DOI: 10.14714/CP84.1374

Storied Maps

Mark Denil
mark_denil_maps@hotmail.com

This paper will explore the relation between maps and stories by looking at how meaning is construed from informational artifacts, and, in particular, from maps. A formal interpretation model, derived from the work of Erwin Panofsky, is applied to examine how meaning is brought to the map. The core issue is whether maps really do tell stories, or if that glib platitude hides a more complex relationship that would be advantageous to understand.

KEYWORDS: cartographic theory; iconography; iconology; map stories; maps; mapstorytelling; meaning; meaning construal; meaning acquisition; narrative; Panofsky; rhetoric; semiotics; stories

PREAMBLE

This article explores the question "Do maps tell stories?" by examining how a map artifact comes to carry complex and sophisticated meaning. The approach is conceptual, but the results are practical. The core issue is whether maps really *do* tell stories, or if that glib platitude hides a more complex relationship that would be advantageous to understand.

At this point, some might ask: "So What? Does saying that maps tell stories do any harm?" No more harm, really, than repeating any other platitude like, "the moon is made of green cheese"—harmless in normal conversation, but a very different matter when professed in public or taught in school. Cartography is supposed to be an informed practice, and the tenets of an informed practice should stand up to scrutiny. This scrutiny should be carried out "not carelessly and dogmatically, as we do in ordinary life …, but critically, after exploring all that makes such questions puzzling, and after realizing all the vagueness and confusion that underlie our ordinary ideas" (Russell 1912, 7).

This paper's analysis and conclusions are not confined to what are sometimes called "narrative" or "story" maps, or to any other particular type or style of map, because *every* map must facilitate the discovery of some meaning or other. For that reason the discussion that follows is concerned with *how* meaning is found in any map: trendy or dowdy, old or new, paper or plastic, regardless of *what* that particular meaning might be.

INTRODUCTION

Maps and stories are intimately related. On the one hand, a map must be fit into a coherent story in order to be understandable, while, on the other, a map provides key persuasive arguments that may lead a reader to adopt a particular story explaining some milieu or situation. Recently, this relationship has sometimes been shortened to: "*Maps Tell Stories.*"

While seemingly innocuous, the statement "Maps Tell Stories" raises some thorny questions about the map/story relationship. For example: if a map tells a story, does it tell the same story to everyone?

There is both professional and commercial interest in the notion of storytelling maps. For example, the three most recent North American Cartographic Information Society (NACIS) conferences have seen both formal addresses and session presentations on the topic. As well, the Esri company has made "Story Mapping" something of a byword for their online mapping services, while other individuals

© by the author(s). This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

and organizations use terms like "narrative map." Still, there is very little evidence that the implications of the map storytelling notion have been much examined.

WHAT ARE MAPS? WHAT ARE STORIES?

It is interesting to note that Randall Munroe included both "map" and "story" amongst "The Ten Hundred Words People Use The Most" (Munroe 2015, 57–60); that is, the thousand words that are "simple and familiar" enough to make up the vocabulary for his 2015 book *Thing Explainer*: *Complicated Stuff in Simple Words*. Munroe assumes that the words in his list denote concepts common enough to need no definition, and for his purposes this assumption is reasonable. This discussion, however, will hinge upon these terms, so their meanings must be declared usefully and comprehensively.

Defining "so ambiguous and complex a cultural object as the map" (Pickles 2004, 19) is not simple, because "not only are maps multivocal, not only are the spaces they constructively represent complex articulations of coded and nomadic spaces, but so also must be our accounts of them" (Pickles 2004, 19). This need for a multifaceted definition was addressed by Christian Jacob when he wrote of the map as "the projection and materialization of a mental schema on a medium. The materialization of an abstract intellectual order extracted from the empirical universe" (Jacob 2006, 30). Jacob's is a broad, usable definition of the map artifact; one that is practically and uncontroversially applicable to the full range of everything that has been or might be identifiable as a map.

I, myself, (2003) further described the map as a rhetorical entity that must be "useful, usable, and persuasive." This description centralizes what it is that any and every map must do, regardless of map type or form. Between these two complementary definitions the map is fully, if abstractly, characterized: together, they define what a map *is* and what it *must do*.

What, on the other hand, are stories?

The *Compact Edition of the Oxford English Dictionary* (1971) defines *story* as "an allegation; a statement; an account or representation of a matter; a particular person's representation of the facts in a case."

This definition particularizes the term *story* as a narrative with a purposeful point of view, an argument for understanding something a certain way. It harmonizes well with what I have written about how a map is always, and necessarily, presenting some particular proposition, and attempts to frame its presentation of that position so as to naturalize its propositions to the beliefs and assumptions of the map user.

There is, clearly, a close relation between between maps and stories, but is the map actually *telling* a story?

DO MAPS REALLY TELL STORIES?

In her talk at the 2014 NACIS Annual Meeting, *Do Maps Really Tell Stories? The Problem of Narrative Time in Cartography*, Anne Knowles spoke about some of the practical and conceptual issues she and her associates had been encountering in a project to tell some very specific stories with maps.

She was, at a certain stage, disconcerted to discover that her patrons were positively *repelled* by maps she had prepared: what she had found *moving*, they found *cold* and *offensive*. How was it that maps that she and her associates saw as telling particular, moving stories seemed to tell her partners such very different, repellent stories? Here, then, is the crux of the biscuit: if maps tell stories, why did these maps tell different stories to different people?

A PARABLE

Knowles is not the first to see different observers read very different stories from a single narrative graphic. Lewis Carroll described the same sort of thing in this excerpt from his short story "A Photographer's Day Out."

> PICTURE 5: This was to have been the great artistic triumph of the day; a family group, designed by the two parents, and combining the domestic with the allegorical. It was intended to represent the baby being crowned with flowers, by the united efforts of the children, regulated by the advice of the father, under the personal superintendence of the mother; and to combine with this the secondary meaning of "Victory transferring her laurel crown to Innocence, with Resolution, Independence, Faith, Hope and Charity, assisting in the graceful task,

> while Wisdom looks benignly on, and smiles approval!" Such, I say, was the intention; the result, to any unprejudiced observer, was capable of but one interpretation — that the baby was in a fit—that the mother (doubtless under some erroneous notions of the principles of Human Anatomy), was endeavoring to recover it by bringing the crown of its head in contact with its chest—that the two boys, seeing no prospect for the infant but immediate destruction, were tearing out some locks of its hair as mementos of the fatal event—that two of the girls were waiting for a chance at the baby's hair, and employing the time in strangling the third—and that the father, in despair at the extraordinary conduct of his family, had stabbed himself, and was feeling for his pencil-case, to make a memorandum of having done so.
>
> (Carroll 1976, 1093)

Knowles, and the parents in Carroll's story, had each assembled a graphic (map or image) that they saw as carrying one or more specific stories, and each felt it was not unreasonable to expect that these stories would be retold intact to their respective audiences. In each case, however, neither the map nor the image managed to do this. Why?

STORIES DON'T COME FROM THE MAP

Maps (as well as graphics and images) require interpretation, both as a whole and in their individual constituent parts. Part of map reading leverages the reader's ability to see and recognize symbols as signs, and other parts depend on the reader's facility in finding meaning in the recognized signs. Out of this material alone, however, no one can be sure they are correct in their reading: that they have found the right story. One has to bring in a context external to the map itself; a context composed of a combination of what one thinks one has read in the map, what one knows about maps, one's own knowledge about the topic or milieu, and the context in which the map is situated. Whether or not one recognizes or accepts the propositions the map is presenting, one is *not compelled* to find any particular story in any particular map. One finds the story that satisfies oneself alone as a reasonable reading.

As Jacob remarked "…on the map no privileged course is given, nor any narrative imposed or set in place. … the reader becomes the author of and the actor in his or her own fictions" (Jacob 2006, 285).

