

Bending Lines: Maps and Data from Distortion to Deception

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FOR THOSE WHO WORK WITH MAPS as a profession, the fraught relationship between cartographic representation and truth is a familiar problem. But for the vast majority of casual readers and users of maps, the epistemological status of maps is typically much more straightforward: maps seem to show the world as it really is. In the popular imagination, “maps don’t lie,” to borrow the maxim that appeared in the headline of a 2019 *New York Times* column written by Charles Blow.

Blow’s headline, written in reaction to Donald Trump’s mischievous distortion of a National Weather Service map forecasting the path of Hurricane Dorian, became the subject of much head-shaking amongst scholars steeped in the critical tradition of geographers such as J. B. Harley, Judith Tyner, and Mark Monmonier, all of whom have pointed to the ways in which maps can indeed be used to lie, deceive, cheat, and dominate (e.g., Harley 1989; Tyner 1982; Tyner 2015; Monmonier 2018). But most people are not equipped with this automatic skepticism towards maps—getting directions to the local grocery store, after all, hardly feels like the terrain on which the forces of social and political contestation are brought to bear. Maps, at least the way they appear in most people’s everyday lives, carry the stamp of trustworthiness. And it is precisely this

vein of good faith which can make maps so dangerously persuasive.

The Leventhal Map & Education Center at the Boston Public Library (LMEC) launched an exhibition and initiative in May 2020 with the goal of examining how truth and belief are constructed through cartography and the visual display of information. The show, *Bending Lines: Maps and Data from Distortion to Deception*, was moved to an online-first format due to the COVID-19 pandemic. Beginning with the familiar categories of propaganda maps and persuasive cartography, and expanding to include themes around information literacy, data justice, and the social construction of belief, *Bending Lines* is a wide-ranging attempt to highlight the many ways in which cartography bends the truth—both for nefarious, oppressive reasons as well as, at times, in service of counter-hegemonic movements. Indeed, *Bending Lines* expands the categorical limits of “persuasive” cartography outward to include all forms of mapmaking, noting that reduction, simplification, and symbolization (“lies,” of a sort) are not incidental but inherent in the act of representation. Rather than simply trying to replace the public’s faith in maps with a reactionary distrust, however, *Bending Lines* instead argues in favor of a critically informed trust, showing how maps must always be evaluated in terms of their position within systems of authority and power.

