those of Karl Mollweide (top) and Arthur Robinson (bottom).

all at the level of the photo or map, say, rather than at that of the paper, the printing screen, or the typeface; but then to draw attention, as to the collar or hemline (in the fashion photo) or to the system of highways (in a road map). Other relay effects of speech include its ability to go beyond the image, to interpret, to say what the narrow collar *means* (it's sexy) or the tint of red in the legend (the road is limited access), and its ability to direct attention, to emphasize ("Pay attention to *this!*").²³ In Peters' case, the paramap attempts to keep us focused on the equal-area property of his map, to force us to compare it *along this dimension* to the unequal-area Mercator, and to pretty much ignore everything else. His paramap immobilizes our perception on his chosen ground.

Every map does this. Consider *Seasonal Land Cover Ecoregions*, published by the United States Geological Survey (USGS) in 1993 and distributed as a supplement to the *Annals of the Association of American Geographers* in 1995²⁴ (figure 1.8). The title doesn't add, "of the coterminous United States" but then the familiar shape obviates the need. This is an extremely fine-grained mosaic. Colors change within minute parts of millimeters, shifting almost continuously, but are dominated in the west by acid pinks and purples (blotchy and pimply with bright and sallow greens), in the plains states and Midwest by intense yellows and oranges, and in the east by mottled opal and jade greens. It's pretty amazing looking (*it's a nightmare*), and absent its perimap, *completely* unintelligible. Oh, sure, if you know your geography you can pick out the Mississippi Delta and the Appalachians, the Corn Belt and the Great Plains, the Black Hills and the Central Valley of California; but if you know your geography, you can find these on an outline map, and none of them are actually shown on this map anyway. What *are* shown are "159 polythetic seasonal land-cover classes in 159 different colors, each keyed to a unique combination of vegetable/land-cover types, seasonal properties, and relative primary production." You learn all this on the back of the map where a text is supplemented by twenty-six smaller maps (including a simpler "monothetic land-cover map" of only twenty-six classes), as well as in the epimap, the article that accompanied the map in the *Annals*. Indeed it would not be too much to insist that *Seasonal Land Cover Ecoregions'* epimap also included all of the literature cited in the article, so concentrated within the map is the density of previously concentrated material (for example, "These maps were derived from an AVHRR normalized difference vegetation index [NDVI] time series . . ."). Absent this supplemental literature, there is little true understanding of the map.

Besides stabilizing our attention on the map as a map, the *Seasonal Land Cover Ecoregions'* paramap *forces* us to see the map as one of polythetic seasonal land-cover classes, to compare it along this dimension to a less subtle monothetic classification, and to pretty much ignore everything else. The paramap immobilizes our perception on the map's chosen ground.

COGNITIVE CARTOGRAPHICS

Given: a nightmarishly encrypted main map, a 159-item key, a text (with citations to many other texts), twenty-six supplementary maps,



Figure 1.8
Seasonal Land Cover Ecoregions. What does it all mean? Map dimensions (WxH): 27in. x 32in.

Courtesy of USGS, 1993.

titles, scales, and credits as in *Seasonal Land Cover Ecoregions*; or a main map, legend, texts, seventeen ancillary maps, a timeline, a chart, four graphs, five photographs, several dozen call-outs, legends, titles, scales, and credits as in "Australia Under Siege"; or even a main map, text, seven ancillary maps, titles, scales, and credits as in *The Peters World Map*; given this heterogeneity, what is one to do? That is, what sense is one to make of it? How to assemble it, pull it all together?

Contemporary cartography textbooks treat this as a problem in graphic design: "Titles, legends, scales, and insets may be arranged in various ways in the graphic organization of a map," say the authors of *Elements of Cartography*, sixth edition, where none of their examples comes near to approaching the complexity of ours:

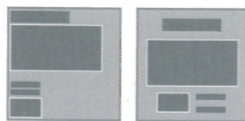
Nothing should seem out of place. Layout is the process of arriving at proper balance. In a well-balanced design, nothing

3 Map layout: balance

Balance refers to the stability of a map layout. When balance is poor, map readers may be distracted. When balance is achieved, map readers will focus on the content of the map. Balance can be symmetrical or asymmetrical.

balance

Balancing map elements is complicated and intuitive. The map elements to balance vary in weight. **Heavier** elements include those that are larger, darker, brightly colored, simpler and more compact in shape, and closer to the map edge (particularly the top). **Lighter** elements include those that are smaller, lighter, duller colored, complex or irregularly shaped, and closer to the map center.



Poor balance:



Better balance:



Figure 1.9

Achieving good balance is easy when there's a handful of elements to be laid out. But how relevant are diagrams like this to the real-world problems faced by designers of complicated maps like the ones we're looking at?

Derived from Krygier and Wood, *Making Maps*, (New York: Guilford, 2005).

is too light or too dark, too long or too short, too small or too large, in the wrong place or too close to the edge. . . . The cartographer's job is to balance visual items so that they "look right."²⁵

In the illustration accompanying these remarks, circles and squares balance or unbalance a beam depending on their size and distance from the fulcrum. Another illustration displays differently proportioned rectangles with the admonition that those in the ratio of three to five make "the most stable and pleasing map format." Yet another illustration shows different arrangements of title, legend, and locator inset, all *three* of which mapmakers are encouraged to retain no matter how difficult the design. The text does *not* contemplate a 159-item key, a text (with citations to other texts), twenty-six supplementary maps, titles, scales, and credits. Another text, Borden Dent's *Cartography: Thematic Map Design* is more sophisticated, but again *nothing* like the complexity of our examples is contemplated.²⁶ This whole tradition of thinking about maps as graphics comes out of an illustration, out of an advertising tradition. Indeed, the text in *Elements of Cartography* (whose first edition came out in 1953) could have been lifted from something like William Longyear's *Advertising Layout* (whose first edition came out in 1946). For example, Longyear says the following:

Balance is most important in a layout. The various sizes and shapes of the elements in the layout must have good artistic composition. There are few, if any, distinct formal rules to guide the layout man in deriving good balance. Balance has some of the qualities of a seesaw. By setting a vertical line through the center of the layout to serve as a fulcrum, elements may be balanced for both size and weight. . . .²⁷

Given the prevalent idea that maps amount to a kind of "seeing," none of this is surprising. Committed as most cartographers are to the idea that maps "present information," cartographers rather appropriately approach map design as they would the design of an advertisement, or a smorgasbord, where the aim is to make everything as attractive as possible to draw the grazing eye.

Doubtless this is all sound advice (though what heart a designer is to take from knowing that in a well-balanced design nothing is "too light or too dark, too long or too short" is open to question) but, given that *we* see maps as systems of propositions (as *arguments*), nothing could be further from what we have in mind. The question is *not* for us how things are arranged for the eye, but how the design promotes and constrains, how it directs, the construction of meaning. It is not about the "presentation of information." It is about the construction of meaning as a basis for action. It is for us a question of cognition.

The discipline that has contributed most substantially to our thinking is the new and rapidly evolving one of cognitive linguistics. We're proposing that cognitive linguistics is a good model for thinking about cartography, for thinking about *cognitive cartographics*.

