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Why We Must Make Maps: Historical Geography as a Visual Craft

Anne Kelly Knowles

*Department of Geography
Middlebury College*

I would like to thank Bob Wilson, Maria Lane, and Garth Myers for selecting me for this honor. It means a great deal to me. I welcome the opportunity to reflect on what I value in historical geography, a field that I have loved and sought to promote throughout my academic career.

The title of my talk sums up an argument that I have been making implicitly for decades. I now want to make it explicit. If historical geographers can embrace the visual craft in what we do, while opening ourselves to more creative collaboration, we can make major contributions to emerging fields of interdisciplinary scholarship, particularly in the digital humanities and geovisualization. If we do not, we will once again be left behind.

I would like to start by telling you about my own first encounters with our sub-discipline, to explain why, for me, historical-geographical research is necessarily full of images, especially maps. This will answer the first question: Why do I make maps? Then I will turn to Brian Harley's deconstruction of the kind of cartography that I was taught. Harley asks an important question: Why do historical geographers' maps tell us so little about humanity? My answer points in two directions: (1) the role of collaboration in creative scholarship, and (2) the connection between historical geography and the Digital Humanities.

Why I make maps

Like so many Americans, I went through school with no formal education in geography. In sixth grade, a friend and I made a model of an Amazonian village out of home-made play-doh (on one side of a brown river stood several lumpy trees; on the other, several slab-walled, toothpick-roofed huts). In eighth-grade Civics class, Mr. Driver told us to make a map of a state. I chose Louisiana and lost myself for days drawing its fringed coastline, highways, cities, and the Mississippi River. What geography I learned came from family trips, when I played navigator and soaked up my father's fascination with historical sites. My undergraduate college, Duke University, had no geography department and no geography courses. I filled my time working for the daily student newspaper and then founded a tabloid magazine of politics and the arts.

I had my first exposure to the discipline of geography in Chicago, where I worked in a series of editing jobs at textbook publishing companies. At Dorsey Press, the publisher conceived of a new U.S. history textbook for which he hired Michael Conzen to develop over one hundred new thematic maps, hoping that a full-color "map program" would distinguish the book in a crowded market. As the book's developmental editor, I was given the extraordinary assignment of meeting with Michael to hash out ideas and coordinate the maps' creation with a firm called Mapping Specialists in Madison, Wisconsin.

My working meetings with Michael were intensive seminars in historical geography. He could not resist introducing me to historical atlases and Arthur Robinson's rules of map design. I especially remember one evening when I was trying to convince Michael to simplify a map whose design I thought was far too challenging for our undergraduate audience. Leaning in for emphasis, Michael said, "But Anne, I want to build cathedrals in their minds!" I burst out laughing at his outrageous zeal and ambition. But Michael's enthusiasm worked a magical transformation in my imagination. I was thrilled to see the continent turned on its side in what he called "a satellite view of North America in 1650." I learned how one's sense of history changes with a change of scale as he explained general and specific settlement patterns in New England. And I found historical events, such as the massing of British troops at Boston, more meaningful when I saw them unfold in a series of maps.¹

From Michael I learned that maps are uniquely valuable sources for historical research, that maps can tell stories, and that the lengthy process of creating a map combines assiduous research with creative thinking and graphic design. I agreed with him that maps should be elegant and exciting, communicate clearly, and always contribute substantively to the argument. The book on which we collaborated, *America's History* (1987), was immediately imitated; every self-respecting textbook publisher needed a full-color map program in their flagship history survey text. Working with Michael, I witnessed a brilliant geographic thinker conceiving of historical interpretations that were informed by knowledge of geographic, historical, and cartographic scholarship. I also saw how his ideas were refined through our own editorial discussion and the back-and-forth exchanges with cartographers at Mapping Specialists. This became my model for productive collaboration.

No wonder I hurried to graduate school at University of Wisconsin-Madison (Michael's alma mater and the place where Onno Brauer, who owned Mapping Specialists, ran the Geography Department's cartography lab). At Madison I met another visual-historical artisan: David Woodward. David's cartography course began my apprenticeship as a mapmaker. His history of cartography course inculcated the inclusive yet rigorous approach that was shaping the History of Cartography Project, which was humming busily in the garret offices in Science Hall. From Woodward and his close collaborator, Brian Harley, I learned that cartography was rules + craft + science + history + art + poetry + politics.² These were the days of Rapidograph pens, ruby-tipped scribes, and photographic developing, layer by layer, in the darkroom. My slow work at the light table was a kind of meditation. It allowed me to dwell with the map as it took shape, while larger contexts gradually formed in my mind.

Up to this point I have talked about personal encounters that influenced my sense of historical geography. One also encounters texts, of course. In 1987, the year I began graduate school, came the inaugural publication of three landmark projects: volume one of *The History of Cartography*, Harley and Woodward's *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*; the *Historical Atlas of Canada's* first volume, *From the Beginning to 1800*, edited by R. Cole Harris with senior cartographer Geoffrey Matthews; and Donald Meinig's *Atlantic America, 1492 - 1800*, the first of four volumes in *The Shaping of America*.³ Woodward and Harley's original vision for the History of Cartography Project continues to inspire its crew, now captained by Matthew Edney. Harris and Matthews set a high bar for cartographic historical scholarship that few other historical atlases have met. Meinig's book garnered praise from geographers and historians for its scope, erudition, and distinctly geographical interpretation of American history.⁴

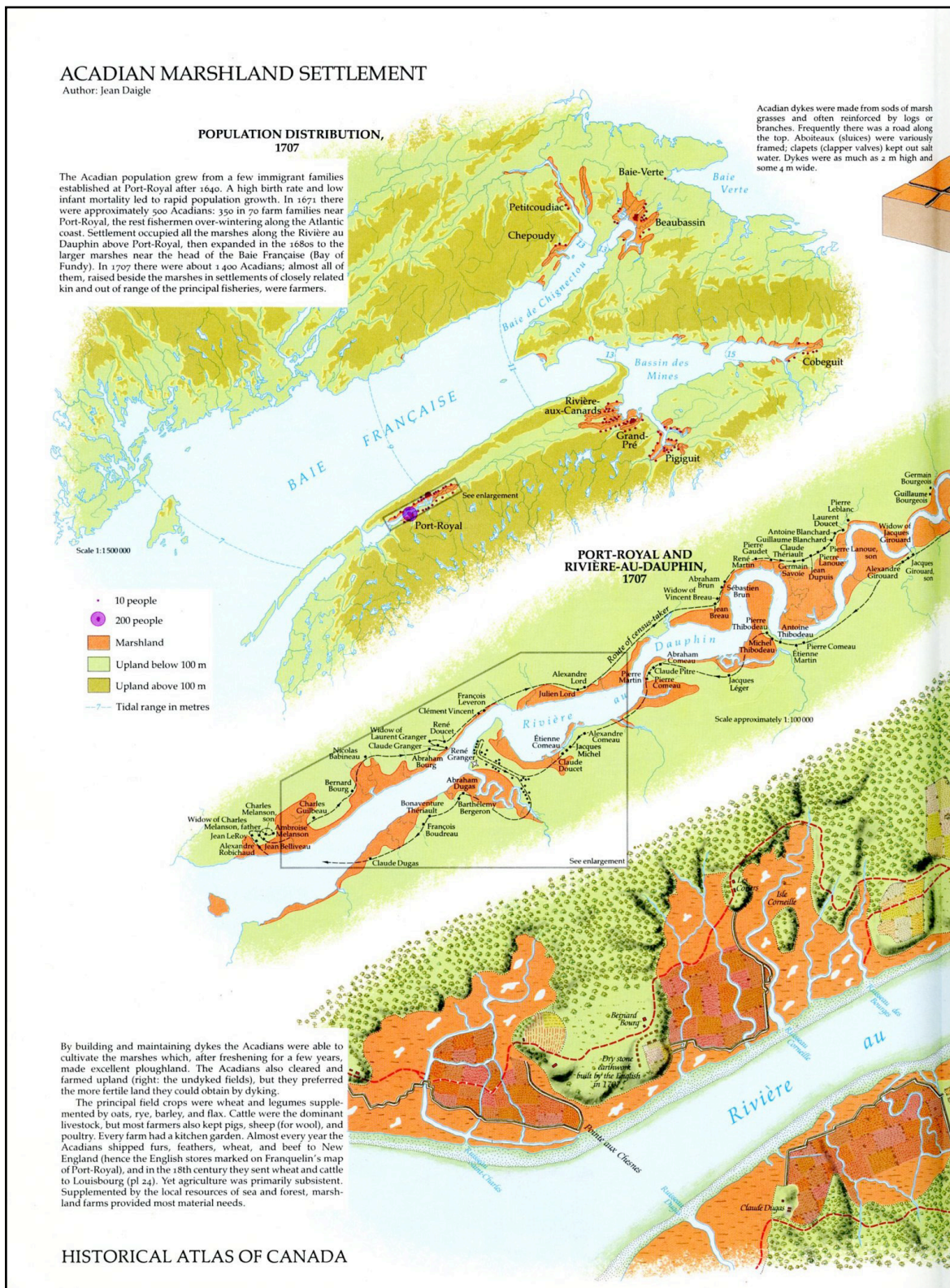


Figure 1a. Jean Daigle, "Acadian Marshland Settlement," plate 29 (R. Cole Harris, ed., *Historical Atlas of Canada*, vol. 1, *From the Beginning to 1800* [Toronto: University of Toronto Press, 1987]).

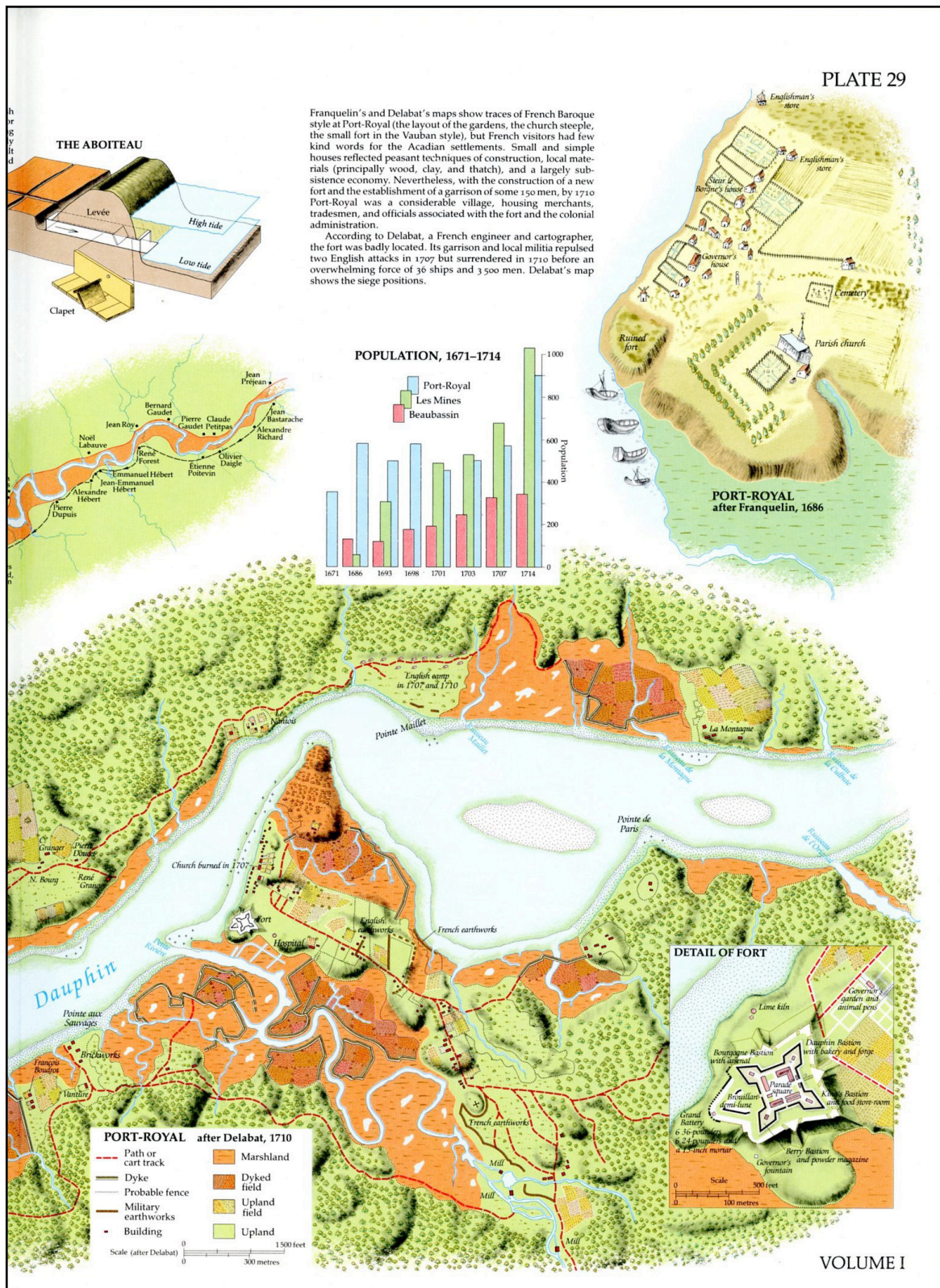


Figure 1b. .