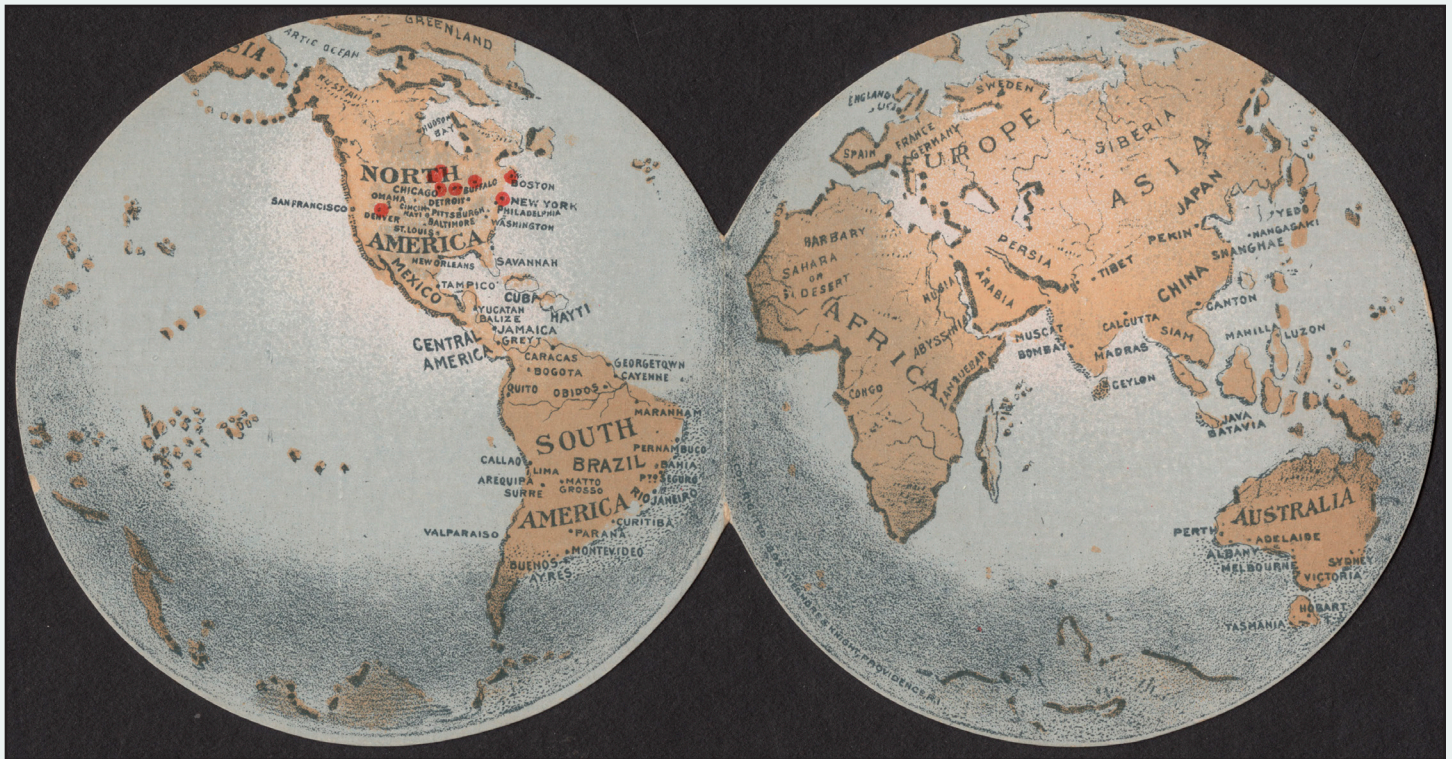
DEVELOPMENT AND BACKGROUND OF THE EXHIBITION

THE ORIGINAL INSPIRATION for an exhibition on truth and lies in cartography came in 2018 from Belle Lipton, LMEC’s Geospatial & Cartographic Information Librarian, and Dory Klein, the Center’s Map Librarian at the time. The P. J. Mode Collection at Cornell University served as a model for curating a set of objects around the

category of “persuasive cartography,” the term first coined in 1974 by Judith Tyner in her doctoral thesis (1974). Lipton additionally brought the theme of data literacy to bear on the exhibition’s agenda. Working with Ronald Grim, the Curator at the time, the Center applied for grant funding from the Institute of Museum and Library



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Services (IMLS) to support the exhibition; we were successful in the application, and *Bending Lines* was made possible by IMLS grant MA-10-19-0400-19.

I joined the Map Center as the new Curator of Maps & Director of Geographic Scholarship in August 2019 and took on the overall responsibility for planning and writing *Bending Lines*, working closely with Lauren Kennedy, the Center’s Design & Communications Lead. Additional development of the exhibition was undertaken by the entire LMEC staff, including Michelle LeBlanc, Lynn Brown, Lauren Chen, Connie Chin, Rachel Sharer, and interns Madison Bastress and Cory Seremetis.

Through the course of our planning, the remit for *Bending Lines* changed from “persuasive cartography” as a taxonomic category in the study of cartography to a broader question about how maps construct the truth. We sought to emphasize truth as a *construction*, rather than a simple binary state, foregrounding how cartographic veracity is



Front (top image) and back (bottom image) of a trade card of the American Radiator Company (1892).

configured by political and social relationships, as well as by registers of meaning and symbolism that acquire significance and viability in the same manner as a written language. Consequently, we drew not only from the scholarly literature on persuasion and propaganda, but also from the social studies of science that have influenced fields such as critical cartography and data feminism. Whether in the form of a sixteenth-century cartographer struggling to incorporate evidence from trans-Atlantic voyages into

