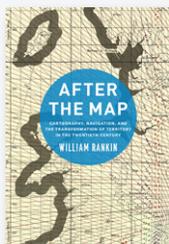


AFTER THE MAP: CARTOGRAPHY, NAVIGATION, AND THE TRANSFORMATION OF TERRITORY IN THE TWENTIETH CENTURY



By William Rankin.

University of Chicago Press, 2016.

416 pages, 13 color plates, 144 halftones.
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Review by: Mark Denil

After the Map: Cartography, Navigation, and the Transformation of Territory in the Twentieth Century, by William Rankin of Yale University, is an impressive bit of research wrapped in a readable text that consistently trims the cloth of history to support a questionable thesis. It is Dr. Rankin's contention that, over the past century or so, we have been progressively abandoning the "representative" map in favor of a "real," full scale, world of points, and he is quite prepared to play Procrustes to prove it.

The book itself is solidly bound with cream pages between tan cloth-covered boards: a typically fine University of Chicago Press product. The dust cover illustration of a detail of a British Gee Lattice radio navigation chart from the 1940s strikes one as a tad garish, but it is actually quite an apt image selection: radio navigation aids play a key role in the book's narrative.

After the Map opens with an Introduction ("Territory and the Mapping Sciences") and is closed by a Conclusion ("The Politics in My Pocket"), with most supporting matter ("Acknowledgments," "Acronyms and Codenames," plus "Notes" and an Index) grouped at the end, save a list of "Possibly Ambiguous Terms" slotted in right at the beginning. A variety of other supporting material, such as image files of the illustrations, spreadsheet and GIS data, and a bibliography, is available at afterthemap.info.

The main body of the text is organized into three Parts: (I) The International Map of the World and the Logic of Representation; (II) Cartographic Grids and New Territories of Calculation; and (III) Electronic Navigation and Territorial Pointillism; each of which contains two

chapters. In the first two parts the paired chapters break at about the Second World War, but in the third part they break in the early 1960s.

Each of the three Parts is given over to exploration of one of three projects easily identified by a Three Letter Acronym (TLA). Part I is devoted to the International Map of the World (IMW), the second to the Universal Transverse Mercator (UTM) system, and the third Part to the Global Positioning System (GPS). The author proposes that these three projects "form a remarkably unified historical narrative," that "is about the emerging logic of the grid and its significance as a new way of structuring knowledge" (17).

The author sets the stage in the Introduction by noting a mid-twentieth century shift in news coverage of military mapping. Before 1960, he reports, news reports focused on the sheer quantity of maps produced (sixty-five million in the First World War, and over a billion in the Second), but by Vietnam War days the talk was of the new geographic precision of "smart bombs" — though this reviewer does not recollect anyone talking about "smart bombs" in the 60s: that blather came much later, didn't it? The goal of *After the Map*, we learn, "is to understand the larger stakes of this shift" (2) through what Rankin later refers to as "a global history of geographic knowledge" (16). The chosen approach is something the author calls geo-epistemology: not just what is known about the earth but how it is known. This overall intention, one might suggest, is a tall order. It is also a relatively important and potentially engaging one, depending in large part just how the author comes to find a grip on the matter.

The reader is introduced to the key dichotomy of the proposed discourse almost immediately. On the one side the author sets up the IMW as the crown of early- to mid-century positivist cartographic mythology, and on the other he places...well, he places GPS. "Rather" he writes, "than creating a miniature substitute for the world, the radio signals sent from GPS satellites instead create a full-scale system of coordinates that overlays and coexists with



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the physical terrain...,” something that is “much more geographically embedded than the experience of using a map” (3).

Rankin refines his map/GPS dichotomy into a representation/post-representation conflict. He explains that

coordinates shift attention from the area to the point: a stable electronic grid makes it possible to aim missiles, drill for offshore oil, or conduct field research without any overarching awareness of a larger geographic region. The overall ambition is quite different as well. Being glib, one could say that with representation the goal is to know about a place without having to visit. With technologies like GPS, the goal is instead to visit a place without having to know much about it. (3)

This actually makes (some) sense; abstraction to coordinates does indeed redirect attention, and this can be extremely complex and possibly problematic. Drone operators, for example, navigate primarily by coordinates supplemented by an on-board camera for very local observation: some operators have described this this way of “watching targets as ‘looking down a soda straw’” (Scahill 2016, 107). However, Rankin seems, in many or most instances, to be over-freighting bald coordinates. Coordinates are not usually used exclusively in the abstract; they are placed into context on a base map that may be explicit or implied. Arguably, the only tasks that use bald GPS coordinates are the same (or analogous to) tasks that had earlier been performed on paper maps using geographic coordinates. If indeed the artificial stars of the GPS constellation “create a full-scale system of coordinates that overlays and coexists with the physical terrain” (3), then so too did (and do) the long-existing stars which have been used in the past for coordinate calculation and are still available for that role (despite a shocking lack of government maintenance funding).