While I share others' admiration for the tremendous scholarship in these works, I always found them most inspiring as visual explanations, particularly Harris and Matthews's atlas and Meinig's *Atlantic America*. The most arresting plates in the Canadian atlas, to my eyes, are those that approach a kind of cartographic realism. The best example is the plate on "Acadian Marshland Settlement" (Figure 1). At three perfectly nested scales, the two-page spread shows us Acadian settlement along the Bay of Fundy, circa 1707; the string of tiny settlements along the Dauphin River; and, claiming nearly half of the visual real estate, a topographic portrait of the marshes, dyked fields, military defenses, and snippets of ribbon settlement along winding paths in 1710. We also get two close-up views of the fort and central village of Port Royal. In a later section we get "The Countryside" (Figure 2), Cole Harris's summary of settlement along the middle St. Lawrence. He and Matthews used three visual and spatial modes: a newly drawn map of settlers' homes along the shore in 1685; a redrawn cadastral survey of the neighborhood around Charlesbourg; and a painting from 1730 that depicts the region's vernacular architecture and land use. This plate exemplifies multi-dimensional historical representation. Harris and Matthews knew that no one map, image, or diagram could represent historical conditions and ways of life, let alone the many modes of geographic analysis and interpretation. While their commitment to reveal the many aspects of past geographies makes some plates in this atlas bewilderingly complex, when they get it right, their visual craft feeds our curiosity. They bring the past close while enabling us to see its structure.

Meinig's spatial diagrams bowled me over as a grad student, and they still do. I consider them the clearest expressions of his spatial thinking. They work on the imagination in ways that his carefully worded exegesis rarely does. His map of the widening gyre of the Atlantic World (Figure 3) captures the circulating connections of fishing, slaving, and trade in the early seventeenth century. The arrows carve restless inscriptions. Better than any map I know, this one makes the ocean its subject, reducing early colonial ports to the touch-points they were for mariners. This image is not as inventive as the upside-down Mediterranean that Jacques Bertin drew for Fernand Braudel,⁵ but Meinig's image has more narrative potential. I see people and stories crossing Meinig's Atlantic, whereas Bertin's surprise, once you orient yourself, fades to geographical facts (for example, that the desert of Northern Africa obstructed Mediterranean Europeans' awareness of the lush, peopled equatorial zone to the south).

Meinig was particularly adept at conceptualizing the spatial form of geographical processes. In writing, he eschewed theory. He presented his craft as the art of geographic description—"mere" description, some critics might say.⁶ His comparative spatial diagrams, however, are steps toward a historically specific pattern language that models geographic and historical change.⁷ Meinig's diagram of "Three Colonial Types" of interaction between Europeans and Native peoples (Figure 4) anticipates Bruno Latour's concept of the metropole as a center of calculation where information about newly identified lands was gathered, analyzed, and then used in crafting policies that were enacted on remote frontiers.⁸ Even more Latouresque is his "conspectus," or overview, of colonial spatial relations (Figure 5). Meinig discards geographic realism to highlight the abstract connections of capital investment and colonial rule that laced North American and Caribbean colonies into the British Atlantic empire. This representation of core-periphery relations suggests bondage; it suggests the abstraction of the imperial gaze and the accounting mentality that calculated the immense value of the sugar islands (Barbados, Grenada, Antigua, and Jamaica) to the British treasury and British foreign policy, and that made Britain in the early eighteenth century such a willing participant in African slavery. The diagram even suggests the shallow reach of British territorial control in North America, a problem that would undermine British land campaigns during the Revolutionary War.⁹

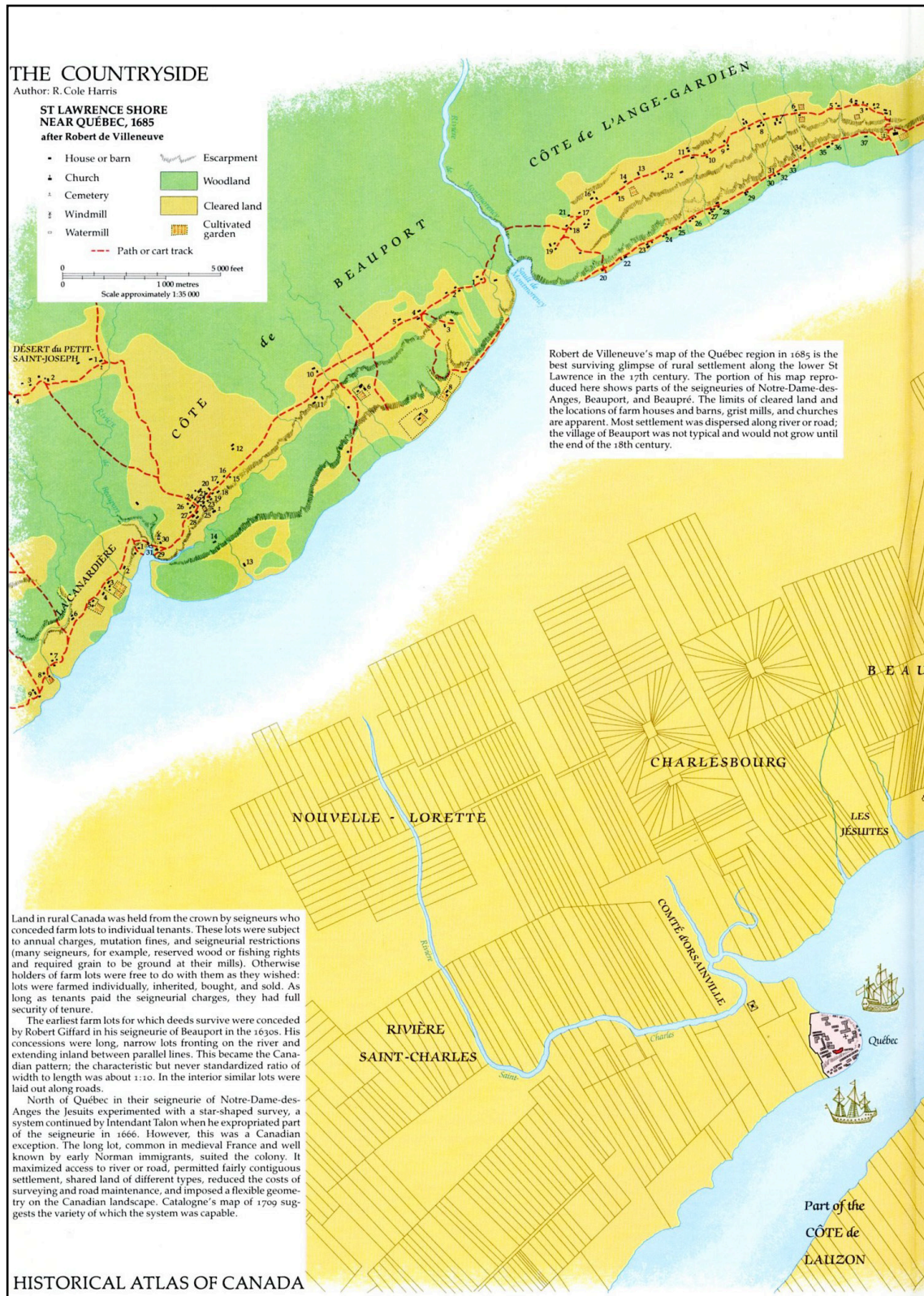


Figure 2a. R. Cole Harris, "The Countryside," plate 52 (Harris, ed., *Historical Atlas of Canada*, vol. 1, *From the Beginning to 1800* [Toronto: University of Toronto Press, 1987]).

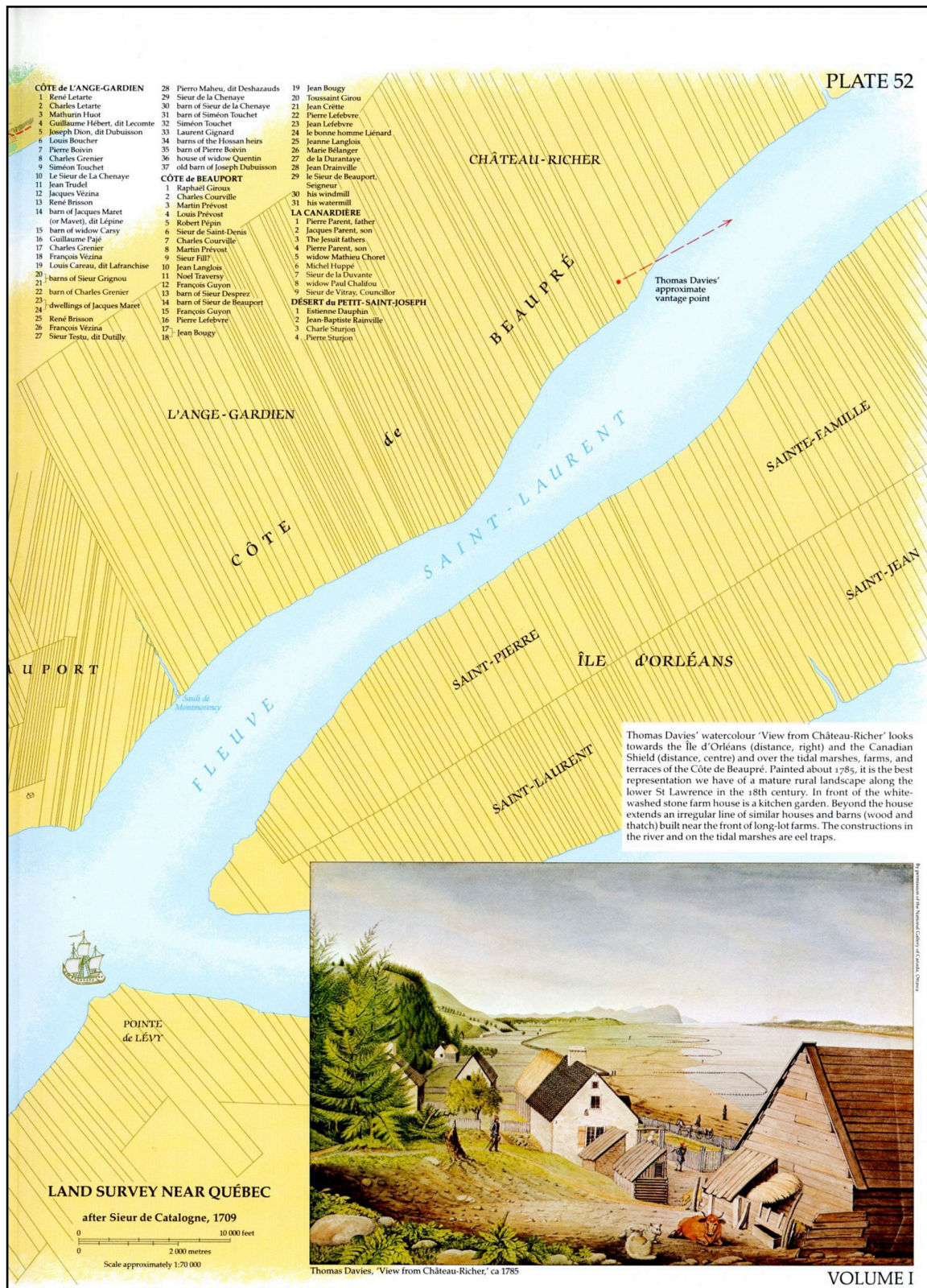


Figure 2b.

