K. Börner, *The Atlas of Science: Visualising What We Know.*

The CEO of Google, Eric Schmidt, recently estimated the size of the internet at roughly 5 million terabytes, or over 5 billion gigabytes, of data. And every day the amount of digital information flowing through the internet is increasing. The torrent of information about scientific developments alone demands that we acquire new tools to help us manage so much information, argues the "Atlas of Science: Visualising What We Know". The book is an attractive, engaging, illustrated collection of the leading, early examples of tools that effectively visualise relationships between and developments among the sciences.

Essentially a catalogue of an exhibit entitled "Places & Spaces: Mapping Science", the book is richly illustrated in full colour with illustrations on all pages but those in the end matter. The large format – 34cm × 28cm – allows the reproduction of the charts, diagrams, and graphs at legible size while the accompanying explanatory notes set in small type further explain the illustrations. The book is ambitious, detailed, and cleverly organised, and, like the diagrams it documents, generally has sufficient detail to please specialists as well as enthusiasts of information design, scientific visualisation, and graphic design. The long bibliography and citation list span 35 pages.

Like a grammar school atlas, this book is largely focused on its home territory, in this case Indiana University's Cyberinfrastructure for Network Science Center and the School of Library and Information Science where the author, Katy Börner is Professor of Information Science. This is just one way in which this atlas is imbued by the author's presence. Judging from the large number of portraits of Börner and her colleagues that accompany the diagrams they've authored, Indiana is a global capital of computational scientometricians, as they're known. The global population of these specialists is only about 300.

About half that number worked on Diderot and d'Alembert's *Encyclopédie*, completed in 1777 and cited in *Part 2: The History of Science Maps* as a precedent in knowledge gathering and cataloguing. Twenty-six years in the making, that work contained 70,000 articles written by "a society of men of letters and skilled workmen, each working separately on his own part, but all bound together solely by their zeal for the best interest in the human race and a feeling of mutual good will." After two hundred and thirty years of technological (not to mention gender equality!) advancement, it took only eight years to write 29 million Wikipedia articles in 250 languages. Academics like herself, Börner says, who must live by the rule "publish or perish" don't have time to answer all their emails let alone keep up with all these new web pages or even papers in their fields. This is the reason for the need for well-designed graphics that help us organise and sort information and the links between ideas, people, and documents.

Part 3: Toward a Science of Science lays the foundation for the examples of *Part 4: Science Maps in Action* which gets to the meat of the matter. Here notable visualisations are explored in detail, with either 2- or 4-page spreads offering detailed descriptions of the graphics, the rationale that informed them, or early drawings and visual studies that show the thinking that shaped the final graphics. The effective use of small multiples helps us understand a visualisation of the links between 7.2 million scholarly documents, for example. These generous spreads which allow the authors to explain the graphics in detail make this book more than a pretty collection of interesting diagrams.

In the conclusion, *Part 5: The Future of Science Maps*, promising avenues are proposed: interfaces to assist scholarly research; methods of mapping economic relationships and consumer patterns to help businesses find new markets; the use and value of virtual worlds in educational settings; and so on. The author makes convincing arguments about the importance of computational scientometrics and their growing utility to society.

But as visually interesting as it is, the book is more like the catalogue of an exhibit than a stand-alone atlas. Although much of the subject matter of the documents is intriguing, one cannot investigate some works in satisfactory detail since the visualisations were designed for an exhibit room where the graphic could be studied either at a larger size, in three dimensions or in an electronic format. So the information on Ingo Günther's "World Processor" globes aren't – ironically, for an atlas – projected onto maps. The atlas is concerned with the visualisations as techniques, and their subject matter is secondary.

Colour choices and information design in the introductory sections sometimes miss the mark which is a disappointment in a book advocating clarity in design. The first spread in *The History of Science Maps* has three different arrow types that show the relationships between 28 pioneers in the fields of knowledge storage, classification, visualisation, and dissemination. Two of the three colours are so similar that this reviewer could only discern relationships of *inspiration*; vectors to indicate *support* and *facilitation* between individuals couldn't be distinguished. Arrows that overlap to the degree that they're illegible is further proof that the book was an afterthought to the exhibits.

Some of the awkward design elements, it seems, are the result of the book being hastily edited or rushed to print. Icons alongside a timeline of major visualisations (e.g. SmartMoney's 1998 "Map

of the Market") are cryptic and unexplained; I could find no legend in the book or even on the book's website, http://scimaps.org. And "Putting Science in its Place", from 2003, is situated on the timeline at 1950, three years before that book's author was born. Perhaps this error of an incorrect year of publication is proof of a point from the introduction: "We need better tools to access, track, manage, and utilize our collective scholarly knowledge and expertise."

Despite some shortcomings in its design and proofreading, Börner's atlas is an exciting presentation of forthcoming tools that will enable us to manage the torrent of information engulfing us.

Martin von Wyss
vW Maps