Considering the map of central Europe shown in Figure 1, one can recognize the shapes of the countries depicted, and that the map somehow concerns air travel. The graphic style (depiction of aircraft, use of solid black) and the national outlines indicate the historical period. Where to go from here? It might seem reasonable to guess that this map would be a part of an advertisement campaign by a Czech air cargo company (CzechEx?) promoting their speedy package delivery service from a hub in Prague to customers in the German market. In fact, one must turn to information external to the map, information that surrounds and frames the map more or less closely, to divine the story. Only then can a reader take into consideration a range of other knowledge—political, social, and historical knowledge, for example—beyond the ink on the paper and other maps they may have seen. The reader can also consider contexts, such as where the map appears, the agendas ascribed to whoever it was that placed the map there, what the reader thinks of those people and agendas, and the reader's guesses about the story those people expected to be taken away. Wood and Fels (2008, 8) referred to these framing contexts as the *perimap*, as contrasted to the *epimap*, which is the inky bit. Only after the reader has considered (or chosen to ignore) this horizon of knowledge can they construct an understanding: the story they actually take away.

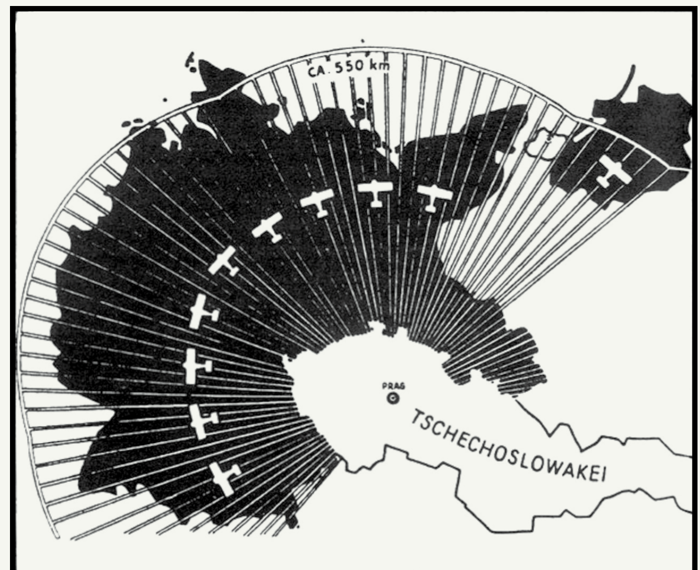

Figure 1. *German magazine map by Rupert von Schumacher. 1934.*

MAPS NEED STORIES

A story is important to the map; arguably, in most cases, more important than the map is to the story. Stories are how humans make sense of the world, and Somerset Maugham reminds us just how closely our natures are tied to storytelling.

> …the delight of listening to stories is as natural to human nature as the delight in looking at the dancing and miming out of which the drama arose. That it exists unimpaired is shown by the vogue for the detective novel.
>
> (Maugham 1954, 637)

We use stories to work through our experience and to fit what would otherwise be an incoherent, bewildering, meaningless set of facts or events into a coherent, understandable, meaningful, and moving experience.

In reading a map, it is the story that provides the serviceable context that the map must absorb and reflect. It is only by absorbing a story that the map can support, enhance, and lend verisimilitude to it.

Absorbing a story? *Reflecting* a story? Is the map not simply *telling* a story? No; that is beyond its power. Maps are, as Robert Lewis Stevenson wrote, "mine[s] of suggestion" (Stevenson 1894, 11), but do not, and cannot, by themselves, tell stories to people: it is, instead, *people* that read stories into maps.

This is true of all maps, but not of maps alone. In point of fact, no graphic, in itself, harbors any meaning whatsoever. Any graphic, such as a drawing, photograph, painting, graph, chart, or, of course, map, must be *read* and *interpreted*, and fit into a contextual understanding (fit into a narrative or *story*) in order to acquire meaning. This is well known.

DISCUSSION

THEORETIC INTERLUDE

The roots of connection between the map and the story run very deep: right down, in fact, to the semiotic bedrock where the the signifier (in this case, a map) is connected to the signified by means of a value or element (a story).

Ferdinand de Saussure recognized that the identity of a sign rests not in the sign itself, but in its relation to other signs through what he called a *principle of linguistic value*. The sign itself is empty, in that meaning does not reside within it, but is instead generated from the surrounding system. A significant component of that surrounding system is the framing story that provides a context within which the sign is understood (Saussure 1916; Lupton and Miller 1996).

Unlike the primarily linguistic semiosis theory of Saussure, where the relationship between the sign and the real-world thing it denotes is an arbitrary, implicit one, Charles Sanders Peirce's triadic semiotic model establishes an explicit three cornered connection between 1) the sign vehicle or *representamen*, 2) the *interpretant*, and 3) the *object* to which the sign refers.

The key element in this irreducible triadic relationship is the *interpretant.* The interpretant is, in part, the contextual story that a reader or user brings to the representamen (in this case, the artifact-that-would-be-a-map) and which allows it to be linked with an object (the stuff being mapped). It is only by virtue of this triangular linkage (a linkage that includes an interpretant) that the artifact can become a map (a representamen: a meaning bearing sign). The converse is also true: because the relationship is not reducible to action between pairs of elements (Peirce and Welby-Gregory 1977), neither can the map exist as a map *without* an interpretant (story). In short: something only becomes a map because the reader can fit it into a story.

DEMONSTRATIONS BY ANALOGY

Photographs work the same way. In *Camera Lucida* (1981), Roland Barthes examined photo after photo, and found none that could move him, or tell him any story, until he at last turned to a photo of his own mother: a person he recognized and for whom he already had a large mass of information, recollection, and emotion. Only then was he forced to find meaning. Barthes differentiated between cultural and personal meanings (which he termed the *studium* and *punctum*, respectively), but in all cases

saw that the meanings existed, in some form, beforehand and were only evoked or triggered by the image. "Such is the Photograph: it cannot *say* what it lets us see" (Barthes 1981, 100; emphasis in original). The principle is clear: meaning does not lie in the photo itself; it is construed by the viewer by fitting the photo onto a *story*.

The artist Cindy Sherman has long leveraged the inevitability of a viewer's manufacture of story out of the slightest of materials. Her *Untitled Film Stills* (1977–80) consisted of photos of herself in what could pass as banal, ambiguous film stills. The works demonstrate that meaning does not reside in the artifact, but is construed by the viewer to contextualize and explain the image.

Viewers *know* how to manufacture stories from what they assume are clues in Sherman's photos because culture has trained them how to recognize a movie still, and how to interpret one. "So familiar are the characters that Sherman created in her photographs that film critics have been known to 'recognize' the movies to which they refer, although none actually relates directly to any particular film" (Gompertz 2012, 352). So ingrained is this predilection to story creation that it takes place in the mind of the viewer even when they know full well that Sherman's photographs "depict fictional characters from films that never existed, [and] which, even if they had done, would also be fictitious" (Gompertz 2012, 353).

Sherman sets up a scenario wherein the viewer is led up a well-trodden path that leads nowhere at all. The reader then marches blithely off the end of the sidewalk and into the bushes, often not realizing that the only meaning that will be found is meaning they themselves have brought with them. The point is that it is not just a trick: this happens with *all* photographs.

Maps are no more able to tell stories than are photographs; a *viewer* or *user* must be a *reader*, and whatever clues the reader finds must be *recognized* and *interpreted*, so the reader can, ultimately, fit them into a *narrative*.

MAKING SENSE

How can these examples be related to an everyday map reading? A useful formal model for understanding this was outlined by Erwin Panofsky (1955). According to Panofsky, in coming to understand an action (such as an acquaintance tipping his hat on the street) or artifact (such as a painting or a map), we can distinguish three distinct strata of meaning: 1) primary or natural subject matter, 2) secondary, or conventional subject matter, and 3) intrinsic meaning or content. These three strata are encountered or engaged in order.

The first, primary or natural, level involves what Panofsky terms *pre-iconographic* description. It is restricted to factual and expressional elements, and keeps within the limits of whatever motifs are present. Our practical experience allows us to recognize circles or squares, lines or enclosed areas, simple or complex symbols, pictograms or images, etcetera. We might recognize the shapes of humans, plants, or animals in a picture, or the typical shapes and colors used to represent roads, cities, islands, or rivers on a map. Our personal experience may not extend to recognizing the shape of a particular river or island, so "in such cases we have to widen the range of our practical experience by consulting a book or an expert: but we do not leave the sphere of practical experience as such, which informs us, needless to say, as to what kind of expert to consult" (Panofsky 1955, 33).