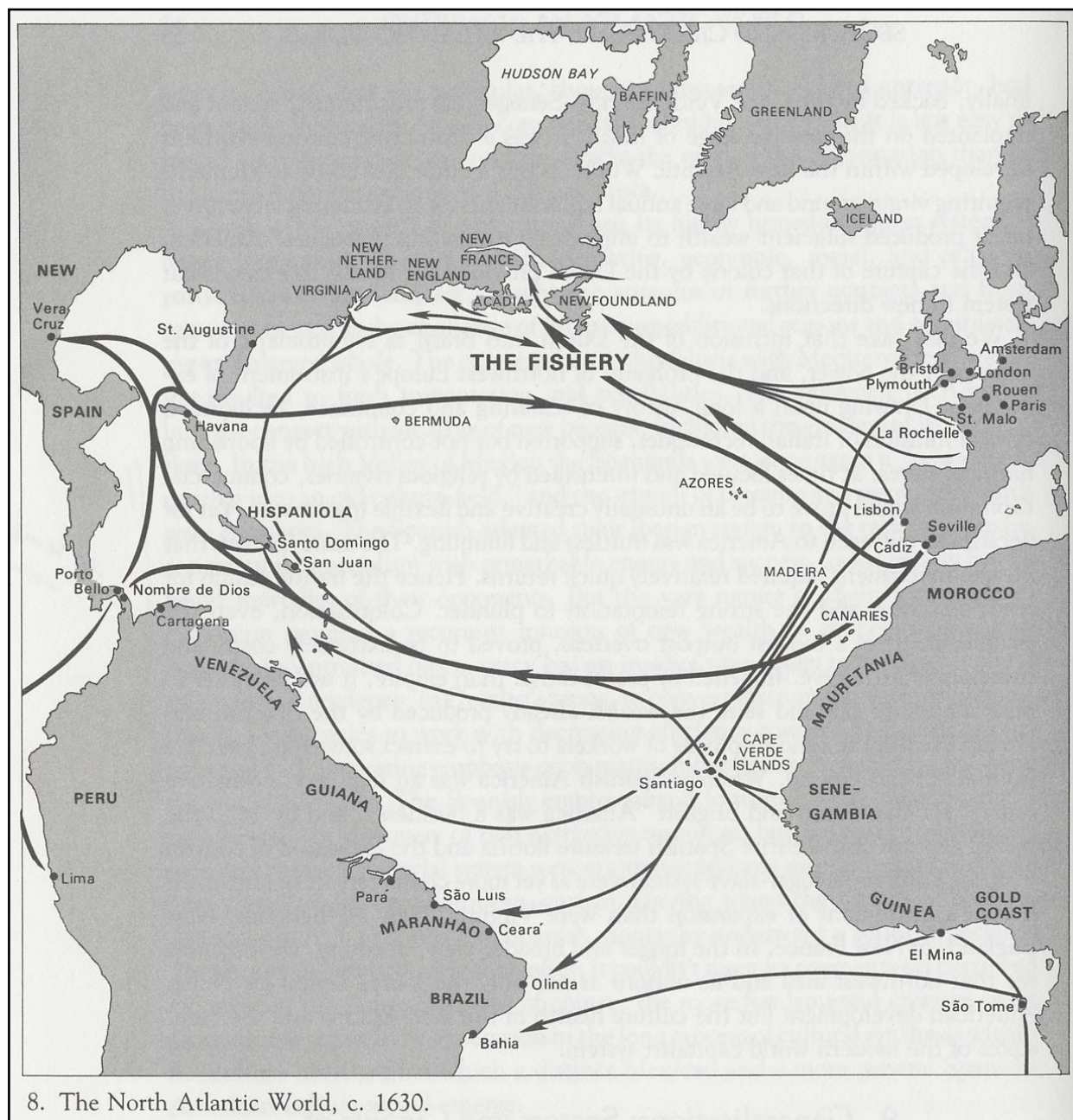


Figure 3. "The North Atlantic World, c. 1630" (Donald W. Meinig, *The Shaping of America*, vol. 1, *Atlantic America, 1492 – 1800* [New Haven: Yale University Press, 1987], p. 56).

I may give Meinig undue credit for theoretical insight where his maps are concerned. He has never claimed that his maps carry interpretive, let alone theoretical, weight. In his 1983 essay "Geography as an Art," Meinig discusses "the craft of geography" as a purely literary endeavor, whose "routine fundamentals" we employ when "we organize our thoughts, select our data, choose our words, and make our statements..."¹⁰

Unable to find any reference to mapmaking in his writing, I asked Don a few years ago how he had made the maps in *The Shaping of America*. "Oh," he said lightly, "I would just sketch a

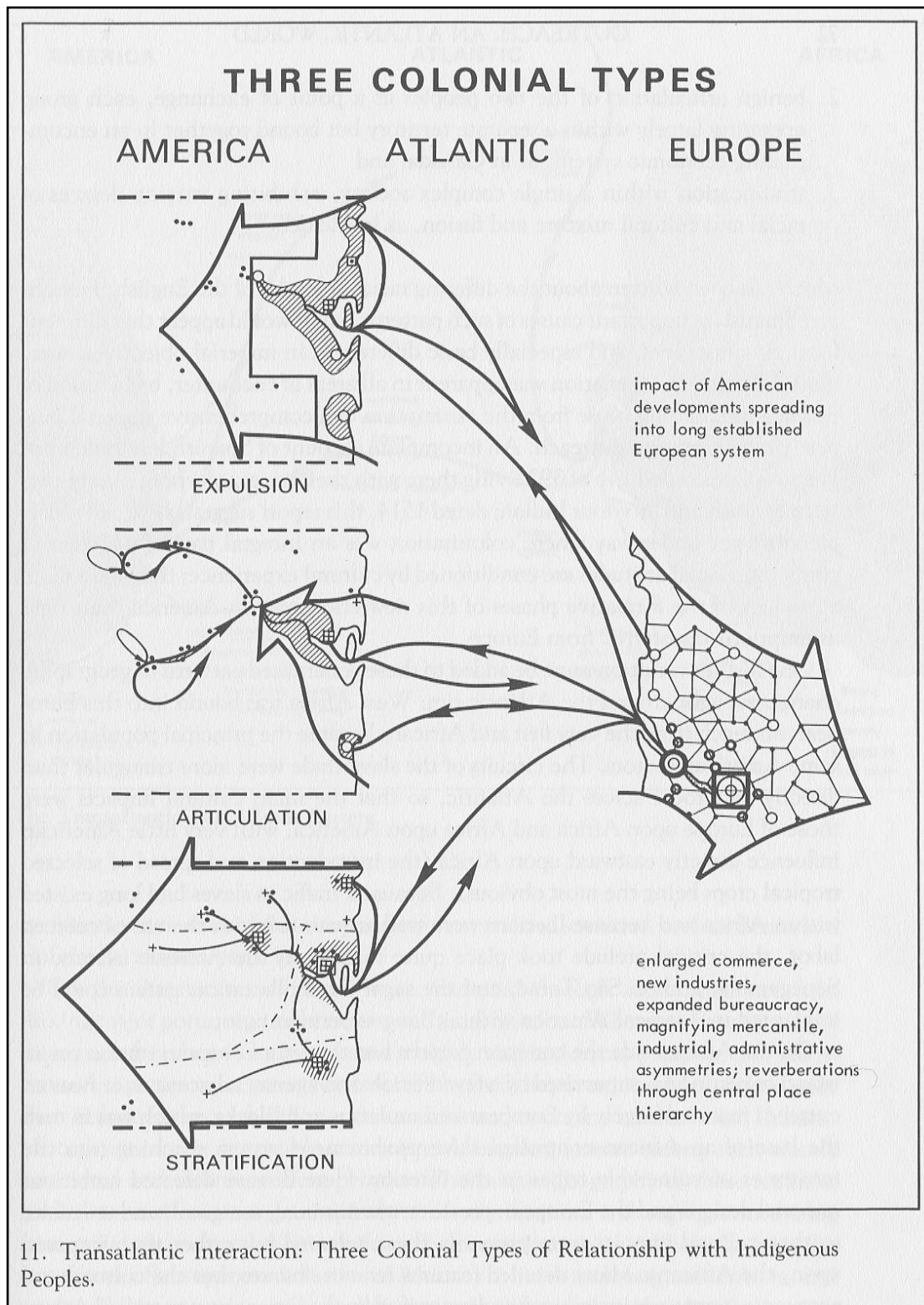


Figure 4. "Transatlantic Interaction: Three Colonial Types of Relationships with Indigenous Peoples" (Donald W. Meinig, *The Shaping of America*, vol. 1, *Atlantic America, 1492 – 1800* [New Haven: Yale University Press, 1987], p. 71).