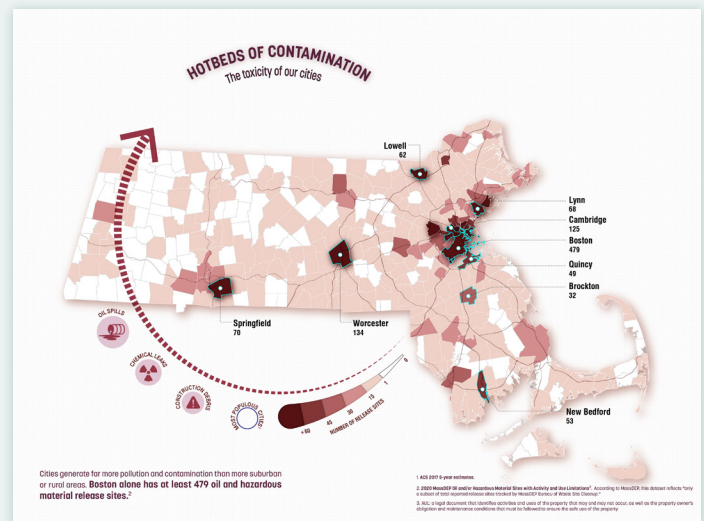
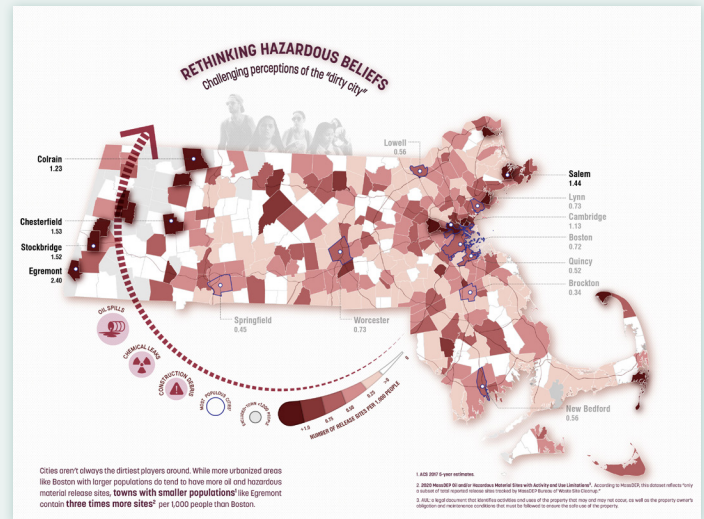
Ptolemaic geography or a modern day big data analyst grappling with a Census variable that poorly captures the heterogeneity of a social phenomenon, we aimed to show that the underlying struggle remains the same: the human process through which the overwhelming complexity of the real world is reduced and simplified into geographic

knowledge. This simplification, of course, can easily become the tool of nefarious intentions in the hands of those who deliberately try to cheat and deceive. But it is not simplification *itself* which accomplishes the lie, for even the best, most sincere cartographers are still practitioners of this reductive representation.

STRUCTURE OF THE EXHIBITION

Rather than taking the typical taxonomic approach of categorizing maps by their purpose, *Bending Lines* is divided instead into three broad sections. In the first, “Why Persuade?”, we examine the motivations that would lead someone to purposefully use maps for persuasive goals. This question flips the locus of explanation from the object itself to the social process that produced the object, and answers to the framing question include “to sell land,” “to incite a war,” and “to promote a political campaign,” amongst others. The second section, “How the Lines Get Bent,” looks at the techniques and methods of cartography, explaining how choices ranging from projection to classification result in skewed versions of the truth, even in cases where the mapmaker or data designer has gone out of their way to present reality as faithfully as possible. Here we show that a choice, such as a coordinate system, may not be made with the intent to deceive, but may nonetheless have the consequence of promoting one viewpoint to the neglect of alternative, equally feasible, perspectives. The final section, “The Power to Make Belief,” ties the exhibition’s guiding questions together by showing that what someone is able to know about the world from looking at a map is a function not simply of what is displayed in the map itself, but instead a social process that depends on trust in institutions, displays of identity, and the machinations of political power.

A special feature of the exhibition is a series of newly commissioned maps for a section called “Same Data, Different Stories.” In this section, we composed a set of data objects about Massachusetts, and gave this data set to six cartographers. We asked these cartographers to select from the data available and create two maps that offered competing arguments. Here, we sought to show that data *by itself* cannot lead to any single conclusion or proof, but, instead, that the choices and conceptual frames that a cartographer brings to a project of data design will inevitably shape what sorts of proofs the data seems to offer. Margaret Owens, Andy Woodruff, Lauren Tierney, Julia Wolfe,