The rest of the Introduction is taken up with an outline of the historically growing instability of territoriality brought on by such things as the expanded and refined definitions of geographic sovereignty, of globalization, and of conflicts between the two. These issues form the environment that both affects and is affected by the three projects and the thesis’ central dichotomies.

In “The Authority of Representation: A Single Map for All Countries, 1891–1939” and “Maps as Tools: Globalism, Regionalism, and the Erosion of Universal Cartography, 1940–1965,” the two chapters focused on the IMW, Rankin discusses the proposal and life cycle of the world map, with particular focus on on the concepts of “legitimacy,” “legibility,” and “representational mapping.” These terms are deliberately left vague, which allows the author a great deal of dancing room in his analysis.

Noting that “as the flagship project of twentieth-century cartography, the IMW is therefore a window into the geo-epistemology of representation as a whole” (26), Rankin recognizes that IMW was indeed the embodiment of an elaborate and pervasive positivist world-view that has since been revealed as seriously flawed and shop-worn, but he then segues into ascribing to the IMW’s proponents a most unlikely conceptual fallacy. By the end of the paragraph he has seized on the IMW as “conceptually ... a paper replacement for the physical landscape” (26), and “a view from nowhere”: this is an astonishing accusatory leap. It seems rather a projection of present-day concepts onto actors in the past.

The impression left the reader is of an IMW project born in a cauldron of confusion, careerist self-serving, imperial machination, colonialist paternalism, and political wrangling. In this telling, the project struggled through a life of pointlessness and impotence, beset by fruitless arguments over “seemingly minor details like standardized symbols, colors, and typefaces” (35), only to die a banal, lingering death long past hope or caring. That this impression may, in fact, be a reasonable one is not the point; the point is that the history is trimmed and folded to fit the thesis of an unstoppable historical march away from a “view from nowhere” type of “representational mapping” to a magical, mystical, Cloud-cuckoo-land (as Aristophanes called it in *The Birds*) “framework of points.”

Chapters 3 and 4, “Aiming Guns, Recording Land, and Stitching Map to Territory: The Invention of Cartographic Grid Systems, 1914–1939” and “Territoriality without Borders: Global Grids and the Universal Transverse Mercator, 1940–1965,” deal with the rise of measured grid coordinate systems. This story begins with the widespread use of measured grids in the First World War, particularly for ordnance applications. It does brush off or ignore earlier land-gridding systems (the US Public Land Survey System, or Canadian Western Land Survey, anyone?), but,

granted, a DNA test would likely not find evidence of paternity for UTM much past Flanders Fields.

“Legibility” continues to be a key concept in these chapters. The term seems to be used in reference to an affordance of usability: it is the *legibility* of the grid that allows a concealed howitzer to drop high explosives on an out-of-sight target, or for a boundary monument to be located without anecdotal reference.

All, or most, of the armies in the 1914–17 conflict employed various grid based mapping coordinates in some manner or another, and although there were attempts to merge what were local, piecemeal, and often overlapping systems, for various reasons none were successful. In the interwar period there were additional moves towards a more unified matrix, but a variety of other impediments helped to thwart these initiatives, too. It was not until the 1939–45 war that a new, energetic player, largely uninterested in the concerns of others, began to implement a world-wide system suited to its own needs. Rankin clearly views the unilateral US Army UTM initiative as quite innocuous, in stark contrast to the less than sympathetic view he had taken of the provisional IMW mapping of South America by the American Geographical Society. That earlier effort was seen as “geographic knowledge in its most privileged and powerful form,” and the resulting “tensions between empire and national self-determination” proved to the author that “the legitimacy of the American mapping effort was at best ambiguous” (63–4). By contrast, the US Army’s efforts to persuade, cajole, bribe, blackmail, trick, or force (not always hostilely, but generally aggressively) broad military adoption of UTM at home and abroad, which in turn helped lead to broad civilian adoption, is viewed as perfectly “legitimate”; more a cause for quips than concern. But, after all, Rankin has already told us that UTM was on the right side of history, as IMW was not.

UTM gets an easy ride in regard to zone boundaries too. The discontinuities between the various hodgepodge of small European wartime grids comes in for a lot of attention, but discontinuities between UTM zones are largely dismissed as irrelevant. Coordinate distortions at the zone edges near the equator get a word or two, but the radical zone overlaps at high latitudes are never mentioned as problematic at all.

