Toward an Epistemic History of Political Things: Cartography, Science, and States

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Jess Bier. *Mapping Israel, Mapping Palestine: How Occupied Landscapes Shape Scientific Knowledge*. Cambridge, Mass.: MIT Press, 2017. 336 pp., index. ISBN 978-0262036153. $35.00 (hardcover).

Surekha Davies. *Renaissance Ethnography and the Invention of the Human: New Worlds, Maps and Monsters*. Cambridge: Cambridge University Press, 2016. 356 pp., index. ISBN 978-1108431828. $32.99 (paper).

Jason D. Hansen. *Mapping the Germans: Statistical Science, Cartography, and the Visualization of the German Nation, 1848–1914*. Oxford: Oxford University Press, 2015. 232 pp., index. ISBN 978-0198714392. $99.00 (hardcover).

William Rankin. *After the Map: Cartography, Navigation, and the Transformation of Territory in the Twentieth Century*. Chicago: University of Chicago Press, 2016. 416 pp., index. ISBN 978-0226339368. $55.00 (cloth).

DO ALL ROADS LEAD TO LEGIBILITY?

Jorge Luis Borges's fragment "On Exactitude in Science" is a parable on overreaching ambition in scientific representation. He tells of guilds of cartographers who were unsatisfied until they had "a Map of the Empire whose size was that of the Empire, and which coincided point for point with it."[1] The next generation found the 1:1 map useless and summarily discarded it. As the adage attributed to Paul Valéry goes, if everything simple is false, everything complex is unusable.

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1. J. L. Borges, "On Exactitude in Science," in *Jorge Luis Borges, Collected Fictions*, trans. H. Hurley (New York: Penguin Books, 1998), 325.

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Simplification presents its own problems. This is the thrust of James C. Scott's *Seeing Like a State*, which argues that state-sponsored "high modernist" projects inevitably tend toward oversimplification because they aim to render the local complexities of peoples and places *legible* to outsiders. The knowledge produced in the course of such projects often comes packaged in maps or other purpose-built instruments that privilege certain facts at the expense of others. In this top-down model, "utilitarian simplifications" realized by the state—or whatever body "aspires to a monopoly on the legitimate use of force"—often bring about disastrous yet unintended consequences.[2] Scott largely treats the legitimacy of a state's knowledge as unproblematic: his aspirant high-modernist state is intoxicated into an ideological stupor by the aura of technoscience. However, as historians of science know, legibility is hardly a simple matter. Conflicting sources of information, competing techniques and technologies, and unsettled hierarchies of actors all shape maps and the interventions they enable—the converse also applies. A closer look at the history of cartography shows that the authority to represent is never a foregone conclusion.

The four recent works reviewed here address cartography and its associated sciences in different periods and geographies. The two pre-twentieth-century accounts draw attention to the overlooked practices of ethnographic and demographic mapping. Davies' Renaissance mapmakers are preoccupied with the exotic, depicting peoples of the New World as a way to gain authority, while Hansen's unifying Germans debate how to enumerate their own *Volk*. The twentieth-century accounts, on the other hand, highlight the expanding role of new technologies in cartography, notably the use of computers. Rankin's episodic yet expansive look at twentieth-century cartography locates the tensions between political and geological conceptions of space in different large projects. Finally, Bier attends to the role of occupation in cartographic practice on both sides of the Israel-Palestine border, arguing that technologies are incapable of impartially mitigating between claims.

VISUALIZING EMPIRES

Surekha Davies's *Renaissance Ethnography and the Invention of the Human* invites us to consider the role of maps in legitimating, circulating, and experimenting

2. James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*, Yale Agrarian Studies (New Haven, CT: Yale University Press, 1998), 87–88.

with ethnographic accounts of New World peoples. She ventures the argument that depictions of humans at the margins or in the otherwise blank continental spaces of Renaissance wall maps were not mere decoration, but rather part of the visual language through which cartographers claimed authority by keeping their maps up to date with the latest travel accounts. These maps were objects for elite contemplation, not navigation, and functioned largely as "organizing devices" to "facilitate comparative analysis" by scholars and statesmen with colonial inclinations (44, 54). Mapmakers synthesized limited accounts of anthropophagy and idolatry into visual statements that *all* peoples in a region were a certain kind of being, encouraging their mistreatment, denial of legal rights, or even enslavement.