We have to be aware, however, that this interpretation is limited: we should not expect to apply it indiscriminately. "Our practical experience is indispensable, as well as sufficient, as material for pre-iconographic description, but it does not guarantee its correctness" (Panofsky 1955, 33). Particularly, Panofsky warns about how graphic expression changes over time and across cultures. "While we believe that we are identifying the motifs on the basis of our practical experience pure and simple, we really are reading 'what we see' according to the manner in which objects and events are expressed by forms under varying historical conditions" (Panofsky 1955, 35).

This is echoed by Kevin Moxey, who writes that "'pure' description is impossible, for the language used to describe objects is itself redolent with the values of its authors" (Moxey 1994, 102). In practice, all "description constitutes interpretation" (Moxey 1994, 106), and what we see draws on what we know, what we recognize, and what we expect. Again, at the pre-iconographic strata, this is only goes so far: one might see a picture of a group of men sitting around a dining table, but one would not yet see the Last Supper (Panofsky 1955).

This pre-iconographic description should not be confused with stages of vision, such as the "primal sketch" described

by David Marr (1982); the concern here is with the interpretation of meaning, not with the mechanics of seeing.

The secondary strata concerns *conventional* meaning, or what is termed *iconography*. "It presupposes a familiarity with specific themes or concepts as transmitted through literary sources, whether acquired by purposeful reading or by oral tradition" (Panofsky 1955, 35). This includes elements such as vocabularies and grammars of symbol usage, like those proposed by Jacques Bertin (1983) and expanded by Alan MacEachren (1995), but it also encompasses what I (2011) have called the cartographic schema, or *mapicity*. As I wrote:

> …collectively, the vocabulary [of map symbols and furniture], the grammar of their interaction, and the canon of exemplars of good practice, together forms the schema, which can be thought of as a coherent terrain or horizon of understanding. The schema defines what for us, and the people who make up our interpretive community, is right, proper and appropriate for a map.
>
> (Denil 2011, 12).

It is in Panofsky's iconographic stage that one first sees how a map is trying to suggest a certain reading, and it is where one sees it try to support that reading by forwarding selected arguments couched in terms recognizable as legitimate forms of persuasive discourse.

> But again, while an acquaintance with specific themes and concepts transmitted through literary sources is indispensable and sufficient material for an iconographical analysis, it does not guarantee correctness. It is just as impossible for us to give a correct iconographical analysis by indiscriminately applying our literary knowledge to the motifs as it is for us to give a correct pre-iconographical description by indiscriminately applying our practical experience to the forms.
>
> (Panofsky 1955, 36)

As an example, Panofsky cites a painting by a 17th-century Venetian "representing a handsome young woman with a sword in her left hand and in her right a charger on which rests the head of a beheaded man" (Panofsky 1955, 36). This painting had long been assumed, from iconographical analysis, to be a portrayal of Salome (John the Baptist's head had been brought to Salome on a charger). Clearly, however, Salome herself did not decapitate John, so why did she have a sword? Panofsky points out that if this were instead read as a painting of Judith with the head of Holofernes, we could account for the sword (which Judith is said to have employed), but not for the charger (according to the Bible, she put the head in a sack) (Judith 13:6–10). Thus we see that there is no way to definitely understand the painting from an iconographical analysis alone. As it turns out, Panofsky was able to identify other contemporary northern Italian paintings of Judith holding a charger, and he backs up this evidence with other persuasive reasons that allowed picturing Judith with a charger, but not Salome with a sword. In other words, he went beyond iconographical analysis; in fact, he drew on information clearly external to the painting *and* to the conventional understanding of paintings, to arrive at a fuller, defensible, meaning. What he did was to construe a story that embodied a third strata of meaning: one that he called the intrinsic meaning.

Intrinsic meaning, Panofsky writes, is obtained through iconological interpretation. This term *iconology* is one Panofsky claimed to have revived in order to indicate an engagement or application beyond the "preliminary statistical survey" role played by iconography. He explains:

> …as the suffix "graphy" denotes something descriptive, so does the suffix "logy"—derived from *logos*, which means "thought" or "reason"—denote something interpretive. "Ethnology," for instance, is defined as a "*science* of human races" by the same *Oxford Dictionary* that defines "ethnography" as a "*description* of human races, and Webster explicitly warns against a confusion of the two terms inasmuch as "ethnography is properly restricted to the purely descriptive treatment of peoples and races while ethnology denotes their comparative study."
>
> (Panofsky 1955, 32; emphasis in original)

The intrinsic meaning to which Panofsky refers is nothing more or less than the story the map would (or might) be telling (if the map could tell stories). Significantly, it shows that the full meaning never comes from the artifact itself.

Quite the opposite: finding that full meaning is the work of the interpreter, using his or her experience, knowledge and initiative to bring an interpretive story to the work. Thus we see that the meaning (the story), as Keith Moxey writes, "is always imposed … by the interpreter" and that it is "a constructed narrative rather than one that is inscribed in the order of things" (Moxey 1994, 5).

All map users come preloaded with assumptions, recollections, prejudices, attitudes, and narratives; it mostly comes from their cultural communities (Fish 1980), but they flatter themselves by calling it *knowledge.* It is out of this *knowledge* that they pull stories, and an idea of how to fit a map into those stories. Panofsky's model shows how that knowledge is applied with increasing sophistication at each strata to come ultimately to a consciousness of a story to ascribe to a map.

But surely the map itself must play *some* part, beyond providing points, lines, and areas, in bringing the story into the personal or shared consciousness; and indeed, it does. The map presents what might be termed arguments or propositions about a situation (Denil 2003; Jacob 2006; Wood and Fels 2008), and the user leverages their own interpretation of these propositions to create, adapt, or adopt a story into which to fit the map.

BUILDING INTERSECTING STORIES

A dramatic and complex performance of meaning construction from (ostensibly) purely visual text was demonstrated by Italo Calvino in his novella *The Castle of Crossed Destinies* (1969). In a mysterious castle, twelve stories are related by mute castle guests and their voiceless host by each participant laying out tarot cards in lines. The intersecting card sequences form a set of stories while building into what becomes a single, large tarot constellation. Another twelve silent "story tellers" then step forward and reuse the existing patterns to tell their own stories; often pointing to each card in reverse order to a previously told tale. As Calvino notes:

> …as one guest is advancing his strip, another, from the other end, advances in the opposite direction, because the stories told from left to right or from bottom to top can also be read from right to left or from top to bottom, and vice versa, bearing in mind that the same cards, presented in a different order, often change their meaning, and the same tarot is used at the same time by narrators who set forth from the four cardinal points.
>
> (Calvino 1969, 41)

In a note at the end of the volume, the author writes that "This book is made first of pictures—the tarot playing cards—and secondly of written words. Through the sequence of the pictures stories are told, which the written word tries to reconstruct and interpret" (Calvino 1969, 123). Calvino's narrator, however, draws on a good deal more than the cards themselves to construct each story he believes is being told. He describes each card as it is laid down, noting the exquisite and engaging detail of the cards in the Milanese Renaissance Visconti-Sforza tarot pack. By this, and by drawing attention to, for example, resemblances between the card figures and the story teller, or to other motifs, the narrator engages the first strata of Panofsky's model. References to the rich traditional iconography of the various card figures brings in second strata meaning, while the play of associations—and, in part, the impetus given by the momentum of the building interpretation itself—brings the narrator to the discovery of a fully realized tale (Panofsky's third strata). How else could the narrator leap from some cards on a table to a recitation of imagined conversations? He has construed a story.

However, the construct and interpretation (the story) is that of the narrator: there is no reason to expect that any of the narrator's companions would have placed the same, or even similar, constructs and interpretations on the cards and their order. As the companions do not speak, no one can know what stories they "heard."

Calvino's narrator himself is wary of claiming to have fully understood any of the stories.

> I have no idea how many of us managed to decipher the tale somehow, without getting lost among all those low cards, cups and coins, that popped up just when we were most eager for a clear exposition of the facts. The narrator's powers of communication were scant, perhaps because his genius was more inclined to the severity of abstractions than to the obviousness of images. In any case, some of us allowed our

> minds to wander, or we lingered over certain couplings of cards and were unable to go on.
>
> (Calvino 1969, 21)

Similarly, just because individuals are all presented with the same visual motifs (the same map), and are (just maybe) in possession of the same cultural heritage and same (no doubt, rigorous) training in map reading, does not ensure that they are going to construe (or are capable of construing) the same stories, or of understanding the construed stories the same way. Again, just as one's fortune is not told so much by the cards as by the crone in her tent who interprets them, a map does not so much tell a story as facilitate reading one into it.

