Review
A History of Data Visualization & Graphic Communication

Michael Friendly and Howard Wainer; Harvard University Press; 308pp; June 2021; ISBN 9780674975231

Friendly and Wainer have been two of the most prominent contributors and expositors of data visualisation methods for the last 50 years. This book is an obvious labour of love that they say has been gestating throughout their careers. It presents a largely Eurocentric view of how many of today's statistical graphics and data visualisation tools originated.

The book is a marvel of research scholarship. Unlike histories of the rich and famous, the work of many of the stars of this narrative is relatively obscure. The authors have done a remarkable job of digging it up and putting it into perspective in a way that is both clear and accessible. This is the sort of book that one can browse and sample in bite-size chunks as the mood seizes, encountering curious delights while doing so.

For example, although finding precursors in prehistory, the book marks mapmaking – mostly after 1500, when regular long-distance voyages of European nation-states began – as the start of what we would call data tabulation and display. Driven by the need to determine longitude at sea to navigate (which was not resolved until John Harrison invented an accurate maritime clock in 1736), early efforts tried to use various astronomical schemes for this purpose. The first use of a statistical graph is pinpointed as a simple plot made by the Dutch "entrepreneur" Michael Van Langren around 1630 to convince the King of Spain (Spain owned the Netherlands then) to award him a grant to develop such a scheme. Who knew?!

Naturally, many of the archetypes of the pioneers are shown. From Britain: William Playfair's graphs of economic data over time, John Snow's cholera map, Florence Nightingale's rose charts of Crimean war deaths, and Francis Galton's bivariate regression plots. From France: Charles Minard's Napoleon Russia campaign map and André-Michel Guerry's

"moral statistics" maps. Also, the Hertzsprung–Russell diagram of astrophysics (*c.* 1910) by Ejnar Hertzsprung, a Dane, and Henry Russell, an American, which led to fundamental insights into stellar evolution.

The chronology of these examples traces the slow development of graphical displays of data from their mapmaking origins until the "Big Bang" in the 1780s when Playfair, whom the book celebrates as "the father of modern graphics", began inventing many of the standard graphical forms still used today for his displays of political economic data. The explosion of political, economic, social, and demographic data collected especially by the French and British after 1800 then led to what the authors characterise as a "golden age" of statistical graphics from roughly 1850 to 1910. Most modern forms of data display arose in this period, and examples of small multiples, maps with overlaid graphics, scatterplots with fitted lines and curves, and even contour plots are given, many of which were used in various compendia of official statistics, including US censuses. Some of these examples are frankly astonishing in their detail, considering both the amount of data represented (thousands of points in some cases) and the draughtsmanship to manually make them.

The book labels the subsequent period from 1910 to 1970 as a graphics "dark age" when graphical methods were overshadowed by the developments of statistical inference. What changed around 1970, of course, was the availability of ever more powerful and cheap computers, which catalysed the development of ever more innovative, interactive and powerful software and hardware for the graphical representation of ever more data. In the final chapters of the book, the authors recount a few of the milestones of this resurgence, such as John Tukey *et al.*'s work on the PRIM-9 system and the development of computer graphics and data animation. As one might expect, the printed page does not work very well for this part of the exposition. The website accompanying the book, which contains
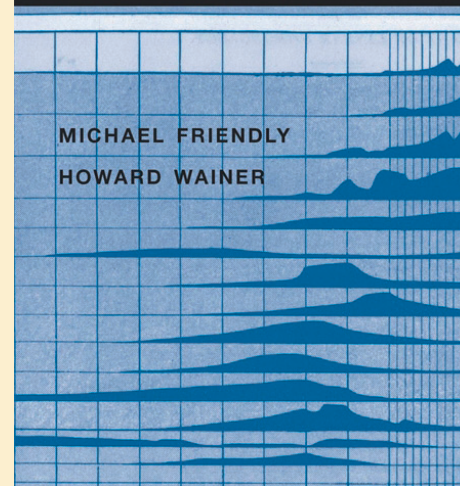
full-colour reproductions of most of the book's graphics, helps; but of course one can just browse interactive statistical graphics software online to actually interact with numerous examples of where this technology has evolved.

Along with my praise, two small concerns. First, as I said, this book is very Eurocentric, leading me to wonder whether the forces that gave rise to many of the European graphical developments might also have been replicated in, say, China, Japan, or the Ottoman Empire. Perhaps not – or perhaps such revelations await the research of scholars in those regions. Second, excluding the wonderful colour plates, many of the historic graphs shown in the book did not survive the printing process very well: details described in the text were often difficult to discern in the graphs. The remedy, of course, is to follow along on the book's website (currently to be found at friendly.github.io/HistDataVis). ■

About the reviewer
Bert Gunter is a retired industrial statistician and a Fellow of the American Statistical Association.

Disclosure statement
The reviewer declares no competing interests.