Part III contains the chapters “Inhabiting the Grid: Radionavigation and Electronic Coordinates, 1920–1965” and “The Politics of Global Coverage: The Navy, NASA, and GPS, 1960–2010.” The first surveys the rise of the various competing and complementary radio navigation systems. The two main system types are distinguished by their approach: the one a directional beacon and the other an area pattern. Each provided a very different kind of navigational assistance. The area systems, Decca, Loran-A, and Loran-C, facilitated location identification anywhere covered by the network, while directional systems provided guide tracks that were often compared to railroad tracks. Each system type and individual system had strengths and weaknesses, but in time, combined receivers of growing sophistication came to simultaneously leverage several radio aids, and to make the technical details and idiosyncrasies of the individual systems transparent to the user. The elaborate printed map accessories used by the earlier generations of the radio systems came to be subsumed into the receivers, much to the relief of anyone who has ever had to use a chart overprinted with a Decca chain or Loran net: whether using the radio aids or not, all that ink on the paper could be a real pain. The really significant feature of these radio systems was, as Rankin points out (in different words), the way they provided sensible benchmarks wherever the network operated.

Replacing radio base stations on the ground with stations in orbital space went hand in hand with technological computing power advances to make possible the modern GPS system. The convoluted story of how GPS came to be is told in the second chapter of Part III. Did you know that, originally, civilian GPS use was intended to require a \$370 annual subscription? Or that the individual military services were, on the whole, rather hostile to the whole idea, each preferring its own pet project? GPS only survived as a Department of Defense-level “go-for-broke” (275) gamble to rationalize the proliferating and competing systems. GPS, we learn:

was a managerial reaction to the 1960s preference for redundant systems and custom solutions. It was a rationalization of radio navigation pushed by administrators rather than users, and it superseded existing systems as much by bureaucratic force as any practical appeal. And even though GPS today is functionally and politically quite universalist—it is used for a wide variety of tasks, all around the

world—these features are largely the result of its all-or-nothing agenda migrating from military administration up the American political hierarchy. The universalism of GPS grew slowly over time, and it did not emerge by consensus. (274)

After the Map concludes with “The Politics in My Pocket,” wherein Dr. Rankin sums up his findings. He writes that:

Together, the IMW, UTM, and GPS tell a relatively coherent story about globalism and the mapping sciences in the twentieth century. They show a gradual but decisive shift from paper to electronic signals, from the logic of representation to the logic of the grid, from a focus on contiguous areas of space to a framework of points.” (295)

On the book’s web site (afterthemap.info), he goes on to remark that:

This book can be read at two scales. Narrowly, it is a history of the mapping sciences in the twentieth century that situates technologies like GPS within a longer trajectory of spatial knowledge. But more expansively, by connecting geographic knowledge to territorial politics and new ways of navigating the world, it is also a political and cultural history of geographic space itself.

After the Map: Cartography, Navigation, and the Transformation of Territory in the Twentieth Century, has a wealth of good, interesting information. It is, for the most part, well written, despite the author’s tedious and annoying habit of starting *so* many sentences with a particular conjunction. Rankin has peered into committee reports and artillery manuals, and drawn it all together quite readably. He is, however, quite selective in his narration. For example, although he found and cites the two sentences about the IMW in *What Really Happened at Paris: The Story of the Peace Conference, 1918–1919*, he doesn’t quote it. Perhaps a report that “The world series of millionth maps proved to be sufficient for all needs. They constituted a sort of international currency, readily accessible, familiar to all participants, and inexpensive,” just didn’t jibe with the good doctor’s program (House and Seymour 1921, 5).

Similarly, Rankin provides a very engaging and detailed telling of the proposal and campaign to promote the IMW, but he breathes not a single word about the then-prevailing situation in world and regional mapping. No mention is made of any chaos or confusion caused by the hodgepodge of *laissez-faire*, parochial, and often eccentric patchwork of practices that obtained in various parts of the world before the establishment of a canonical standard in the IMW. He also seems uninterested in the entrenched influence of both the Enlightenment and European Romanticism that persisted into the early twentieth century; in particular of intellectual encyclopedia-ism and Romanticized scientific-ism epitomized by figures such as Diderot and Humboldt, respectively. Albrecht Penck’s 1891 proposal for the IMW is conceptually rooted in both these movements, and understanding them is key to understanding the IMW project. Instead, Rankin finds it adventitious to allow Penck and his supporters to float free in a history-less sea, contextualized only by events that transpired after they had left the stage.