Why cognitive linguistics? Because it is a nonrepresentational approach to language that is concerned with how we think, act, and communicate. Unlike historical forms of linguistics, which were essentially concerned with the nature of the *signal*, cognitive linguistics is concerned with the *meaning construction* upon which language operates. For cognitive linguists, "meaning construction refers to the high-level, complex mental operations that apply within and across domains when we think, act, and communicate."²⁸

This makes it a form of linguistics analogous in intent to the theorizing we're doing about cartography, which is directed toward the thinking, acting, and communicating that maps facilitate (i.e., cognitive cartographics). No surprise then that cognitive linguistics critiques historical forms of language theorizing in much the same way that we have critiqued traditional theories of cartography. For example, cognitive linguistics critiques traditional forms of language theory for their predisposition to sharply separate components (syntactic, semantic, pragmatic), and to study these in isolation, especially independent of their use in the world for reasoning and communication.²⁹ This parallels traditional cartographic thinking, which not only compartmentalized mapmaking from map use, but within mapmaking, compartmentalized projection, generalization, symbolization, design, and the rest. In its interest in understanding the role of, say, grammar in discourse configuration, cognitive linguistics is a model of appropriate procedure for, to give one example, understanding the role that the choice of map projection plays in shaping world view. As we've already quoted Gilles Fauconnier in

the introduction, “Language data suffers when it is restricted to language,”³⁰ not just because language depends on highly structured background knowledge, conversational meaning, negotiations, and the like, but because it is directed toward an end in action. The same has to be said of maps: map study suffers when it is restricted to maps.

Furthermore, unlike historical forms of language analysis, including semiotics (which we nonetheless hang on to), cognitive linguistics is dynamic, committed to understanding the way meaning is constructed *on the fly*, which is certainly the way we propose to understand—and model—map reading, as a process in time, which encourages the construction of certain kinds of meaning and ultimately behavior.³¹ We’re not interested in maps as pictures. We’re interested in maps as the significant players they are in the world of action. Maps—let us acknowledge this—are not just *of* the world, but in it, very much a part of it.

At the heart of cognitive linguistics is what its developers think and write about as *mental spaces*. Mental spaces, says Fauconnier, “are partial structures that proliferate when we think and talk.” Since these constructions take place on a *cognitive* level, they are partial *cognitive* structures. This is to mark their distinction from the structure of language. Such a cognitive structure “is *not* an ‘underlying form,’ it is *not* a ‘representation’ of language or of language meaning, it is *not* bijectively associated with any particular set of linguistic expressions.” Such a cognitive structure is not a representation of the world either, but it relates language *to* the world by providing “real-world inferences and action patterns.” Fauconnier and Mark Turner characterize these mental spaces as “small conceptual packets constructed as we think and talk, for purposes of local understanding and action.” These small conceptual packets (or partial cognitive structures), “correspond,” Fauconnier and Turner elaborate, “to activated neuronal assemblies,” which are linked or link themselves to other activated neuronal assemblies.³² Cognitive linguists think about these neuronal linkages as *mappings*. For example, the configurations of words you’re reading right now are opening up thinking spaces in your brain, that is, activating assemblies of neurons, which are connected to, project to, are mapped onto, other thinking spaces in the process of constructing meaning.

These *mental space mappings* are the essential subject of cognitive linguistics (giving rise to an alternative name—*space grammar*):

In terms of processing, elements in mental spaces correspond to activated neuronal assemblies, and linking between elements corresponds to some kind of neurobiological binding, such as co-activation. On this view mental spaces operate in working memory but are built up partly by activating structures available from long-term memory. Mental spaces are interconnected in working memory, can be modified dynamically as thought and discourse unfold, and can be used generally to model dynamic mappings in thought and language. Spaces have elements and, often, relations between them. When these elements and relations are organized in a package that we already know about, we say that the mental space is framed and we call that organization a “frame.”³³

George Lakoff says that these frames can be structured by idealized cognitive models (ICMs). ICMs are descended from the earlier *plans* and *scripts* of Roger Shank and Robert Abelson’s “script theory,” where a *script* was a hypothetical knowledge structure capable of generalizing about a socially appropriate sequence of events. A script was a sort of ideal, an ideal you attempted to follow, or that you expected others to follow. Schank and Abelson’s best known example was the Restaurant Script. Script theory, in turn, made powerful connections to Steven Toulmin’s theory of logic as “generalized jurisprudence” and to Mikhail Bakhtin’s ideas about speech genres.³⁴

One of the appealing things about cognitive linguistics is the way it absorbs, integrates, and updates so many worthwhile concepts from the past, while at the same time promising to connect them to neurophysiologic evidence being developed tomorrow from PET scans and functional MRIs.³⁵ Via cognitive linguistics, yesterday’s hypothetical knowledge structures promise either to disappear into the junkyard of failed models (still always worth braving the junkyard dogs to visit) or to transform themselves into actual knowledge structures. It’s all very heady.

“The dynamics of mental space construction and space linking are technically abstract, but conceptually straightforward,” Fauconnier and Eve Sweetser write. “The basic idea is that, as we think and talk, mental spaces are set up, structured, and linked under pressure from grammar, context, and culture. The effect is to create a network of spaces through which we move as discourse unfolds.”³⁶ Similarly, as we read the main map and the various elements of the paramap—text, ancillary maps, title, photos, scale bar, graphs—one or more mental spaces open up that are structured (frequently by ICMs or frames) and linked under pressure from the graphic structure, context, and culture to create a network of spaces—one space opening up after another—through which we move as we read and make sense of the map.

In figure 1.10, motion through this network starts from a *base space*, which establishes the initial *viewpoint* (the space from which, at a given point in the reading, other spaces can be accessed or created) and *focus* (the space to which structure is actively being added); and then *shifts* viewpoint and focus as the reading unfolds. In natural languages, it is grammar that helps answer questions such as the following: Where is the starting point (the base space)? What space is currently the viewpoint? What space is currently in focus? What is the relationship of the viewpoint to the base? What is the nature of the connections between spaces? In maps it is graphic structure—the design—that helps answer these questions.

