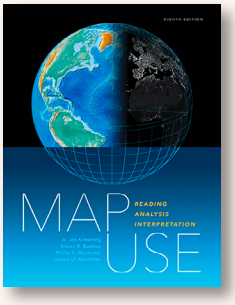
MAP USE: READING, ANALYSIS, INTERPRETATION, 8TH EDITION



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Review by: Daniel G. Cole, Smithsonian Institution

This hefty book, now in its eighth edition, has evolved over the past 40 years from an entertaining read about map use, reading, analysis, and interpretation into a formidable textbook on these subjects. The Preface tells us that "this book offers a comprehensive, philosophical, and practical treatment of map use in three primary ways" (ix). "First," the authors write, "we define a map as a graphic representation of an environment that shows relations between geographic features … second, we make a clear distinction between the tangible cartographic map and the mental or cognitive map of the environment … third, we reference commercial products and services of special interest to the map user" (ix–x). As an afterthought, they also promise to show how map use is relevant to daily life. This review will look to see if this book achieves its goals.

The text is organized into three parts: Map Reading (eleven chapters), Map Analysis (seven chapters), and Map Interpretation (four chapters). Each section has a two-page preface, and every chapter is led with a preamble somewhat less than a page in length. Rather than providing a single reference section at the end of the book, the authors place lists of selected readings at the end of each chapter. In addition, the authors note that "several of the new illustrations are linked to online animated and interactive maps through QR codes" (x).

The Introduction covers, in variable depth, several basic topics, including: Mental Maps, Cartographic Maps, The Map Transformation Process, What Makes Maps Popular?, Functions of Maps, and Map Use. It cautions the reader that "maps, even more than the printed word, impress people as authentic. We tend to accept the information on maps without question. This blind acceptance is potentially disastrous when using maps indiscriminately…You should also question the credibility of maps" (8). This warning is to alert the reader to the range of possible distortions, errors, generalizations, and biases on the cartographer's part. It should be noted that these topics are discussed without ever mentioning the term "critical cartography."

Part I starts with map reading, which involves determining what the cartographer has depicted and how to discover the map's message. As the introduction to Chapter One points out, maps "tell you where things are and let you communicate this information efficiently to others" (25). In the first two chapters, the authors succinctly and logically cover the Earth & its coordinates and map scale, respectively. In Chapter One, they discuss the Earth as a sphere, the graticule, the Earth as an oblate ellipsoid, the differences between geocentric versus geodetic latitude and longitude, and the Earth as a geoid; the explanations are clear and useful. Likewise, Chapter Two features good explanations of expressing scale, large and small-scale maps, converting scale, and determining an unreported scale. Table 2.1 "Commonly used ways of expressing map scale" (43), is especially helpful by covering not only US, but also UK and Canadian practices.

Chapter Three covers projections—a difficult subject for many map users—with sufficient clarity to allow the reader to understand map projection processes, as well as their properties, families, and parameters. Illustrations in this chapter are quite well designed and informative. The fourth chapter discusses different types of grid coordinate systems. The text deals with Cartesian coordinates, UTM, Universal Polar Stereographic, state plane, state grid, and other grid systems (although the Ordnance Survey National Grid [OSNG] dominates the "other" category), and how these systems are used and determined around the world. Grid coordinate determination on maps and grid cell location systems, such as the Military Grid Reference System, US National Grid, OSNG, and proprietary grids are also described. Land partitioning, described in Chapter Five, covers the history and logic behind irregular systems such as metes and bounds, French

long lots, Spanish and Mexican land grants, and donation land claims. Discussions of regular systems follow this section with the ancient Roman centuriation system, the US Public Land Survey System (including its problems) and the Canadian Dominion Land Survey. Lastly, the authors efficiently deal with various types of legal and technical documents: surveyed land records, subdivision plats, the cadaster, cadastral maps, engineering plans, and land information systems.

The sixth chapter, new to this edition, is on map design basics, and begins with an introduction warning readers against the use of tools that enable quick and cheap map production, but which do not "automatically result in well-designed maps that communicate your message clearly and accurately" (121). The chapter divides its discussions into three sections: Cartographic Abstraction, Map Design Considerations, and Web Map Design. Cartographic abstraction is broken down into the elements of cartographic selection, vector and raster generalization, classification, and symbolization. In the first element of the first section, the authors promote personal responsibility on both sides of the cartographic transaction: "Although it is the responsibility of the mapmaker to choose the themes and features wisely, it is the map reader's responsibility to understand that only a limited selection of all possible features is shown on the map" (123). The map design considerations section is separated into 12 components with appropriate discussions. The third section, on web map design, outlines the ways web maps are special and provides four basic design considerations (size and resolution, geographic extent and scale, projection, and symbols and text) of concern for maps used on desktop and laptop computers versus tablets and smartphones.