TURNING FROM CARDS TO CARTES

Calvino has shown that he could manufacture stories out of an ordering of tarot cards, and his manner of doing so can be analyzed using Panofsky's model, but maps are generally far more complex than a pattern of cards. Can this model be applied to reading a map?

It has, in fact, been applied, if not consciously, by Denis Wood and John Fels in their 2008 book *The Natures of Maps*: *Cartographic Constructions of the Natural World*. Their third chapter, titled "Reading *Land of Living Fossils*," is a careful, persistent, exhaustive (and exhausting) close reading of a 1979 National Geographic map. They begin by approaching the folded map, and carefully examine each stage of their encounter with it; observing primitive elements, discovering increasingly complex associations, and identifying motifs. At strata one, they describe, for example:

> …this lush, gorgeous, almost tactile rendering in tawny shades of khaki and sand and lightly done toast. The colors slip through old ivory and olivesheen and citron to conclude in a deep grass-green, minty, almost viridian in the shadows of the Atherton Tableland. There is a ripeness about the rendering, a swelling, a fullness.
>
> (Wood and Fels 2008, 37)

From there they draw in intersecting networks of (strata two) iconographic denotation and connotation.

> What modulates smoothly on the poster-side map from the palest of Caucasian winter-skin "whites" to watermelon-rind green, goose-steps on the main-map side from Western-Australian pink to South-Australian purple to Queensland yellow. What on the poster-side map was a "self-distinguishing" landscape of gradually varying land*forms* (mountains, valleys, plains), is severed, on the main map, into land *status types*, aboriginal lands (bounded by a black line shadowed in gray); and wildlife sanctuaries, nature reserves, and national parks (bounded by dashed lines and filled with green). What on the poster side explodes from the map in abundant profusion (animals, which is to say, nature) is on the main map corralled, bordered, set apart (in parks). Everything else is white….
>
> (Wood and Fels 2008, 39; emphasis in original)

Finally, the authors pull the skein together in a coherent story of (strata three) construed meaning.

> The two sides of the map are connected in precisely this way: the land of living fossils—the poster side, the wild and wacky animals, and the wild and wacky terrain they imply (the lushly painted land of the poster's map)—are subsumed within the bounded and often rectilinear areas of green on the—how to say this?—more "comprehensive," more "real-world" main map of Australia, which while not a USGS topo quad is almost as authoritative. In the terminology of our introduction, nature as cornucopia (theme of profligacy) is subsumed within nature as park. Simultaneously, nature as park takes on the color of the profligate. In other words, nature as park *authorizes* nature as cornucopia. It says, "*I am authoritative*, so *that* is authoritative." Nature as cornucopia colors, *perfuses* nature as park. It says, "In Australia nature is bountiful, it is extravagant," and so it becomes hard to see the shape of Australia without seeing koalas, wallabies, kangaroos. But this effect occurs in our heads. It's not on the paper.
>
> (Wood and Fels 2008, 42; emphasis in original)

This detailed, introspective, and insightful map reading constitutes a virtuoso performance of what each reader does, albeit usually in a less deliberate and self-conscious manner, each and every time *any* reader encounters *any* map. Wood and Fels demonstrate the ubiquity themselves; in each of the eight chapters that follows "Reading *Land of Living Fossils*" in *The Natures of Maps*, they stage abbreviated performances of the same reading method over and over again. Starting from simple descriptions of motifs, they invoke a web of connotation and association and finally leap headlong into a fully realized story: one that they themselves have conjured in their own heads.

"This effect occurs in our heads. It's not on the paper" (Wood and Fels 2008, 42): "Aye, there's the rub" (*Hamlet* Act III, Scene I). Wood and Fels have come to this story (the story they themselves tell) only by way of a deliberate construction of meaning, an intrinsic part of which is the conceit that the map itself has "told" them this. They manage, time after time, to get from the ink on the paper to places (variously) of sublime grandeur, wonder, awe, mystery, domesticity, and/or ownership to which the various map authors may or may not have wished to lead them, but which Wood and Fels themselves have shown to be their own chosen destinations.

They find themselves, for example, chilled by maps of Everest and Antarctica. The authors write: "The myriad ridges are rock solid yet razor sharp, the glaciers—the entire map in fact—icy cold, and the thin air as transparent as a vacuum" (Wood and Fels 2008, 117) about the Everest map. Similarly, in regard to a map of Antarctica, they are certain that: "This map is cold—extremely cold … it is almost surprising to touch the map and not feel one's finger tips stinging with cold" (Wood and Fels 2008, 121). These histrionic tales are clearly nothing but the flapping of the authors' own over-heated imaginations. They are stories *inspired* and *facilitated* by the map, but quite patently not *told* by the map. It's in the authors' heads, not on the paper. One may *believe* that "most National Geographic maps … tell you how they want to be read by the way they unfold themselves" (Wood and Fels 2008, 36), but the voice one hears in one's head is one's own.

Wood and Fels stage their virtuoso reading performances throughout *The Natures of Maps*, but the meanings they find at each strata, and indeed at every turn and twist of their relentless autopsies, are not necessarily, or in some cases, even likely, the ones someone else would find in their own encounter with the artifact. Of course not: it is not to be expected that the story (or stories) any one reader, or even this pair of passed master readers, find in any map would be universal. Remember, "this effect occurs in our heads. It's not on the paper" (Wood and Fels 2008, 42): the intrinsic meanings, the map stories, do not reside in the map and are not "told" by the map. The map instead presents propositions and arguments (which Wood and Fels call *postings*) that play to the assumptions and predilections of the reader(s), and thus strive to insinuate themselves into the stories constructed by the reader(s). Sometimes the map succeeds in its efforts, and at other times it fails. Occasionally, the map becomes entirely the puppet of its audience. This is called a counter-reading.

COUNTER-READING

It is important to recognize that counter-readings are entirely legitimate interpretations, and not simply an exercise in facing a map and saying: "*Tisn't*" (Monty Python 1972). A counter-reading is not a denial of the map's propositions; it is a commandeering or hijacking of a map's arguments to fit a new story. The deliberate counter reader assumes that their counter-reading is antithetical to the intentions of the map issuer, but the intentions of the map issuer are in any and all events entirely an assumption by the reader, and thus a part of the counter (or any other) story. The assumption may well be very good and accurate, but it is an assumption nonetheless. Subversion is in the eye of the beholder. Thus, a counter-reading is as real and legitimate as any other reading, and employs the self-same mechanisms for construing meaning, and the same conceits of correctness.

TEMPLATES AND APP-TITUDES

Esri has adopted the notion of storytelling maps as a central marketing trope for their ArcGIS Online map services. They provide customers with several variant online map application (app) templates, at various levels of complexity, that can be used more or less as-is or customized in different ways to any level of sophistication. The template library allows the map/app maker to create a website focusing on one, two, or many maps; to structure their presentation for guided or random access; and to handle delivery of text, photos, links, etcetera in several ways (Esri 2016b). This certainly seems like a very useful and comprehensive range of starting points, well suited to

accommodating many map presentation and usability affordance needs.

However, the templates do not so much assist the map in telling a story as they facilitate an integration of maps and text with other material in a digital environment. A look through the *Story Map Gallery* (Esri 2016a) bears this out. It is never the maps themselves that are speaking: while the maps are showing one or more propositions as fact, it is the text that is giving explicit guidance on how the facts are to be construed. This is no different from any other type of map or map/text integration: the templates are only leveraging and making accessible to map/app makers new tools to do what map makers have always done (or have tried to do). Story Maps no more tell stories in a digital environment than the breakthrough of integrating wood-block maps with printing type on a page allowed Hartmann Schedel's maps to tell stories (1493).

Esri Story Maps clearly do a pretty good job of what is within their power; however, it is also clear in reviewing the results that stories are not told by these maps but are construed from them.

The same could be said of the communal on-line atlas *MapStory* (2016), which offers a similar, but non-commercial, tool set and platform. In one short essay on the *MapStory* site, "Making sense of dynamic change in a global world," Jonathan Marino writes that "Mapstorytelling can't itself provide this dynamic understanding [by itself]. But by giving the general public a place to share and edit data and deploy these data in the form of annotated geospatial narratives that can travel far and wide across the world wide web, it can play an important part" (Marino 2015).

