

## SOUND

John Krygier's chapter "Sound and Geographic Visualization", pages 149-166. Visualization in Modern Cartography, Volume 2. Edited by Alan MacEachren and D.R. Fraser Taylor (1994). New York: Pergamon.

Keith and Steven Rice (University of Wisconsin at Stony Point). NACIS 2001 meeting. "Scoring and Scripting Music for Animated Maps".

### book reviews

#### The Grammar of Graphics

By Leland Wilkinson  
New York: Springer-Verlag, 1999.  
ISBN 0-387-98774-6, hardcover,  
\$69.95, xvii, 408 pp., tables, 248  
illustrations (169 full color), refer-  
ences, index.

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Some books defy simple classification. This volume is at once a text and a philosophical treatise, and to some may seem to be an advertisement for a companion statistical software program. Moreover, given its title, many cartographers and geographers might miss its considerable relevance to their work. That would be unfortunate, for there is much of interest to be found within its pages.

The book's title at once promises more and less than the text delivers. Leland Wilkinson, the book's author, is a legendary figure in the field of statistical software, having been an academic, a programmer, and an entrepreneur who wrote and marketed the SYSTAT program and is now senior vice

president for SYSTAT products at SPSS, Inc. Wilkinson has spent an entire career thinking about how to array, visualize, analyze, and interpret data, and this book summarizes his current thinking on the subject. While much of his work may seem theoretical, Wilkinson is a very practical man who has also developed a data graphics software package designed around the grammar described here.

The heart of this book is a series of chapters describing the concepts and structure of Wilkinson's understanding of the grammar of graphics. The grammar consists of verbs, nouns, and adjectives, and processes from the input noun "data" through the successive steps "dataset," "varset," and "graph," to the output noun "graphic." Along the way, the verbs "dataview," "varmap," "grapher," and "aesthetic" transform the data as it is shaped into a graphic, modified by the adjectives "reference," "algebra," and "coordinate." Each of these steps and modifications is described in general terms in a series of ten chapters, with illustrations of the application of most concepts discussed. Cartographic examples appear throughout, although Wilkinson takes pains to remind the reader that his grammar does not create or emulate a geographic information system.

Wilkinson's purpose is to identify the general rules that govern the creation and presentation of data graphics, and to set forward a structure within which these rules might be operationalized most efficiently. If the grammar is successful, it should be possible to reduce any data visualization problem into a graphic utilizing the rules outlined. Wilkinson is the first to admit that this structure is only one of many that might be constructed while following these rules, and that the purpose of the book is to further the scientific understanding of the display of quan-

titative data in graphical forms. To this end, Wilkinson builds on, and in some instance criticizes, the work of Tufte, MacEachren, Bertin, Cleveland, Tobler, and many others who have contributed to this field over the past fifty years.

The final chapter pulls together the elements of the grammar of graphics by attempting to graph complex problems solely through the rules proposed. To demonstrate the versatility of his grammar of graphics, Wilkinson shows how it might be applied to generate a replica of Minard's well-publicized "Figurative map of the successive losses of men in the French army during the Russian campaign, 1812-13" (Tufte 1983), and a complex dataset concerning the annual northward migration of the Monarch butterfly across North America.

Among its many strengths, this book is very methodical, at times obsessively so. It is also very well illustrated, with numerous charts and graphics, a lengthy and comprehensive bibliography and index. For this reviewer, the most significant weakness is that it is difficult to grasp many of the nuances of the proposed grammar without the opportunity for a hands-on experience. A companion CD-ROM including the examples in the book, so that readers can experiment with the various functions and elements of the grammar of graphics, would greatly enhance the text.

This book is not for the faint of heart, and certainly not for the novice reader. It would not be recommended reading for those without several courses in statistics; geographers who lack training in cartographic methods may also find the book difficult. However, those who read the book cover to cover and take some time to ponder the concepts and proposed theoretical structure for data graphics will find the experience worthwhile. All geography and

map libraries should add this book to their collections; the serious scholar of quantitative data graphics will place this book on the same shelf with those by Edward Tufte, and volumes by Cleveland, Bertin, Monmonier, MacEachren, among others, and continue the unending task of proselytizing for the best in statistical data presentation by example and through scholarship like that of Leland Wilkinson.