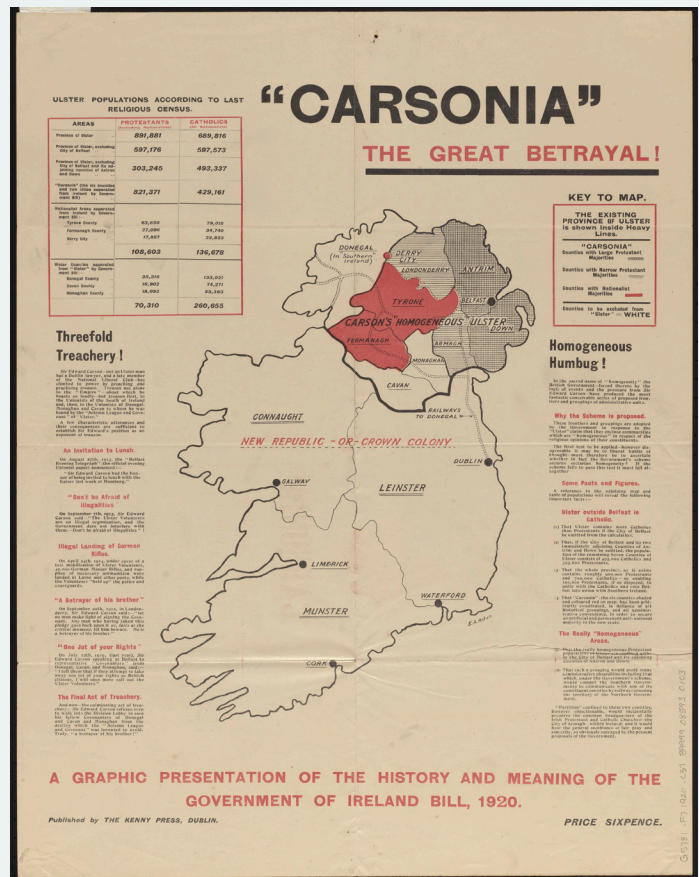
Two maps by Maggie Owens in the “Same Data, Different Stories” section show how data can be manipulated to draw different conclusions.

and (acting as a team) Madison Draper and Alison D. Ollivierre each created pairs of maps that challenge readers to rethink their assumptions that geospatial data offers an unvarnished, perfectly objective truth free of human interpretation.