In all these cases, and regardless of the technology employed, we see that the map maker's task is still to use the persuasive powers of the map to guide and coerce the user's construction of meaning so as to adopt a story the makers or their sponsors prefer the map user believe. If, in swallowing the bait, the user fancies that the map itself has told him a story like a kindly cartographic Uncle Remus (Harris 1881), the map maker should see it as all well and good. As long as the user adopts something like the proposed point of view as his own, it is a win for the map.

NARRATIVE AND CARTOGRAPHY

Sébastian Caquard, in his *History of Cartography* article "Narrative and Cartography" (2015), traces the twentieth century evolution of the map/text relationship. The time line he lays out, and the landmarks he identifies, are cogent and pertinent to the topic, but he errs when he leaps uncritically to a new identity or interchangeability between maps and narrative stemming from new technology, particularly interactivity. His observation that "by the turn of the century, people were as likely to study Leopold Bloom's travels through Dublin via on-line mapping as they were to study them through direct engagement with Joyce's novel [*Ulysses*]" (Caquard 2015, 991) may well be correct, but that happenstance does not mean that the experiences or stories gained each way are fungible. Stories built by the exclusively online mapping user are unlikely to be very much like the ones constructed by the reader of Joyce. No one could possibly reach Molly Bloom's soliloquy from a map alone, however so very interactive that map might be.

Christian Jacob's remark (quoted by Caquard) that "the reading of a map cannot be disassociated from narrative writing" (Jacob 2006, 294) is key: for the purposes of understanding the relationship between stories and maps, *reading* a map is narrative *writing*. One does not *read* a story previously embedded in a map; one *writes* a story of one's own through interpreting rhetorical arguments forward by a map.

RHETORIC

A map deploys native, rhetorical arguments and devices (tropes, figures, schemes, enthymemes, etcetera) in order to suggest readings and to persuade a reader to adopt them.

Rhetoric is the art of persuasion—traditionally of persuasive speaking or writing, but in recent decades the rhetorical nature of graphic design and communication has been explored by Hanno Ehses & Ellen Lupton (1988), by Richard Buchanan (1985), and by me (2003), among others. I have, in particular, shown how a cartographer employs rhetoric in composing a map. Aristotle (1932) showed that there are essentially two types of persuasive arguments: discovered and invented. In mapmaking, discovered arguments would be called data (elevation data, census data, property descriptions, etcetera). Discovered

data is made plausible by the invented arguments of *logos*, *pathos*, and *ethos* (arguments of logic, emotion, and authority) (Aristotle 1932, 8), which I (2003) identify as *use* (*what* the map is for), *usability* (*how* it can be used), and *believability* (*why* it should be used).

ANALYSIS

Some maps go to great lengths to lead the user to a particular story; the following three examples leverage different strategies to do that leading.

BOATING WITH CHAMPLAIN

Margaret Pearce and Michael Hermann's (2008) map *They Would Not Take Me There; People, Places and Stories from Champlain's Travels in Canada, 1603–1616* (Figures 2 and 3) presents a complex intersection of narrative and map that strongly urges a reader to see North America as Samuel de Champlain did in the 1600s. Surely this map tells a story, does it not?

Yet, as Daniel Huffman noted in his review of this map:

> …Champlain's words are the star. The text is supported and enhanced by the spatial representation, not the other way around.
>
> (Huffman 2012, 119)

In fact, the map does not *tell* Champlain's story so much as frames it, contextualizes it, makes it accessible, and adds an air of *verisimilitude*. The framework of a story (narrated by Champlain) is supplied, and the map is tailored to appear to drop into place in it.

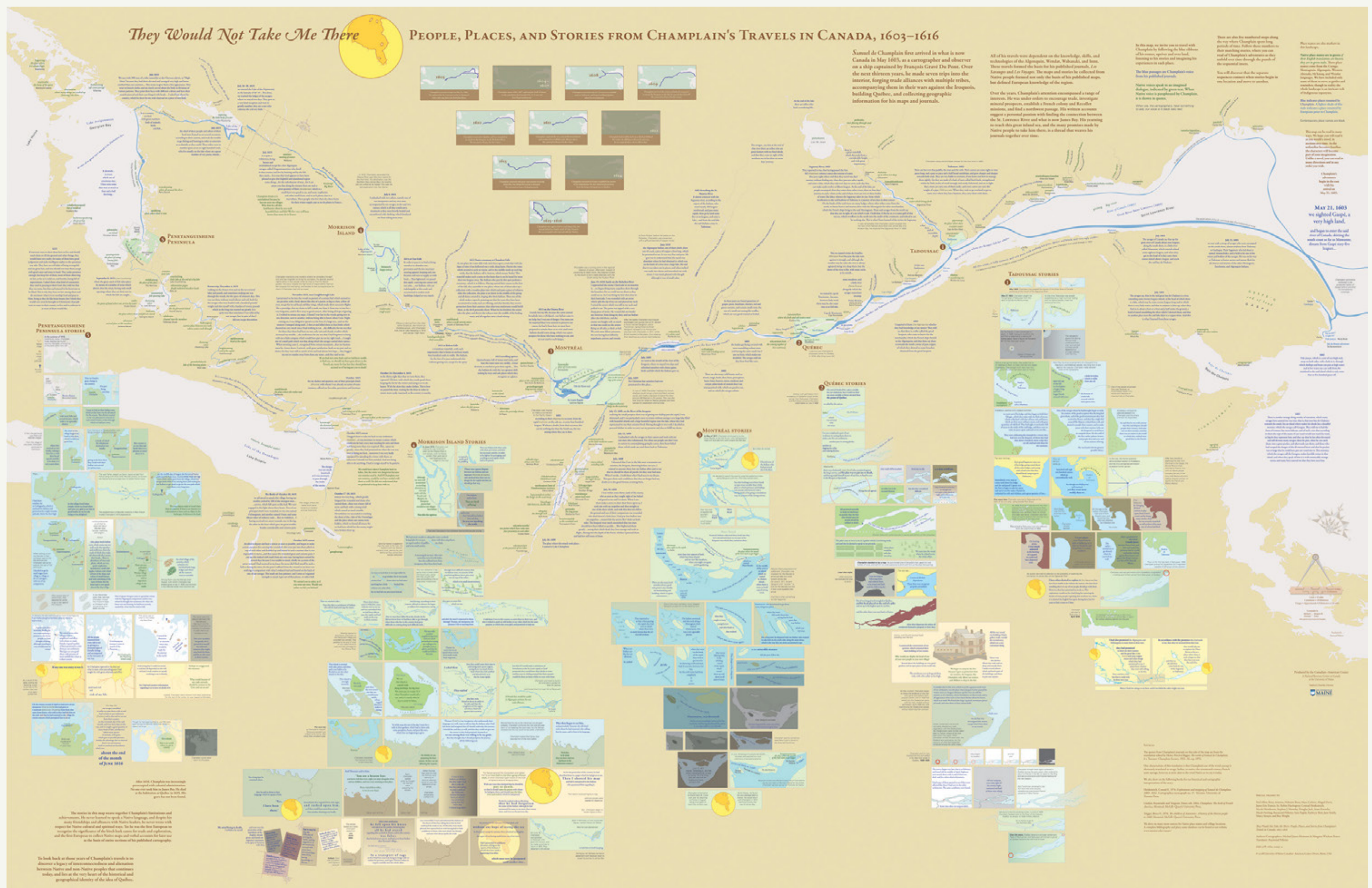

Figure 2. They Would Not Take Me There; People, Places and Stories from Champlain's Travels in Canada, 1603–1616 *by Margaret Pearce and Michael Hermann. 2008.*

