Cartographic Perspectives

The Journal of **nacis**

IN THIS ISSUE

Dear NACIS members and *Cartographic Perspectives* Readers,

As you will no doubt notice, this letter is a little tardy in arriving on your virtual doorstep, as my term as NACIS President (2015–2016) has now been over for some months. Nevertheless, I would like to take some time to recap some of what the Society was up to during my term as President.

The 2015 Minneapolis meeting, which had a theme of *Mapping Interactions*, was a success, with strong attendance and some unique events that our venue in the Renaissance Depot Hotel allowed us to experiment with because of its extensive open spaces. Chief among these was the Tangible Map Exhibit, an addition to our regular Map Gallery that highlighted tangible and physical cartographic works, with many visually stunning artistic maps and even a giant interactive floor map of the Bad River-Wetland Medicine River. This exhibit was co-organized by Matt Dooley, Jake Coolidge, and Caroline Rose. If you were unable to see it in person, you can see it photographically documented in a Visual Fields piece in *CP 82* (doi.org/10.14714/CP82.1344). I would like to offer a big thank you to every one of the many people who helped the NACIS Board to put on a successful 2015 meeting.

In addition to highlighting the excellent work of students who were recognized in the 2015 student mapping competitions (print mapping: Evan Applegate for Design Quality and Gabriel Rousseau for Research Quality; dynamic mapping: Lucas Smith in the Individual category and Daniel Stephen/Jane Darbyshire/Samuel Hooper/Gareth Baldrica-Franklin/Jennifer Bohanan in the Group category), I am pleased to also now finally be able to announce the winner of our 2015 *CP* Student Paper Competition, Joel Radunzel, whose article entitled "Using the Right Tool: David Woodward's Suggested Framework and the Study of Military Cartography" was published in *CP 81* (doi.org/10.14714/CP81.1281). Congratulations to Joel on his fine work, and thank you to the *CP* Editorial Board members who served as the judges for papers published in 2015 volumes: Rob Roth and Bernie Jenny. If you have not yet read Joel's article, I recommend it to you.

Anthony Robinson, the current President of NACIS, will no doubt tell you all about the 2016 Colorado Springs meeting in a future letter from the President that will be published soon, but I will mention one item from Colorado Springs that is of relevance to this issue of *CP*. For the first time, we experimented with streaming and recording a portion of the Annual Meeting, in an effort to broaden the reach of the Society to those who cannot always

make it to the conference or who don't yet know about the benefits of being a NACIS member. In this experiment, we recorded the presentations from Practical Cartography Day (PCD). The videos are now available on our NACIS YouTube channel (**bit.ly/2phnDID**). This is relevant to *CP* because in this issue, we present an attempt to build on and add further value to that project in a Practical Cartographer's Corner submission entitled "Pretty Maps Without the Price Tag: Cartography with QGIS" by Emily Eros, one of the PCD 2016 presenters. You can see her video alongside some commentary about her presentation and an accompanying tutorial for working with the print composer to make maps in QGIS.

The current Vice President, Fritz Kessler, and VP-Elect, Ginny Mason, are busy preparing for the next meeting, in Montréal, Canada, and welcome any and all ideas for participation. I'd like to remind you all that abstracts are due for the 2017 meeting in a few weeks — on May 31, 2017.

A second major project that the Board undertook in 2015–2016 was an investment in and implementation of an organization-wide project management system. As the Society has grown and the Annual Meeting has become more complex, we needed some technological help to improve the coordination of all the people whose volunteer efforts make things happen. With more than 248 separate tasks just for putting on the Annual Meeting, you can appreciate the scale of the challenge!

Finally, during 2016, the *Atlas of Design* editorial team, Marty Elmer, Sam Matthews, and Ginny Mason, were hard at work in putting *Volume 3* together. It sold out quickly after publication, and I will let Anthony tell you more about it in his letter.

I would like to extend a special thank you to all of the NACIS Board, and especially the Executive Board team, for all of their support during my term as President. There is no way we would have made any of these things happen without the teamwork and good cheer of everyone involved. On that note, if any of our readers have an interest in becoming more involved with the Society, one way of doing so is to run for the NACIS Board. Wearing my Past-President hat, my primary job is to solicit nominations for candidates for the Board. Please feel free to contact me soon if you would like to put yourself forward as a candidate for this year's election.

I hope that you have some time to have a closer look at the contents of *CP 84*. In addition to Emily Eros's piece already mentioned above, Mark Denil responds to Anne Knowles's 2014 Annual Meeting Keynote in a peer-reviewed piece entitled "Storied Maps." In Visual Fields, Meghan Kelly's contribution expands on her work on cartographic borders, first presented at the 2015 Annual Meeting in Minneapolis, in a piece titled "Collectively Mapping Borders." Learn about a collection of maps of other worlds, including the Land of Oz and Middle-earth, in Sierra Laddusaw and Jeremy Brett's profile on the Cushing Memorial Library and Archives at Texas A&M in their Cartographic Collections piece. Finally, you will find reviews of Mark Monmonier's recent memoir, Cindy Brewer's updated edition of *Designing Better Maps*, and a scholarly volume on maps as consumer items and what their study can tell us about society in Renaissance Italy. Enjoy!

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NACIS President, 2015–2016
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Storied Maps

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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.

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

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.
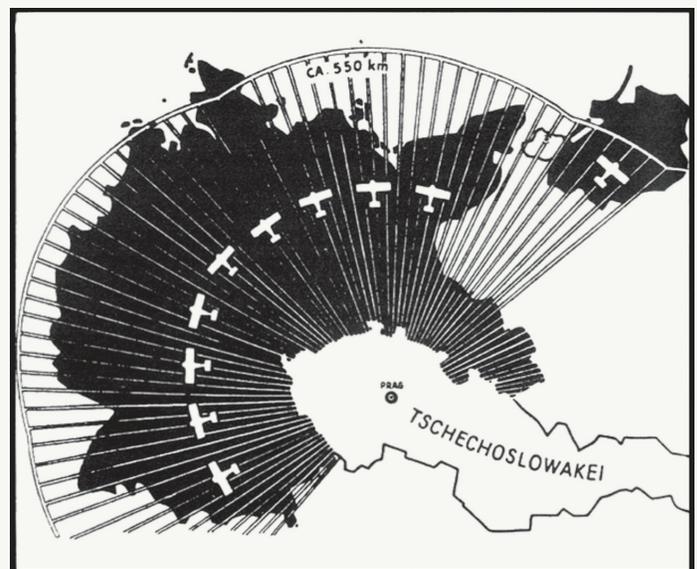

Figure 1. German magazine map by Rupert von Schumacher. 1934.

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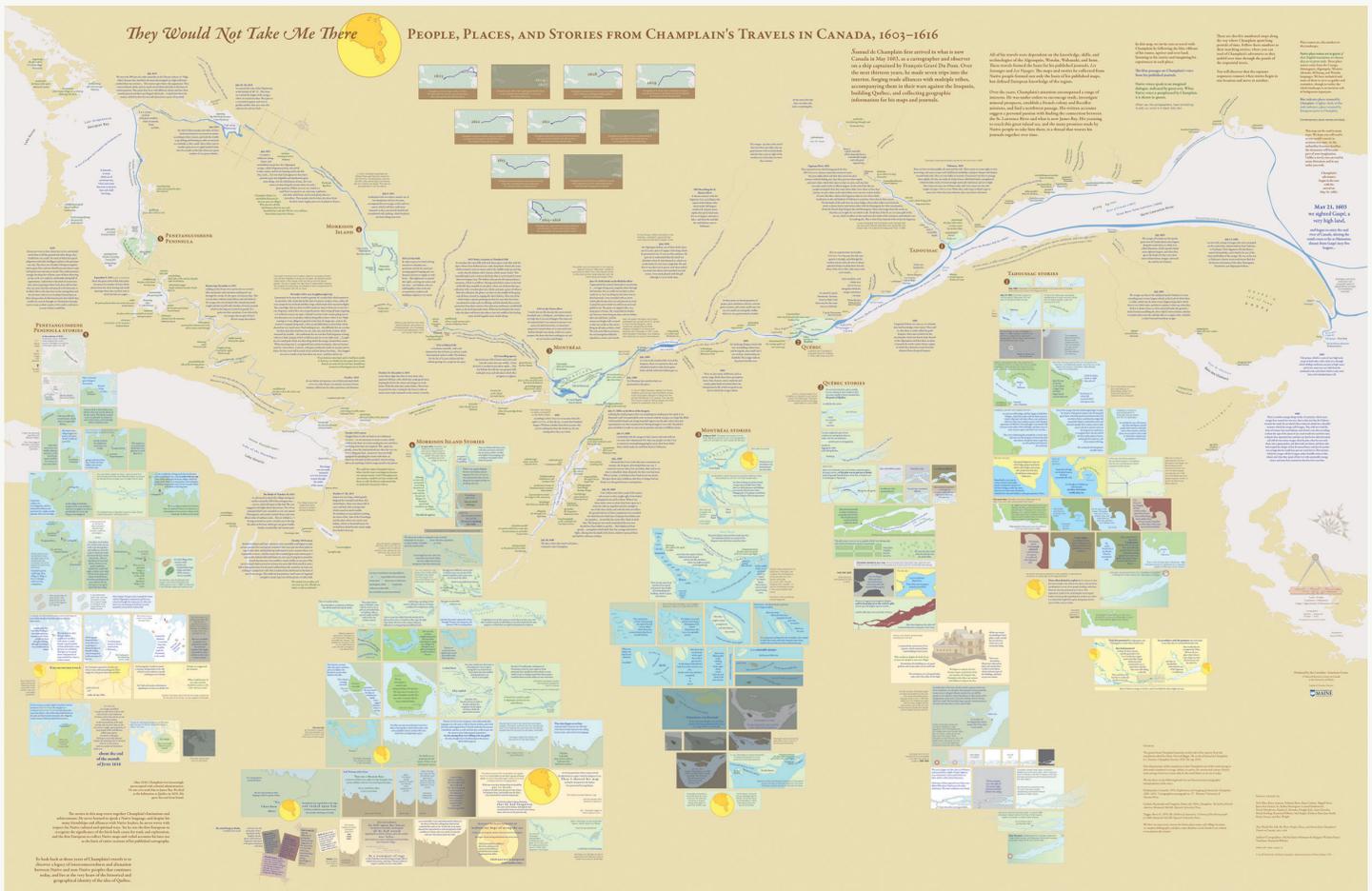
Figure 2. They Would Not Take Me There; People, Places and Stories from Champlain's Travels in Canada, 1603–1616 *by Margaret Pearce and Michael Hermann. 2008.*

The map contains the following labels and text:

Mont Royal

Formerly Indians cultivated these lands, but they have abandoned them on account of the frequent wars which they carried on there.

a small river, which leads some distance into the interior

I assure you I never saw any **torrent** of water pour over with such **force** as this

thonawate
place right on the rapids
La Salle

Abandoned

more than sixty arpents of land, which have been cleared and are now like meadows, where one might sow grain and do gardening.

kaniatarowanenna
the place where the mouth of the river starts to get bigger

This Place ✗

which we named Place Royale

St. Helen's

In the middle of the river is an island which we named St. Helen's island... where there is room to build a good strong town.