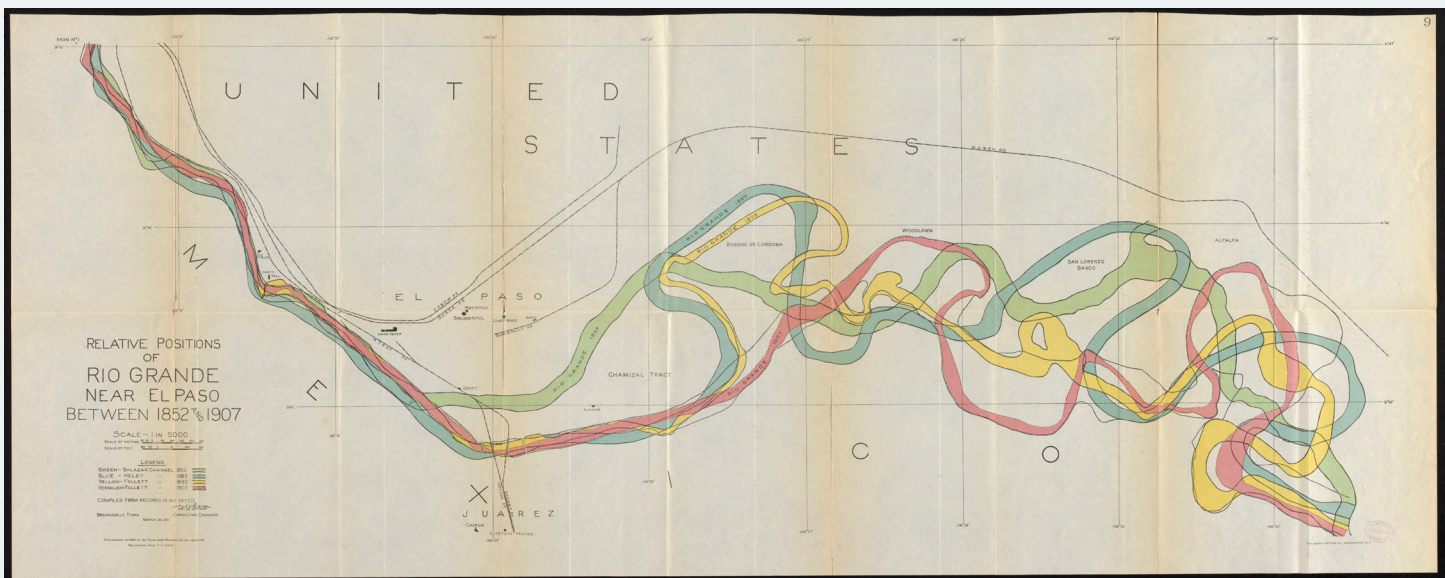
NOTABLE OBJECTS

THE PERMANENT COLLECTIONS of the LMEC include many of the most famous examples of persuasive cartography, such as Frederick W. Rose's *Serio-comic War Map for the Year 1877* (1877), with its octopus presentation of the Russian Empire; the U.S. Army Morale Service Division's periodical *Newsmag*, produced during World War II to narrate the official version of the war effort; and William Bunge's *Nuclear War Atlas* (1988), a series of anti-proliferation maps republished from a 1982 poster. We also discovered many objects in the collection which had not previously been interpreted in this light, such as a 1920 Irish nationalist broadside entitled "*Carsonia*" *The Great Betrayal!*; an enormous 1918 map published by the National Highways Association, urging investment in road infrastructure; and an 1839 map of the northern border of Maine, used in the negotiations that led to the Webster-Ashburton Treaty. We also found suitable material in the BPL's research collections, including original maps of the Chamizal boundary dispute between Mexico and the United States—a cartographic skirmish described in Chapter 3 of Monmonier (2010).

Acquisitions also brought new material into our collections for display in *Bending Lines*. The exhibition gave



E. A. Aston, "Carsonia" *The Great Betrayal!* (Kenny Press, 1920).



W. W. Follett, *Relative Positions of Rio Grande Near El Paso Between 1852 and 1907* (International Boundary Commission, 1911).

LAND OF THE *setting* SUN

★ The several military missions have agreed upon future military operations against Japan.

The three great Allies expressed their resolve to bring unrelenting pressure against their brutal enemies by sea, land and air. This pressure is already rising.

The three great Allies are fighting this war to restrain and punish the aggression of Japan.

They covet no gain for themselves and have no thought of territorial expansion.

It is their purpose that Japan shall be stripped of all the islands in the Pacific which she has seized or occupied since the beginning of the first World War in 1914, and that all the territories Japan has stolen from the Chinese, such as Manchuria, Formosa and the Pescadores, shall be restored to the Republic of China.

Japan will also be expelled from all other territories which she has taken by violence and greed.

The aforesaid three great powers, mindful of the enslavement of the people of Korea, are determined that in due course Korea shall become free and independent.

With these objects in view, the three Allies, in harmony with those of the United Nations at war with Japan, will continue to persevere in the serious and prolonged operations necessary to procure the unconditional surrender of Japan.

Text of the general statement issued after the Cairo conference attended by President Roosevelt, Generalissimo Chiang Kai-shek and Prime Minister Churchill, together with their respective military and diplomatic advisers.



Dark red indicates original Japanese territory.
Light red indicates area she controls now.

In each of the drawings at right Japan's latest seizures are encircled by a white line, while earlier acquisitions are outlined in gray. Black areas indicate what Japan started with together with what she captured last. Intervening occupations are dark gray.



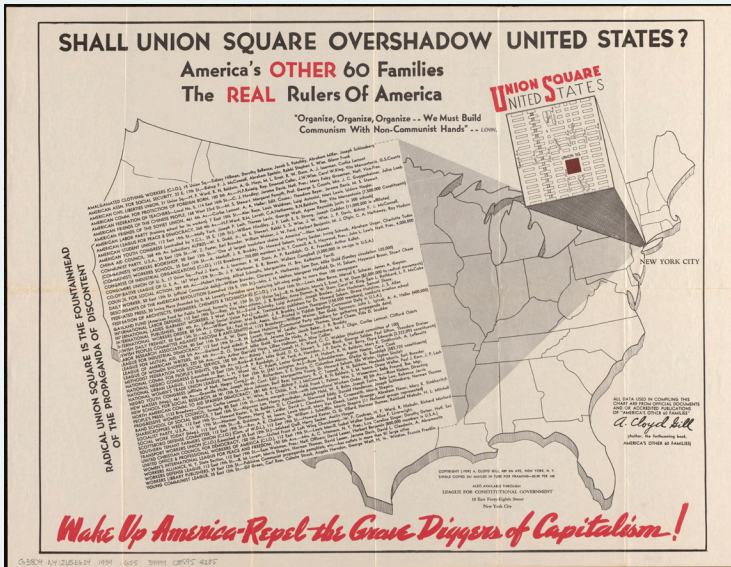
NEWSMAP Printed and published by ARMY ORIENTATION DIVISION, Department of the Army, Washington, D. C.