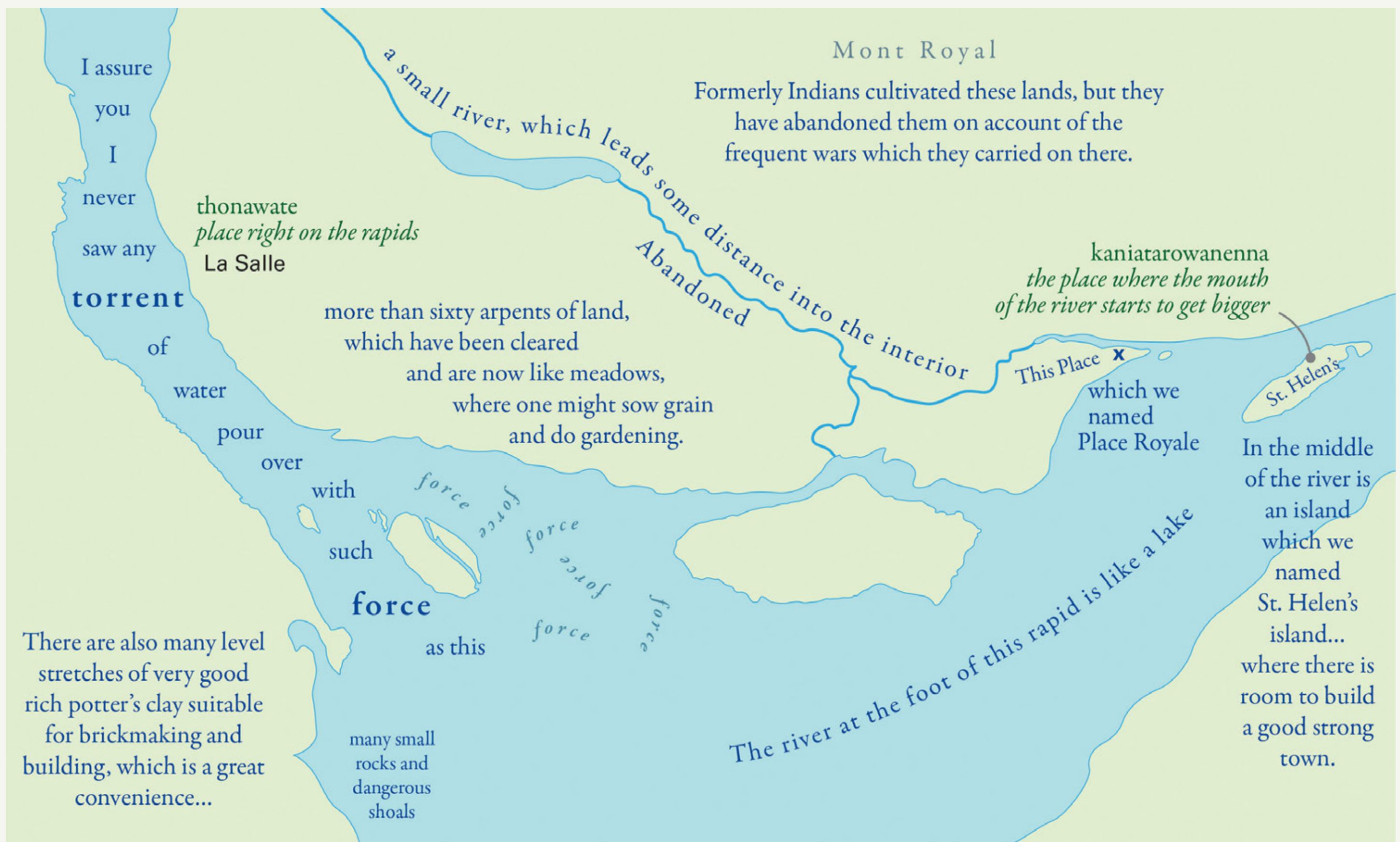

Figure 3. Detail of They Would Not Take Me There.

This map is wrapped in Champlain's commentary and festooned with his text; each feature on the map is present because it is tied to some episode or other, and its reason for appearing is Cham-splained with an excerpted note.

In *They Would Not Take Me There*, the second Panofskian strata aggressively encroaches on the third. Instead of just suggesting a normative reading (specifically, the point of view of the Father of New France), this map effectively employs a voice-over narration to dominate and colonize the map reader's construction of strata three meaning. It would require a strong and determined reader (a veritable Roland Barthes) to avoid going along with this catechism, and even then it would seem likely that the only alternative is a wholesale rejection of the Champlain story.

None of this should be taken as criticism of the appropriateness or legitimacy (or the quality) of *They Would Not Take Me There*; nor does it disparage the ethics of the map's authors. *They Would Not Take Me There* does exactly what it set out to do, and what it set out to do is exactly what a map of this sort must do. Had the authors done anything less, they would have been doing a disservice to their program of rendering Champlain's journal accessible and verisimilar. This analysis simply lays bare the mechanics of how the goal is accomplished.

A BONNY RAMBLE THERE-AND-BACK

The next example is Charles Joseph Minard's (1869) famous map of Napoleon's Russian Campaign of 1812 (Figure 4) which, as Edward Tufte remarked, "tells a rich, coherent story" (Tufte 1983, 40).

Perhaps, though, it does not.

In his recent book *Mapping Time*, Menno-Jan Kraak clearly writes that in this map one can see what happened to Napoleon's army, but not how or why.

> Napoleon crossed the River Neman into Russia with 422,000 troops, and crossed it back into Poland with only 10,000. The flow map expresses this disastrous outcome very clearly. However, it does not explain why the disaster occurred. The temperature diagram tempts

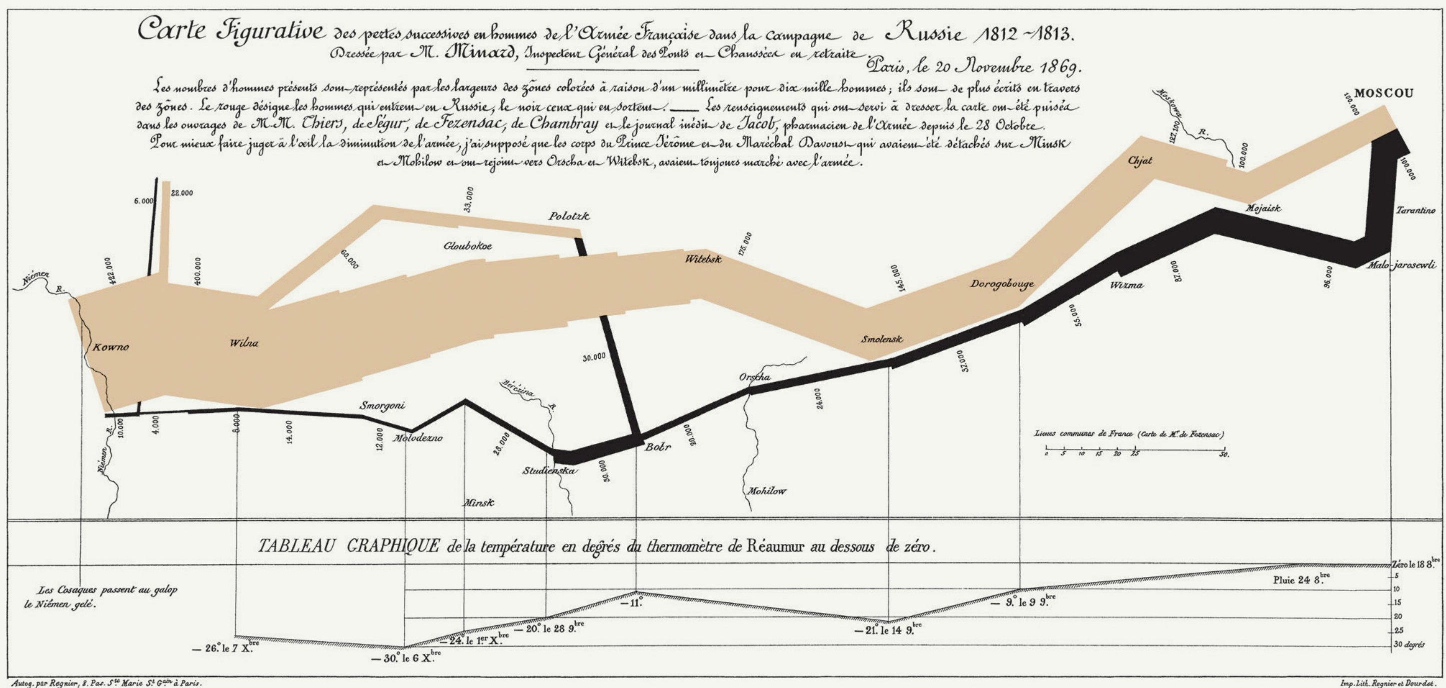

Figure 4. Figurative Map of the successive losses in men of the French Army in the Russian campaign 1812–1813. *Charles Joseph Minard. 1869*

> readers to conclude that the cold created the calamity. Many paintings of the campaign support this, with their stark depictions of soldiers succumbing to the harsh winter weather …. However, scrutiny of the map reveals that the largest drop in troop numbers occurred on the march toward Moskva, which took place during autumn. Did battle, desertion, or illness cause these losses? (Talty 2009) The map does not indicate the most important battles so it is hard to answer this question.
>
> (Kraak 2014, 20)

Kraak seems to recognize that while the map provides factual information, and assembles the information into a proposition or argument about what happened when, where, and to whom, the story must be sorted out by the user.