Contemporary cartography texts are not entirely unaware of this parallelism. For example, *Elements of Cartography* says the following:

The task of map design has much in common with writing. An author—a literary designer—must employ words with due regard for many important structural elements of the written language, such as grammar, syntax, and spelling, in order to produce a first-class written communication. Likewise the cartographer—a map designer—must pay attention to the principles of graphic communication.³⁷

Diagramming mental spaces

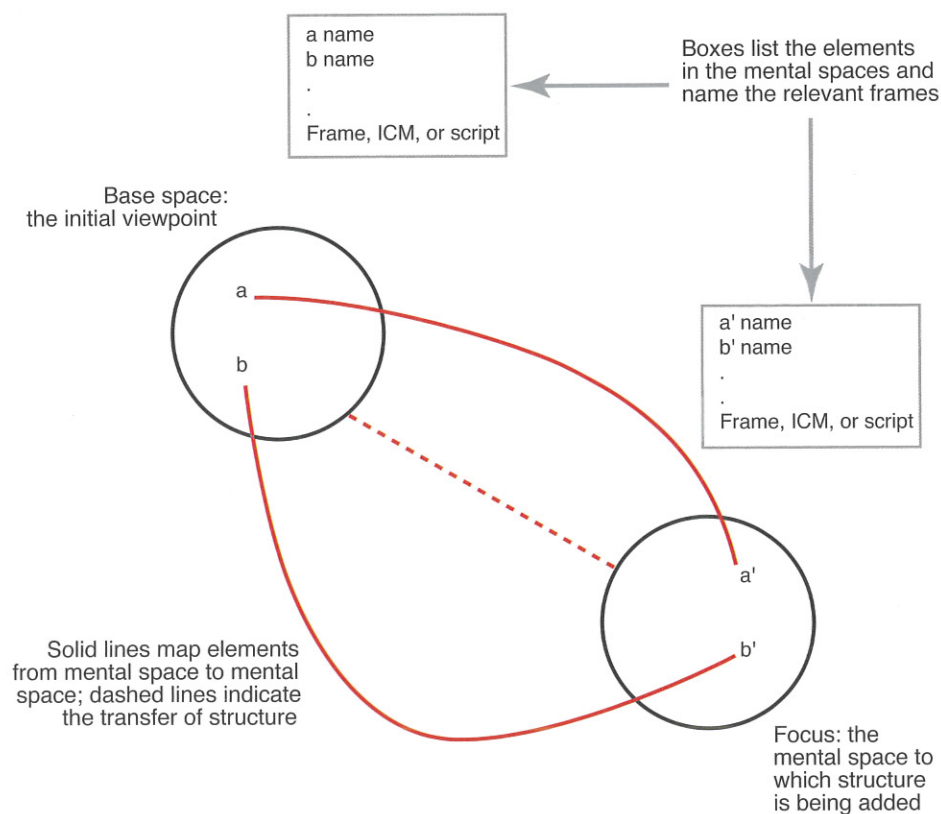


Figure 1.10

Cognitive linguistics diagrams represent mental spaces with circles, a network of which is propagated as discourse unfolds. The first space that a discourse opens is considered its *base space* (here upper left). The elements in the space are lettered. If a frame, ICM, or script structures these elements, it appears as a box containing the elements and naming the framing structure. For example, the frame “buying and selling” with its buyer, seller, consumables, money, price, and rich set of inferences about owning, exchange, and so on; or the frame “vegetation map” with its locative field and vegetation classes, and inferences relating to hierarchic relationships, adjacency expectations, and the like. Continuing discourse spawns further spaces. The space to which structure is being added is the *focus* (here lower right). Dashed lines indicate the transfer of structure from space to space, while solid lines map the movement of elements. The diagrams are a graphic way of keeping track of what’s going on.

Of these so-called principles we have seen a sample (“nothing too dark or too light, too long or too short”), and despite infusions of psychophysics over the years this remains state of the art.³⁸ As such, these “principles” bear little relationship to the structure provided by grammar and indeed, absent explicit scaling arguments, offer no guidance to mapmakers—and so no guidance to map readers—whatsoever. Yet however unarticulated, implicit principles masked by the chatter about aesthetically pleasing appearance and “looking right” must in fact be structuring the elements of the map, that is, guiding the creation of spaces through which we move as we read and make sense of the map.

Space mapping has convinced us—and we are convinced it will convince you—that the principles underwriting the graphic design of maps are wholly at the service of *the structure of the map’s construction of knowledge*. That is, the principles of map design are concerned with the straightforward display of postings amenable to consumption by

propositions appearing on the plane of the map as incontrovertible characteristics of the territory the map thereby evokes and over which it exhibits its authority. The essential goal of these principles is not “looking right” but the preservation and enhancement of authority, and nothing supports this goal more strongly than the pretense, and so the impression, that all maps do is “present information.”

Did we mention how preliminary the work in cognitive linguistics is, how tentative its conclusions? Even more preliminary are our proposals, which nonetheless we advance as a model for understanding how maps hoist themselves off the page into our brains, spawning world views, images of the city, and a spatialized, a regionalized nature; a nature plucked equally from the vagaries of veneration and from the toils of taxonomy; a nature capable of being isolated as a region, capable of coming into conflict with other regions, and capable of being legislated and commercialized. This spatialized nature can threaten and be threatened; it can awe and it can be cuddled; it can be collected and it can be systematized; it is unknowably remote and it is underfoot. It is a nature, ultimately, *quietly put in its place*.

EIGHT NATURES OF MAPS

Which is our question: the place of nature, *what is it?* Our contention is that, today, maps play a significant role in the way we frame this question and in the answers we give to it. Since what nature is taken to be affects the possibilities of its being mapped, and since what mapping is taken to be affects the nature we can imagine being mapped, there has been a continuous evolution in the mapping of nature over the half millennium during which maps have played a significant role in human affairs.³⁹ This evolving history, being eagerly explored, has not yet been written—nor do we propose, despite its importance, to write such a history ourselves. Our interest lies elsewhere, in the present, in the ways in which everyday map readers, encountering maps throughout the course of their lives, find maps participating in the construction and reconstruction of their ideas of nature.

Nature, as we suggested earlier, is a powerful concept, circling as it does around ideas of the real and the nonideological. It can be used as a heavy hammer to attack the “unnatural” and as a powerful flag around which to rally the “natural.” So it has been interesting, as we have worked our way through the maps that came to hand, to discover so many *different* natures. There is the nature that is threatened, but there is also the nature that threatens. There is a sublime, awe-inspiring nature, but there is also a pretty, endearing, and bounteous nature. There is a nature that we collect, which may be different from the nature that we study. There is an unfathomable, mysterious nature, but there is also a nature in which we can picnic.

1. *Threatened nature*. Nature as victim, susceptible to countless threats, is inescapable these days. This is nature harassed by man. It is nature on the ropes. “Wildlife as Canon Sees It” is the headline in a series of full-page advertisements that Canon has run for years in a broad range of magazines with an enormous readership: *Scientific American*, *National Geographic*, *Natural History*, *The Smithsonian* (figure 1.11). A photograph of an animal (doubtless taken with a Canon camera) fills the top half of the page. A text—one



Photographed by Neil Gurnea

WILDLIFE AS CANON SEES IT

In the relative cool of early morning, a terrestrial long-tailed ground-roller probes among leaf litter and around thorny thickets, hunting for insects and their larvae. The shy bird stands quietly for extended periods surveying an area, slowly lifting and lowering its long tail. Then, with a few quick hops, it disappears into the scrub. The usually solitary ground-roller stays with its mate while nesting, close to the nest cavity they have tunneled one meter into the sand. Confined to a small strip of unprotected coastal forest, the long-

tailed ground-roller is threatened by loss and degradation of habitat.

As a global corporation committed to social and environmental concerns, we join in worldwide efforts to promote greater awareness of endangered species for the benefit of future generations.