There are also many level stretches of very good rich potter's clay suitable for brickmaking and building, which is a great convenience...

many small rocks and dangerous shoals

The river at the foot of this rapid is like a lake

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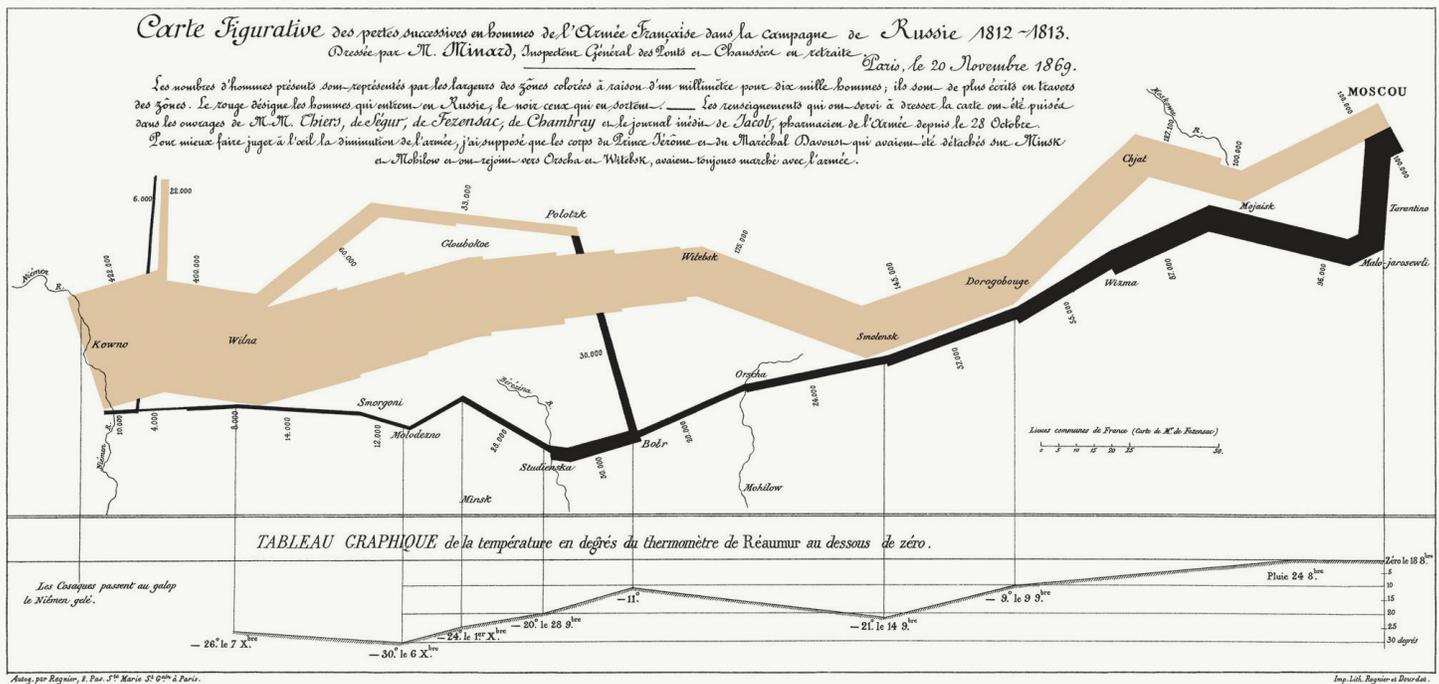
Figure 4. Figurative Map of the successive losses in men of the French Army in the Russian campaign 1812–1813. *Charles Joseph Minard. 1869*

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.

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."

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Real Maps, Unreal Places: The Maps of Imaginary Places Collection at Cushing Memorial Library & Archives

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It can be difficult to attract students outside of the geosciences into a university map collection, even if it contains material that will help them with their research and studies. But unique and interesting material can bring in new users: holding "cool" maps that are culturally relevant and visually engaging provides an outreach opportunity to a wide audience. Maps of imaginary places, including those from famous and popular works of literature,

television, movies, graphic novels, and games, offer a new collecting focus within a map collection.

At Texas A&M, Cushing Memorial Library & Archives has been building an impressive collection of Science Fiction and Fantasy (SF&F) materials since 1974. Among the materials in its Science Fiction & Fantasy Research Collection are several maps drawn either from archival
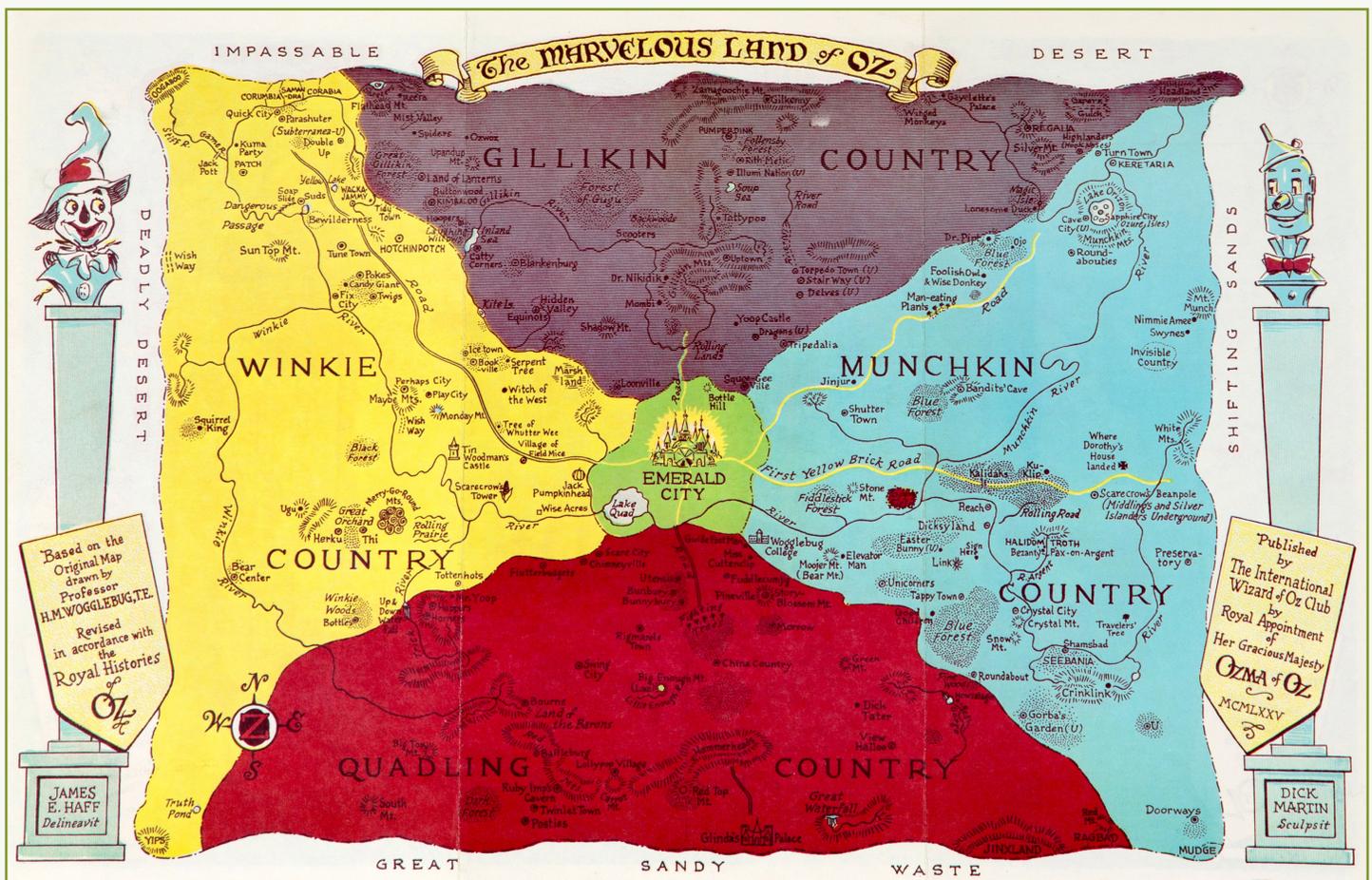
Figure 1. The Marvelous Land of Oz: Based on the Original Map drawn by Professor H.M. Wogglebug, T.E.; Revised in accordance with the Royal Histories of Oz, *cartographer James E. Haff, 1975.*

collections or cataloged as individual library items. These maps tie into our research holdings and provide another way to view and approach science fiction and fantasy works. Some of them are the official maps for a universe, approved by the author or movie production company, while others are created by fans of the worlds they read about, watch, or play in.

Given the strong tradition of maps as visual aids or narrative devices in the SF&F genres, we reasoned that building a strong research collection should include adding maps as a larger component of it. So in early 2014, the SF&F Curator and the Map Librarian officially joined forces and began cooperating on the Maps of Imaginary Places (MIP) Collection. In order to showcase and publicize the collection, a formal physical exhibit, entitled "Worlds Imagined," was proposed and accepted in August 2016.

The mainstay of the collection consists of maps drawn, in one form or another, from literature. Of course, due to the nature of the SF&F Collection, many of the maps in the MIP Collection are of fantasy lands or other planets. Some of these are not separate artifacts: they are included within the books in which they appear and include such varied worlds as Arrakis (*Dune* — Frank Herbert), Earthsea (*A Wizard of Earthsea* — Ursula K. Le Guin), and The Lands Beyond (*The Phantom Tollbooth* — Norton Juster). Others appear as individual maps, including storied fantasy worlds such as Narnia, Westeros, Middle-earth, and Oz (Figure 1). Both the collection and the exhibit balance out these famous geographies with lesser-known places such as Island Town (the *Children of the Drought* trilogy — Arianne "Tex" Thompson), Alera (the *Codex Alera* series – Jim Butcher), and The Stillness (*The Broken Earth* trilogy

— N.K. Jemisin). One of our hopes, when selecting materials for the exhibit, was that some of these lesser-known places might garner more attention from patrons, who hopefully will be driven to seek out new literary worlds to explore.