Richard Edes Harrison and US Morale Services Division of the Army Service Forces, "Land of the Setting Sun," Newsmap (December 27, 1943).

us a reason to acquire our first object by Charles Joseph Minard, an 1862 map of cotton imports to Europe which pioneered the use of flow lines. A 1980 piece of pop cartography, S. Orozco's tourist map of Acapulco, offers an extreme example of the use of mapmaking in support of commercial advertising and corporate branding. A pair of maps of Manhattan show how related cartographic techniques can be deployed for opposite ideological goals: the first, an 1895 map by the reformer Walter Vrooman, argues for municipal socialism, while the second, a 1939 map by the right-wing activist A. Cloyd Gill, warns of a Communist takeover of the United States. A 1978 tourist map of South Africa, published by the apartheid government, shows the use of selective generalization to obscure the relative importance of Black towns in comparison to the cities built and populated by European colonizers, an example of subtle cartographic racism described by Kelso (1999).

Regrettably, some of the newly acquired objects were not able to be included in the digital show, due to the closure of the library's digitization lab at just the time when these objects were scheduled to be photographed. These objects include the 1938 *Atlas of To-day and To-Morrow*, created by the left-wing, anti-imperialist cartographer Sandór (Alexander) Radó; a Nazi-produced *Deutscher Schulatlas* from 1943, showing the white supremacist geography of *Lebensraum*; and Herbert Bayer's 1953 *World Geo-Graphic Atlas*, a masterpiece of information visualization in the High Modernist register.

In addition to the newly commissioned maps for the "Same Data, Different Stories" feature, *Bending Lines* also includes several other contemporary maps that are meant to showcase cartography used for social movements that countervail hegemonic power structures. For instance, Margaret Pearce's 2017 *Coming Home to Place Names in*



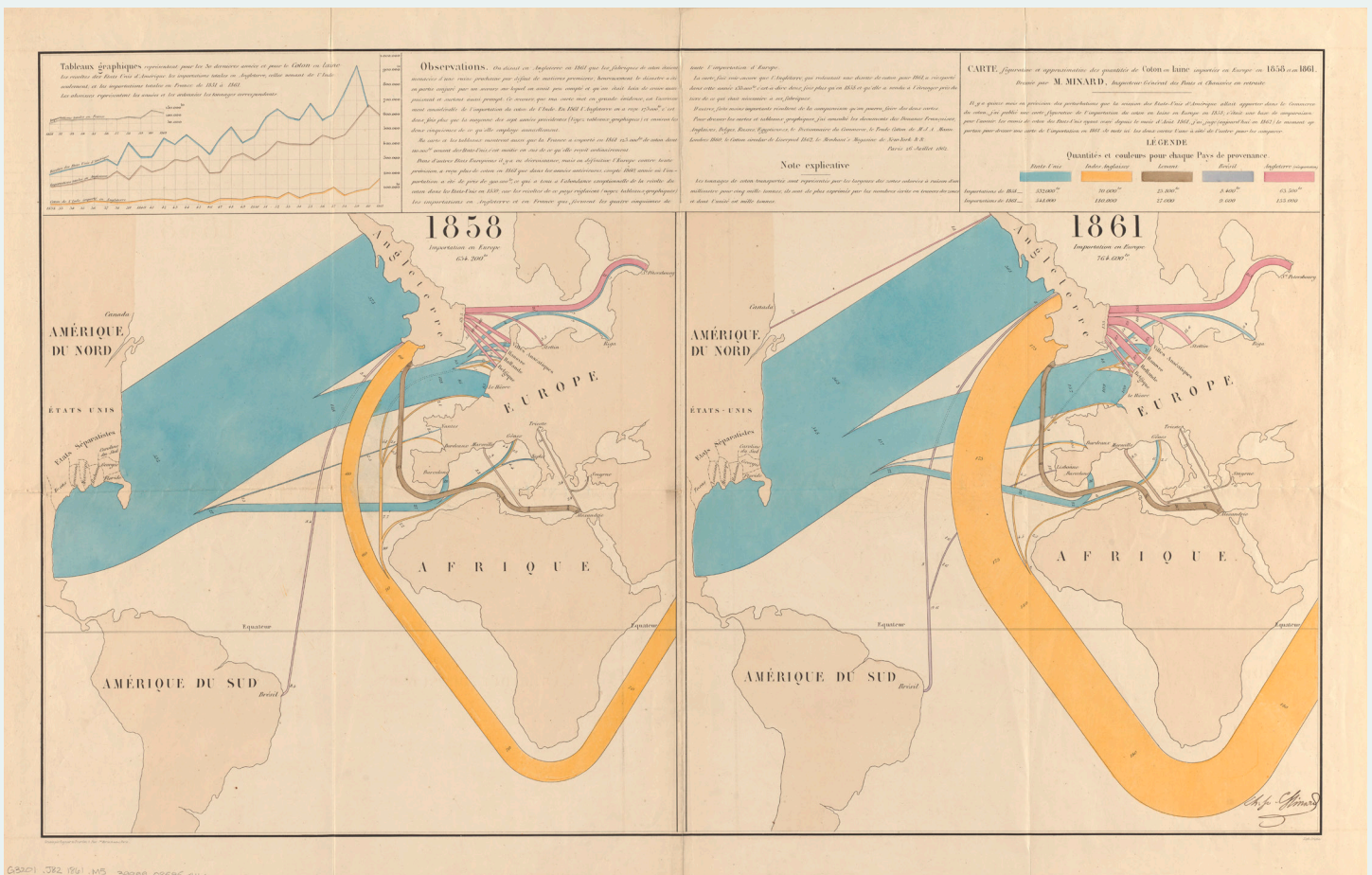
A. Cloyd Gill, *America's Other 60 Families: The Real Rulers of America* (League for Constitutional Government, 1939).