Long-tailed Ground-roller
(*Urosalpinx olivacea*)
Size: Length, 47 cm
Weight: Approx. 70 g
Habitat: Dry, spiny forest and semi-desert scrub in southwest Madagascar
Surviving numbers: 10,000-20,000;
population declining

© 2001 Canon Inc. www.canon.com



Canon is committed to social and environmental concerns. We join in worldwide efforts to promote greater awareness of endangered species for the benefit of future generations.

Canon

Figure 1.11

A Canon wildlife ad (2001) that includes a map illustrating the minuscule—almost nonexistent—habitat of the terrestrial long-tailed ground-roller. One reading of this might be “It’s a good thing someone had a Canon in the right place at the right time, because unless we do something about it, this photograph may be the last chance we have to see the bird in its threatened, shrinking home.”

Courtesy of Canon, Inc.

of Barthes’ relays—says (in the case at hand), “In the relative cool of early morning, a terrestrial long-tailed ground-roller probes among leaf litter and around thorny thickets, hunting for insects and their larvae. The shy bird stands quietly for extended periods surveying an area, slowly lifting and lowering its long tail. Then, with a few quick hops, it disappears into the scrub.”⁴⁰ Another sentence sketches the bird’s domestic economy (“stays with its mate while nesting”), and another its imminent peril: “Confined to a small strip of unprotected coastal forest, the long-tailed ground-roller is threatened by loss and degradation of habitat.” A map is invariably appended: ours shows, in green and blue, the Indian Ocean, southeast Africa, and Madagascar. An aging eye can hardly discern the minuscule dot (in red) on the southwest coast of Madagascar that signifies the bird’s remaining—shrinking, threatened—habitat. By translating “habitat” into space, the map gives the habitat real credibility at the same time it dramatizes how small this habitat is. Beleaguered nature. Canon wants to help. Canon wants us all to help.

2. *Threatening nature.* Yet every bit as common are maps of a beleaguering nature: nature threatening man, nature on the rampage. Every summer newspapers in our part of the coun-

try publish inserts with titles like, “Stormtracker 2005, Your Official Hurricane Survival Guide.” A joint effort of Raleigh’s *News and Observer* and a local television station, this one was widely distributed and “proudly sponsored” by Jiffy Lube and North Carolina’s Electric Cooperatives with paid advertisements from local companies sprinkled throughout. Stuffed with sound advice (“Prepare a Family Disaster Plan”), these inserts are really all about the maps. There are usually two of them. One describes areas prone to flooding and sketches the evacuation routes. The other—typically a couple of feet across—is a hurricane tracking map showing the East Coast and Atlantic Ocean, and extending to 30° west (figure 1.12). The water area is gridded in one-degree increments. Inset is a graph for you to record facts about the storm, the time, its latitude and longitude, and other statistics, sort of like a line score in baseball. Transferring the storm’s latitude and longitude to the map lets you keep track of the storm.⁴¹ As you keep updating its location, you transform the hurricane into something spatial. *You* spatialize it. It’s a short step from this to synoptic hurricane maps (like the widely reproduced satellite map NASA’s Goddard Laboratory made of 1989’s Hurricane Hugo), maps compiling tracks of hurricanes, and maps of hurricane regions. On the National Geographic’s “Hurricanes: Where Ill Winds Blow” map, gradations of blue demarcate the frequency of hurricanes per hundred years in steps of forty.⁴² Hurricaniana: it’s now a region—a place—like any other.⁴³

3. *Nature as grandeur.* What can threaten also can awe, and the sense of powerlessness and personal insignificance that hurricanes inspire is not unrelated to what people experience standing on the rim of the Grand Canyon, looking up at Everest, down on Victoria Falls, or across the Amazon. With their majesty, their sublimity, each inspires a sense of the *power* of nature, less its strength (hurricanes are strong), than its boundlessness, its magnanimity, its *glory*. As we write these words, a new *National Geographic* map of Everest arrives, an extraordinary image, photographic in detail. Here Everest, vast beyond understanding, is caught at a resolution of nineteen inches (May 2003 supplement). But . . . didn’t *National Geographic* just publish a map of Everest? Wholly different but just as awesome? A joint production of the *Geographic*, the Boston Museum of Science, and the governments of Nepal and China? Actually, that was fifteen years ago (November 1988, figure 1.13), and it came in a long line of powerful Himalayan images. *The Kingdom of Sikkim*, glorious mountains from north to south, appeared as a supplement to the *Annals of the Association of American Geographers* in 1969. Four years earlier the *Annals* had published *The Kingdom of Bhutan*, twelve square feet of Himalayas folded up and shipped along with the journal.⁴⁴ Before that . . .

But the list is long. Each of the great sublimities has been mapped, the maps as extraordinary in their way as their subjects, the efforts invariably daunting (so high, so deep, so far away). This is not a nature we can threaten (not one we can *dream* of threatening), nor yet is it one that threatens. This is a nature *beyond us*.

4. *Nature as cornucopia.* There is yet another nature, the nature that we embrace, that we cuddle. This is the nature of the small and the soft, the fuzzy and the warm. This is the nature of fur and