In this map, Panofsky's model works out in a more conventional manner. Straight off, we see that great zig-zag of muscular lightning flash across the west Russian plains to strike the capital, and we see the slow, painful trickle of the retreat. This is visceral and emotive; pure Panofskian strata one. We also see the explicit links between the route and the temperature graph, a strata one feature that feeds straight into our strata two knowledge about conventional tellings of the Russian Campaign story. The map leaves things there, however; it is up to us to bring enough to the map to find a fuller (strata three) meaning. Kraak suggests that Stephan Talty's *The Illustrious Dead* (2009) has something useful to contribute, and by bringing in Talty he is able to leap to a more fully realized strata three meaning. Many readers, however, will not have access to such resources. These folks may well have to fall back on better known conventions, such as *War and Peace* (Tolstoy 2008) or the "many paintings of the campaign" (Kraak 2014, 20), and, in the end, perhaps, accept at face value the propositions of Minard's map. They are persuaded to build their story from what it suggests. It would seem that Tufte did.

As can again be seen, not only is a story construed from strata one and two interpretations unreliable, but in all cases the map never *tells* a story, the reader *construes* it.

BUILDING A STORY OF ONE'S OWN

The third example is from Chris Ware's novel in a box: *Building Stories* (2012). Ware's work comes as close as is possible to actually mapping stories; both because many episodes are actually structured as maps and because the reader must negotiate a path through the work as a whole and, quite explicitly and deliberately, map out a story to build.

Figure 5. Untitled front endpaper from an untitled component of Building Stories *by Chris Ware. 2012.*

In this illustration (Figure 5) from the endpapers of one of the 14 small books, pamphlets, flyers, and cards assembled in *Building Stories,* one can see a woman lying in bed late at night, contemplating suicide.

The spread is, quite clearly, a map of the topography of this woman's nighttime thoughts. She, and every reader, is able to, and in fact must, undertake a journey across and through this mental landscape. Like any topographic map, this map makes some landscape features explicit, and maintains silences on other features that may well exist; hiding them from both the sleepless woman and the map user.

Ware usually refuses to recommend a reading order for the materials in *Building Stories* (Hart 2012), and one assumes that this applies within the topography of this map as well. *Building Stories* is, in fact, a quintessential, paradigmatic, model for a topographic map. Ware, as map maker, provides material pitched to propose that one or more stories exist, but he refuses to say there is a *correct* story, or even to suggest that the reader should adopt or accept any particular one. Instead, the audience is required to explicitly bring their own interpretations forward, and tailor their story to fit what they themselves interpret as the evidence presented. This is what happens with any map anyway; but with most maps this process lies hidden between the map maker's conceit and the user's naivety.

Viewed through Panofsky's model, one can see how Ware has carefully set a stage for both the strata one and two analysis that provides for launching into strata three in almost any direction. In the first strata one sees individually identifiable features, including the predominant motif of paths relentlessly looping back upon themselves. Second strata evaluation brings the reader face-to-face with the reality of the potential exits and the ramifications of that looping pattern: there seems no conventionally desirable way out. There is no question that the landscape is bleak and terrible; the author has plunked the map reader down between the devil and the deep blue sea, and surrounded them with a prospect of cliffs, crags, pestilential swamps

and searing deserts. Like any topographic map, the overall proposition of this map is that it is complete: that it shows all that is there, all that is truly possible, and provides all that one needs to know. Still, again like any topographic map, it leaves Ware's reader (and his unfortunate character) to shift for themselves in making the leap to a strata three meaning. Neither Ware (nor the United States Geological Survey, for that matter), can guess what sort of story a particular reader might want or need told. In both cases they only propose that their maps are usable stage sets upon which to play out any chosen story.

CLOSE

A RECAP

What this all means is that there are at least three ways maps can integrate with stories. For example, someone could be telling a story, and they could haul out a map to support it: think here of Pearce and Hermann's map (Figure 2), which sits in the context of Champlain's narrative. In such a case, the map is framed and bounded by the supplied story, and the reader has only to decide if that map supports that story.

Alternatively, a map could present a set of propositions designed to persuade a user of the *likelihood* of certain facts: Minard's map comes to mind here (Figure 4). Minard's map proposes that people died and it was really cold. It is up to the reader to judge the validity and pertinence of the propositions and to construct his or her own story.

Or, again, as in the Ware map (Figure 5), a map may facilitate a range of readings, but with no particular reading privileged. Here the story is most entirely the reader's own. Topographic maps generally aspire to appear to do this, but all such maps still propose (at least) their own disinterested authority, reliability, and completeness. Other propositions can permeate these (and all types of) maps as well, in the hope and expectation of guiding the map user in construing a story.

Now, at this point a mapmaker might jump up and shout that any particular reader's interpretation of the map is *not* what they, as creator, intended, and the mapmaker may well be quite right about that. If so, it's kinda too bad. By that stage there is nothing at all that can be done about it: the mapmaker has missed their chance to lead the reader to that preferred reading.

As Northrop Frye has pointed out: "the [map] author's interpretation has a peculiar interest, but *not* a peculiar authority" (Fry 1957, 5).

CONCLUSION

It is clear that, although maps and stories are bound together, a map does not actually tell a story. A map can only propose rhetorical arguments: it can set a contextual stage, it can suggest the existence and pertinence of facts, and it can attempt to make its propositions appear reasonable. It is the map *user* or *reader* that must fit the map's propositions into a narrative that resonates with a wider understanding—with a story. Formal examination of how meaning is construed can be facilitated by employing Panofsky's model, which makes clear that while the reader learns many things directly from the map, the fully realized story comes through the user's interpretation. The map cannot tell a story to the user: the user must make a place in a story for the map. Sometimes this fitting dramatically affects the story, and the story may become quite different, or even unrecognizable, after accommodating the map, but it was the map reader that effected the change and construed the new story: actual storytelling is beyond the map's power.

Maps can propose facts, relationships, correlations, and situations that suggest or support some story, but fostering, influencing, or reinforcing a story is not the same as telling one. Stories are thrust upon the map, and fuller and richer stories are born from fuller and richer resources that are brought to bear through increasingly sophisticated strata of analysis; strata that draw increasingly upon knowledge from further outside the map itself.

A successful map is one that provides persuasive verisimilitude, or can afford persuasive access to propositions about facts, relationships, correlations, situations, or milieus. A successful map is one that can naturalize its propositions to such a degree that the map user accepts the map as an integral support or justification for the story they themselves have adopted.

TAKE AWAY

Panofsky's model provides a formal, structured means of examining how meaning is brought to the map by the reader. That reader first forms a primary interpretation of what they see using their understanding of graphic form (graphic literacy). By placing this primary interpretation into the framework of what they know about cartographic vocabulary and grammar, and by situating it against the horizon of the cartographic canon (that is, through map literacy), a conventional interpretation is construed. Other (topical) knowledge can then be chosen and deployed to bring this somewhat formulaic conventional interpretation into the user's understanding as the "intrinsic" meaning (story). This chain of construal is kicked off by the map, but takes place almost entirely outside it.

Every map achieves a third-strata Panofskian meaning: it is the user's sophistication in drawing on resources outside the map, beyond basic map-reading skills, that determines the fullness or poverty of that meaning. The mapmaker, however, can strive to structure their map's rhetorical appeal so as to direct (and perhaps restrict) the reader's choice of resources, in order to discourage mis- or counter-readings and to persuade them to tailor their construed story to fit the map.