Nearly all of Chapter Six is well written, and would likely instill in students a desire to seek out and pursue a full map design course. However, minor complaints about several figures intrude. Figure 6.2, borrowed from *Thematic Cartography and Geographic Visualization* (Slocum et al. 2009), is unjustifiably fuzzy, with badly degraded text. The scale-dependent effects of generalization operations shown in Figure 6.3 practically disappear because the illustration has been reduced in size by some undisclosed, but apparently dramatic, amount (it was "resized to fit the page" [125]). The resizing renders the whole illustration nonsensical. Figure 6.7 is another that caught my eye: the figure caption and the text state that map is "centered correctly at 96 degrees" (128) and "positioned correctly with the central meridian" (129), respectively, but this is clearly untrue. The central, vertical, meridian is obviously the 90° line.

Chapter Seven considers qualitative thematic maps, with helpful presentations of the concepts of homogeneity, principles of symbolization, single-theme, and multivariate maps. The chapter finishes with introductions to mapping qualitative change on static and dynamic maps. Again, scan resolution is problematic in Figures 7.8 and 7.11, two maps from the *Atlas of Oregon* (Loy et al. 2001). The eighth chapter deals with quantitative thematic maps. Unfortunately, three more figures copied from the *Atlas of Oregon* (Figures 8.2, 8.4, and 8.46) display the same problems as the examples in Chapter Seven. Nonetheless, Chapter Eight quite adequately covers the differing types of quantitative data for points, lines, and areas, as well as the variety of classification schemes available, noting the advantages and disadvantages of each. The important distinctions between choropleth and dasymetric maps are covered, while cartograms, prism maps, and continuous surface maps are also presented in their various types and styles. Plenty of warnings are given, such the authors' note that "incorrectly made dot density maps can be confusing, if not downright misleading" (200). In addition, multivariate maps and multiple display maps are presented in their many forms, and several varieties of quantitative change maps are discussed.

Chapter Nine treats the topic of relief portrayal and presents a logical overview of the different absolute and relative relief mapping methods, oblique perspective maps, combined methods, and stereoscopic views. Examples of different relief shading views of Mount Saint Helens provide clear demonstrations of relief reversal and single versus multidirectional hillshading. I would suggest, however, that the image pairs in Figures 9.18 and 9.19 could have been combined in one three-image figure, because both use the same left-hand image and yet are placed side-by-side. Specific digital and dynamic portrayals of relief are handled with discussions of fly-throughs, interactive methodology, Shuttle Radar Topography Mission data, the National Elevation Dataset, Coastal Relief Model, and Lidar.

Image maps, or maps made from satellite imagery and aerial photography, are concisely considered in Chapter Ten. The authors provide appropriate coverage of black and white, color infrared, and high and low altitude photography, along with the potential geometric distortions to

which photographs are subject. They also discuss orthophoto maps, and satellite image maps from various public and private sources. This chapter finishes with a discussion pointed at dynamic image maps, most particularly ArcGIS Earth. This seems unnecessarily limited, because, while many in the GIS community use this program, it is not nearly as widely used by the map reading public as Google Earth, or even Bing Maps (which at least gets a mention).

Chapter Eleven covers the critical issues of map accuracy and uncertainty on maps. The authors identify the differences between uncertainty, error, and bias, as well as between map precision and accuracy. The types of accuracy and the sources of error are also discussed. Because the sources of error are often difficult for the average map reader to detect, this chapter includes helpful sections on communicating accuracy and uncertainty through metadata, reliability diagrams, legend notes, symbols, and notations—the last of which are the means most likely noted and understood by map readers.

Part II deals with map analysis, the purpose of which "is to reduce what might appear to be a muddle of information on a map to some sort of order that you can understand and describe to other people" (294). Chapter Twelve covers distance finding, including the means of determining distances, whether by physical measurements on the map or by coordinate distance, along with the potential error factors of each. Also discussed is the concept of functional distance, including travel time maps and isochrones. Chapter Thirteen is concerned with direction finding and compasses, with the relations between true vs. grid vs. magnetic north, with magnetic declination, and with compass direction systems. This straight-forward chapter is completed with plenty of well illustrated guidance for direction finding and determination on large and small scale maps. The fourteenth chapter covers position finding and navigation with a map, and with how to estimate one's ground position and relative distances to other features. This chapter also includes a discussion of GPS use for wayfinding and navigation. There is an overview of GPS, describing how it works, its potential accuracy and errors, and how its outputs are expressed. Land, marine, and air navigation methods complete this chapter.

Chapter Fifteen, which deals with spatial feature analysis, covers areal determination with the use of grid cell counting while maintaining awareness of measurement accuracy. Coordinate methods are outlined, with the use of mechanical, electronic and polar planimeters discussed, along with the configuration of irregular surface areas. In addition, the authors explain the concepts of area, perimeter, and centroid. It is shown how volumes can be calculated using the discrete ordinate, grid cell, and random sample methods. Lastly, the computation of shape measure, area correspondence, and compactness values are described. Chapter Sixteen concerns surface analysis, touching on the means used to determine slope, gradient, aspect, illumination, curvature, profiles, and cross sections. The authors provide an important discussion of how much vertical exaggeration is appropriate for particular profile and cross section scenes. Visibility analysis, through the setting of viewpoints and viewsheds finishes off this chapter.