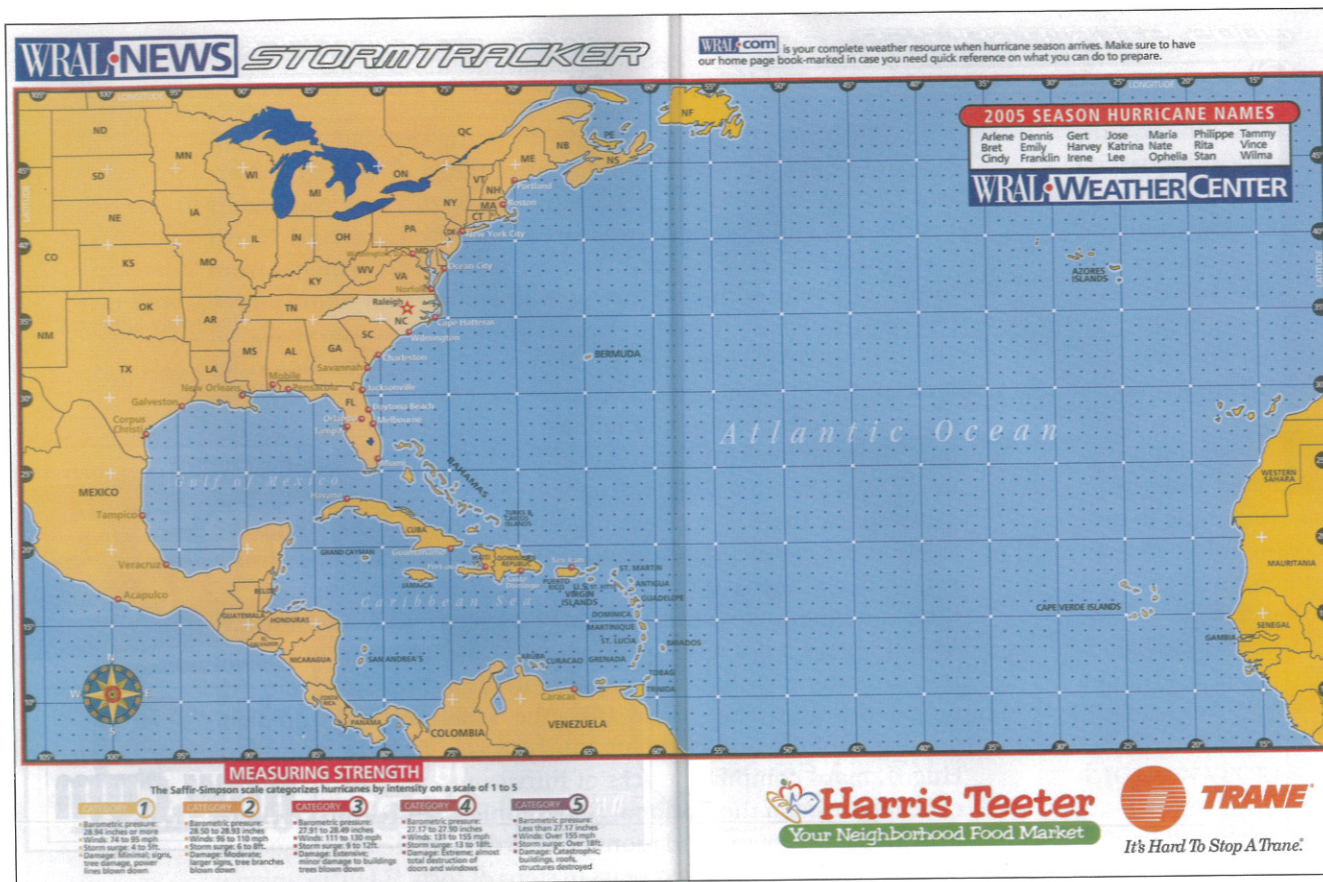


Figure 1.12
2005 Stormtracker map.

Courtesy of WRAL-TV5, Capitol Broadcasting Company, Raleigh, North Carolina.



Figure 1.13
A detail of "Mt. Everest"
(supplement to *National Geographic*,
November 1988). The full map
showing Everest in all her glory can
be seen in figure 6.16 on page 117.

Courtesy of Ng Maps/National Geographic
Image Collection.

- feathers, birds and bees, flowers and seed. If the mountain is awesome, its flower-strewn meadows are beautiful. If the oak is sublime, the dogwood is sweet. Anything but austere, this nature is giving, prodigal. It is a gigantic cornucopia, an unceasing gush of bounty: flowers, fruit, berries, nuts. "The sublime *moves*," Immanuel Kant wrote, "the beautiful *charms*."⁴⁵ But it also feeds, also nurtures, and the soul no less than the stomach: "Emblazoned with beauty, this floral map shows the origins of 117 of man's favorite flowers" begins the perimap of "The World of Flowers" (figure 1.14). Beguiling bouquets burst from the hearts of continents. A clump of tulips sprouts in Turkey. A branch of a *flamboyán* flowers in Madagascar. Oriental poppies bloom in Pakistan. The theme of profligacy mingles with that of beauty. The abundance of this nature is inexhaustible: in yet another *National Geographic* map, individual portraits of sixty-seven birds—from "hundreds of kinds"—festoon a map of migratory routes in the Americas.⁴⁶ The routes lace the continents from pole to pole. The numbers are insane: the arctic tern may travel twenty-five thousand miles a year! *Ain't nature something else!* The maps demonstrate that this nature—flowers, trees, birds, seals, furry friends—is everywhere.
5. *Possessable nature*. The beautiful, the profligate (and so the exotic) is also the collectible. We yearn to tally it, catalog it, photograph it, and perhaps even own a small piece of it. Maps of this collectible, possessable nature—bird sightings, birds' nests, rocks and minerals, gemstones, big game animals, highest points, stars—are less interested in display than they are in inventory. At stake here are lists, head counts, censuses, catalogs, statistics.



Figure 1.14
A detail of "The World of Flowers" (supplement to *National Geographic*, May 1968, by artist Ned Seidler). The full map is shown in figure 7.1 on page 127.

Courtesy of Ned Seidler/National Geographic Image Collection.

We're holding in our hands *A Bird Lover's Life List and Journal*, a luxurious, hardbound volume, based on the checklist of the American Ornithological Union, in which birdwatchers can keep score. It lists 715 species and is decorated with illustrations by John James Audubon. While life lists rarely include maps, field guides almost always do. There are 362 maps, for example, in Peterson's *Birds of Britain and Europe*, each map distinguishing breeding and winter ranges for an individual species. Here the maps are corralled into an "atlas" in the back of the book, but in *The Audubon Society Field Guide to North American Birds (Western Region)* the maps accompany the text, one per species, each with its textual relay: "Southeastern Arizona, southern New Mexico, and western Texas, where it breeds at the northern fringes of its otherwise all-Mexican range."⁴⁷

Historically, the construction of spatial identities for species led to the construction of synthetic regions composed in different ways of numbers of species,⁴⁸ and these syntheses, too, appear in the field guides, as in *Trees of North America* (a Golden Field Guide), where hundreds of thumbnail maps (such as the one shown in figure 1.15) are preceded by a map of forest regions. Here, for example, we read that in the Northern Forest region "far northern tree associations" consist of coni-