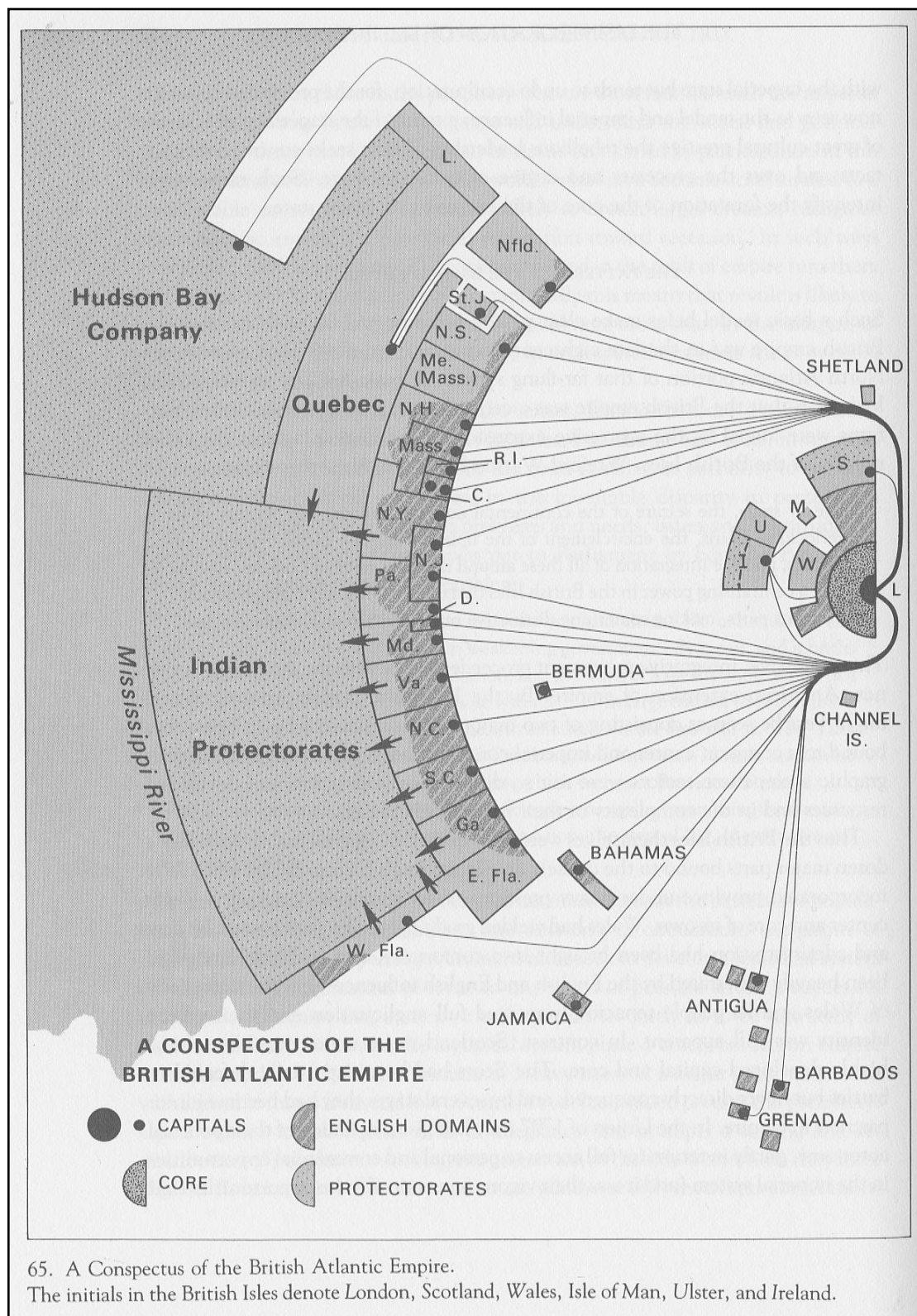


Figure 5. "A Conspectus of the British Atlantic Empire" (Donald W. Meinig, *The Shaping of America*, vol. 1, *Atlantic America, 1492 – 1800* [New Haven: Yale University Press, 1987], p. 376).

few ideas and give them to the cartographer, who then made the maps.”¹¹ Since then, I discovered that his most unusual maps were the result of a creative collaboration with a print-maker-turned-cartographer named Marcia Harrington. Harrington told me that Meinig did indeed provide pencil sketches to get her started, but that the meat of his communication came in his explanation of the concepts and geographical relationships that he wanted a map to show—“the theory behind things,” as she put it. Meinig always knew exactly what he wanted, Harrington said, but it was up to her to find the best visual expression of his conceptualizations.¹² Marcia Harrington designed each of the spatial diagrams I have shown here, and many more. It is her rendering of Meinig’s ideas that I, and so many others, have admired all these years.

The problem of positivistic historical cartography: Harley’s argument

The creative working relationships between Meinig and Harrington, Harris and Matthews, and, to a lesser extent, Conzen and Mapping Specialists, were exceptions to the typical relationship that Brian Harley describes in “Historical Geography and the Cartographic Illusion.” This piece, one of his lesser-known essays, was published in the *Journal of Historical Geography* in 1989.¹³ For all Harley’s importance as perhaps the single most influential figure in the history of cartography, many are unaware that he began as an historical geographer, doing his PhD at Birmingham University on the historical geography of medieval Warwickshire.¹⁴ There he was presumably trained in the kind of scientific mapping of historical data that made Clifford Darby’s mapping of the Domesday Book the epitome of innovative historical geography in Britain at the time.¹⁵

Harley’s essay is an excoriating critique of cartographic practice in historical geography and, more broadly, of academic cartography as a whole. He begins by pointing out that historical cartography—that is, mapping the past—“has remained...an unexamined aspect of our creative scholarship.” He sets out to fill that gap. Harley demands that maps for history should be understood as texts, and that historical geography, “like art,” is “a social practice” whose representations should be produced with the full consciousness of engaged, critical scholarship.¹⁶ This argument was part of his broader effort in the late 1980s to shake geographers free from their scientific assumptions and to anchor historical geography and cartography in deconstructionist theory. Unlike his other essays from this period, this one focuses on how present-day geographers produced and thought about maps.

Ordinarily, Harley explains, a scholar hands over sketches or compilations for a cartographer to render for publication.¹⁷ This practice has serious consequences. It disengages historical geographers from the cartographic process, which perpetuates their failure “to grasp the illusion of cartographic representation.” What is the illusion? That maps are a mirror of reality. “It is as if an army of ghost writers had written a large part of our texts for us,” Harley writes. “We have failed to question the inner logic, the rhetoric, and the style of the map in the same way that we would question the syntax of the written word. We have abrogated to the cartographers a part of our discourse, on the assumption that their standard techniques could somehow redescribe the past for us in more rigorous terms...”¹⁸

Harley’s main target in “Cartographic Illusion” is thematic maps, a category that was the brainchild of Arthur Robinson, father of the Wisconsin school of cartography. Robinson was lead author of a widely used textbook, *The Elements of Cartography*, which presented map-making as a science based on ever-increasing accuracy and fidelity in representing the earth and its human-made features.¹⁹ Harley argues that this view of maps is fundamentally wrong:

The normal understanding is that we control the map: but through its internal power or logic the map also controls us. We are prisoners in its spatial matrix. An analogy can be drawn between what happens to our data in the cartographers’ hands and what happens to people in the disciplinary institutions – prisons,

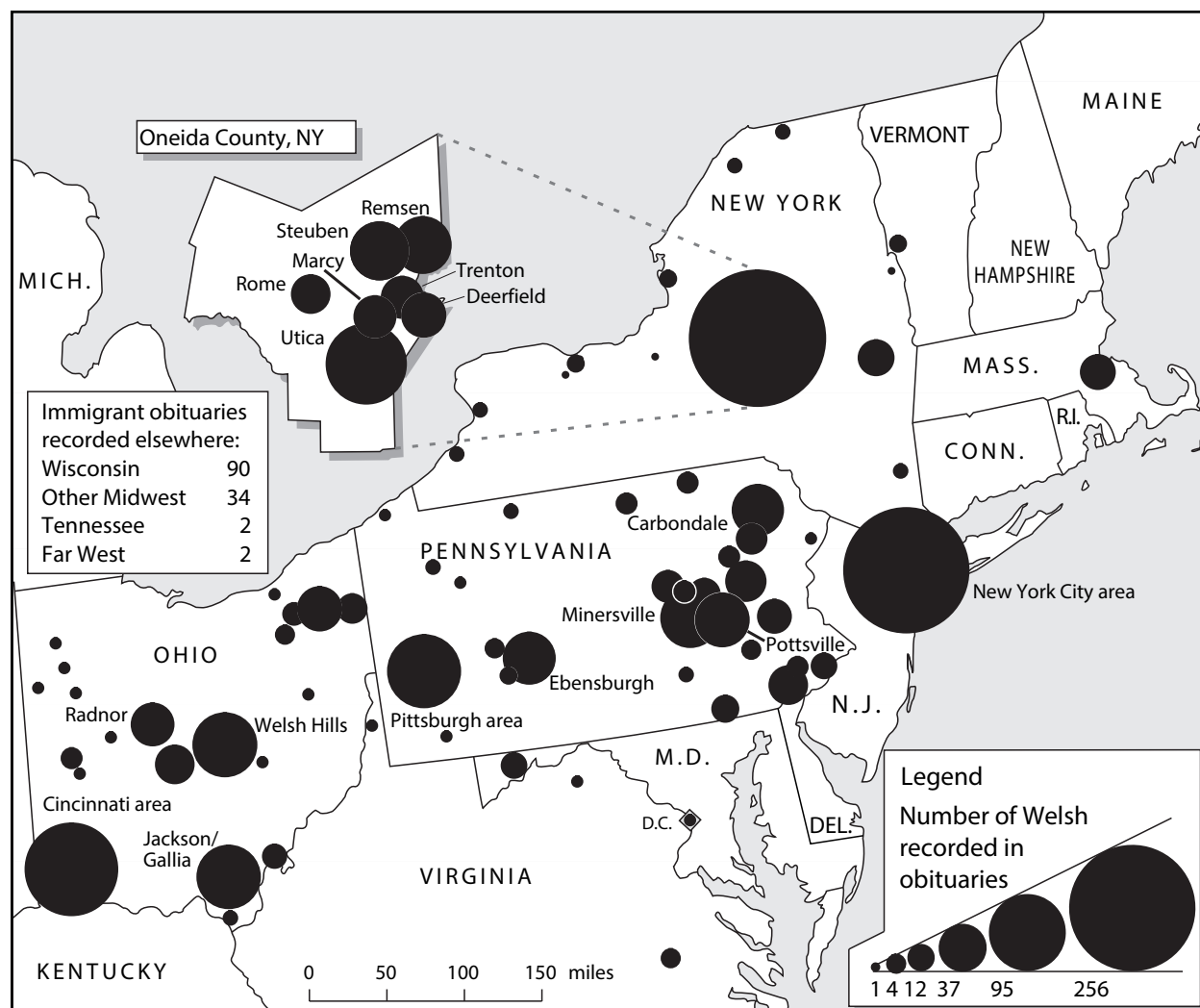


Figure 6. Places of death of Welsh immigrants to the United States, 1838 – 1850, derived from immigrant obituaries in Welsh-American religious periodicals (Map 1.3 in Anne Kelly Knowles, *Calvinists Incorporated: Welsh Immigrants on Ohio's Industrial Frontier* [Chicago: University of Chicago Press, 1997], p. 26. © 1997 The University of Chicago. All rights reserved).

schools, armies, factories – described by Foucault; in both cases a process of normalisation occurs. Standardisation is the golden calf of ‘thematic’ cartography: compilation, generalisation, classification, formation into hierarchies must all be done according to standard principles. The result is a highly artificial image which limits our ability to engage in interpretative manoeuvre. Mapping is a game, almost a ritual, with its own set of rules. We learn to accept the results to become players at the chessboard of the map.²⁰

I was trained, by Woodward and Conzen, to make maps in the “Wisconsin” style. Figure 6 is an image of my own imprisonment, a map of Welsh immigrant destinations from my first book, *Calvinists Incorporated*.²¹ This map exemplifies the “frozen,” “vacuous and stultifying image[s]” that Harley found so unsatisfying. Such maps draw “a curtain across the landscape...shutting out the sense of place from our thoughts. They are a lexicon without people.”²² Figures 7 and 8 show similar examples from my book *Mastering Iron*.²³ Harley’s essay has removed the scales from my eyes.