Davies contextualizes Renaissance interpretative frameworks and norms of cartographic production before following different motifs: cannibals, giants, headless men, Amazons, and cities. Successful mapmakers struck a balance between intrinsic and extrinsic plausibility—between the thematic expectations of the viewer and the authority of witnessed detail. They had to decide whether accounts of beings they had not seen firsthand were credible, and portray that information through visual rhetoric that made it believable to the viewer, such as the assumed effects of the equatorial climate or existing accounts of monstrous figures from Europe (250). Davies's multinational account of maps made from colonial encounters across the Americas displays great sensitivity toward the technical and interpretive work of cartographers, whose representations could be politically at odds without being baseless or sensational.

The third and fourth chapters, on images of Brazilian cannibalism, illustrate this sensitivity most effectively. German mapmakers working from Iberian accounts of Brazil singled out cannibals from the host of other monstrous peoples customarily portrayed in the space of non-Western lands; they chose to convey "alterity through dietary difference," despite many firsthand accounts that discredited aspects of the iconic image of a human spit-roast (96–105). French mapmakers, on the other hand, showed Brazilians as industrious trading partners. Favorable associations with the inhabitants might have won the merchants they served royal privileges to conduct affairs in Brazil, where France was politically marginal (147). The interpretations enshrined in wall maps could be political without being inaccurate relative to available accounts, giving them distinctive authority.

Ultimately, Davies argues, the summarizing utility of sixteenth- and seventeenth-century ethnographic maps was compromised as the ambitions of ethnography grew. The development of "a historical rather than geographical

grammar" for describing degrees of civility led to the displacement of a spatial medium by a textual one (258–59).[3] Did this ultimately change how colonizing powers treated their subjects? A conclusive answer would be out of scope here, or better approached through local cases. Nonetheless, we can move forward in time to see how such proto-racial thinking—augmented by a reformist ideology of nationhood—formed the basis for Europeans to re-map human difference within their own borders.

A DEMOGRAPHIC REPUBLIC

Jason Hansen's *Mapping the Germans* traces the rise of German demography in the nineteenth century, addressing themes raised by Davies in the context of a modern state attempting to constitute its own physical and human boundaries of nationhood. The book tracks the establishment of this new scientific discipline alongside the rise of a popular national consciousness: in other words, "learning to 'see' nationality" (6). Maps were a more compelling medium for visualizing and disseminating a statistical consciousness than tables of denuded digits; tourism sponsored by nationalist organizations could buttress this geographical sense of the nation through an active engagement with place (144). Most importantly, Hansen argues that official state building did not determine the scope and priorities of the discipline. Demography was led by individuals who tied themselves variably to the state, academic institutions, and private organizations.

How, then, could one be counted as German? Easily enough: by speaking it. However, in a multiethnic and multilingual society, demographers found this a moving target. There was the *Umgangssprache* of public life, deemed useless for ethnic information, and the *Familiensprache* of the household, which had the potential to penetrate private life and reflect ethnicity (27–31). An 1861 census in which the entire population of Berlin was counted as German made it clear that neither was particularly useful. Demographer Richard Böckh promoted the pseudo-ethnic category of *Muttersprache*, or mother tongue, which he saw as justified upon physiological and hereditary bases. This shift led to the ethnographic mapping effort Hansen follows through the remainder of the book. The effort to redraw European boundaries through a language

3. For a modern take on how physical anthropologists attempted to establish a biological timeline of human cultures through human blood-banking, see Joanna Radin, *Life on Ice: A History of New Uses for Cold Blood* (Chicago: University of Chicago Press, 2016).

map was beset with technical and scientific limitations: demographers lacked a compelling or uniform visual code, and arbitrary philological interpretations of already speculative census data led known groups to simply disappear (57–60). Although early efforts did not inspire confidence, growing state and military support led to the mapping effort's involvement in the 1870 annexation of the French-German border region Alsace.[4] Thereafter, private organizations and political activists took over the bulk of demographic cartography, circulating maps, demographic data, and photography throughout the public sphere via periodicals and schools, buttressing a radical nationalism in which cultural unity was tantamount to social harmony.