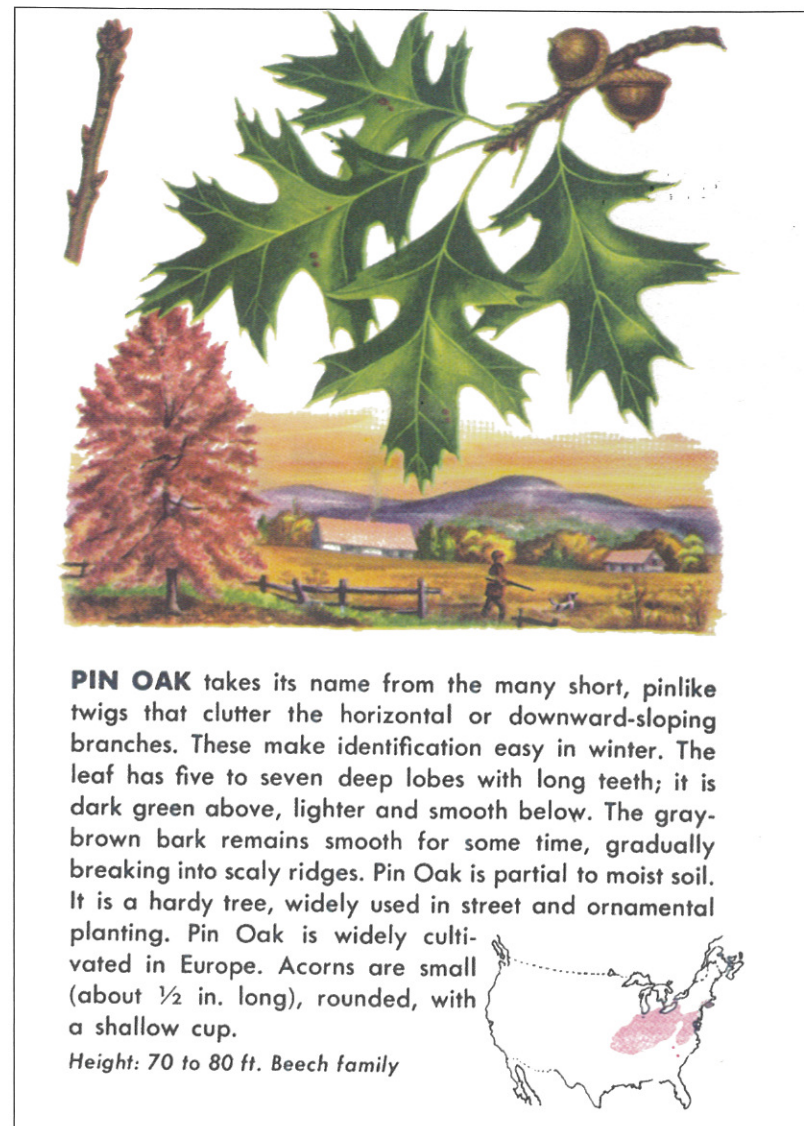


Figure 1.15
This range map of the pin oak tree is the spatial equivalent of its species identity. Range maps are the spatial face of our inventorying of nature. The map shows us where we might find a pin oak, so we might check it off our lists, snap a picture, pocket a leaf.

PIN OAK takes its name from the many short, pinlike twigs that clutter the horizontal or downward-sloping branches. These make identification easy in winter. The leaf has five to seven deep lobes with long teeth; it is dark green above, lighter and smooth below. The gray-brown bark remains smooth for some time, gradually breaking into scaly ridges. Pin Oak is partial to moist soil. It is a hardy tree, widely used in street and ornamental planting. Pin Oak is widely cultivated in Europe. Acorns are small (about ½ in. long), rounded, with a shallow cup.

Height: 70 to 80 ft. Beech family

fers, birches, and willows. In Hugh Johnson's *The Principles of Gardening* we find maps not only of where domesticated plants originally grew wild, but of plant hardiness zones which pretty much amount to maps of zones of consistent annual average minimum temperature.⁴⁹ Maps like these hint at the systematization—that is, at the science—that consumes the collectible nature.

6. *Nature as system.* The nature of science, of system, is anything but collectible, for it is a nature that exists less in its parts than in the whole. It is an inherently spatialized nature, and maps are a primary way of knowing it. Here individual outcrops metamorphose into strata and strata into geologic formations; soil series aggregate into soil associations and these into soil groups; plant species fall into plant associations and associations combine into plant communities; variations in barometric readings grow into weather systems and these merge into climate. It is a paradigmatic nature. With *Seasonal Land Cover Regions* we have already



Figure 1.16
A Tapestry of Time and Terrain shows us an illuminating synthesis of two natural systems—physiography and its underlying geology. (See the whole map in figure 9.9 on page 177.)

Courtesy of USGS, 2000.

glanced at a representative of the genre, but other examples abound: Robert Bailey's *Ecoregions of North America*, USGS's *A Tapestry of Time and Terrain* (figure 1.16—a truly mind-boggling geologic/physiographic map of the U.S.), Simon and Fels' *Plant Associations of the Chattooga River Basin*, the endless suites of thematic maps (of landforms, climate, temperature, winds, precipitation, ocean currents, natural vegetation, soils) that stand in the front of so many atlases. This nature is neither threatened nor does it threaten. It does not awe nor is it cute. It is anything but collectible. It is nature that is *known*. It is that of science.

7. *Nature as mystery*. Out of science a new nature has lately risen: it is a nature seen but mysterious, *unknown*. It is that from space. Its construction reverses the usual process through which careful measurements are compiled over time to reveal, for example, a continent (as in the gradual emergence of the Americas on European maps in the fifteenth and sixteenth centuries), an ocean current (as on Ben Franklin's map of the Gulf Stream), a hole in the ozone layer (as with the TOMS data from the Nimbus 7 satellite). This new seen-but-unknown nature emerges whole, apparently unscarred by conceptual categories. Maps of this nature pass for photos, of which Barthes famously remarked, "the feeling of 'denotation', or, if one prefers, of analogical plentitude, is so great



Figure 1.17
 This is a detail of "Portrait USA" (*National Geographic* map supplement, July 1976): what does it say to you? (See the whole map in figure 10.2 on page 189.)

Courtesy of Cartographic/National Geographic Image Collection.

that the description of a photograph is literally impossible." This special status of a photograph? *It is that of a message without a code*. At least it *appears* to be without a code. Barthes showed that photos did have a code, but one developed on the basis of a message without one: "It is *read*, connected more or less consciously by the public that consumes it to a traditional stock of signs."⁵⁰ It also turns out that these new maps are not photographs, they are maps after all, the connotation—the code, the concepts—has been imposed in their production (looking *like* a photograph is part of this code). This new genre of "portrait" maps (figure 1.17) presents a nature of gradations without distinctions. "What is *that*?" The map does not answer. It is whatever you wish to make of it. This nature is fragile. It is threatened. Or it is tough, resilient. It is enduring. It is distant. It is somewhere else. It is unknowable. It is a vehicle for our anxiety; a recipient of our admiration.

8. *Nature as park*. One final nature, the *intimately known*, that nature mapped at a scale of two and a half inches to a mile, with a contour interval of ten feet (or less). This is the nature of the USGS topographic quad (figure 1.18) and other national mapping surveys. Here again is the sense that everything can be seen, but here *everything* is coded. In fact, here *only* the coded exists, anything not on the (admittedly capacious) leg-



Figure 1.18

To return to where we started, *Cove Creek Gap* quadrangle: the border of Great Smoky Mountain National Park protects nature by, among other things, criminalizing the poaching of ginseng within it.

Courtesy of USGS, 1997.

end doesn't. "What is *that*?" The map returns an answer. It is an intermittent stream; it is a mangrove; it is a dry lake; it is a sunken rock; it is scrub; it is a gravel beach. But nature is not brought to the foreground here. The map is as loquacious about exposed wrecks, landing strips, railroads under construction, vineyards, gauging stations, built-up areas, and dams as it is about glaciers and permanent snowfields, shorelines, mountains, swamps, and rivers. Here nature is subject to no rhetorical flourish, no isolation, no highlighting. It is not the *theme* of these maps. It is along for the ride. This is the nature of the *phenomenological* inventory. At this level nature lies so deep in the conceptual frame that it manifests itself in things instead of attitudes. But the things it manifests itself in are not hills, rivers, or trees, which, undifferentiated from culture, here lie *below* the level of nature. Here nature shows up as parks, monuments, sanctuaries, and preserves. It is a fenced-in nature that we can visit, that we can protect, that we have to protect. . . because it is threatened.

So we have come full circle. Only it is not a circle. It is a multi-dimensional space of contradictions. It is a dialectical space ripe with the interpenetration, struggle, and unity of opposites. Eight natures—doubtless there are others—each spatialized, each areal, each hoisting itself off the page, taking shape in the mental spaces of cognitive linguistics as we read the map, as we unfold it, turn it over, and refold it; as we bring it closer to our eyes or move it away; as we scale its distances with our fingers: nature as victim, bully, spectacle, cornucopia, collectable, paradigm, mystery, park.