However, we do not limit the collection to maps from the SF&F genres. To this end, we acquired a map (admittedly a reprint) of Thomas Hardy's Wessex. We also made sure to include one of the most well-developed non-SF&F fictional worlds, the Mississippi county of Yoknapatawpha created by William Faulkner (the map was drawn by Faulkner himself for the 1936 novel *Absalom, Absalom!*). We also display maps drawn from famous novels of adventure — the map used by Allan Quatermain to find his way to the fabled *King Solomon's Mines* (H. Rider Haggard, 1885) and that drawn by Robert Louis Stevenson for his 1883 novel *Treasure Island*. Both these items represent another function of maps in literature: not simply describing a particular geography or tracking a route or quest, but serving as an active device that drives the narrative. The maps in these novels are of such importance to the plot that they are depicted in the books themselves, that the reader might be able to place themselves in the minds of their protagonists and feel a visceral thrill at being part of the story. That's something much harder to accomplish when a world or a city or a route are merely described rather than cartographically displayed.

A highlight of the collection is the 1925 Bernard Sleigh *An ancient mappe of Fairyland: newly discovered and set forth* (Figure 2). Sleigh's map displays a collective geography in which characters from mythology, fairy tales, and legend share a common land.

Figure 2. An anciente mappe of Fairyland: newly discovered and set forth, *cartographer Bernard Sleigh, 1925.*

Figure 3. Recentissima Novi Orbis Sive Americae Septentrionalis et Meridionalis Tabula, *cartographer Justus Danckerts, 1690.*

Although the inspiration for the MIP Collection was born out of a longtime love for maps found in books, the collection also includes maps from outside the realm of literature. One of the most famous geographic misconceptions in the history of cartography is the representation of California as an island. This falsehood arose in the 16th century and continued to be reproduced on maps through the 18th century, even after explorers had proved that it was not its own land mass. We include Justus Danckerts' 1697 *Recentissima novi orbis, sive, Americæ septentrionalis et meridionalis tabula* in the MIP because the map shows California as an island along with several other cartographic errors, including Terrae Esonis — a land bridge connecting North America and Asia; Danckerts' map is

the oldest piece in the collection (Figure 3). We also use the legendary tale from Garci Rodriguez de Montalvo's 1510 novel *Las sergas de Esplandian* to discuss the fictional Island of California, a kingdom of warrior women who ride griffins and are led by the beautiful Queen Calafia.

There is rich cartographic material to be found in the universes of broadcast media as well. Our exhibit displays, for example, a map of the United Federation of Planets (from the *Star Trek* media universe), one of "The Verse" (from *Firefly*), and one of the Twelve Colonies of Kobol (from the SyFy Channel reboot of *Battlestar Galactica*). These last two are particularly fascinating and wonderful because their cartographers have taken a relatively scant amount

Figure 4. *Exhibit attendees viewing the United Federation of Planets map.*

of detail as given in their shows of origin and built creatively upon it, describing planets and entire star systems from vague or one-off references and vastly expanding on a universe's given geographical complexity. The Federation map, in a reverse phenomenon, telescopes a sprawling universe — built over the course of six separate television shows and a movie series — that the cartographers have reduced to a manageable size by stressing locations and events of particular significance to the overall *Star Trek* narrative (Figure 4).

Location and setting are a key part of the story and gameplay in video games. Most games include an in-game map which the player can access to determine their location and to find their next objective, and some games come packaged with a physical map. Several video game maps are held in the collection. Our most popular video game map, and one of the most requested items in the entire collection, is the map of Hyrule that came packaged with the Super Nintendo Entertainment System game *The Legend of Zelda: A Link to the Past*. This map is double-sided,

showing the Light World and the Dark World: two parallel worlds that the player travels between using the Magic Mirror. Another popular map from the collection was created by a student at Texas A&M for a class assignment, showing the relationships between Pokémon and their nature-based abilities. Other video game maps held in the collection include maps from *Fallout 4*, *Chrono Trigger*, the *Elder Scrolls* series, and the *Final Fantasy* series.

Beyond maps of fictional locations, the collection includes allegorical and intellect maps. Allegorical maps cartographically illustrate emotions, stages of life, and morals. Intellect maps trace an idea or thought on paper. *Carte du Tendre*, an allegorical map produced in 1654 (we own a reproduction), shows the path to love and the pitfalls that exist along the way. Jason Bradley Thompson's *The Map of Zombies* maps out different types of zombies found in media and pop culture. Thompson's map shows zombie types based on movement speed, intelligence, and how one would kill them, neatly presenting it all using imagery of the human nervous system.

We began work on the exhibit in October 2016, reviewing maps, atlases, and books in the collection to determine which items should be shown and to identify items we should purchase for exhibit. After assessing the collection and purchasing several new items, we created our master exhibit list which was comprised of 53 maps, 12 atlases, and 14 books.

Working with the University Libraries' Conservator, we designed a conservation treatment plan for the materials. Since much of the collection is new, only a few items needed treatment. Items were delivered to the Conservator for flattening, tear repair, tape removal, and custom support creation for display. After conservation, maps were taken to picture framers in batches over several weeks. While the maps were out for framing, we created custom stands for books and atlases using plexiglass.

Cushing Library has a long tradition of producing high quality exhibit catalogs that are free to exhibit attendees. For the "Worlds Imagined" exhibit, we continued this tradition, but with a few changes. Past catalogs were typically close to imperial octavo (8¼" × 11½") size, produced in muted color tones to match the historical materials on exhibit, and written to provide further information about the items on display. With our catalog, we chose to design it like a travel guide one would use while on vacation to a foreign land. The dimensions of the catalog are smaller (6½" × 9½", and 96 pages), it is filled cover to cover with bright color, and each map is described as if as if it were a real location. For example, here is an excerpt of the entry for the map of Middle-earth:

> Travel Middle-earth! Climb the trees of the Mirkwood forest or ride a barrel down the Forest River. Take care if you venture to Mordor, the ash plain of Mount Doom, this area is an active field of war — you don't want to be captured and eaten. If you are looking for a 5-star stay, check in at Rivendell, home to the elves. Also known as "The Last Homely House East of the Sea," Rivendell is famous for the hospitality it offers to travelers.

After initially considering a scholarly cartographic "expert" as the speaker for the exhibit opening, we decided instead to invite an actual fantasy cartographer, someone who had familiarity and experience with the various considerations that go into mapping a fictional world and how to physically manifest those considerations in a map. We also wanted someone whose artistic work we both admired, and so we agreed on Priscilla Spencer as our speaker. Priscilla, a Texas-born filmmaker and artist, has created maps for a number of different fantasy authors including Jim Butcher, Seanan McGuire, and Kevin Hearne. The collection already had one of her maps, "The Realm of Alera and the Barbarian Lands" (from Butcher's *Codex Alera* series), and its creativity and detail had already won it a place in the exhibit. We purchased two additional maps of Priscilla's for the collection and all three are on display.

Priscilla spoke, using her Alera map as the main focus, about her process for creating her maps and the features of the landscape she considers, such as the effect of plate tectonics or concepts involving infrastructure — where would roads logically go? — and more subtle ideas such as the level of technology needed to produce different kinds

Figure 5. *Priscilla Spencer speaking at the exhibit opening.*

of maps (Figure 5). What should a map of a place look like, given the materials at hand within that world? Priscilla believes in making a map look and feel as if it had truly been created in the world it describes.

To date, the exhibit is enjoying substantial praise and success (Figure 6). We are gratified that so many people are finding or rediscovering the same love of fictional maps that we have, and it is our hope that this exhibit will shine a new and lasting light on the MIP Collection as a whole.

Figure 6. *Exhibit attendees viewing the map of Ankh-Morpork.*

Pretty Maps Without the Price Tag: Cartography with Just QGIS

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MY ROLE AT the American Red Cross is to provide mapping and data management support for international activities. On any given day, this can involve training Liberian volunteers on how to use cell phones for data collection, remotely analyzing earthquake damage in Haiti, or mapping immunization rates in Malawi to help eradicate measles.

By the time I joined the American Red Cross in 2014, I'd been using GIS for analysis and mapping for almost ten years but I'd only really been exposed to proprietary software packages. I'd heard of QGIS, and even tried to use it once, but back then I found it counterintuitive and frustrating.

At the Red Cross, we try to use free and open source software whenever possible. Partly this supports a collaborative software environment, and partly this is just more practical for our needs: using free tools means that I can train local staff or community members and point them to a software download that doesn't require a license.

Adapting to the Red Cross team meant that I had to shift my whole workflow into QGIS. Moreover, our team needed a process to balance rapid deadlines—"We're sending someone to Nepal in an hour and we need 10 maps"—with visual aesthetics and good cartographic design principles.

At first, I kept hitting roadblocks, or would end up spending an hour trying to solve a minor problem. Over the past couple of years, though, the Red Cross mapping team has come up with a collection of tricks that make it easy to get started in QGIS and quick to make print-ready maps

ACCOMPANYING VIDEO (14:35)
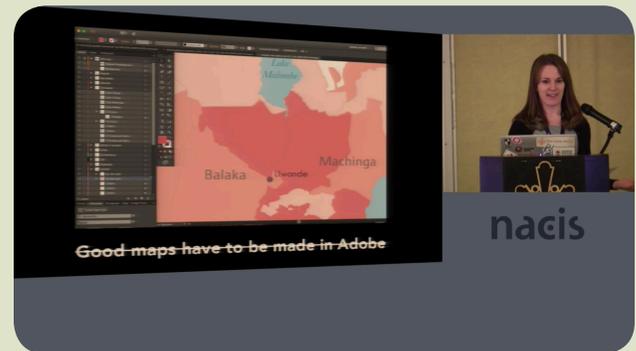
NACIS 2016 Practical Cartography Day
Colorado Springs, CO • October 19, 2016

Click to watch, or visit
youtube.com/watch?v=MjL2O3Oow60

(ex: **github.com/AmericanRedCross/workflows/blob/emily/qgis_print_composer_tricks.md**). We've also leveraged and extended the work of others to create styles and symbologies for our maps. We've worked out a lot of the kinks and have built tutorials to train new staff. Rather than feeling frustrated by QGIS, everyone on our team has come to love it.

I was interested in sharing our experience with others at NACIS because I wanted to spread awareness about the different resources that cartographers have at their disposal. Open source tools were not part of my formal GIS education, and I didn't realize that they offered a viable option for making production-quality maps. Also, QGIS has

excellent documentation for all its technical features, but I hadn't come across a resource that would guide someone through the practicalities of working with the print composer and that would answer the types of questions our team had to figure out, such as:

- How come what I see in the composer doesn't match what's on my screen?