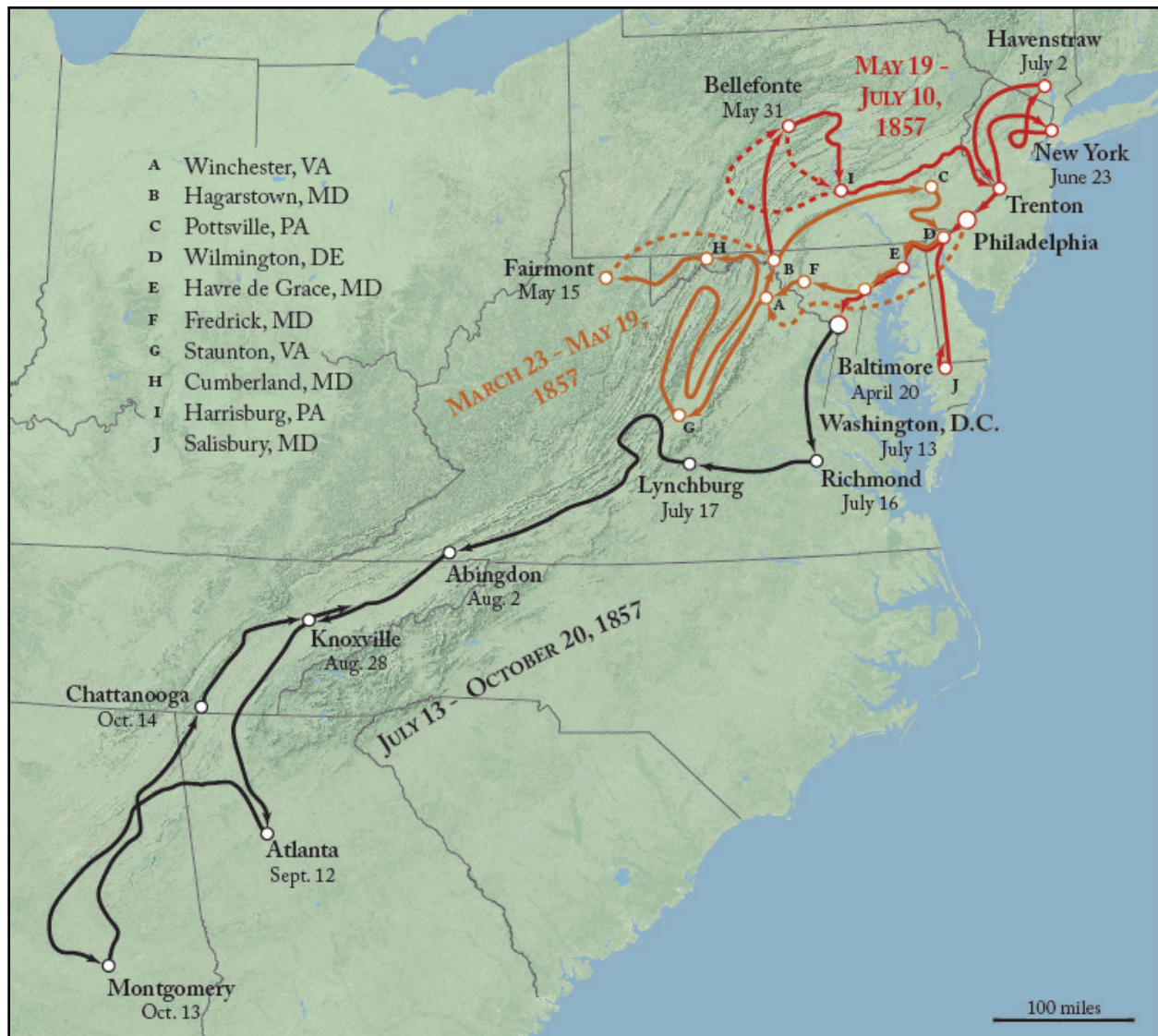


Figure 7. The route of Benjamin Smith Lyman as he gathered information on iron works in the South, March – July 1857 (Figure 7 in Anne Kelly Knowles, *Mastering Iron: The Struggle to Modernize an American Industry* [Chicago: University of Chicago Press, 2013], p. 29. © 2013 The University of Chicago. All rights reserved).

After believing for more than two decades that the Wisconsin school of cartography was the epitome of excellence, I now see the lifelessness of these maps.

Harley's *cri de coeur* ends with a bow to Denis Wood, who had pleaded "for a 'cartography of reality' that is 'humane, humanist, phenomenological, and phenomenalist'." "The obvious alternative" to dehumanized cartography, Harley concludes, "is a greater pluralism of cartographic expression...we need a narrative cartography that tells a story and portrays a process at the same time as it [reveals] the interconnectedness of humanity in space...we could try to make cartography exciting again."²⁴

When GIS was being developed in the late twentieth century, its designers incorporated the rules laid down by academic cartographers, including Robinson and his protégé Barbara Bartz Petchenik.²⁵ Their criteria for proper, scientific map design are embedded in the default settings of cartographic "functionality" in ArcGIS and many other GIS programs. One can change the

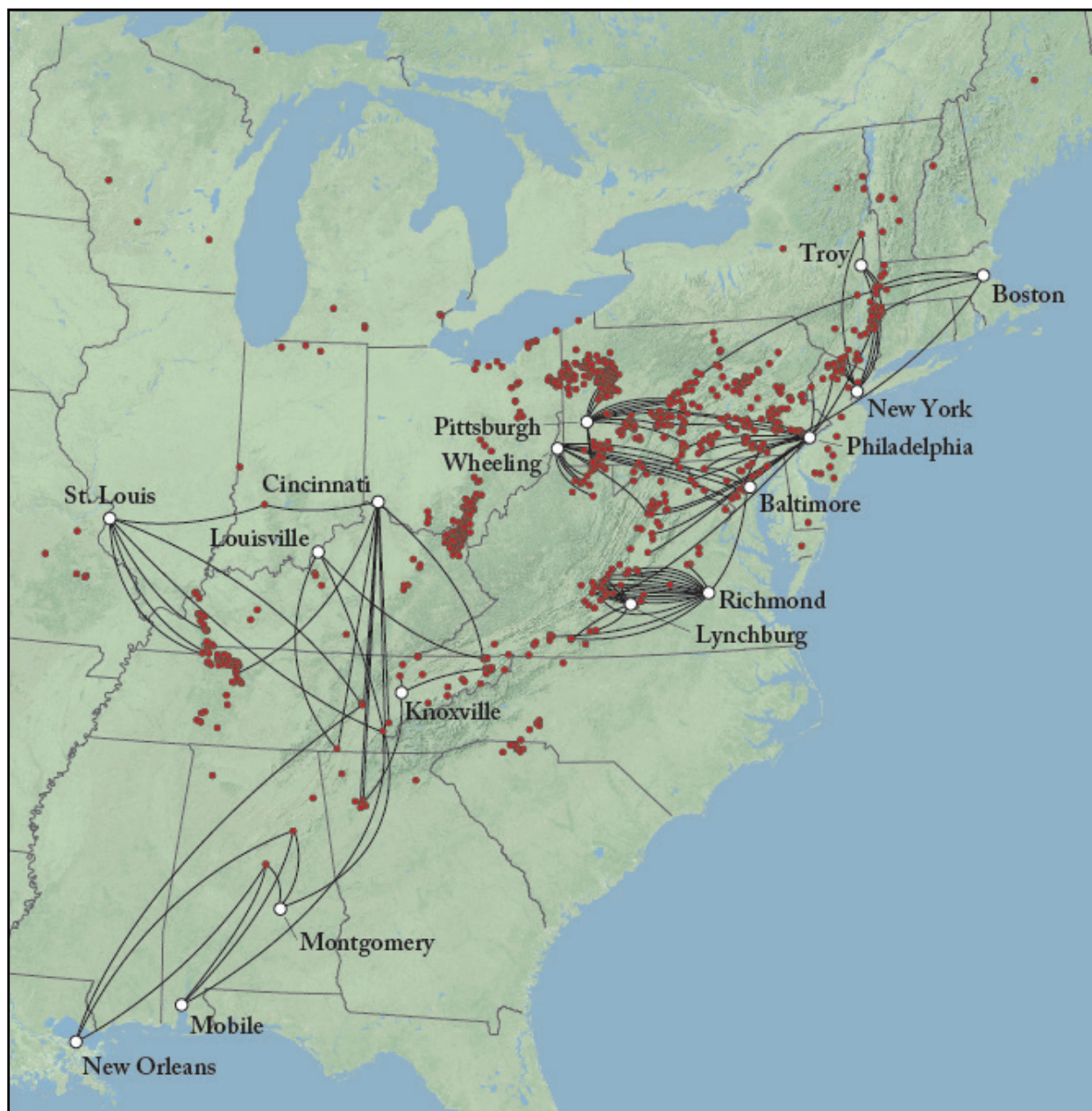


Figure 8. Map showing the market connections between pig iron producers and manufacturers, according to J. Peter Lesley's *The Iron Manufacturer's Guide* (1859) (Figure 16 in Knowles, *Mastering Iron*, p. 52. © 2013 The University of Chicago. All rights reserved).

settings, but how many of us do? Geographers know what it means when someone complains about the stilted, abstract quality of "GIS maps." Because today's student cartographers, and many professionals, are trained in GIS, it is all the more incumbent upon those of us who are conceiving of maps not to abdicate our creative responsibility when we collaborate with cartographers.

It is much easier to identify what is lacking in maps of human experience than it is to find better modes of geographic representation. One example can stand for many. In a recent article,

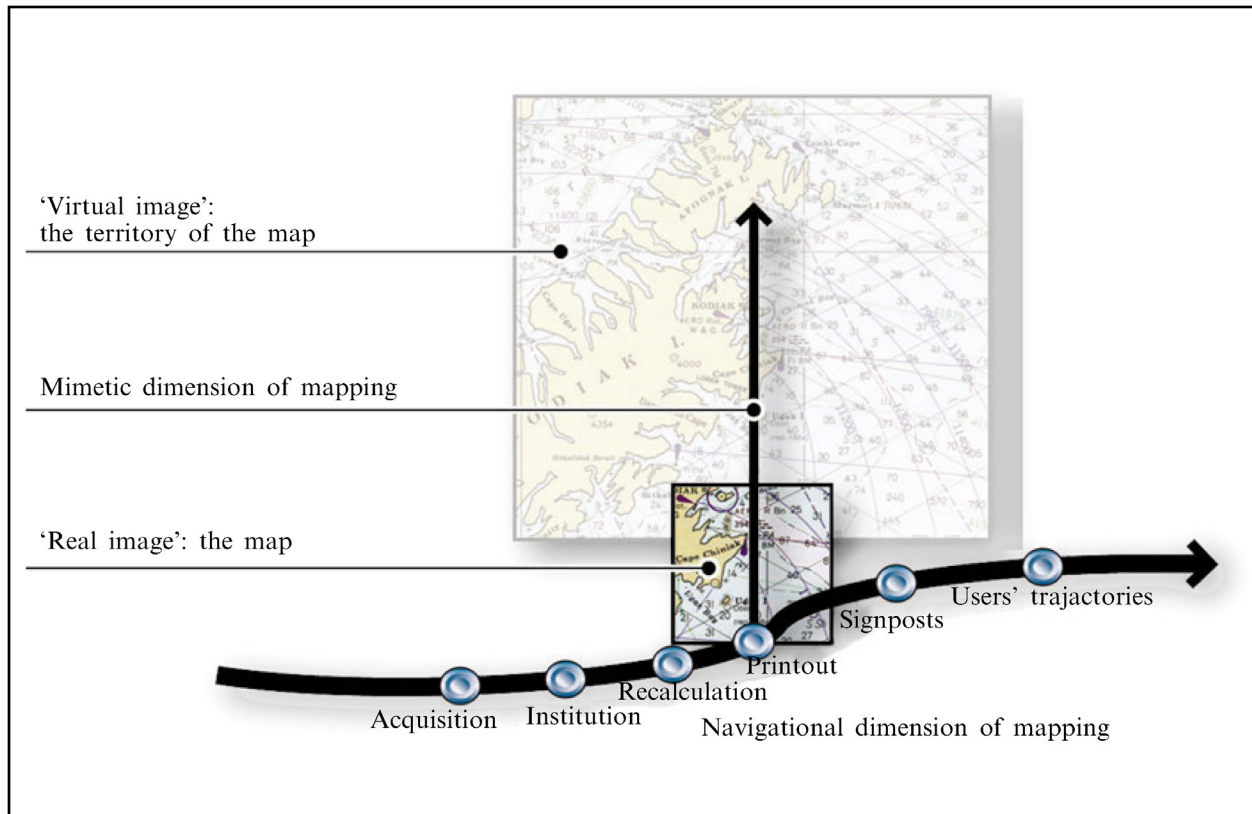


Figure 9. “Two Orthogonal Representations of the Mapping Impulse” (Figure 1 in Valérie November, Eduardo Camacho-Hübner, and Bruno Latour, “Entering Risky Territory: Space in the Age of Digital Navigation,” *Environment and Planning D: Society and Space* 28, no. 4 (2010), pp. 581-99, Pion Ltd., London. Figure on p. 587).