Raúl the Third and Elaine Bay, *Boston Kids Count* (Leventhal Map & Education Center, 2020).



Walter Vrooman, "Map of New York City showing concrete socialism in red, and private enterprises in white, 1895," in *Government Ownership in Production and Distribution* (Patriotic Literature Publishing Co., 1895).



Charles Joseph Minard, Carte figurative et approximative des quantités de coton en laine importées en Europe en 1858 et en 1861 (1862).

Canada and the 2008 People's Republic of Cambridge map produced by Institute for Infinitely Small Things both show how alternative presentations of toponymy can be used to challenge the dominance of European and male names in the North American landscape (see also Pearce 2014; kanarinka 2011). And, as part of the LMEC's focus on K-12 education, a special section for educators and students features an original cartoon map by the Boston-based artists Raúl the Third and Elaine Bay, based on a

choropleth map of American Community Survey data showing the relative concentration of Boston's youth population. Like the rest of the exhibition, this map, titled *Boston Kids Count*, challenges the reader to think about what forms of visual, textual, and argumentative evidence we look to in order to secure our belief that a map is accurate, reliable, and, most importantly of all, the inspiration for taking action.

AN ONLINE EXHIBITION

WE WERE ALREADY FRAMING OBJECTS and finishing our reproductions in early March 2020 when the Boston Public Library announced its closure to the public to combat the spread of the COVID-19 pandemic. It became clear within the first several weeks of the lockdown that we would not be able to mount the show in a traditional gallery format, and consequently we shifted all of our efforts into redesigning *Bending Lines* for an online-first experience. This effort was greatly aided by the fact that

I had already begun working with a beta software environment called *Quire*, developed by Getty Publications for the creation of digital exhibition catalogues. Based on the Hugo static site generator, with additional layers of customization from the Getty team, *Quire* is designed by default to create a paginated, linearly traversed site that is analogous to a printed catalogue. We spent considerable effort customizing the *Quire* templates to produce a digital exhibition that was less linear, and more multi-faceted.



A retail view of Boston

Title	A guide to Boston
Creator	John Sample, Jr.
Year	1895
Dimensions	26 x 36 cm
Location	Leventhal Map & Education Center at the Boston Public Library

[View full Digital Collections record](#)

A pointing finger in red overprint marks the location of the Copley Square Hotel, where this map would have been given out to guests visiting Boston. John Sample, Jr. illustrated this map with the points of interest that a tourist might have wanted to see on a walking tour, like the State House, Old South Church, and the “New Public Library” then under construction in Copley Square.