## Reference

Tufte, Edward R. *The Visual Display of Quantitative Information*. Cheshire, CT: Graphics Press, 1983.

## The New Nature of Maps: Essays in the History of Cartography

By J. B. (John Brian) Harley, edited by Paul Laxton, with an introductory essay by J. H. Andrews. Baltimore, MD: The Johns Hopkins University Press, 2001. xviii + 334 pages, 36 illustrations, \$45.00 cloth (ISBN 0-8018-6566-2)

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A collection of seven essays by the late Brian Harley (1931-1991), *The New Nature of Maps* is an unusual book. Harley had such a book in mind but published its chapters separately in the late 1980s and early 1990s, in a variety of anthologies and academic journals, including *Cartographic Perspectives*. What he no doubt never intended was a posthumous volume that is as much about the author himself as it is his own critique of late-twentieth-century approaches to the history of cartography. Meticulously edited by Paul Laxton, a former student who inherited the role of Harley's "literary execu-

tor," *New Nature* is introduced by a lengthy and insightful critique of Harley's ideology and scholarship by John Andrews and topped off by a comprehensive list of Harley's publications, compiled by Matthew Edney, and a consolidated bibliography for the seven essays, compiled by Laxton.

In the preface, Laxton explains his rationale for putting Andrews's essay first. Brian Harley is the closest thing cartography has had to a cult figure, and even though his essays "will survive as important statements in map history . . . a critical evaluation is now both necessary and healthy" (xi-x). As a friend, critic, and frequent correspondent of Harley's, Andrews was not only "well placed" to offer an "objective" overview but readily able to contribute a shorter version of his essay "Meaning, Knowledge, and Power in the Map Philosophy of J. B. Harley," published in 1994 in Trinity College's occasional papers series.

Andrews's lively narrative and provocative opinions are a fitting complement to his subject's fluent, elegant, and at times inflammatory prose. Harley, he observes, was a "widely read" scholar who eagerly sought cartographically relevant insights in a diverse array of disciplines that included art history, literary criticism, Marxist ideology, and semiotics. But in what reads as a benevolent deconstruction, Andrews notes that "Harley considers most map makers to be less objective than they think they are," but asks, "Can the same judgment be applied to him?" (3). Probably not, one must conclude from Harley's tendency to unduly emphasize a map's minor decorative elements and to read unfriendly intent onto the map maker's use of size, centrality, color, and vernacular toponyms. Putting one's own country or continent at the center of a map—arguably an appropriate strategy for user-friendly design—thus becomes evidence of arrogant

ethnocentricity. Andrews also questions the Harleyian concept of "silences," which allows the critic to read sinister motives into what are merely "blank spaces" on a map. Is it fair, Andrews wonders, to accuse a cartographer with nothing to show of withholding relevant information? But as Harley argues later, in several of his essays, the answer at least occasionally can be a resounding yes.

Especially intriguing is Andrews's critique of Harley's use of cleverly phrased, seemingly broad generalizations. Of course, Andrews also indulges in generalities, as when he suggests "it may just be bad luck that when Harley's theories hit cartographic bedrock the results are often unsatisfying and sometimes factually incorrect" (29). Or when he observes that "a notable failure of Harley's explanations, then, is how much of their weight is borne by his contexts and how little—sometimes none—by the maps themselves" (30). And in what strikes me as the epitome of backhanded complements, Andrews asserts, "The fact remains that on a 'weak' interpretation Harley's essays may yet prove to be ahead of their time. His predecessors and contemporaries have known perfectly well that cartography works against a background of capitalism, elitism, nationalism, imperialism, and religious prejudice . . . [but] when young map historians start asking 'Daddy, what is class?' Harley's arguments will come into their own" (31). Don't hold your breath, eh?

As for the contemporary popularity of Harley's writings among humanities scholars, Andrews offers the understandable if not cynical explanation that Harley "has subjected the 'technocratic' claims of modern cartography to the kind of critical onslaught that outsiders are always glad to see leveled at any entrenched professional group" (32). Even so,