- How can I zoom in without going overboard?

- Why does my map disappear when I save and re-open it? How do I get it back?

Everyone's cartographic needs are different and QGIS may not be a great fit for everyone, but the goal of this presentation is to introduce it as an option that some people may not have considered.

Collectively Mapping Borders

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I BECAME FASCINATED with borders and all their peculiarities about two years ago, while simultaneously enrolled in a border studies course and a cartography course. At that time, I began questioning and rethinking the cartographic conventions and workflows that I had been exposed to: downloading a shapefile of country outlines, generalizing the linework, and assigning homogenous symbolization—thin, solid, black strokes—across all units, sometimes adding a dash if the border is contentious (Figure 1). But throughout the semester, I quickly discovered that I was doing it all wrong: I had no clue what borders were or how to represent them.

Borders are dynamic and are continuously evolving. They are nowhere near homogeneous, as each border is geopolitically different. They often tighten and loosen, allowing some to enter, but not others—and force many to be smuggled across. We conventionally represent borders in two dimensions: lines for the border itself and points for border crossings. In reality, borders are often areas and zones of transition. Lastly—and most importantly—individuals experience borders in different ways. Men and women, the young and old, those alone and those in groups, often have very unique and individualized border experiences. These peculiarities became the center of my work as I chose the timely case study of Syria and Syrian refugee border experiences for my graduate research.

The question at the center of my research became: How can the cartographic portrayal of Syrian borders be improved to better represent refugee experiences? I conducted a series of interviews with Syrian refugees and humanitarian workers in the spring of 2015 and developed an alternative technique to remap Syria's borders based on my interviewees' experiences and perspectives (Kelly 2016 and mappingborders.github.io). My technique, however, is just one solution for rethinking and remapping borders, so I turned to the cartographic community to continue this exploration of border symbolization.

Figure 1. *A familiar depiction of Syria and its neighboring countries that uses conventional border symbols (solid and dashed black lines) and smooth, unhindered flow lines showing refugee movement.*
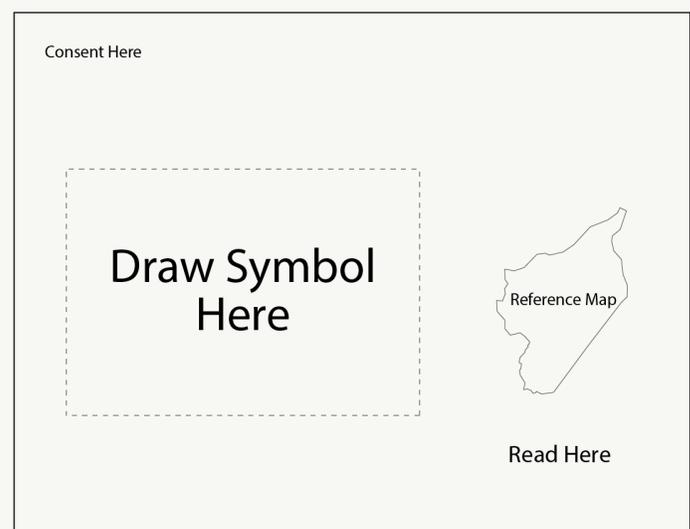

Figure 2. *The page layout used in each notebook given to sketch mapping participants.*

In October 2015, I asked attendees of the NACIS Annual Meeting in Minneapolis, MN to collectively remap Syria's borders based on excerpts from my interviews with refugees and humanitarian workers. Participants were given one of six notebooks and various colored pens. Each page had a blank space for drawing, a locator map, and a different quote from one of my interviewees—either Adiba or Mohammed (Figure 2). I asked participants to (1) pick a notebook, (2) read the passage, (3) symbolize the border based on the experience described in the passage, and (4) start again!

Each passage was taken from either Adiba's or Mohammed's description of Syria's borders through their personal experience or perspective (Kelly 2016).

Passage 1 (Adiba): "It's very difficult for young men. It's a high-risk age to be trying to leave."

Passage 2 (Mohammed): "I was lucky. They didn't have my name on the [Syrian] border."

Passage 3 (Adiba): "The Turkish border [is] more fluid or porous, more equipped."

Passage 4 (Adiba): "For women, I think it's been a bit easier to cross… if you want to come to Europe, make sure you have one of your children at least with you."

Passage 5 (Mohammed): "You have to go through the mountains and take backroads through villages. It [the Lebanese border] is like walking through a mine field."

Passage 6 (Mohammed): "The Jordanian-Syrian border is totally one hundred percent controlled by the Jordanian government. No one or nothing goes in and out."

I collated and digitized my 50 collected sketches (Figures 3-A through 3-DD) and quickly analyzed the visual variables and cartographic techniques used in each map. Here, I briefly mention a few of these variables that were most frequently used in reinvigorating border symbolization.
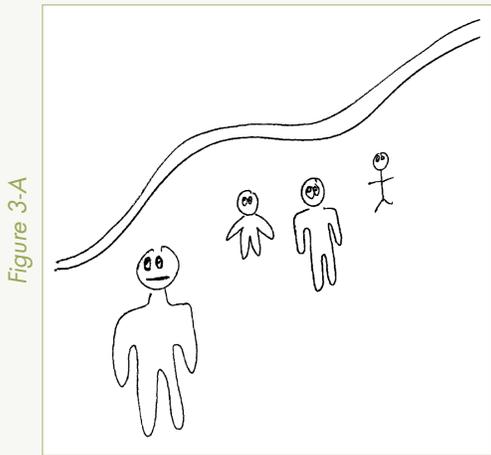
Figure 3-A

Figure 3-B

Passage 1

"It's very difficult for young men. It's a high-risk age to be trying to leave."

Adiba
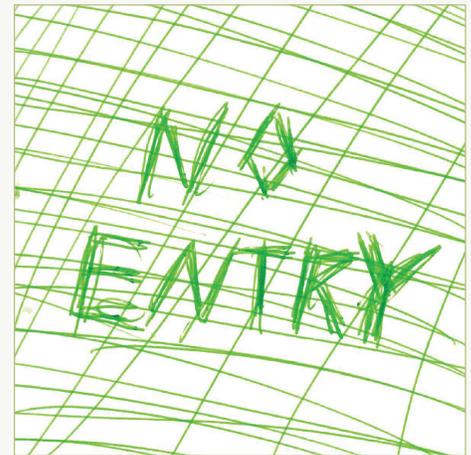
Figure 3-C
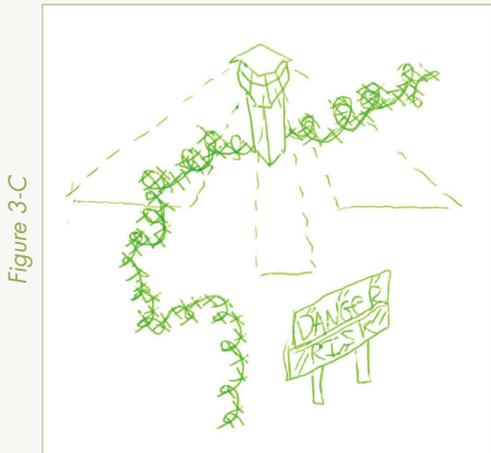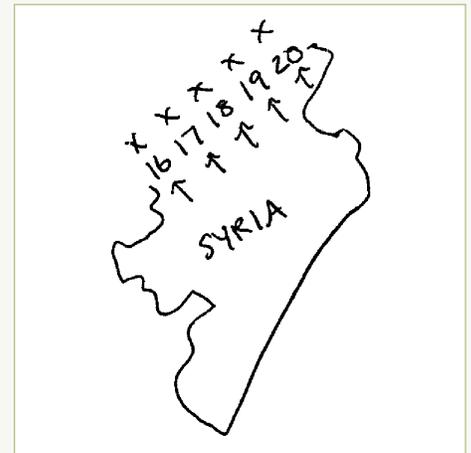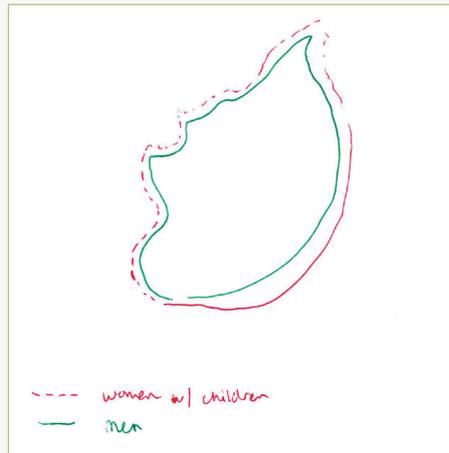
Figure 3-D

Figure 3-E

Figure 3-F

Passage 2

"I was lucky. They didn't have my name on the [Syrian] border."

Mohammed

Figure 3-G
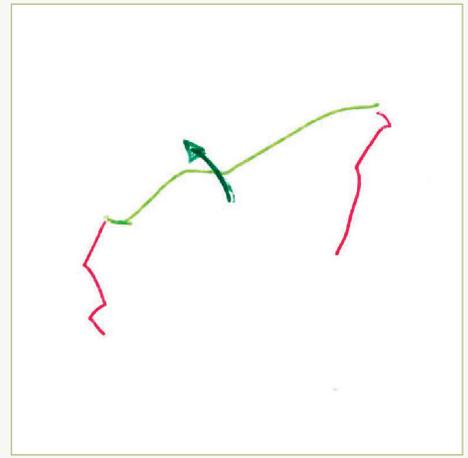
Figure 3-H
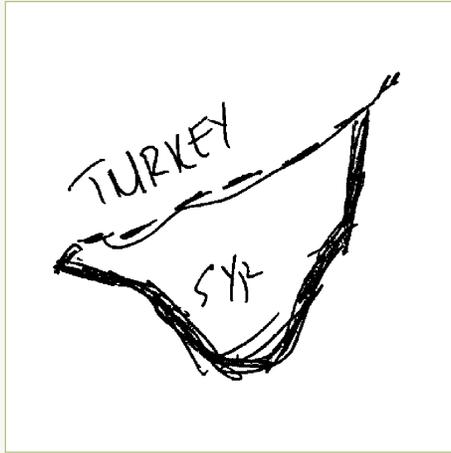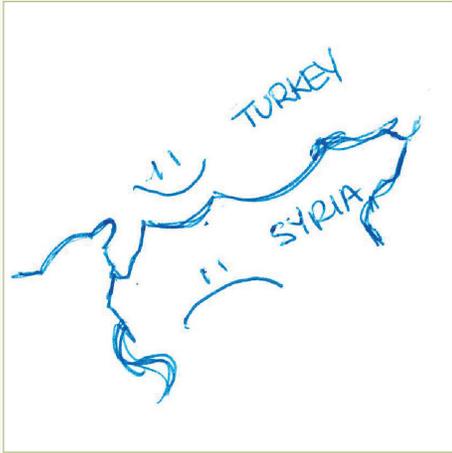
Figure 3-I
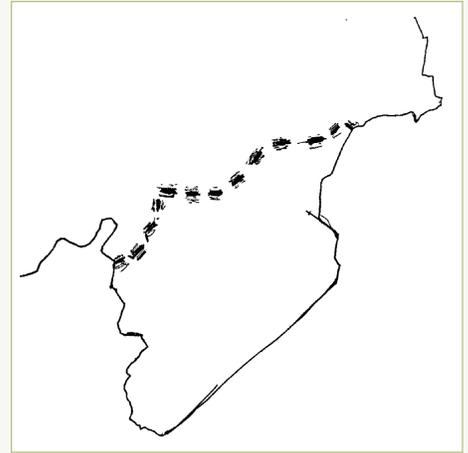
Figure 3-J

Figure 3-K

Passage 3

"The Turkish border [is] more fluid or porous, more equipped."

