Much of human knowledge is communicated in texts, and our education tends to bias us towards a familiarity with reading as a way of getting information. But an enormous amount of knowledge is best (or even only) communicated visually. Time tables, bar graphs, maps, even pictorial icons (on restroom doors and other signs) figure prominently in our routine activities. Though these are part of our daily landscape we rarely stop to think about the way a clockface or calendar expresses historical and cultural values (Why does the week start on Sunday? Why is midnight at the top of the clock?). Information in images isn’t only expressed in what they show, but in how they show it. The structure and style of graphical information (is it in blocks, columns, tables, aligned on an axis, or laid out in a scatter plot?) is a crucial part of its meaning. The books in this list help to shift our idea of “visual information” towards an understanding of graphical forms as part of the larger cultural legacy that we rely on for knowledge of the world and ourselves. Oddly enough, precious few books have been written on this topic. Usually, when images are the subject, art historians or cultural critics are the ones paying attention. But we have to look long and hard to find the handful of books that are shaping the study of graphical forms of information. Though no ideal book exists, this group contains a few starting points for reading in this area. They are works that increase our understanding of the formats of graphical information as knowledge, that is, expressions of culture and history, not just statistical data.

Production of visual representations is increasing through widespread use of computers to turn data into images. We learn how to read most of these common graph forms in elementary school. But we rarely pause to consider the rhetorical structure of these visual forms that makes an argument, a persuasive expression. Though diagrams often seem to be “just there,” their conventions have a long history that is structured into the way they “show” us meaning.

Most “information visualizations” come from fields where quantitative data are an integral feature of the discipline, such as statistics in the natural sciences, engineering, technical drawing, and applied mathematics. The work of people like Stuart Card and Edward Tufte comes directly out of that realm and does not necessarily attend to the cultural history of the graphical forms they use. Works by James Elkins and Alan MacEachren are beginning to synthesize a fascinating history of graphical knowledge.

This synthetic history exposes the lineage of visual forms of information. The familiar “tree” form diagram, for instance, assumes a continuous, branching, relationship of the elements that mirrors concepts of organic evolution (incorporating genealogical charts with biblical antecedents). Gridded tables that make use of columns assume continuity of information types along the horizontal and/or vertical axes—and were developed for classification and calculation. Cartographic modes structure a point of view into their presentation—an omniscient bird’s eye, a cultural bias (usually emphasizing the northern hemisphere), or recording the history of an exploration as it occurred. Iconic symbols draw on long-held beliefs about the power of images to be read directly by the eye, in the tradition of the “hieroglyphic” or “Chinese character” taken as self-evident signs. Bar charts often “chunk” their data according to very crude or reductive parameters such as age groups, income distribution, or other unsubtle statistical metrics.
Many graphical contain incidental information. The representation of a “typical” woman, farmer or soldier, speaks volumes about the culture in which such images are legible. A map containing mermaids, monsters, and personified figures of the winds shows a belief system that once projected its imagery upon the world. Even the simple diary makes many assumptions through the way it structures the hours of the day into same-sized units. These information structures impose their expectations and shape attitudes. The study of cognition has led to the development of an information-processing version of visual experience, and away from earlier mechanistic models of stimulus-response through eye to brain. In such a systems-dependent analysis, graphical forms of knowledge become part of a set of exchanges in which the ability to know as well as the content of knowledge is formed by these structures.

The books in this list each offer some useful thoughts on this topic. But the best and most interesting work in this field? It lies ahead!

This gem of a book, lucid and clear, is filled with information about Venn diagrams and the work of the fabulous Raymond Lull (the medieval visionary who created a system of revolving wheels to describe everything in the universe and compute god’s capabilities), and others. This book is small and short, but it is a great introduction to thinking about graphical forms as machines capable of doing something, not only showing it. This distinction between generative methods of visualization and presentation of data already calculated is crucial, and though Gardner doesn’t state it explicitly, his emphasis on the productive capacity of visualizations makes a strong contribution to this argument.

Tufte is among the most elegant and sophisticated, information designers in current practice. His first book on this topic is still the most engaging and striking. Its design embodies his beliefs that clarity and economy are essential to the graphical presentation of information. Tufte’s approach is classical in its rigor, but is premised on a belief in the empirical credibility of data. For all his power as a designer, he stresses continually that the information exists independently of its presentation and that the designer’s task is to make as clear a graphic image of it as possible. He never addresses the assumptions inherent in hierarchical structures, grids, or other formats, though he does present a series of “greatest hits” from the history of diagrams, beginning with work designed by the equally elegant 18th-century figure, William Playfair.

Simply the smartest book on vision, visuality, and theories of cognition that I have come across. MacEachren is a cartographer, but his introductory chapters in this book are thorough reviews of the history of models of vision from physiological and philosophical perspectives. His work is current, and contains an information-processing theory of vision that is attentive to the way images function to shape, constrain, and generate knowledge. Though MacEachren is not a historian of graphical forms, he makes a
significant contribution to our understanding to the history of visuality.

Elkins has a creative and original mind and is one of the few writers trained in art history looking beyond the confines of the art historical canon to the broader history and use of visual images. This fascinating book raises many issues about the way the aesthetic properties of images work in communication of information in medical imaging, scientific illustration, and other visual forms. Elkins is conversant with philosophical traditions and synthesizes notions of realism, empiricism, idealism and functionalism across disciplines in a useful and tractable way. His writing is dense but unjargoned, his thinking is complex but he communicates well, and the book is finely designed so that captions and images and commentary are all in proximity (which should be the norm!).

A classic in the field of art history, Ivins’s book is still extremely useful for thinking about the way print reproduction stabilized knowledge. Though he has been criticized by later art and cultural historians as mechanistic in his emphasis on the impact of technology Ivins’s analysis of the effects of standardized reproduction and circulation of knowledge in natural and physical sciences is valid. Ivins’s premise is that print technology allowed visual forms to circulate widely and thus to function as a shared foundation of knowledge in emerging disciplines. Printed reference works that used imagery gave rise to conventions for representing natural processes as well as objects. Ivins’s discussion of the “syntax” of printed images remains another useful contribution to the discussion of graphical knowledge. Ivins, like other art historians of his generation and training, wrote with generous clarity and erudition.

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