Ours is not a systematic survey. We have made no effort to search for maps of nature but taken as examples those that came to

hand in our grappling with the nature of maps. We shall proceed by unfolding in each chapter a map or maps of a different nature, and to use this reading as an opportunity for probing one component or another of our model of the map—the logical structure of the map's construction of knowledge; the physical structure of the paramap; the intellectual structure of the act of map reading itself—as well as probing the nature of the nature in question. Inescapably, we attend closely to the concept of nature as it intertwines itself with economic structures, class formations (nature is above all else a construction of class), and official systems of construal. As we scan sheet after sheet, more and more the maps appear as players in a complicated social game defining the relationship of our species to the rest of existence. Pretending to be no more than scorekeepers, maps stand revealed as more like the ball, the very medium through which the game's moves are made.

NOTES

1. Robinson and Petchenik, *The Nature of Maps: Essays toward Understanding Maps and Mapping* (Chicago: University of Chicago Press, 1976); Harley, *The New Nature of Maps*. Note that although Harley's book wasn't published until 2001, the manuscript, lacking the promised introductory and concluding essays, was submitted for publication ten years earlier. The title originally bandied about was *Maps and Society*, which Harley had found "a bit tame: could we devise something more arresting?" (letter to George Thompson, 15 October, 1991). In a postscript a month later Harley wrote, "Please note the new title which

is final as far as I'm concerned: *The New Nature of Maps: Essays in the History of Cartography*" (letter to George Thompson, 26 November 1991).

2. This is from the questionnaire prospective authors were asked to file with the Johns Hopkins University Press. Harley dated it 11/25/91.

3. Ibid.

4. Wood and Fels, "Designs on Signs," *Cartographica* 23 (Autumn 1986): 54–103; Wood, *Power of Maps*, where "Designs on Signs" appears as the fifth chapter.

5. In fact picking ginseng without a permit anywhere but on your own property is larceny under the North Carolina General Statute 14-79: Larceny of ginseng. This statute links the spatialized entity North Carolina with ginseng. It's punishable by up to six months in prison and a five-thousand-dollar fine. Poaching in the national park carries a maximum sentence of a year, though, according to Burkhard Bilger ("Wild Sang: Rangers, Poachers, and Roots that Cost a Thousand Dollars a Pound," *The New Yorker* [July, 15, 2002]: 38–47), no one has ever received it.

6. For one window into the fascinating subject of reference objects, try John Willinsky's *Empire of Words: The Reign of the OED* (Princeton: Princeton University Press, 1994), which struggles with the source of the authority of the Oxford English Dictionary.

7. Hui, "Social Studies Squeeze," *News and Observer* (August 13, 2003): 1B, 9B.

8. Genette, *Paratexts*, 5.

9. Jacques Derrida plows related ground in his treatment of the *parerga*, those elements about, outside, or around a work—in short, the frame; but also the columns of a building, the drapery on a statue—in short, *hors d'oeuvres*. See especially pp. 53–82 and the whole section "Cartouches," (183–253) in his *Truth in Painting* (Chicago: University of Chicago Press, 1987). Be forewarned: "Parergon" is a reading of Kant's *Critique of Aesthetic Judgment*, and "Cartouches" is a catalog essay for a show of Gérard Titus-Carmel's drawings. Where Derrida and Genette are closest is in their understanding of the paratext/parerga as liminal, as threshold. See also (always) Goffman's *Frame Analysis: An Essay on the Organization of Experience* (Cambridge, Mass.: Harvard University Press, 1974).

10. Genette, *Paratexts*, 344.

11. Scientific American Book Club, August 2003.

12. While rarely discussed in the cartographic literature as such, the epimap has become an issue in the liminal area between the history of cartography and the history of science. Jane Camerini, for instance, is explicit about her interest in "the notion that the meaning of a map resides not only in the map, but in relation to the written text of which it is a part." See her PhD dissertation "Darwin, Wallace and Maps" (PhD diss., University of Wisconsin, Madison, 1987), or her "Evolution, Biogeography, and Maps: An Early History of Wallace's Line," *Isis* 84 (1993): 700–27. The quotation comes from this latter, p. 702.

13. We propose to treat freestanding maps such as this as though they were the independent reference objects they so frequently and so rapidly become. At the same time we need to observe their connection to their epimap: here, that the map was a supplement to *National Geographic*, July 2000.

14. Gall, "Use of Cylindrical Projections for Geographical, Astronomical, and Scientific Purposes," *Scottish Geographical Magazine* 1 (1885): 119–23.

15. There are many versions of this map in circulation, with more or less inflammatory perimaps. This is from a copy distributed by ODT in 2000.

16. Peters, *Die Neue Kartographie/The New Cartography* (Klagenfurt and New York: Universitätsverlag and Friendship Press, 1983).

17. Robinson, "Arno Peters and His New Cartography," *American Cartographer* 12, no. 2 (1985): 103–11. Although clearly a review of Peters' book, the piece appeared in the Views and Opinions section. Considering how completely batty Peters' book is, Robinson's treatment is surprisingly temperate.

18. From a review by Jonathan Yardley of Mark Monmonier's *Drawing the Line* (New York: Henry Holt, 1995). Source unknown (*Washington Post?*). Yardley developed his jibe by stringing together phrases of Monmonier's. The tone, however, cannot be attributed to Monmonier whose treatment of the Peters affair in *Drawing the Line* is thorough and thoroughly scrupulous (9–44). Monmonier's list of sources for both sides is the best available (301–2).

19. This is from *The Wall Street Journal's* front page story about the resolution, June 8, 1989. The ACSM's resolution was a way of dealing with Peters' use of the Mercator as a straw map: excommunicate both projections!

20. This list—and it goes on—is from Robinson, "Rectangular World Maps-No!," *The Professional Geographer* 42, no. 1 (1990): 101–4. Robinson concludes by predicting the resolution's futility.

21. All this commentary, the reviews, the ACSM resolution, its coverage by *The Wall Street Journal*, and the rest (and see Monmonier's treatment for an idea of how extensive this "rest" was) constitute what Genette calls the "metatext." See the presentation of the five varieties of "transtextuality"—intertextuality, paratextuality, metatextuality, hypertextuality and architextuality—in Genette's *Palimpsests: La littérature au second degré* (Paris: Seuil, 1982). Each of these forms of transtextuality plays an important role in the world of maps.

22. Barthes, *The Fashion System* (New York: Hill and Wang, 1983), 11.

23. Barthes uses the word "relay" constantly. An explicit discussion can be found in "The Photographic Message" (of 1961) in Barthes' *Image—Music—Text* (New York: Hill and Wang, 1977). If you pick up the book, "Rhetoric of the Image" and "The Third Message" are also relevant.

24. Loveland, et al., "Map Supplement: Seasonal Land-cover Regions of the United States," *Annals of the Association of American Geographers* 85, no. 2 (1995): 339–55. This is then a second example of a map supplement that can be experienced as a freestanding map; only in this case, the magazine and map were published by unrelated but cooperating entities.