But this map wasn’t a pure public service. Paid for by advertisers, it also draws the tourist’s attention, again using red overprint, to a handful of business establishments, who would have paid to have their locations shown on the map. Top billing went to the map’s sponsor, the Metropolitan Rubber Co., whose storefront is featured in an

See another map that selectively leaves out features for more nefarious ends.
[Wander across the exhibition](#)

The digital exhibition of *Bending Lines*.

The online exhibition retained the overall structure of the physical show, and we were able to use most of the objects planned for display, with the exception of those that were not digitized or for which we could not secure rights to distribute digital images. But the digital format also enabled us to add many features which would not have been possible in a static exhibition—for instance, Andy Woodruff’s interactive version of Charles Deetz’s famous map head projection, and Mike Bostock’s interactive presentation of Tissot’s indicatrix, both of which were created using the D3.js visualization package for JavaScript. An embedded version of Districtr, the draw-your-own electoral district map created by the Metric Geometry and Gerrymandering Group at Tufts, was added to the

section on electoral mapping. And an original interactive, “Do You Trust This Map,” allows visitors to look at modern-day maps from television, print, and social media, and evaluate them on a range scale of trustworthiness, in a similar vein to scholarly studies on “viral” mapping by Muehlenhaus (2014) and Griffin (2020).

The digital exhibition—which includes, in addition to the exhibition material, bibliographic metadata for the objects, a scholarly references section, and links to each object’s authoritative copy on the LMEC or partner libraries’ digital repositories—is available at leventhalmap.org/digital-exhibitions/bending-lines.

CONCLUSION: QUESTIONING BELIEF WITHOUT DESTROYING TRUST –

BENDING LINES IS A SHOW THAT was curated deliberately in an active dialogue with the issues around media, science, knowledge, and communication that have destabilized the politics of the present day. The Boston Public Library, the first large free municipal public library in

the country, was founded in the middle of the nineteenth century on the principle that education and citizenship went hand in hand. In this spirit, *Bending Lines* makes the case that the ability to critically examine forms of data representation is a crucial skill for making sense of the

complicated, conflictual issues which run through every level of our lives, from community planning decisions to global environmental governance.

Equipping the public with a more careful skepticism of cartographic authority, setting visitors up to critically examine their own beliefs about maps, is one of the foremost goals of this exhibition. At the same time, our planning was done in the context of a society that was challenged by too little trust. Complaints about “fake news” and conspiratorial narratives about the work of scientific institutions are now widespread in the political dialogue of the United States and many other countries. How, then, can

we present an argument that “all maps distort the truth” without leading visitors to the paranoid conclusion that “no maps can be trusted”?

The framing, which we repeat throughout *Bending Lines*, emphasizes the fact that omission, simplification, and distortion are not, *in and of themselves*, the playthings of liars and frauds. Instead, we draw attention to the fact that the world is simply too big and too complicated to understand without shorthand devices such as maps and figures. The direction of our critical inquiry, then, should not run along the lines of “does this map perfectly correspond with the world?”—since no such map exists, and indeed



John Speed, *A New and Accurat Map of the World* (1626).

no such form of any human communication exists—but instead along the lines of “*why* did the creator of this object choose the particular perspective on the world that is shown here?” Examining the word “accurate”—a term that appears on many early modern maps, including the 1626 John Speed double hemisphere map shown in *Bending Lines*—offers one hint to support this thesis: accuracy derives etymologically not from a sense of objective matching with a world prior to interpretation, but, instead, from the term *care*, referring to the mapmaker’s intentions and practices in creating the map. In this sense, we have tried to show that an “accurate” map is one where the mapmaker has taken a caring, judicious approach to representing the world as fairly and as sensitively as possible, and has considered the power dynamics that underly their use of visual language.

Perhaps most importantly of all, *Bending Lines* forms just the first part of a series of initiatives at the LMEC to equip citizens with the skills, resources, and institutional support to act not only as consumers of cartographic knowledge, but as producers of it, as well. Following the famous maxim “map or be mapped” (Stone 1998), the exhibition argues that ordinary people cannot simply rely on the good intentions of professional cartographers to tell an unproblematically objective truth, but must instead engage in forms of cartographic communication that run in both directions. By connecting *Bending Lines* with our education programs in both K–12 classrooms and with adult learners, we believe that if there is to be something like a substantive truth in maps and data, it will come not in a single, perfect map, but rather in the back-and-forth of an ongoing dialogue amongst many kinds of producers of geographic knowledge.

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