Valérie November, Eduardo Camacho-Hübner, and Bruno Latour echo Harley’s complaint against the assumptions of modernist cartography in the hands of geographers. “When social scientists collaborate with geographers,” they write, “they are often puzzled by the weight given by their colleagues to the base map, upon which they are asked to project their own objects as if they had to add a more superficial layer to a more basic one.” These scholars argue that mimetic maps—those that embody the “cascades of inscriptions” that make scientific cartography seem to represent reality—are actually the farthest from reality because they freeze time, and thus deny the flux and change that characterize life. Like Harley, these authors crave a kind of mapping that is mobile and responsive, capable of conveying the complexity of life.²⁶ Their own figures, however, lack these qualities; they are pale, fixed diagrams that I have yet to understand (figure 9).

Almost none of us can master all three of the major modes of geographic expression, namely empirical writing, theoretical writing, and geovisualization. November and her co-authors are exceptional among theorists for attempting to visualize their ideas. So far as I know, Harley never did this in his theoretical papers; he left mapping behind when he turned to critique the history of cartography. Meinig described his interpretive concepts in words, but needed an artist-cartographer to render them visually. If historical geographers cannot be both literary and visual artists, what are we to do?

The answer is: *collaborate*. Historical geographers *have* produced exciting, creative, humane cartography when they have had both powerful ideas and imaginative, talented cartographers

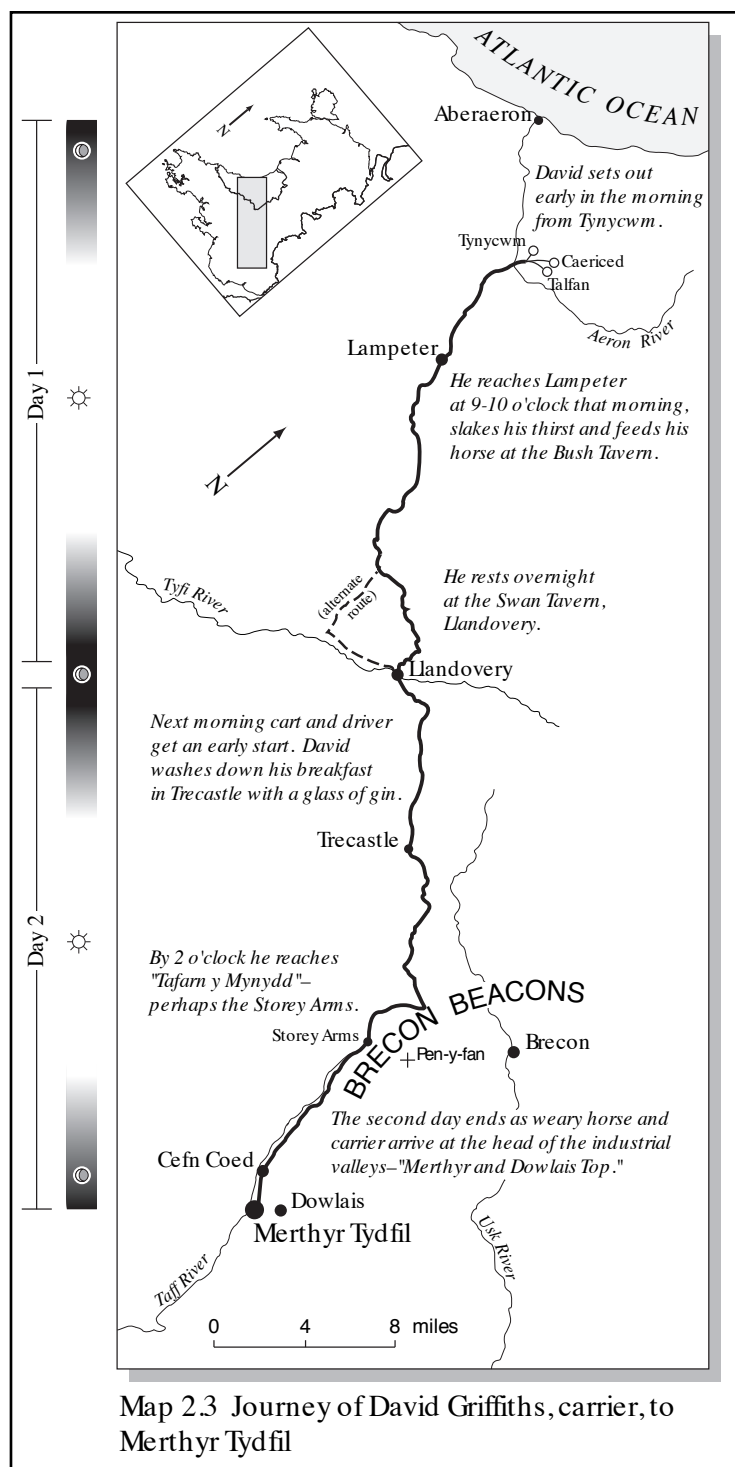


Figure 10a. A map of the journey of David Griffiths to Merthyr Tydfil to sell farm goods in the city, based on a Welsh folk song (Map 2.3 in Knowles, *Calvinists Incorporated*, p. 70. © 1997 The University of Chicago. All rights reserved).

and graphic artists as collaborators. Collaboration is much more than handing off one's sketches to a technician. It is a process of intellectual exchange that engages the creative abilities of all parties. The more unusual and complex one's ideas are, the more necessary collaboration may be.

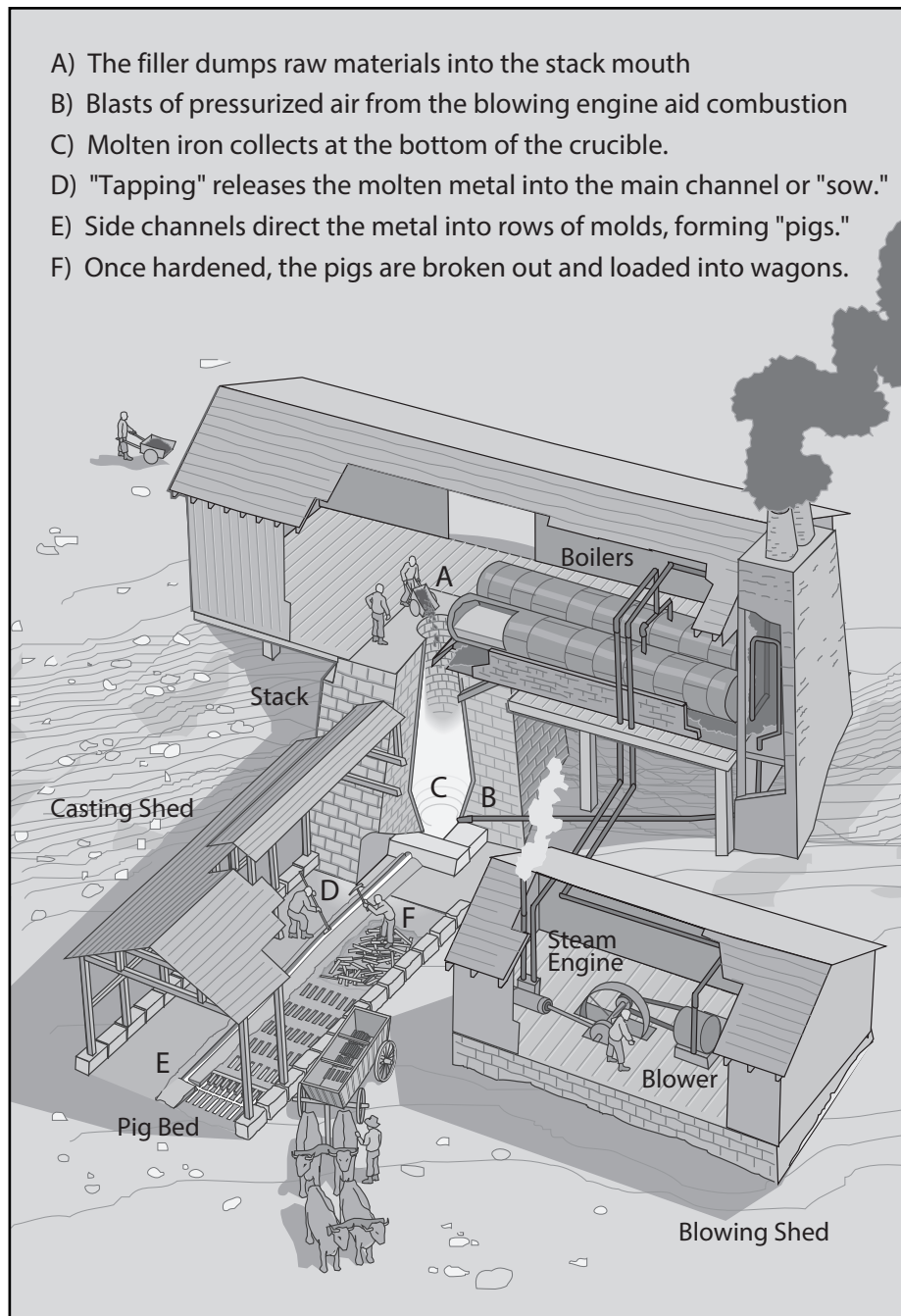


Figure 10b. A cut-away view of a typical blast furnace in operation, drawn by Tom Willcockson (Figure 4.1 in Knowles, *Calvinists Incorporated*, p. 169. © 1997 The University of Chicago. All rights reserved).

I mentioned at the beginning that I learned a way of working from Michael Conzen. While he did show me how to work with cartographers, collaboration had been my professional mode of operation from college, when I was a cub journalist with the daily student newspaper at Duke University. All of my work in publishing involved collaboration of some kind. Good books are created by many talented people. In graduate school, I sought out gifted student cartographers to help me create my more unusual maps, such as Figures 10a and 10b. The map on the left, based on a Welsh folk song, was drawn by Sara Arscott for my dissertation. The drawing on the right, a cut-away view of a blast furnace, was drawn by Tom Wilcockson, a historical illustrator, for *Calvinists Incorporated*.