25. Robinson, et al., *Elements of Cartography*, 6th ed. (New York: John Wiley & Sons, Inc., 1995), 333.

26. Dent, *Cartography: Thematic Map Design*, 3rd ed. (Dubuque: William Brown Publishers, 1993). Among major texts in cartography, only Jacques Bertin's *Semiology of Graphics: Diagrams, Networks, Maps* (Madison, Wis.: University of Wisconsin Press, 1983) deals—vigorously—with displays on our order of complexity, but then *Semiology of Graphics* is analytical, not prescriptive.

27. Longyear, *Advertising Layout* (New York: Ronald Press, 1946), 11.
28. Fauconnier, *Mappings*, 1.
29. About the limitations of this kind of “modularity” see, among many others, the pointed comments in Dancygier and Sweetser’s *Mental Spaces in Grammar: Conditional Constructions* (Cambridge: Cambridge University Press, 2005), throughout, but most emphatically on p. 15.
30. Fauconnier, *Mappings*, 7.
31. We are not unaware of Roland Barthes’ semiotic construction of meaning on the fly in *S/Z* (New York: Hill and Wang, 1974), his slow rereading of Balzac’s *Sarrasine*, but it is the only example that comes to mind. And besides, it was actually a rereading of Balzac’s text: “We must accept one last freedom: that of reading the text as if it had already been read” (15). Nonetheless, Barthes’ reading here is very much in the spirit of the cognitive linguists he preceded by a generation, and very much a model for our own unfolding of the map.
32. Fauconnier, *Mappings*, 11, 36 (emphasis ours). Fauconnier and Turner, *The Way We Think: Conceptual Blending and the Mind’s Hidden Complexities* (New York: Basic Books, 2002), 40, 102.
33. Fauconnier and Turner, *Way We Think*, 102.
34. Lakoff, *Women, Fire, and Dangerous Things* (Chicago: University of Chicago Press, 1987), chap. 4. Schank and Abelson, “Scripts, Plans, and Knowledge” in *Thinking: Readings in Cognitive Science*, ed. P. N. Johnson-Laird and P. C. Wason (Cambridge: Cambridge University Press, 1977), 421–32. A cool, accessible, book-length treatment of the restaurant script is Schank’s *The Connoisseur’s Guide to the Mind* (New York: Summit Books, 1991). Toulmin, *The Uses of Argument* (Cambridge: Cambridge University Press, 1958). Bakhtin, *Speech Genres and Other Late Essays* (Austin, Tex.: University of Texas Press, 1986).
35. See Lakoff and Johnson’s discussion of these points in their *Philosophy in the Flesh: The Embodied Mind and Its Challenges to Western Thought* (New York: Basic Books, 1999), chap. 3.
36. Sweetser and Fauconnier, “Cognitive Links and Domains: Basic Aspects of Mental Space Theory,” in Fauconnier and Sweetser, *Spaces, Worlds and Grammar* (Chicago: University of Chicago Press, 1996), 11.
37. Robinson et al., *Elements*, 316.
38. In fairness to *Elements*, it must be acknowledged that its discussion of the principles of graphic design—following the caveat that “There is little agreement among professional designers about what they mean by graphic design”—is relatively more sophisticated and revolves around the concepts of legibility, visual contrast, figure-ground, and hierarchical structure (324–38). Discussions of these issues occupy hundreds of subsequent text pages. Much of this, however, is the development of technical production vocabularies. The principles themselves remain at the level of “If these visual relationships coincide with the cartographer’s intentions, effective communication can take place. If not, the map design is likely to fail” (324) which is—effectively—meaningless.
39. More or less. Not that maps played no role in human affairs prior to, say, 1400, but that after that time they begin to play the role they continue to play today. Our decision to draw the line here is akin to Ian Hacking’s drawing the line for the birth of statistics at 1660. It’s not that

there weren’t all kinds of precursors but that “We do not ask how some concept of probability became possible. Rather we need to understand a quite specific event that occurred around 1660: the emergence of our concept of probability. If there were Indian concepts of probability 2,000 years ago, they doubtless arose from a transformation quite different from the one we witness in European history,” and so on (Hacking, *Emergence of Probability*, Cambridge: Cambridge University Press, 1975, 9). Similarly, we are not concerned with the host of potential precursor map-like things, but with the map as we know it, and have known it for five or six hundred years. See Wood’s “P. D. A. Harvey and Medieval Mapping: An Essay Review” *Cartographica* 31 (Autumn 1994): 52–59; and his “Maps and Mapmaking” in *Encyclopedia of the History of Science, Technology and Medicine in Non-Western Cultures*, ed. Helaine Selin. Dordrecht, Boston: Kluwer Academic, 1997), 549–54.

40. Our example comes from the May, 2001, issue of *National Geographic*, among the unpaginated front matter.
41. Americans have been known to similarly track the war front. For more about the practice of publishers to package maps in kits with little flags and pins during World War II, see the section, “War Is God’s Way of Teaching Us Geography,” in Schulden’s *Geographical Imagination*, 206–14.
42. An element of the “Great Disasters: Nature in Full Force” poster, supplement to *National Geographic*, July 1998.
43. Marita Sturken observes this and more in her “Desiring the Weather: El Niño, the Media, and California Identity” *Public Culture* 13, no. 2 (2001): 161–89.” She focuses on TV not maps, but her paper is all but a disquisition on the spatialization of the weather in which all such media collaborate.
44. Karan, Pradyumna P. *The Kingdom of Sikkim*, supplement to *Annals of the Association of American Geographers* 59 (March 1969), and *The Kingdom of Bhutan*, supplement to *Annals of the Association of American Geographers* 55 (December 1965).
45. Kant, *Observations of the Feeling of the Beautiful and Sublime* (Berkeley: University of California Press, 1960), 47.
46. “Bird Migration” was a supplement to the August, 1979, issue.
47. Boucher, *Bird Lover’s Life List and Journal* (Boston: Museum of Fine Arts, 1992). Peterson et al., *A Field Guide to the Birds of Britain and Europe*, 4th ed. (Boston: Houghton Mifflin, 1983); Udvardy, *The Audubon Society Field Guide to North American Birds (Western Region)* (New York: Knopf, 1977), 647. John Law and Michael Lynch compare and contrast a number of these field guides in their “Lists, Field Guides, and the Descriptive Organization of Seeing: Birdwatching as an Exemplary Observational Activity” in *Representation in Scientific Practice*, ed. Michael Lynch and Steve Woolgar, 267–99. (Cambridge, Mass.: MIT Press, 1990).
48. See Camerini, “The Physical Atlas of Heinrich Berghaus: Distribution Maps as Scientific Knowledge” in *Non-Verbal Communication in Science Prior to 1900*, ed. R. G. Mazzolini, 479–512. (Florence: Olschki, 1993).
49. Brockman, *Trees of North America: A Field Guide to the Major Native and Introduced Species North of Mexico* (New York: Golden Books, 1968); Johnson, *Principles of Gardening* (New York: Simon & Schuster, 1979). The maps in *The Principles* came from the Mitchell Beazley studio.
50. Barthes, *Image—Music—Text*, 18, 19.