Adiba
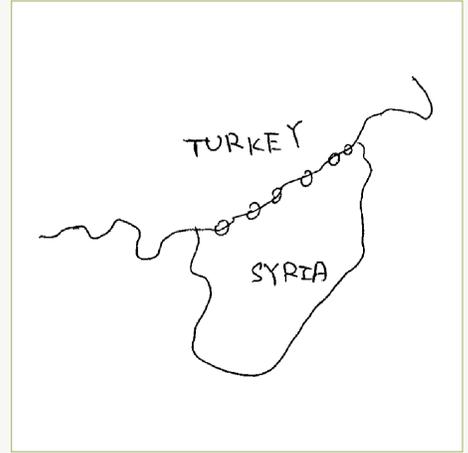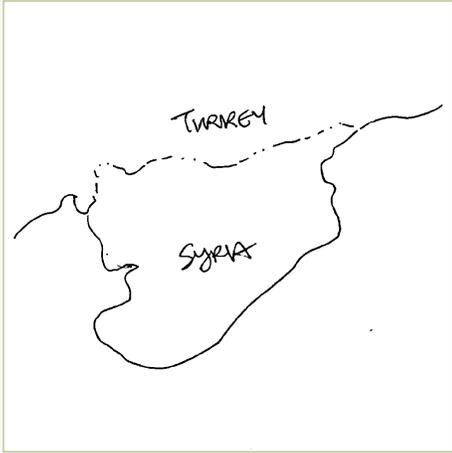
Figure 3-L

Figure 3-N

Figure 3-M
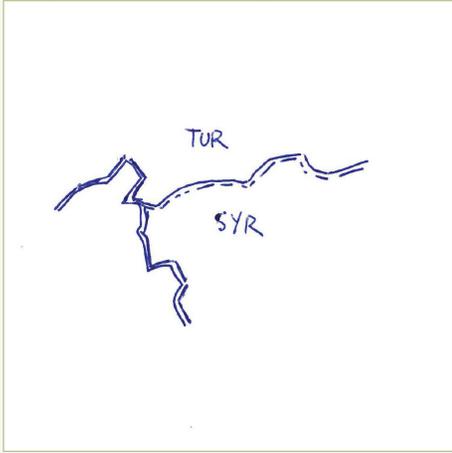
Figure 3-O

Figure 3-P

Figure 3-R

SYRIA
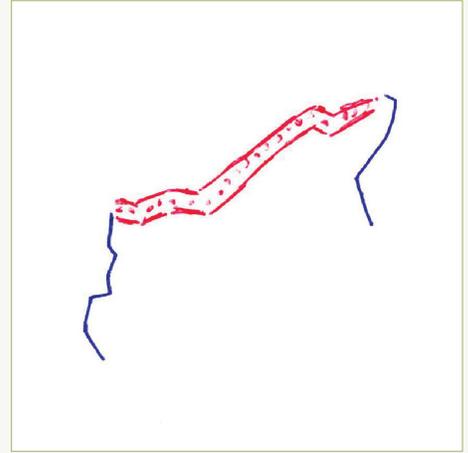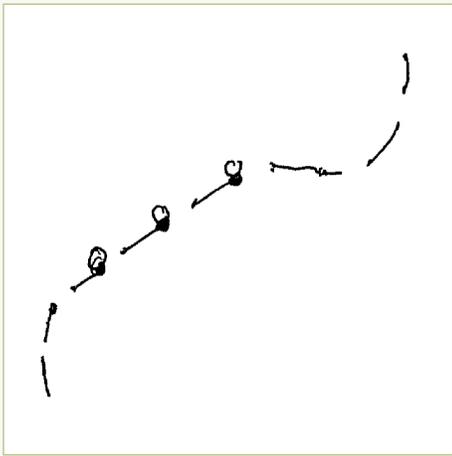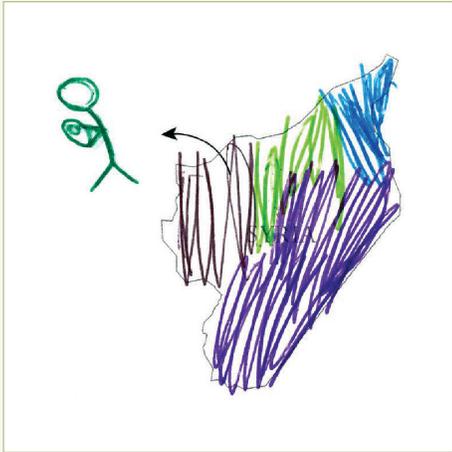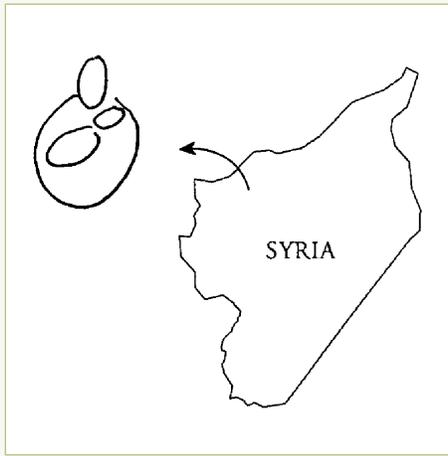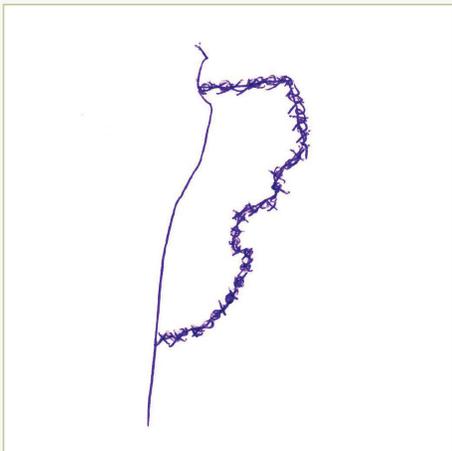
Figure 3-Q

Figure 3-S

Passage 4

"For women, I think it's been a bit easier to cross… if you want to come to Europe, make sure you have one of your children at least with you."

Adiba

Figure 3-T

Figure 3-U

Passage 5

"You have to go through the mountains and take back-roads through villages. It [the Lebanese border] is like walking through a mine field."

Mohammed

LEBANON

SYRIA

Figure 3-V

Figure 3-X

Figure 3-W

LEB

SYRIA

- mines
mountains
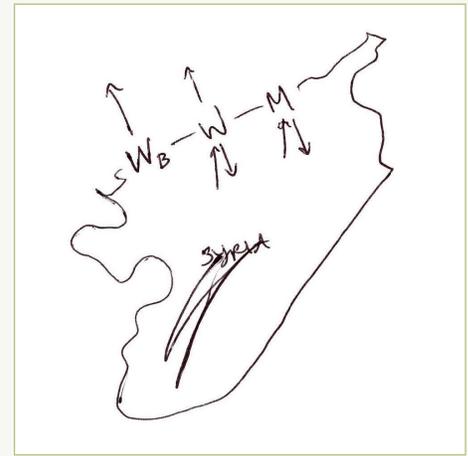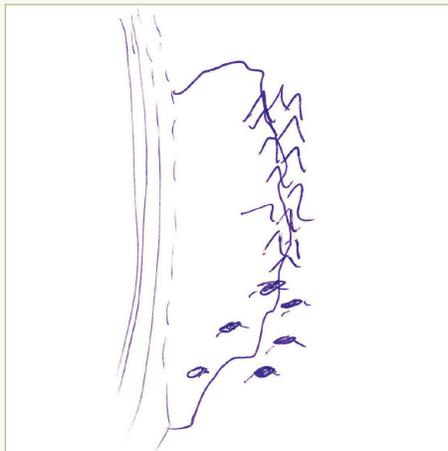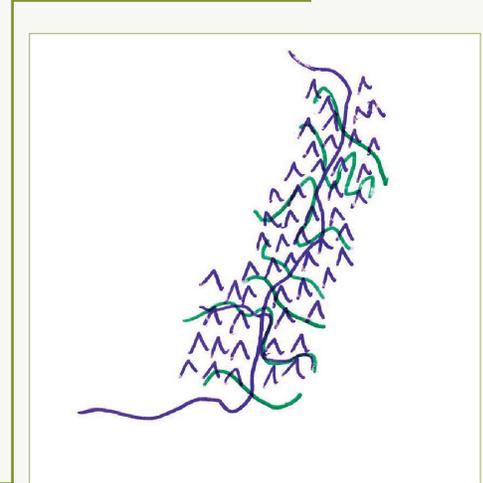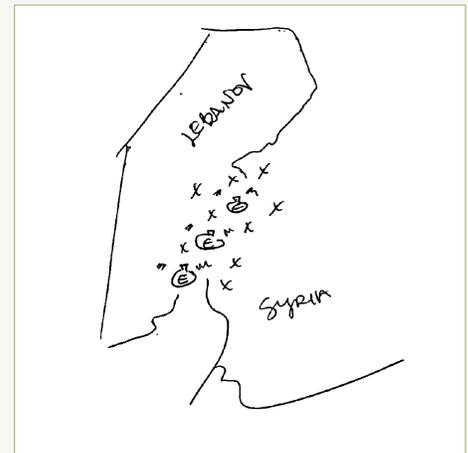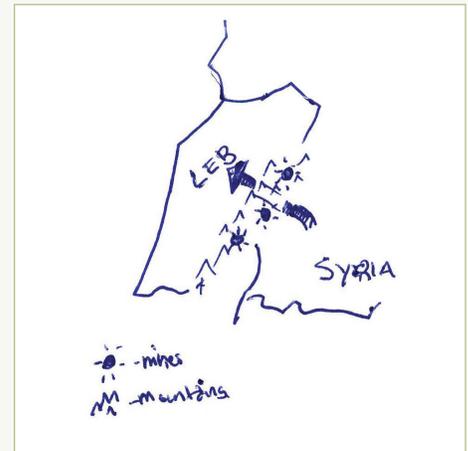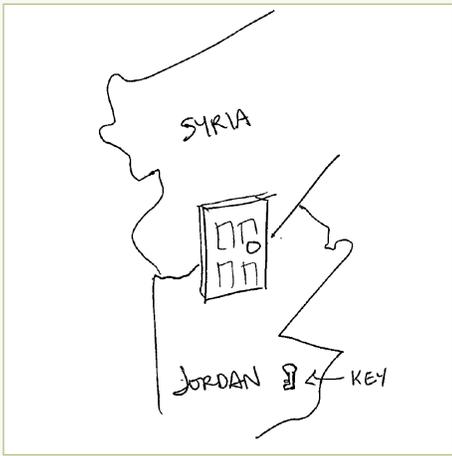
Figure 3-Y

Passage 6

"The Jordanian-Syrian border is totally one hundred percent controlled by the Jordanian government. No one or nothing goes in and out."