Mapping the Germans presents a complex enterprise in an engaging narrative, though it can at times feel schematic or overdetermined by the ominous burden of the living-space (*Lebensraum*) ideology that would characterize National Socialism in the 1930s. The central irony Hansen elucidates is that the demographic enterprise became most thoroughly politicized in the absence of formal state capacity, oscillating wildly between appeals to scientific and cultural legitimacy. At the Paris Peace Conference following World War I, it became clear that other nations had learned to use these tools against the master. As an American commentator recalled, "Each one of the Central European nationalities had its own bag of statistical and cartographic tricks" (157). However, with divergent claims on territory appealing to the apparent objectivity of statistics and cartography, maps could only continue to be useful through diplomatic negotiations, or perhaps even undercut by new cartographic technologies.

PUTTING THE "GLOBE" IN GLOBALIZATION

William Rankin's *After the Map* tracks the "geo-epistemology" of surveying and navigation across the twentieth century, from the patchwork international collaboration of creating a reliable world map in the years leading up to World War I to the use of radiolocation technologies eclipsed by the meteoric rise of the Global Positioning System (GPS) in the 1990s. Rankin's fine analytical sensibility regarding scale, space, and subjectivity enables him to make a nuanced argument about the nature of territory under globalization. His

4. For a detailed account of this episode, see Catherine Tatiana Dunlop, *Cartophilia: Maps and the Search for Identity in the French-German Borderland* (Chicago: University of Chicago Press, 2015).

account comprises three major projects in twentieth-century cartography: the International Map of the World (IMW), the Universal Transverse Mercator system (UTM), and the aforementioned GPS. Arguably the greatest strength of *After the Map* is its interest in the users of maps as opposed to the ontological status of their claims on political or terrestrial reality. The arc of these developments adumbrates the history of territory in the twentieth century, "not [as] a transition from national to planetary, but from one worldwide political-geographic framework to another" (14–15).

The IMW, an international cooperative effort toward a standard world map, helped establish consensus on what a world "viewed from nowhere" might look like. Despite its clear Western bias, it remained largely unchallenged because nothing else of comparable scope was possible. After aviation needs during World War II shook faith in the project, it was reinvigorated in the postwar period as a "base map" for global economic development. However, the primacy of the flat, paper map was ceded to other ways of organizing space, a point Rankin emphasizes by historicizing the "critical" paradigm of geography that paralleled waning administrative confidence in maps' representational sovereignty (115).

Perhaps the most perceptive section charts the development of cartographic grids, touted by Scott as the signal form of reductive legibility. Rankin argues that by stabilizing space, grids constrain "strategies of domination just as much as they do those of resistance" (140). There was, in fact, more than one way to make a grid, and civilians seeking a system to resolve problems of taxation or other geographic disputes without state overreach advocated on behalf of these projects. Further, U.S. geodetic work on the postwar UTM global grid projection could even be welcomed for the computing resources it offered and the temporary, locally disinterested character of the work (192). This can be easily read as an attempt to export American universalism—the Soviets even had their *own* universal grid. However, Rankin suggests that the epistemic and subjective character of this non-terrestrial, geometric geography yields a different interpretation: previous concerns with the Western variety of representational universalism advanced through the IMW were displaced by an emphasis on convenience.