Here, then, is the complex relationship hidden unexamined behind the glib platitude "Maps Tell Stories."

REFERENCES

Aristotle. 1932. *The Rhetoric of Aristotle*, translated by Lane Cooper. Upper Saddle River, NJ: Prentice-Hall.

Barthes, Roland. 1981. *Camera Lucida*, translated by R. Howard. New York: Hill and Wang.

Bertin, Jacques. 1983. *Semiology of Graphics*. Madison: University of Wisconsin Press.

Buchanan, Richard. 1985. "Declaration by Design: Rhetoric, Argument, and Demonstration in Design Practice." *Design Issues* 2(1): 4–22. doi: **10.2307/1511524**.

Caquard, Sébastian. 2015. "Narrative and Cartography." *The History of Cartography*. Vol 6, bk. 2, *Cartography in the Twentieth* Century, edited by Mark Monmonier, 986–991. Chicago: University of Chicago Press.

Calvino, Italo. 1969. *The Castle of Crossed Destinies*, translated by William Weaver. New York: Harcourt, Brace and Company.

Carroll, Lewis. 1976. "A Photographer's Day Out." *The Complete Works of Lewis Carroll*. New York: Random House.

Compact Edition of the Oxford English Dictionary. 1971. s.v. "story," 6.

Denil, Mark. 2003. "Cartographic Design: Rhetoric and Persuasion." *Cartographic Perspectives* 45: 8–67. doi: **10.14714/CP45.498**.

Denil, Mark. 2011. "The Search for a Radical Cartography." *Cartographic Perspectives* 68: 7–28. doi: **10.14714/CP68.6**.

Ehses, Hanno and Ellen Lupton. 1988. *Rhetorical Handbook*: *An Illustrated Handbook for Graphic Designers*. Design Papers 5. Halifax, NS: Nova Scotia College of Art and Design. **http://www.academia.edu/8588383/Hanno_Ehses_Ellen_Lupton_Rhetorical_Handbook**.

Esri. 2016a. "Story Maps Gallery." Accessed May 15, 2016. **http://storymaps.arcgis.com/en/gallery/#s=0**.

Esri. 2016b. "What Kind of Story Do You Want to Tell?" Accessed May 15, 2016. **https://storymaps.arcgis.com/en/app-list/**.

Fish, Stanley. 1980. *Is There A Text in this Class*? *The Authority of Interpretive Communities*. Cambridge: Harvard University Press.

Fry, Northrup. 1957. *Anatomy of Criticism*: *Four Essays by Northrup Fry*. Princeton: Princeton University Press.

Gompertz, Will. 2012. *What are you looking at*? *The surprising, shocking, and sometimes strange story of 150 years of Modern Art*. New York: Dutton

Harris, Joel Chandler. 1881. *Uncle Remus: His Songs & His Sayings*. Project Gutenberg. **http://www.gutenberg.org/cache/epub/2306/pg2306-images.html**.

Hart, Hugh. 2012. "Chris Ware Brilliantly Bundles 'Building Stories' as Graphic Novel Boxed Set." *Fast Company*, September 21. **http://www.fastcocreate.com/1681628/chris-ware-brilliantly-bundles-building-stories-as-graphic-novel-boxed-set**.

Huffman, Daniel. 2012. Review of *They Would Not Take Me There: People, Places and Stories from Champlain's Travels in Canada, 1603–1616*. *Cartographic Perspectives* 71: 108–110. doi: **10.14714/cp71.63**.

Jacob, Christian. 2006. *The Sovereign Map*, translated by Tom Conley, edited by Edward Dahl. Chicago: University of Chicago Press.

Kraak, Menno-Jan. 2014. *Mapping Time: Illustrated by Minard's Map of Napoleon's Russian Campaign of 1812*. Redlands, CA: Esri Press.

Lupton, Ellen and J. Abbott Miller. 1996. *Design Writing Research: Writing on Graphic Design*. New York: Princeton Architectural Press.

Marr, David. 1982. *Vision: A Computational Investigation into the Human Representation and Processing of Visual Information*. New York: Freeman.

MapStory. 2016. "The atlas of change that everyone can edit." Accessed May 15, 2016. **https://mapstory.org**.

Marino, Jonathan. 2015. "Making sense of dynamic change in a global world." **https://mapstory.org/journal/55**. Accessed May 15, 2016.

Maugham, Somerset. 1954. *Mr. Maugham Himself*. New York: Doubleday.

MacEachren, Alan. 1995. *How Maps Work: Representation, Visualization, and Design*. New York: Guilford Press.

Minard, Charles Joseph. 1869. *Carte Figurative des pertes successives en hommes de l'armée qu'Annibal conduisit d'Espagne en Italie en traversant les Gaules (selon Polybe). Carte Figurative des pertes successives en hommes de l'armée française dans la campagne de Russie, 1812–1813. [Figurative Map of the successive losses in men of the army of Hannibal led from Spain to Italy by crossing Gaul (according to Polybius). Figurative Map of the successive losses in men of the French Army in the Russian campaign 1812–1813]*. Lithograph. 624 × 452 cm.

Monty Python. 1972. "The Argument Clinic Sketch." *Monty Python's Flying Circus*, Series 3, Ep. 3. **http://www.montypython.net/scripts/argument.php**.

Moxey, Keith. 1994. *The Practice of Theory: Poststructuralism, Cultural Politics, and Art History*. Cornell: Cornell University Press.

Munroe, Randall. 2015. *Thing Explainer: Complicated Stuff in Simple Words*. Boston: Houghton Mifflin Harcourt.

Panofsky, Erwin. 1955. "Iconography and Iconology: An Introduction to the Study of Renaissance Art." *Meaning in the Visual Arts*. Doubleday: New York. Originally published as "Introductory" in *Studies in Iconology: Humanistic Themes in the Art of the Renaissance*. New York: Oxford University Press. 1939: 3–31.

Pearce, Margaret Wickens and Michael James Hermann. 2008. *They Would Not Take Me There; People, Places and Stories from Champlain's Travels in Canada, 1603–1616* [*Les hommes, les lieux, et les histoires retrouvées des Voyages de Samuel de Champlain au Canada, 1603–1616*]. Translated by Raymond Pelletier. Offset lithograph. 39 × 59 in. Orono: University of Maine Canadian-American Center.

Peirce, Charles Sanders, and Victoria Welby-Gregory (Lady Welby). 1977. *Semiotic and Significs*: *The Correspondence between C. S. Peirce and Victoria Lady Welby*, edited by Charles S. Hardwick and James Cook. Bloomington and Indianapolis: Indiana University Press.

Pickles, John. 2004. *A History of Spaces*: *Cartographic Reason, Mapping, and the Geo-coded World*. New York: Routledge.

Russell, Bertrand. 1912. *The Problems of Philosophy*. Amherst, NY: Prometheus Books.

Saussure, Ferdinand de. 1983. *Course in General Linguistics*, edited by Charles Bally and Albert Sechehaye, translated by Roy Harris. La Salle, Illinois: Open Court.

Schedel, Hartmann. 1493. *Nuremberg Chronicle aka Schedelsche Weltchronik (Schedel's World Chronicle)*. Nuremberg: Brussel and Brussel. **https://books.google.com/books?id=IeUOAQAAMAAJ**.

Schumacher, Rupert von. 1934. "Ein Kleinstaat Bedroht Deutschland [A Minor State Threatens Germany]." *Zeitschrift für Geoplitik*, November.

Sherman, Cindy. 1977–80. *Untitled Film Stills*. New York: Museum of Modern Art.

Stevenson, Robert Lewis. 1894. "My First Book: Treasure Island" *Idler Magazine: An Illustrated Monthly*. August. 3–11.

Talty, Stephan. 2009. *The Illustrious Dead*: *The Terrifying Story of How Typhus Killed Napoleon's Greatest Army*. New York: Crown.

Tolstoy, Leo. 2008. *War and Peace*, translated by Richard Peavear and Larissa Volokhonsky. New York: Random House.

Tufte, Edward. 1983. *The Visual Display of Quantitative Information*. Cheshire, CT: Graphics Press.

Ware, Chris. 2012. *Building Stories*. New York: Pantheon.

Wood, Denis, and John Fels. 2008. *The Natures of Maps*: *Cartographic Constructions of the Natural World*. Chicago: University of Chicago Press.