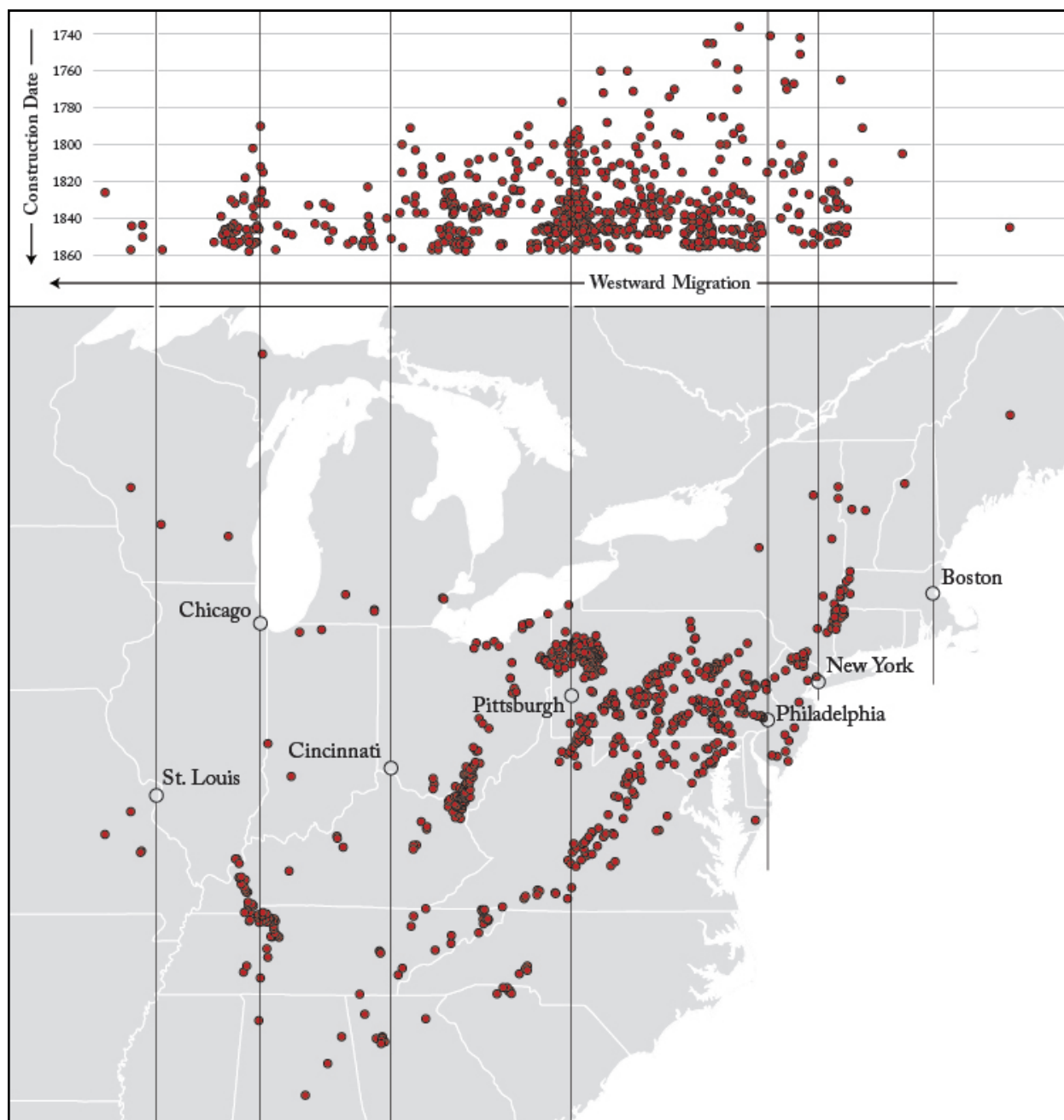


Figure 11. The simultaneous concentration of iron works in certain localized regions and movement of the industry west and south during the early 19th century (Figure 9 in Knowles, *Mastering Iron*, p. 35. © 2013 The University of Chicago. All rights reserved).

Geography undergraduate students at Middlebury College have been my collaborators in geovisualization for the last decade. Garrott Kuzzy created the image in Figure 11 from my historical GIS database of the U.S. iron industry. The data documented that during the antebellum period, the iron industry moved westward while becoming concentrated in particular places, mostly in the East. I asked Garrott to find a way to display both trends in a single graphic. His solution was to plot iron companies' longitude on the graph above (with time reading from top to bottom), and then to connect the temporal distribution to geographic location on the map, below. I still marvel at his ingenuity.

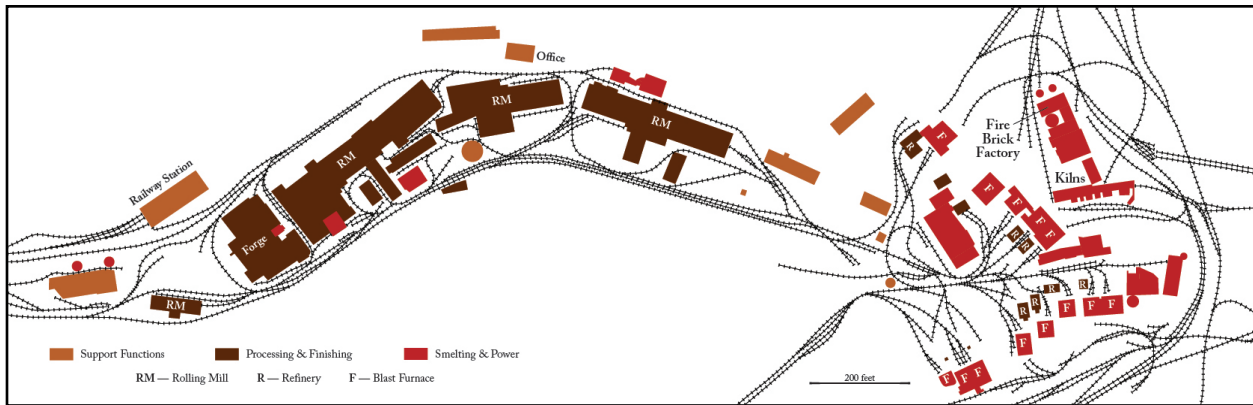


Figure 12. A diagrammatic view of the spatial organization of the Dowlais Iron Company Merthyr Tydfil, Wales, circa 1852 (Figure 41 in Knowles, *Mastering Iron*, pp. 116-17. © 2013 The University of Chicago. All rights reserved).

Chester Harvey, who drew most of the maps and diagrams in *Mastering Iron*, helped me express my geographic ideas many times. Figure 12 is our pared-down version of an 1851 British Ordnance Survey map of Merthyr Tydfil, Wales. Merthyr's iron companies were the envy of American entrepreneurs who wanted to replicate their low-cost, high-volume production in the United States. By stripping away the historical richness of the manuscript map to reveal the functional landscape of production, we highlighted the geographical efficiency of this large company's production system, which connected mines and quarries (just off the right side of the map) through smelting, refining, and shipping (off the left side of the map).

I could show many more examples of students' creativity, but my space is limited. My last examples come from the Holocaust Geographies project.²⁷ The case study of evacuations from Auschwitz by Simone Gigliotti, Marc Masurovsky, and Erik Steiner began with conventional mapping of evacuation routes. While this was useful information, it did not begin to represent evacuees' traumatic experiences as recorded in survivor testimonies. Well into the project, Erik Steiner, a superb cartographer and graphic artist, began experimenting with non-cartographic representation of the testimonial evidence. Figure 13 deconstructs seven women's post-war testimony into its constituent letters and locates them by the time and place to which they refer. This image reveals striking gaps of silence. Erik also tried figurative representations, most movingly in a poetic image of an evacuation (Figure 14) that captures the snows of Poland in January, the profound isolation and disorientation of evacuees, the mobile community of the marching column, and the seeming endlessness of the journey.

Each of these examples came from wrestling with complex historical information that refused to be mapped politely. One of my students showed me just how valuable it can be to confront the inadequacies of conventional mapping by thinking better about what one really wants to visualize in historical evidence. The student, Hannah Day, was in my senior research seminar on the historical geography of the Holocaust. She became fascinated by the massive two-volume diary of Victor Klemperer, a secular Jew who survived the Holocaust and the bombings of his native Dresden. Hannah wanted to map Klemperer's experiences as recorded in his diary. She began conventionally with a basemap of 1944 Dresden, to which she added short quotations from Klemperer's diary at the locations to which they refer. Hannah was dissatisfied with this approach. It had no feeling. What she and I finally came up with was an emotional diagram structured by time rather than place (Figure 15). Time runs from left to right along the horizontal axis. The vertical axis rises above the centerpoint according to the degree of transcendence that

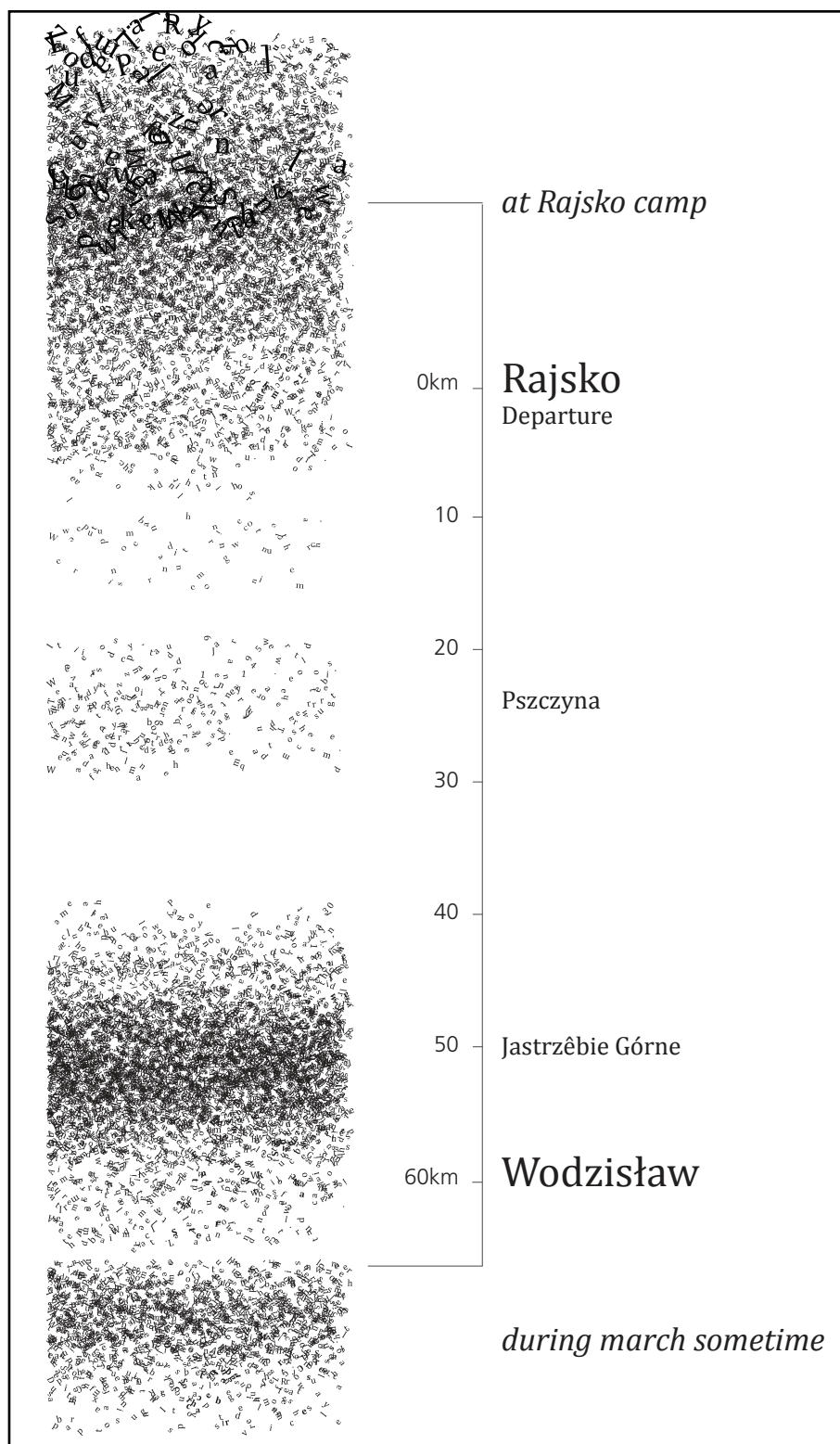


Figure 13. “Terrain of Encoded Memories,” by Erik B. Steiner. Figure from Simone Gigliotti, Marc J. Masurovsky, and Erik Steiner, “From the Camp to the Road: Representing the Evacuations from Auschwitz, January 1945,” in Anne Kelly Knowles, Tim Cole, and Alberto Giordano, eds., *Geographies of the Holocaust* (Indianapolis: University of Indiana Press, 2014), 216. By permission of Erik B. Steiner.

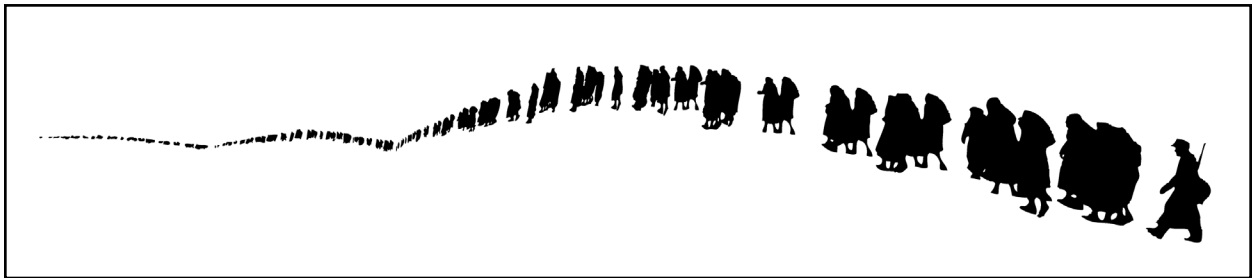


Figure 14. A sketch of evacuees from Auschwitz, by Erik B. Steiner. By permission.