Overall, Rankin insists that mapping technologies should be seen as boundary objects satisfying multiple stakeholders: branches of government and military at odds with one another, expert users, and even concerned civilians. The final section on the transition from radionavigation to GPS epitomizes this approach, while showing that technological scaffolds allow representations to

coexist without mutual compromise. In both surveying and navigation, networks of radio signals could be readily connected rather than smoothed into a single system. There were two dominant patterns of wartime aerial radionavigation: one used railroad-like tracks to guide aircraft along fixed paths, while another emphasized the freer approach of oceanic navigation. "Integrated navigation"—or guidance tools that could incorporate as much available information as possible—became the watchword of the postwar era (248). This framing lets us understand GPS, "a rationalization of radionavigation pushed by administrators rather than users," in a different light (278). Why settle for less information? Rankin argues that GPS was successful only insofar as it drove a shift in the dominant geo-epistemology away from accuracy and toward the notion of a permanent, universal utility that can be built upon with tools like permanent markers and overlays. Rather than weighing in definitively on whether a technology can be permanently marked by military origins, Rankin reorients the reader's attention toward broader political changes: GPS is "not aligned with particular institutions, but with a particular approach to governance—one that is spatially intensive but fundamentally temporary" (290). Spatial politics, in other words, aren't what they used to be.

COMPUTERS AND COMPETING CLAIMS

Jess Bier's *Mapping Israel, Mapping Palestine* is a penetrating analysis of mapping in occupied territory that gives us an on-the-ground look at how such spatial politics play out. The kind of overview provided by GPS is less useful for solving higher-resolution conflicts like border disputes, though it is a crucial part of the Geographic Information System (GIS) software Bier studies. Her account emphasizes how ground data collection remains integral to cartography, and that groundedness—in the interstices of national and international scales—matters a great deal for the representations these data yield. Bier takes up the plea for symmetry so central to antecedents and offshoots of Science and Technology Studies. A chapter on Israeli demographic mapping during the Cold War is balanced with another on attempts by Palestinian cartographers to survey territory while perpetually on-the-run and square it with Mandate-era British maps in order to solidify claims to nationhood. A third, empirically driven section develops themes Bier establishes in the theoretical chapter following her introduction through an ethnographic account of the mismatch between maps made by exclusively Israeli and Palestinian NGOs.

Computing and the politics of internationalism form a major thread through the book. Chapter three follows the career of Israeli cartographer Roberto Bachi. As director of the 1967 census, he was hesitant to enumerate Jews using a curfew due to the traumatic associations with British occupation, and therefore did so only for Palestinians (93). The more precise, computerized cartography favored at the time foregrounded data about geographical and human features of landscapes over territorial borders. Bier argues that this led to a near erasure of Palestinian territory: because most of their data existed below the threshold of his chosen indicators, the lack of a border line naturalized their territory as blank space. The following chapter reconstructs how the Palestinian Authority's mapping data was shaped by their attempts to establish *stasis*, the ability to stay in place. Palestinian cartographers have contended simultaneously with the biases of Mandate maps and the requirement of mapping inaccessible areas of the West Bank in order to claim international legitimacy (134, 144–45). Bier is thoughtful about how tools and data constrain geographic knowledge, and attentive to cartographers' practices as ways of regaining control.

The promising chapter on the mismatch between NGO representations of territory begins with a 2006 report of Israeli West Bank settlements. The Israeli government took issue with the report's partiality, and supplied the organization that authored it, Peace Now, with more data in exchange for a corrective follow-up. Meanwhile, a Palestinian group was criticized by an NGO watchdog for a report based on observations Israelis could not corroborate; the view from the Israeli road, inaccessible to Palestinians, was irreconcilable with the report. Bier invokes feminist standpoint theory to discuss these competing claims, arguing that "[the] focus, scale, detail, and composition of data thus mimic the sphere of mobility of the cartographers themselves" (196). Perhaps a greater focus on how conflicting representations do political work, rather than an emphasis of the impossibility of impartial observation, would raise the stakes to where it seems like they should be. Nonetheless, while historians and sociologists commonly invoke the precept, Bier demonstrates just how embedded knowledge can be.