Mohammed

Figure 3-CC
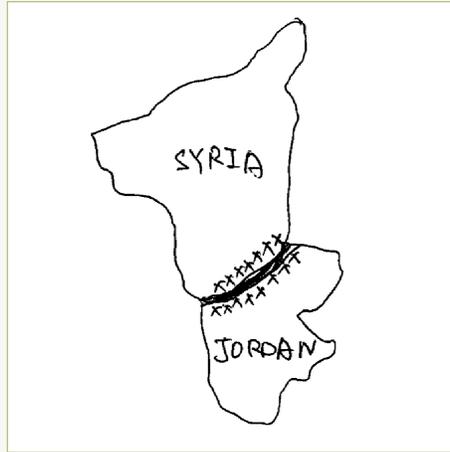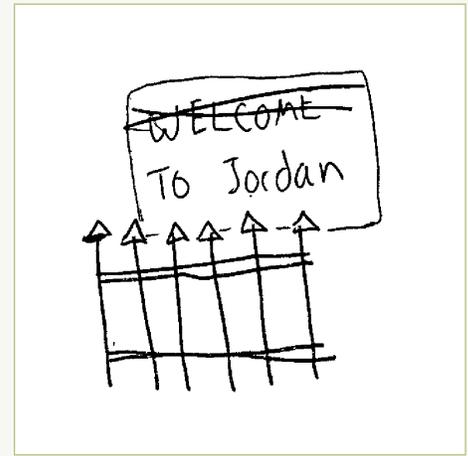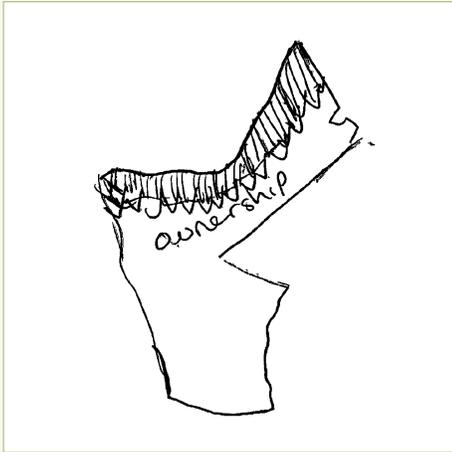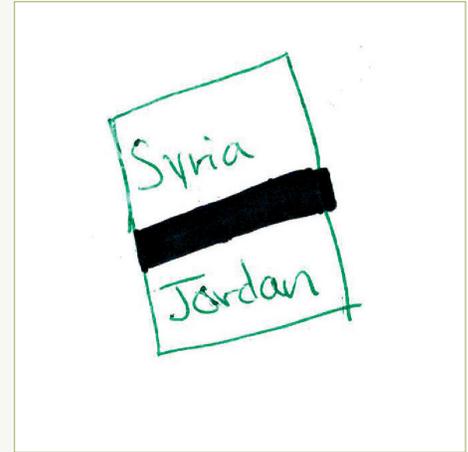
As expected, a majority (37 of 50) of the maps used lines to represent the borders. Lines are an obvious and often default choice when choosing border dimensionality. Points were also common in depicting border-crossing locations. I was intrigued, however, to discover that roughly half of the sketches used areas to depict the border; polygons are an innovative dimension through which to explore border features. Additionally, one map did not show the border in any dimension, opting to use type—the word Syria centered in the sketch space—and type only. It was also common in over half the maps to use more than one dimensionality. For example, Figure 3-Z uses a doorway to show a border crossing point, but also uses solid, black lines to depict the remainder of the borders. Similarly, Figure 3-CC combines a polygon and a line, whereas Figure 3-H only uses a line. This combination and use of alternative feature dimensions expands the vocabulary of border features.

Sixty percent of the sketches used black ink alone, while the remaining 40 percent used color. Figures 3-D, -G, -O, -DD, for example, used two hues to nominally separate two border types. In contrast, Figures 3-H and 3-W used only one hue. I expected color, particularly red, to be used more frequently as it elicits a sense of fear or negativity. Although red was only used four times, Figure 3-G uses a combination of a red and green to show a "stop and go" effect similar to a stoplight. Hue is a visual variable that could be used more to explore border symbolization.

Type was an effective tool, used in 29 sketches. Twenty-one of the sketches used type for labeling purposes only, but other participants in this exploration used type in interesting and evocative ways. Figure 3-C uses type to show "danger" and "risk," while Figures 3-AA and 3-BB use it to describe Jordan's control of its border. Figures 3-D, -Y, and -Z use text in their legends to identify particular features. Figure 3-B uses the words "NO ENTRY" to emphasize the border as inaccessible.

As expected, solid lines were the most prominently used symbol choice (40 sketches) utilizing the visual variable of arrangement. Yet I was surprised to find that 18 sketches used dashes and 16 used both dashed and solid lines. While arrangement is a visual variable commonly used in border depictions, I was excited to see participants use a variety of other visual variables and symbolization

techniques, including shape, lightness/saturation, perspective height, and thickness.

The visual variable of shape was used in 31 sketches, eight of which were used for border crossing points. These shapes included the icons and point symbols. Although icons ranged in iconicity or the level of abstraction, participants used mimetic icons most readily. These icons varied, and included: people, bombs, mountains, doors, signs, and towers. Using people and faces was an effective cartographic choice to show emotion. In Figure 3-A, for example, the four figures are bleakly looking towards the borders and Figure 3-H shows happy and sad faces to convey a sense of joy and despair, respectively. Figure 3-F uses a combination of type and icon to show restriction based on name. Icons are extremely helpful tools to quickly and effectively convey a message.

I did not expect lightness and saturation to be used very efficiently, because participants were using ink pens. While it is difficult to shade with pen, I was happy to see this accomplished in 15 sketches. One example is Figure 3-J,

which uses a combination of a dashes and lightness. Each dash illuminates a shaded gradient in either direction.

Height was used in several maps, including Figures 3-Z and 3-AA. Height was only used from oblique perspectives, which aids in its perception. Height and the oblique perspective—used in eight sketches—give the viewer a more intimate viewing angle and are useful tools for showing on the ground experience. Thickness—and particularly varying thickness—also proved to be an effective tool, particularly for showing difficulty. Figure 3-N shows a gradient of thickness, which reflects the fluctuating border control and degree of difficulty for individuals in crossing. Overall, the participants in this exploration expanded the use of visual variables beyond the usage of arrangement (solid and dashed lines). It is important to continue to explore these "other" visual variables to expand the representation and symbolization of border experience.

After analyzing the cartographic techniques used by participants at NACIS, I created a composite representation

Figure 4. A composite representation of Syria that combines individual sketches and border symbols created by the NACIS community.
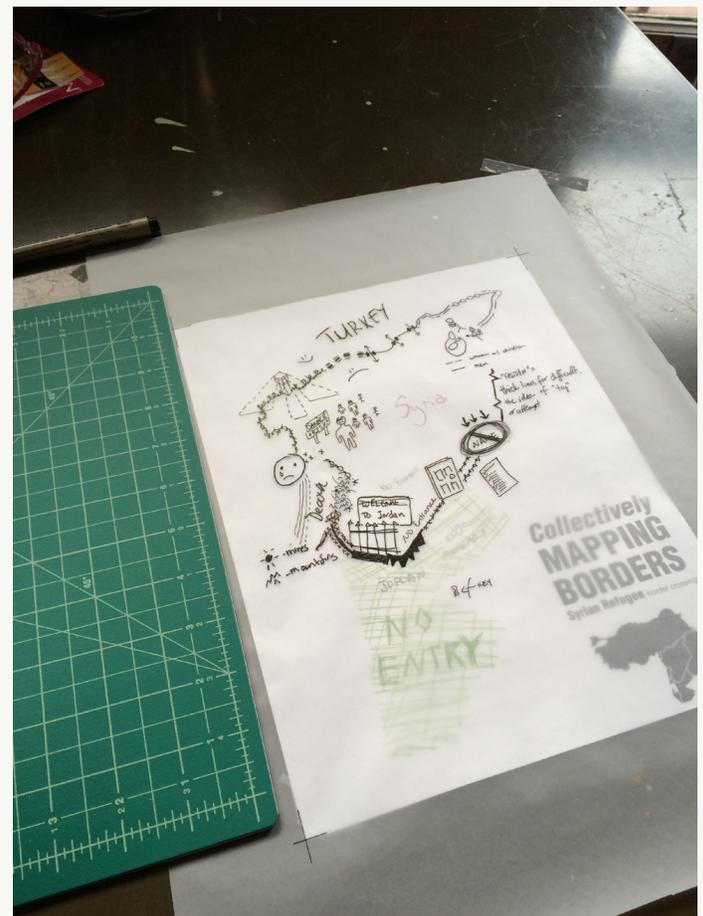
Figure 5. A photo mid-process that shows my ink tracing on top of the composite representation of Syria.