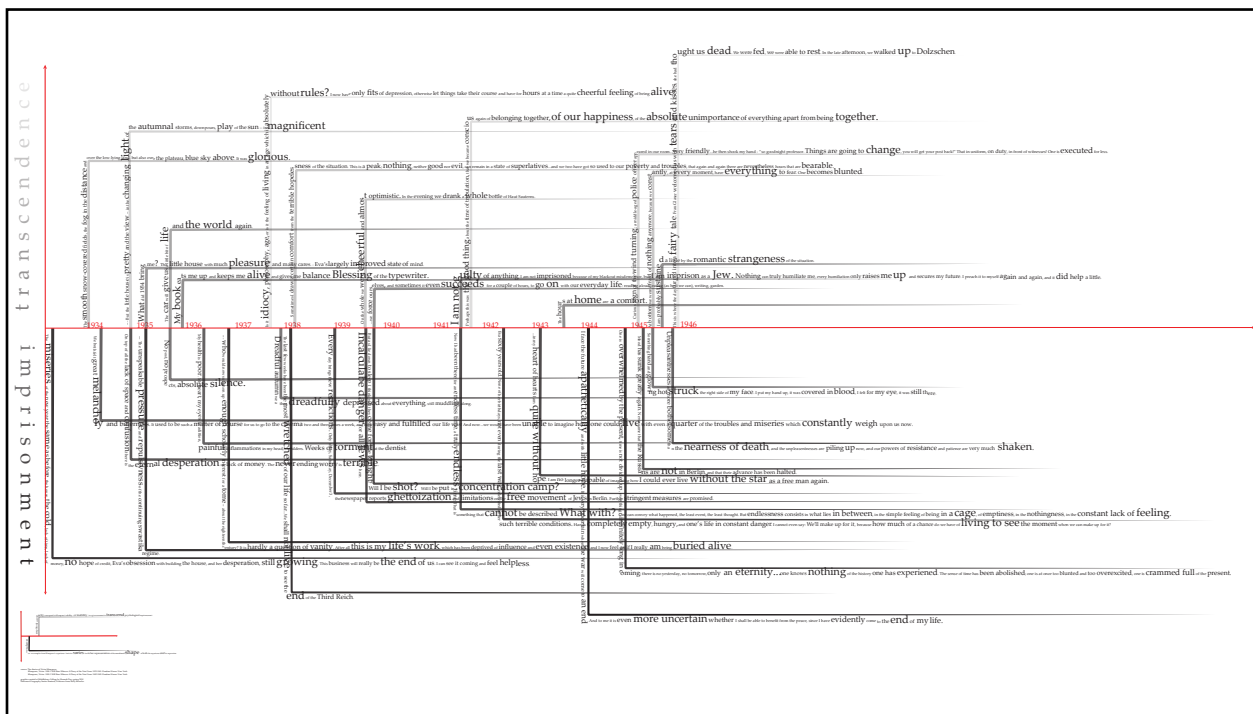


Figure 15. Hannah Day's graphic representation of Victor Klemperer's emotional experience during WWII, as recorded in his diary. By permission.

Klemperer felt in moments represented by quotations that rise above the timeline, or the depth of imprisonment and despair he felt at moments that descend below the line. The final image makes me think of an organ concerto, with deepening bass chords as conditions worsened but also notes of pleasure and joy, as when he found his wife alive after a bombing raid, was able to get food, or escaped the city for a day in the countryside.

What we have to offer as visual artisans

As spatial and visual thinkers, historical geographers have so much to offer scholarship. We are adept at spatial thinking and capable of creative visualization that our colleagues in other disciplines envy and are eager to learn.

In the Digital Humanities, literary and historical scholars are eagerly using digital visualization tools that reveal relational patterns, including spatial patterns, in new ways that can be very stimulating. The intellectual substance of some of this work is yet to be determined, but I am convinced of its value in generating new questions and engaging new bodies of evidence. What I see lacking in Digital Humanists' embrace of visual technologies is precisely the critical awareness that Harley urges us to exercise. Just as historical geographers have tended to be oblivious of the cartographic illusion that maps mirror reality, those of us who are now using GIS, virtual reality, NVivo, and the many other tools of geo- and socio-visualization should resist the seductive impression that the images generated by computer programs are real.

It is never too late to learn how to think critically about visual representation. Where I part company with more theoretically driven cultural and historical geographers is that I believe we must continue to make visual images. At the same time, we must also critique our own efforts. My work has benefited enormously from critical engagement with the visual craft of my students, fellow scholars, and cartographers who have dared to break the mold of the Wisconsin school. I hope we might all become more daring, and more human, in our efforts to represent our understanding of the past.

NOTES

- 1 James A. Henretta, et al., *America's History* (Homewood, Ill.: Dorsey Press, 1987): Maps 2.2, 2.4, and 6.2.
- 2 I met Harley during my last months working for Dorsey Press. When I acquired David Buisseret's book manuscript *From Sea Charts to Satellite Images* for the Press, Buisseret suggested that I ask Harley to write an introduction. He agreed to meet me during one of his regular visits to the University of Wisconsin-Madison. I vividly remember his eagle-sharp gaze when I walked into the long, narrow office under the eaves of Science Hall where he sat tipped back in a swivel office chair. A formidable man, but generous. His typically perceptive introductory essay was one of the last pieces he wrote before he died in 1991. *Sea Charts* was picked up by University of Chicago Press when Dorsey Press was sold by its parent company, Richard D. Irwin; the book was published in 1990.
- 3 J. B. Harley and David Woodward, eds., *Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, vol. 1 of *The History of Cartography* (Chicago: University of Chicago Press, 1987); R. Cole Harris, ed., *Historical Atlas of Canada*, vol. 1, *From the Beginning to 1800* (Toronto: University of Toronto Press, 1987); D. W. Meinig, *Atlantic America, 1492 – 1800*, vol. 1, *The Shaping of America: A Geographical Perspective on 500 Years of History* (New Haven: Yale University Press, 1987).
- 4 See, for example, James E. Vance, Jr.'s review in *Annals of the Association of American Geographers* 77, no.3 (1987): 479 – 80 and James Axtell's review in *William and Mary Quarterly* 45, no.1 (1988): 173 – 75. For a contrary view, see Rowland Berthoff's critique of Meinig's

- spatial thinking as inadequate to explain the character of American life, economy, and national identity, in *Journal of Southern History* 53, no.4 (1987): 645 – 646.
- 5 Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II*, vol. 1, trans. Siân Reynolds, abridged edition (New York: Harper & Row, 1992), 122.
 - 6 This was historian Bernard Bailyn's memorable critique of my mapping of the American iron industry at a "Geography and Atlantic History" workshop at Harvard, 4 November 2006. I was unable to persuade Bailyn that mapping could be interpretive, not merely descriptive. He is not alone.
 - 7 Meinig's capsule diagrams of spatial interactions have the universal quality and specificity of architect Christopher Alexander's conceptualizations of types of human living and working spaces in *A Pattern Language: Towns, Buildings, Construction* (New York: Oxford University Press, 1977).
 - 8 Bruno Latour, *Science in Action: How to Follow Scientists and Engineers Through Society* (Cambridge: Harvard University Press, 1988).
 - 9 For an elegant argument about the lack of geographic knowledge of the interior among British military forces, see Stephen J. Hornsby, *Surveyors of Empire: Samuel Holland, J. F. W. Des Barres, and the Making of the Atlantic Neptune* (Montreal: McGill-Queens University Press, 2011), chap. 5.
 - 10 D. W. Meinig, "Geography as an Art," *Transactions of the Institute of British Geographers*, new series 8, no.3 (1983): 314. Emphasis added.
 - 11 This almost casual approach was confirmed by Joseph Stoll, a Syracuse University cartographer who worked with Meinig as he was completing volume 4 of *The Shaping of America*; telephone interview with Joseph Stoll, 4 April 2014.
 - 12 Telephone interview with Marcia Harrington, 5 April 2014. Thanks to John Olson of the Syracuse University Cartography Lab for helping me find Ms. Harrington, who left the Lab many years ago to begin a new career.
 - 13 J. B. Harley, "Historical Geography and the Cartographic Illusion," *Journal of Historical Geography* 15, no.1 (1989): 80 – 91. This essay is not included in the collection edited by Paul Laxton, *The New Nature of Maps: Essays in the History of Cartography* (Baltimore: Johns Hopkins University Press, 2001). Thanks to Stephen J. Hornsby for bringing this essay to my attention.
 - 14 Paul Laxton, "Harley, (John) Brian (1932–1991)," *Oxford Dictionary of National Biography* (Oxford: Oxford University Press, 2004); online ed., May 2010 [<http://www.oxforddnb.com/view/article/41115>, accessed 24 November 2014].
 - 15 There are many volumes. Between two covers, see H. C. Darby, *Domesday England* (Cambridge: Cambridge University Press, 1977). I see Darby's exhaustive, iterative mapping of the Domesday Book's data, and his uses of it to interpret medieval England, as a direct precursor to historical GIS. See Bruce M. S. Campbell, *English Seigniorial Agriculture 1250 – 1450* (Cambridge: Cambridge University Press, 2000), for a comprehensive but poorly designed mapping of the Domesday data with GIS.
 - 16 Harley, "Cartographic Illusion," 80.
 - 17 Harley's work as a book editor may have given him insights into the limitations of this process.
 - 18 Harley, "Cartographic Illusion," 83.
 - 19 Harley, "Cartographic Illusion," 85. Robinson, et al., *The Elements of Cartography*, went through several editions. Karen Reppen of Mapping Specialists gave me a copy of the 5th edition in 1984 to help prepare me for working on the maps in *America's History*. Robinson's history of cartography, which opens the book, is a fine distillation of the progressive (or

- Whig) view of increasingly scientific cartography championed by Norman J. W. Thrower in *Maps and Map: An Examination of Cartography in Relation to Culture and Civilization* (Englewood Cliffs, NJ: Prentice-Hall, 1972) and later editions.
- 20 Harley, "Cartographic Illusion," 85.
 - 21 Anne Kelly Knowles, Map 1.3 in *Calvinists Incorporated: Welsh Immigrants on Ohio's Industrial Frontier* (Chicago: University of Chicago Press, 1997), 26.
 - 22 Harley, "Cartographic Illusion," 86.
 - 23 Anne Kelly Knowles, Figs. 7 and 16 in *Mastering Iron: The Struggle to Modernize an American Industry* (Chicago: University of Chicago Press, 2013), 29, 52.
 - 24 Harley, "Cartographic Illusion," 87-88.
 - 25 Arthur H. Robinson, *The Look of Maps: An Examination of Cartographic Design* (Madison: University of Wisconsin Press, 1952); Robinson and Barbara Bartz Petchenik, *The Nature of Maps: Essays Toward Understanding Maps and Mapping* (Chicago: University of Chicago Press, 1976).
 - 26 Valérie November, Eduardo Camacho-Hübner, and Bruno Latour, "Entering Risky Territory: Space in the Age of Digital Navigation," *Environment and Planning D: Society and Space* 28 (2010): 581 – 99.
 - 27 Anne Kelly Knowles, Tim Cole, and Alberto Giordano, eds., *Geographies of the Holocaust* (Indianapolis: Indiana University Press, 2014).