Chapter Seventeen presents spatial pattern analysis, starting with consideration given to the particular parameters captured by spatial pattern measures of point, line, and area feature counts. Most of this chapter, however, focuses on pattern analysis and on the mathematical tools involved, followed by a short introduction to using GIS for spatial pattern analysis. The eighteenth chapter covers spatial association analysis, including: an examination of the types of spatial association, how to judge association visually with bivariate maps and scatterplots, and how to measure it through a variety of formulas and statistics. The authors round off this chapter with a look at the movement and diffusion of point data.

Part III deals with map interpretation, and, despite being the shortest part of the book, it is as equally important as the others. The authors note that "interpretation is the most demanding of all map-use endeavors. It is also the most exciting" (478). Chapter Nineteen covers interpreting the lithosphere, or, more properly, geomorphic and geologic terrain analysis. The authors discuss and illustrate basic landform features and types, followed by a presentation on geologic maps and cross sections. The twentieth chapter, interpreting the atmosphere and biosphere, starts with basic weather maps, media weather maps, and weather satellite image maps. I would suggest that a future edition should include a link to **hint.fm/wind**, which provides a near real-time animated depiction of current wind flow. The next section of Chapter Nineteen covers climate maps, including average annual precipitation, monthly climate maps, climate types, heating degree-days, and solar radiation. The last section, covering the biosphere, deals

with, and differentiates between, species distribution, range, and zone maps for species and vegetation.

Chapter Twenty-One, focused on interpreting the human landscape, provides an overview of human factors that influence the urban and rural landscapes in terms of settlements and land use/land cover, and then delves into the various means of viewing the sundry components of mapped demographics. The twenty-second, and last, chapter involves maps and reality, and opens with a caution against "putting too much faith in maps, of not realizing their limitations, and of forgetting to look beyond the symbols of the map to the real world beyond" (553). Numerous warnings like this, along with related statements largely drawn from works of fiction, make this a memorable essay. Recognition of the fact that maps have to lie, at minimum through cartographic generalization and abstraction, should remind the reader of the danger of treating maps as reality instead of as a cartographic interpretation of a selected portion of reality is a critical reminder for all. While this 12-page chapter is the shortest in the book, it is possibly the most important.

Two appendices, a glossary, and an index complete this book. The appendices include brief discussions of digital cartographic raster and vector databases from mainly US sources, some tables of measurement unit conversions (including length variations for a degree of latitude and longitude), coordinates for 50 US cities, and prime meridians used historically on some foreign maps (in DMS from Greenwich). The final 72 pages hold the glossary and index.

Overall, *Map Use* accomplishes is goals, despite my few quibbles. A review of the 6th Edition by Julia Siemer (2011) criticized that book's loss of the section on cartographic communication theory that had been present in earlier editions. Her hope that it would reappear in a future edition remains unfulfilled. Siemer also criticized the lack of international content; a shortcoming that too has yet to be fully addressed. In closing, I would suggest that given that this edition of *Map Use* is also available as an e-book (for only $79.99: a $20 savings over the paper), it may seem likely that the digital version will be the primary form for future releases. That format will permit clickable links to high resolution maps, animations, and interactivity to provide a greater learning experience, and avoid the shortcomings I have pointed out in this review.

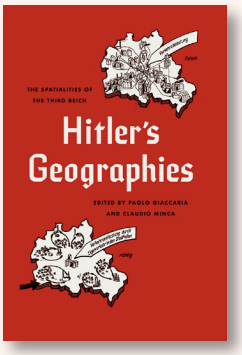
REFERENCES

Loy, W. G., S. Allan, A. R. Buckley, and J. E. Meacham. 2001. *Atlas of Oregon, 2nd Edition*. Eugene, OR: University of Oregon Press.

Siemer, Julia. 2011 "Review of Map Use: Reading and Analysis." *Cartographic Perspectives* 68: 91–92. doi: 10.14714/CP68.14.

Slocum, T. A., R. B. McMaster, F. C. Kessler, and H. H. Howard. 2009. *Thematic Cartography and Geographic Visualization, 3rd Edition*. Upper Saddle River, N.J.: Pearson Prentice Hall.

HITLER'S GEOGRAPHIES: THE SPATIALITIES OF THE THIRD REICH



Edited by Paolo Giaccaria and Claudio Minca

University of Chicago Press, 2016

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Review by: Aimée C. Quinn, Central Washington University

From their earliest days, the ideological masters of the Third Reich viewed cartography and spatial politics as tools for conquest. Not since the Roman Empire has geopolitics seen such grand, imperial, unbridled ambition dominate the world order. *Hitler's Geographies*: *The Spatialities of the Third Reich* is a well planned, meticulously executed work that examines the Nazi mapping enterprise through a new level of interdisciplinary rigor. To this end, the editors, Paolo Giaccaria (Political & Economic Geography Professor at the University of Turin in Italy) and Claudio Minca (Cultural Geography Head Professor at Wageningen University in the Netherlands), have brought together the work of scholars from Canada,