In a later chapter, discussing the expanding use of measured locational grids, the author delves deeply into the confusion and dissonance arising from a patchwork of individual abutting or partially overlapping grids, but befuddles the explanation by forcing it into his thesis matrix. This thesis is that, for him, not only are grids simultaneously both “local horizons” and “global systems,” but they somehow both sensibly exist and are accessible to users “at full scale.” The author opines that “GPS has created a separate reality: an intangible knowledge space of electronic points that shares space with the physical world, but does not refer to it” (280). He apparently believes that, although grids are abstract and wholly artificial, the user somehow inhabits them directly, foregoing any “representative” conceptual analog. Roads, buildings, deserts, rivers, and national boundaries become irrelevant and immaterial to the inhabitants of Rankin’s gridded (and later, pointilist) cloud-cuckoo-land. A “brave new world” indeed, for Syrian refugees and Mesoamerican migrants.

At one point (no pun intended) Rankin enters the artillery plotting board as evidence for the triumph of the grid over the “representative” map. In his mind the plotting board is somehow not a map, seemingly because it does not immediately resemble an IMW sheet. This assertion, however, is simply untenable; a plotting board is as much a map as any other map. Assuredly, a plotting board, like a marine navigation plotting sheet, is a profoundly *terse* map, but

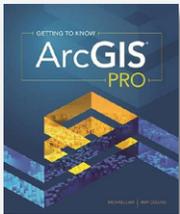
it is a map nonetheless (see, for example, NGA Nautical Chart 27).

A great deal of emphasis is freighted on the autonomy of points, but the primary value of points is not their independent existence as points, but their place in a topological context; a context represented by “a projection of a mental schema on a medium, the materialization of an abstract intellectual order extracted from the empirical universe” (Jacob 2006, 30). To wit: a place contextualized on an explicit or implicit map.

The author writes frequently of a geo-epistemology, which he finally defines (on page 298) as equivalent to geographic tools, but he seems to have a rather faulty grip on the ontology and epistemology of the map. It might seem necessary, if one is going to dismiss the relevance of the map, to engage with it; but, when Rankin gets close to doing so, he grandly dismisses the map as “representational,” and thus an artifact of the past.

This sort of thing is what makes reading *After the Map* by turns so interesting, tedious, and infuriating: Rankin’s persistent strong arming of a great deal of well-researched information into the straitjacket of his vaulting vision of the march of technology leaving the map behind for the utopia of a cloud of autonomous points.

GETTING TO KNOW ARCGIS PRO



By Michael Law and Amy Collins.

Esri Press, 2016.

467 pages. \$85.99, softcover

ISBN: 978-1-58948-457-3

Review by: Tara LaLonde, The Pennsylvania State University

Getting to Know ArcGIS Pro provides the reader with ten well-structured chapters introducing features of ArcGIS Pro 1.1. The book includes background material on geographic information systems (GIS) principles, and the chapters build on one another in a manner appealing to both new and experienced GIS users, while at the same time incorporating new terminology specific to ArcGIS Pro. Sample data are provided by Esri via a companion

Un fortunately for Dr. Rankin, the fact remains that the map has not been, and will not be, left behind: outmoded forms and practices are not “the map,” they are just forms and practices. “The map” is an entirely artificial, cultural construct, and cartographic epistemology relies on a schema of mapicity that is mutable. The map, and its epistemology, is not tied to any particular form or style of artifact. While the map is ontologically stable as a useful, usable, and persuasive rhetorical artifact, its epistemology is culturally contingent. Maps can and will change: that is indisputable. That they are being left behind, as William Rankin contends in *After the Map*, remains, at best, unproven.

REFERENCES

House, Edward Mandell and Charles Seymour, eds. 1921. *What Really Happened at Paris: The Story of the Peace Conference, 1918–1919*. New York: Charles Scribner’s Sons.

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

Scahill, Jeremy. 2016. *The Assassination Complex: Inside the Government’s Secret Drone Warfare Program*. New York: Simon and Schuster.

website, for use with each chapter’s exercises. Each of the text’s exercises occurs in the context of a scenario related to a real-world problem or question. This project-based learning mirrors how GIS is taught in educational settings and how learners apply GIS concepts to new software and data.

Law and Collins guide readers through the application of practical and relevant GIS concepts in ArcGIS Pro through ten chapters. Each begins with an introduction, followed by a description of exercise datasets, exercise instructions, a summary, and a glossary of terms. This consistent framework and layout provides the reader with an easy to follow pattern as the material progresses from introductory GIS techniques to more advanced topics in later chapters.