Collectively Mapping Borders
Meghan Kelly

of Syria using Adobe Photoshop and Illustrator to the combine the techniques used by the NACIS community (Figure 4). I then retraced each sketch using ink and sketch paper before returning to Photoshop for final touch-ups (Figures 5 and 6). This new alternative map nudges cartography forward by asking cartographers (professional and amateur alike) to *collectively* rethink borders and their symbolization. By focusing on border symbolization, participants—myself included—collectively expanded our visualization and cartographic vocabulary to better reflect the experiences of those crossing and interacting with borders. My brief analysis of the visual variables used by participants creates new questions and opportunities for further analysis. Additionally, it is my hope that this collective mosaic calls attention to the Syrian conflict and those most affected. In this light, I return *Collectively Mapping Borders* to the NACIS community. Thank you to all that have contributed, specifically Margaret Pearce for her help in brainstorming the idea!

REFERENCE

Kelly, Meghan. 2016. "Mapping Syrian Refugee Border Crossings: A Critical, Feminist Perspective." Master's thesis, Department of Geography, University of Kansas.

Visual Fields focuses on the appreciation of cartographic aesthetics and design, featuring examples of inspirational, beautiful, and intriguing work. Suggestions of works that will help enhance the appreciation and understanding of the cartographic arts are welcomed, and should be directed to the incoming section editor, Matt Dooley: mathew.dooley@uwrf.edu.

ADVENTURES IN ACADEMIC CARTOGRAPHY: A MEMOIR
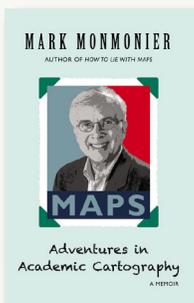
By Mark Monmonier.

Bar Scale Press, 2014.

278 pages, maps, illustrations. $11.99, softcover.

ISBN: 978-0-692-33225-2

Review by: Leslie Wagner, The University of Texas at Arlington

Mark Monmonier's *Adventures in Academic Cartography: A Memoir* takes the reader back to the beginning of Monmonier's career in academic cartography at a time of great change. He reflects on his budding interest in maps as a young boy and directs the reader through the swift evolution in academic cartography that took place during his lifetime. Monmonier has only a few years on me, and both having lived through eras of great change during the last century, I can say he has captured its essence. He reveals the choices that changed his life while he steered through and observed changes in the discipline. He relates his own adaptability in cartography and geography, taking us through the pursuit of his career and through the numerous obstacles and unexpected opportunities that his particular background afforded him.

By not adhering to a strict climb through the academic ranks, Monmonier blended his academic work with government contracting and consulting work in the private sector. In turn, this gave him a broader perspective which fueled the development of many new and practical applications in mapmaking. Monmonier takes us from the arduous methods of mid-twentieth century mapmaking to today's digital cartographic manifestations—and everything in-between—and in doing so gives us a dose of history in twentieth-century cartography.

A prolific writer, Monmonier delves into the subjects of his books, gives insight into his writing style and the world of publishing, and provides his take on the levels of success of each of his varied and diverse publications. He brings up the point that the intense research endeavors that culminated in his books also served to revive and transform his teaching. Although he merely inferred that it "informed my teaching," his enthusiasm for each project tells the reader otherwise. Monmonier discusses his contributions to cartographic literature, both academically and for the map-oriented layperson, along with the purpose behind each project. In his discussion of his post-9/11 and post-Hurricane Katrina efforts as part of the Mapping Science Committee (MSC), he injects his own political opinions and observations (here and elsewhere). His work with the MSC produced the federal government report, "Disaster Recovery Begins with a Map," which provides an excellent example of the relevance of new and continued applications of mapping in the real world. After all, how can one truly understand the magnitude of a disaster without its visual representation on a map?

During his career, he has also helped shape the field of academic cartography through his service on various committees and journals. His expertise boosted demand for his consulting work with clients among whom were most notably the US Geographical Survey and the National Geographic Society. Again, his broad approach to writing for an audience larger than academia increased demand for speaking engagements, which he juggled carefully with his continued role in academia.

Mark Monmonier's *Adventures in Academic Cartography: A Memoir* will appeal to anyone with an interest in cartography, geography, or just maps in general. Monmonier's writing style, which he also discusses in his chapter, "Writing," serves to carry the reader through the lesser thrills of his adventures, such as the blow-by-blow hits and misses of his publishing career, and projects that saw no fruition due to government red tape and budget cuts. Of his many successful projects, the ten-year project as editor of the recently published *Cartography in the Twentieth Century* (Volume 6 in the series, *The History of Cartography*), qualifies as a major achievement.

I found his chapter on writing particularly enlightening for those interested in writing and publishing. His advice, similar in my mind to that of Edgar Allen Poe, was to

write with the end in mind. It boils down simply to knowing where you're going—what is the work's purpose—when you begin to write with any hope of publishing your work.

Monmonier speaks selectively on vintage maps and antiquities as he is, himself, a modest collector of maps. And he delves into a number of cartographic works from the past, adding his own opinion on the variety and type of collectors. I found the topic of collecting particularly appealing as well, in that I have my own meager selection of maps based on their content and relevance to my own research and interests.

All in all, Monmonier's *Memoir* has touches of humor and plenty of respect for his cartographic colleagues and their

work. Readers can appreciate his viewpoint all the more because his publications were written to appeal to the general map-loving public. While his *Memoir* may be of greater interest to the academic crowd, there is still plenty for those of us who are simply map *aficionados*. More importantly, in all his efforts, he educates not only academia, but also the general public, in how maps are and can be used to convey ideas, to sway opinion, and even to fool the beholder. So if you still take a map at face value, look again, and read Mark Monmonier's *Adventures in Academic Cartography: A Memoir,* to follow his exploits in the world of maps. And when you're done with his *Memoir*, you will certainly want to take the journey through *How to Lie with Maps*. You'll never look at a map the same way again.

DESIGNING BETTER MAPS: A GUIDE FOR GIS USERS, 2ND EDITION
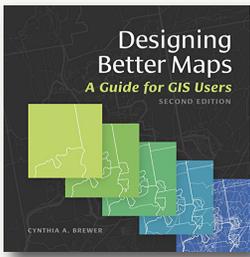
By Cynthia Brewer.

Esri Press, 2015.

231 pages, with maps and other figures throughout. $59.99, softcover.

ISBN: 978-1-58948-440-5

Review by: Amanda Tickner

The author of *Designing Better Maps: A Guide for GIS Users* is Cynthia Brewer, who co-created the popular web resource ColorBrewer, a valuable tool that has been well-regarded for over a decade. She is a Professor and Head of the Department of Geography at The Pennsylvania State University. Clearly, someone well qualified to write a book on the subject of digital cartographic design.

The book addresses the importance of better map design in GIS. Courses in GIS often focus entirely on the analysis tools available and how to use them, rather than on the design of a map output. This book fills that potential gap.

The object of this book is to allow readers to gain an understanding of map design and graphic skills for effective mapmaking. It does so by taking a very fast and brief tour of many topics. Each chapter is introduced with a summary, and includes a bulleted list of major topics. This is a second edition, updates include a new discussion of

feature types and scale as well as improved illustrations (not changed in content but presented in a higher-resolution format).

The preface to the second edition is more interesting than most (usually these are not memorable, in my experience): it features a reflection on how digital mapping has changed over time from the author's perspective. Brief but insightful, it would make a nice longer essay.

Chapter One, "Planning Maps," reviews topics related to design essentials such as map purpose and hierarchy, white space, and layout, as well as the important topic of map projections. There is also discussion of how to solicit and respect critique from reviewers of your draft maps, which is a useful though non-technical aspect of mapmaking.

Chapter Two, "Base Map Basics," discusses map background options (such as elevation maps, imagery, vector features such as hydrology, and property boundaries), their appropriate scale, and techniques for production. There is more methodological information in this chapter with descriptions of methods within GIS used to create hillshades, etc., though these are not specific instructions nor are they particular to one software package.

Chapter 3, "Explaining Maps," covers the area of map elements including scale bars, grids, north arrows, legends, text placement, spacing, and hierarchies. There is a

discussion of wording and specificity in regards to calculations and contents within maps. It was interesting to me that the implication was that these notes should be included in maps themselves rather than in the figure descriptions as is usually the case.

Chapter 4, "Publishing and Sharing Maps," provides information on designing for publication such as print resolution specifications, selecting raster or vector export methods, the importance of citing sources used in maps, and a brief review of copyright and public use licenses. Context of use is emphasized: e.g., differences in approach for different media.

Chapter 5, "Type Basics," describes all things font related, such as font families and styles, size of type and spacing, and effects on type, including shadows and halos. Fonts used in figures and examples are specific to the Windows operating systems. Again, context of use between print and screen publications and selecting appropriate fonts for each is considered.

Chapter 6, "Labeling Maps," covers topics such as the graphical quality of labels, how their abstract properties such as weight and spacing can convey information about hierarchy, and label placement. This chapter might be the most ArcGIS-specific, as characteristics of the software related to annotation and data frames are discussed.

Chapter 7, "Color Basics," considers the perceptual qualities of color, and the technical aspects of its creation. The usage of both CMYK for print and RGB for screen applications are described. This chapter covers color theory, as well as discussing hue, lightness/value, and saturation. These concepts are applicable to most graphic design contexts and this chapter would be useful in non-cartographic contexts (for example, it would be relevant to a data visualization class) though it is heavy on technical detail.

Chapter 8, "Color on Maps," turns the color discussion to specific topics, such as color schemes, creating custom color ramps, and color blindness. The discussion of bivariate color schemes—color patterning that allows for the depiction of two variables—was especially useful.

Chapter 9, "Customizing Symbols," combines much of what was discussed in previous chapters into one topic and provides a nice synthesis of information.

The Appendix contains color schemes and information from the Color Brewer website.

The book ends abruptly; there is no grand philosophical statement or summary of content, just a simple paragraph of encouraging directives, ending with "You will be designing better maps."

I would describe this book as easy to skim; this is a reflection of the terse coverage of topics. However, this approach does cater to busy professionals and students and is probably, on the whole, a plus. The book is peppered with pithy tips: for example, lower case letters have more variation and therefore are easier to read than uppercase alone. Individually these short design tips read almost like a list but if the whole is grasped there is a good grounding in cartographic design to be found.

There were some instances where the quick moving pace let the book down. A topic that really could use a more in-depth treatment was that of hierarchies, which was presented in the first chapter and then referenced conceptually throughout the book. A more involved discussion of this topic would have provided a better frame for the other material to coalesce around.

Maps and figures could be larger; there are many cases where maps fill only half the page leaving a large white space. A wide margin format is something that I have noticed as the "Esri Press house style" and given the fact that this impinges on space for maps, I wish they would reconsider this format.

In data visualization and graphic design, cultural differences can often have an impact on perception of information. While color blindness and Section 508 (the federal regulation regarding disability) receive attention, consideration of cultural differences is apparently beyond the scope of the book—though it is briefly mentioned under the heading of audience and context. The focus here is on "analytical" approaches, though these are not always necessarily backed up by citations or references to perceptual studies, and as such on occasion best practices seem like assertions. The well-chosen figures do provide a solid argument in favor of most methods presented, however.