SCIENCE, TO SCALE

Out of these four works, at least three strong themes emerge: the need to resolve the fluidity of practices with the fixity of representations, the

geopolitical dimensions of biopolitics, and the opportunities for historians of science to attend more closely to scale.

Critical geography has often moved in lockstep with science studies, leveling parallel critiques of the socially constructed nature of knowledge and turning to focus on its ontological underpinnings. The latter has led to an emphasis on the processual aspects of cartography. As geographers Rob Kitchin and Martin Dodge put it, "[*maps*] *are practices*—they are always *mappings*; spatial practices enacted to solve relational problems."[5] However, recalling Bruno Latour's argument that scholars studying knowledge production need to move from "matters of fact to matters of concern," we should wield reflexivity to speak outwardly to power, rather than inwardly to ourselves.[6] By animating the critical imagination, process furnishes a suitable starting point for thinking about how maps and other representations organize and mobilize interventions, but does not avail us of the responsibility to reckon with closure. The histories discussed here are object lessons in balancing these often centrifugal forces.

Further, all of these accounts show how the spatial dimensions of the human sciences matter. Although many have followed Michel Foucault and Ian Hacking to show how constructed categories define people through their cultural currency often more pervasively than through coercion, controlling people through space has a deeper history.[7] Alison Bashford has recently suggested through her work on global population debates that biopolitics is always connected to geopolitics, be it through purely territorial concerns or more instrumental ones of waste disposal and food production.[8] How are population problems translated into spatial ones? Paying attention to mapping can put historians of science into closer dialogue with environmental historians and urban historians studying the built environment.

Finally, scholars have recently identified "political epistemology," which draws attention to the normative conditions and aspects of scientific knowledge,

5. Rob Kitchin and Martin Dodge, "Rethinking Maps," *Progress in Human Geography* 31, no. 3 (1 Jun 2007): 335, https://doi.org/10.1177/0309132507077082.

6. Bruno Latour, "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern," *Critical Inquiry* 30, no. 2 (2004): 225–48.

7. Michel Foucault, *Society Must Be Defended: Lectures at the Collège De France, 1975–76*, ed. Mauro Bertani and Alessandro Fontana, trans. David Macey (New York: Picador, 2003); Ian Hacking, "Making Up People," in *The Science Studies Reader*, ed. Mario Biagioli (New York: Routledge, 1999), 161–71.

8. Alison Bashford, *Global Population: History, Geopolitics, and Life on Earth* (New York: Columbia University Press, 2014).

as a new direction for the history of science.[9] What should be the terms of this discussion? One candidate seen throughout these works is *scale*, whether through the constraints of local political situations or the hard-won authority to transcend entities like the nation state.[10] Scaled-up science, like that which took place during the International Geophysical Year, both is enabled by existing political arrangements and has the potential to change them.[11] In another sense, the availability of open-source data sets and analytical tools represents a reciprocal scaling-down, in terms of the overhead for making contributions to research, and scaling-up of existing economies of credit. Yet, computer networks—even clouds—act on the environment in imperceptible yet potentially disastrous ways.[12] Scale provides a link between epistemology and politics where topology and topography overlap.

9. Max Plank Institute for the History of Science, *Political Epistemology: New Approaches, Methods, and Topics in the History of Science Workshop Series, 2016–17*, https://www.mpiwg-berlin.mpg.de/page/political-epistemology (accessed 20 Mar 2018).

10. For further reflection on scale, and a nuanced account of citizen enrollment in seismology, see Deborah R. Coen, *The Earthquake Observers: Disaster Science from Lisbon to Richter* (Chicago: University of Chicago Press, 2013).

11. Elena Aronova, "Geophysical Datascapes of the Cold War: Politics and Practices of the World Data Centers in the 1950s and 1960s," *Osiris* 32, no. 1 (1 Sep 2017): 307–27, https://doi.org/10.1086/694094.

12. Nathan Ensmenger, "Computation, Materiality, and the Global Environment," *IEEE Annals of the History of Computing* 35, no. 3 (2013): 80–79.