The title indicates that the book is "for GIS Users," so is that the case? Given that the book is published by Esri, I was curious if that was an accurate statement or if "GIS

Users" really meant "ArcGIS Users." More and more people are using a variety of web mapping applications as well as open source software such as QGIS, and so knowing if this is a text that could be useful across GIS tools is important. Overall, the book is broadly applicable to creating maps using non-Esri software and applications, though there were instances where the material was specific to ArcMap and Esri products. Some examples of specific topics that were approached from an ArcMap perspective include the methods described for creating annotations and labels, the fact that the font discussion focused on Windows fonts, and the options for exporting PDFs being framed in terms of ArcMap's capabilities.

This is potentially a good book for students, instructors assigning a text in an introductory technical class, and professionals just starting out in mapmaking in multiple contexts. Some of the material (color theory) is even strongly applicable to data visualization beyond mapmaking. No one subject is covered with extensive depth but altogether the material gives a good grounding to the subject of digital cartographic design and would make an excellent introductory text book for classes in cartography, regardless of software or design tools used.

WORLDLY CONSUMERS: THE DEMAND FOR MAPS IN RENAISSANCE ITALY
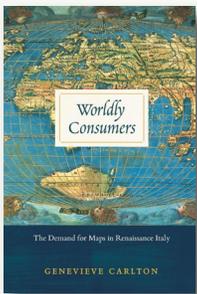
By Genevieve Carlton.

University of Chicago Press, 2015.

237 pages, 15 maps, 2 plans, 3 charts, and other illustrations. $45.00, hardcover.

ISBN: 978-0-2262-5531-6

Reviewed by: Aimée C. Quinn, Central Washington University

Exploring maps through the lens of domestic inventories of Venetian and Florentine households, Genevieve Carlton reveals the "self-fashioning" (Greenblatt 205, 3) of Italian households during the early modern period. The context for this revelation is rather remarkable: public identity was carefully crafted and cultivated through the impact of household items. From the vantage points of the printmaker, the seller, and the buyer, the reader is guided though a fascinating quest to discover what a map is while realizing the artistic breadth of the Italian household. Carlton's tools are household inventories, the personalities of the printmakers of the time, and the maps themselves. It is rather an unusual toolkit for a quest, yet with it the reader is led on a sensational voyage. In her 227-page narrative, including sixty-five pages of notes, index, and bibliography, Carleton carefully explains that the examination of household inventories shows how the Italian consumer's appetites grew to appreciate the map as a distinct art form.

Laid out in six chapters, the book has three over-arching themes: history of printing and map-making; household consumption of goods in the early modern era; and maps as art. Chapter 1, "Capturing the World on Paper: The Visual Tradition and Mapmaking," reviews the history of printing and map-making. This chapter is more than just a cartographic history, however. This chapter sets the tone for the rest of the book by introducing the reader to the world of maps before the printing press was invented.

Chapter 2, "The Commerce of Cartography: Printing, Price, and Francesco Rosselli," introduces the reader to Carleton's work in studying 3,351 inventories which provide a "snapshot of the possessions in the Renaissance home." Her analysis makes a most compelling argument for the use of household inventories as an investigative tool to demonstrate how consumer appetite grew for cartographic resources as much as for other art forms. These inventories are more than just primary sources: she uses them to paint a portrait of the Renaissance consumer to whom "[the] study of the world was seen as something delightful, a worthy and enjoyable pursuit" (123). Suddenly, maps became de rigueur: found in private homes, public spaces, and books. It seemed if one were a member of society, you owned maps in the plural, ornately decorated with many details.

Building on the previous chapter, Chapter 3, "A Buyer's Market: Map Ownership in Venice and Florence, 1460–1630" reveals the consumer appetite for beautiful objects, including maps, as novelty items and the economics

involved in this newfound awareness of self-fashioning. The world was relatively unknown and maps were rare at the beginning of the early modern era. This chapter further discusses the newness of printing and consumerism and their effects on society.

Chapter 4 is entitled "A World Unknown to the Ancients: the Demand for Cartographic Novelty." Given that printing was a fairly new phenomenon and maps were primarily still crafted by hand by skilled artists, most maps were original pieces. They opened up the imagination by telling stories of far-off places, allowing viewers place themselves into the story. In this chapter, Carleton discusses how maps were created as much for entertainment as for any other purpose such as geographic accuracy or political gain. Yet as the market for maps grew, an appetite developed for more accurate maps, especially those of a geo-political nature including trade routes. As the significance of Florence and Venice as centers of trade increased, both nobles and the common person grew accustomed to knowing more about the world around them. Residents became accustomed to seeing people from different cultures and places, and therefore wanted sources describing those faraway lands.

The chapter also includes a discussion of the importance of the great Ptolemy, in a section entitled "Questioning Classical Wisdom." This section examines how the discovery of new lands questioned the classical authorities, especially Ptolemy's work. While the maps have been the focus up to this point in the book, the second half of the book focuses more on the theory of cartography. As more and more expeditions challenge the classical truths, many scholars from this period begin to look to cartographers to solve geo-political debates.

The final two chapters reveal the educational and societal impacts maps had as a result of their increased availability. Entitled "The Power of Knowledge: Education and Curiosity in Cartographic Prints" and "Making Impression: The Display of Maps in Sixteenth-Century Italian Homes" respectively, we learn that the household inventories that Carleton has studied frequently list the location of maps, "revealing the meaning owners attached to their specific maps" (144). These chapters further the discussion of how maps became tools in political conversation and diplomatic deliberation.

There are two things missing from this book: color illustrations and examples of the actual inventories. In fact, more illustrations overall would be a nice complement to the fascinating text. It is unfortunate that either the author or the editor did not make the choice to include these items as they would enrich the text. Aside from that, I highly recommend this book to any library or reader interested in the early modern period, particularly in Italy or cartography. Carlton weaves a fascinating story.

REFERENCE

Greenblatt, Stephen. 2005. *Renaissance Self-Fashioning: From More to Shakespeare*. Chicago: University of Chicago Press.

Cartographic Perspectives (*CP*) publishes original articles demonstrating creative and rigorous research in cartography and geographic visualization under open-source licensing. Papers undergo double-blind peer review; those accepted for publication must meet the highest standards of scholarship, address important research problems and issues, and appeal to a diverse audience.

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- Images must both be embedded in the manuscript, and sent a as separate files.

- Color images should be submitted in CMYK where possible.

- Images in raster format must, at minimum, be 1000px wide; at least 2000px is strongly preferred. Images will be printed at 300 ppi.

- Where possible, graphics should have a transparent, rather than a white, background.

- Digital art files should be cropped to remove non-printing borders (such as unnecessary white space around an image).

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- Type sizes below 6 point should be avoided.

- Captions should not be part of the illustration. Instead, please supply captions within the text of the article.

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PEER-REVIEWED ARTICLES

TITLE: The title serves as the author's invitation to a diverse audience. It should be chosen wisely. The title section should include the full names of the authors, their email addresses, and their academic or professional affiliations.

ABSTRACT: An abstract of 250 words or less should summarize the purpose, methods, and major findings of the paper.

KEYWORDS: Five to ten keywords should be listed at the end of the abstract.

REFERENCES: References should be cited parenthetically in the text, following the author-date system found in *The Chicago Manual of Style*, 16th ed. (**chicagomanualofstyle.org**). When making a direct quote, include the page number. Examples: (Doe 2001) and (Doe 2001, 38).

Books: Invert the first author's name (last name, first initial or name, and middle initial). Middle initials should be given wherever known. For books with multiple authors, authors' names are listed in the order in which they appear on the title page, with the last author's name preceded by a comma and *and*. Note: With more than ten authors, invert first author's name and follow it with a comma and the words et al. without italics in the reference list.

The general format is: Name of author(s). Year. *Title in Italics*. City of Publication: Publisher Name.

Robinson, A. H., J. L. Morrison, P. C. Muehrcke, A. J. Kimerling, and S. C. Guptill. 1995. *Elements of Cartography, 6th Edition*. New York: John Wiley & Sons.

Articles in Periodicals: Author's or authors' names as in *Books,* above. Year. "Title of Article." *Title of Periodical*, volume number, page numbers, DOI if available. Follow punctuation and spacing shown in the following example.

Peterson, M. 2008. "Choropleth Google Maps." *Cartographic Perspectives* 60: 80–83. doi: 10.14714/CP60.237.

Articles in edited volumes: Name of author(s). Year. "Title of Article." In *Title of Edited Volume*, edited by [Editor's or Editors' names, not inverted], page numbers. City of Publication: Publisher's Name.

Danzer, Gerald. 1990. "Bird's-Eye Views of Towns and Cities." In *From Sea Charts to Satellite Images: Interpreting North American History through Maps*, edited by David Buisseret, 143–163. Chicago: University of Chicago Press.

Websites: Websites may be generally referenced in running text ("On its website, the Evanston Public Library Board of Trustees states…") rather than with a URL listing. For more formal citations, use the following format: Name of author(s). Year. "Title of Document." *Title of Complete Work (if relevant)*. Access date. URL.

Cartography Associates. 2009. "David Rumsey Donates 150,000 Maps to Stanford University." *David Rumsey Map Collection*. Accessed January 3, 2011. http://www.davidrumsey.com/blog/2009/8/29/david-rumsey-donates-150-000-maps-to-stanford.

Maps: Maps should be treated similarly to books, to the extent possible. Specific treatment may vary, however, and it is often preferable to list the map title first. Provide sufficient information to clearly identify the document.

A Plan of the City of New York and its Environs. P. Andrews, sold by A. Dury in Dukes Court, St. Martins Lane, surveyed by John Montressor, 1775.

E-mail correspondence: E-mail messages may be cited in running text ("In an e-mail message to the author on October 31, 2005, John Doe revealed…") instead of in a note or an in-text citation, and they are rarely listed in a bibliography or reference list.

Additional examples: For additional examples, please consult *The Chicago Manual of Style*, 16th ed. (chicagomanualofstyle.org).

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REFERENCES LIST: The list of references should begin in a separate section, immediately after the text. Entitle the section "References" and list all references alphabetically by the author's last name, then chronologically. Provide full, unabbreviated titles of books and periodicals.

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TABLES: Tables should be discussed in the text and denoted by call-outs therein, but the meaning of a table should be clear without reading the text. Each table should have a descriptive title as well as informational column headings. Titles should accent the relationships or patterns presented in the table.

Cartographic Perspectives

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IN THIS ISSUE