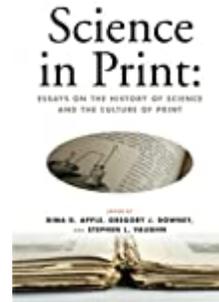




**Rima D. Apple, Gregory John Downey, Stephen Vaughn, eds.** *Science in Print: Essays on the History of Science and the Culture of Print*. Madison: University of Wisconsin Press, 2012. xiii + 235 pp. \$34.95 (paper), ISBN 978-0-299-28614-9.



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## Turning the Pages of Science

The intimate, not to say constitutive, relationship connecting science and print has proven to be fecund territory for scholars in the history of science, book history, and historical geography concerned with the production, circulation, and reception of knowledge. That the technologies and cultures of print have shaped, whilst being shaped by, science as a communicative process has encouraged attention to the role of printed books, scholarly articles, maps, engraved images, and other forms of inscription, in processes of knowledge making and dissemination. For science and for print, questions of authorship and authority, standardization and fixity, transmission and reception have often gone hand-in-hand. So great is print's perceived significance to science in the modern era, it is often presented (alongside empiricism) as science's *sine qua non*.

As a consequence of the important links between science and its printed forms, historians of science have, as James Secord notes in his forward to *Science in Print*, 'played a strikingly larger role in studies of print' than their numbers would imply (p. ix). Secord's point is

clear: one cannot be a historian of science, nor a historian of geography, without also being a historian of the book. *Science in Print*—wide-ranging in its disciplinary and temporal foci—is a welcome addition to the extant literature on science's print cultures. Emerging from a 2008 conference, 'The Culture of Print in Science, Technology, Engineering, and Medicine,' held at what was then the University of Wisconsin-Madison's Center for the History of Print Culture in Modern America (now the Center for the History of Print and Digital Culture), the book seeks to structure its diversity through a thematic attention to questions of production, distribution, and reception.

In the book's first empirical chapter, issues of accuracy and replication in the visual communication of science are neatly addressed by Meghan Docherty in her attention to the work of the seventeenth-century English engraver William Faithorne and, in particular, his 1662 text *The Art of Graveing and Etching*—an instructional manual which offered engravers a 'grammar and syntax of accuracy' (p. 27). In examining the intimate relation-

ship between Faithorne and the experimental scientists who formed London's Royal Society, Docherty argues that standards of accuracy in scientific observation and in the visual depiction of the natural world developed in a parallel, reinforcing manner. Just as experimental science came to be governed by protocol, technique, and correct bodily deportment, so too was engraving increasingly dependent upon an adherence to prescribed practices, specified tools, and approved methods designed to ensure an engraver could create images that would pass for transparent representations of nature (p. 31).

In his attention to the production of textbooks of algebraic instruction in the late eighteenth- and early nineteenth-century United States, Robin Rider pays close attention to typographical practice as a pedagogical problem and as a tool for, or potential obstacle to, the effective communication of mathematical meaning. Rider shows, through a forensic examination of the layout and structure of the printed page (what we might think of as the micro-geographies of the book), how the specific arrangement of algebraic expressions—sometimes incorporated in sentences, other times offset and aligned according to decimal points or mathematical operators—could serve either to highlight and reinforce or to obscure ideas (p. 38). Whilst contemporary manuals instructed printers and compositors in the setting of numerals, tables, and poetry, among much else, the effective presentation of algebra for pedagogical purposes depended, as Rider shows, upon experimentation as much as replication (p. 40).

Historians of geography and scientific travel will find much of interest in Lynn Nyhart's account of the multiple authorship and multivolume publication of the scientific report of the late nineteenth-century German Plankton Expedition. Nyhart's central claim is that such multi-authored, serially produced expedition reports epitomize the collaborative and international nature of much scientific work in the nineteenth century even whilst they constitute a distinct genre of scientific publishing (p. 67). The Expedition's report was, Nyhart shows, the product not only of multiple voices but of multiple sites—the collaborative effort of a geographically dispersed group of scholars (p. 79). Such distributed enterprises, and their printed manifestations, were one mechanism by which nineteenth-century communities of professional and amateur scientists were formed and maintained. The operation of such large-scale, long-distance processes demands attention, however, to the procedures by which, and infrastructures through which, specimens moved, reports circulated, editing occurred, proofs were

commented upon, and, in short, how the diverse and distributed practices of science came together in certain places to become seemingly authoritative print.

Questions of geographical distribution and of cross-border exchange are to the fore in Bertrum MacDonald's examination of the Smithsonian Institution—an authority which, by the last quarter of the nineteenth century—had become the world's leading agency for the international distribution of scientific publications (p. 87). MacDonald's examination of the Smithsonian's extensive correspondence record reveals something of the operation of North America's nineteenth-century Republic of Letters. As the hub in an international network of knowledge exchange, the Smithsonian was a clearing house through which printed scientific matter was distributed to corresponding scholars (with greater or lesser regularity), scientific specimens received in exchange, and communication between scientist–amateur and professional, metropolitan and rural—facilitated. Whilst MacDonald's focus falls specifically upon scientists living and working in remote parts of Canada, his chapter has much to say, more generally, about the role of institutional authorities in encouraging and facilitating scientific dialogue at a geographical distance.

That a single individual can assume an institutional significance in respect to professional practice in science is illustrated by Jennifer Connor in her account of medical authorship and editing in the Progressive-Era United States. Connor's particular quarry is the prolific, superhumanly productive medical editor and journal publisher George Gould. Through his editorship of a variety of metropolitan and national medical periodicals, Gould exerted an important influence on the nature of medical writing, particularly in relation to questions of research quality and impartiality, and on medicine's wider print culture (not least through his presidency of the Association of Medical Librarians, which mirrored, for medical practitioners, the distributive function of the Smithsonian Institution). Connor is correct to point out that scholarly periodicals generally, and editing specifically, have been somewhat overlooked in favor of the book in much work on the history of science's print cultures (p. 123).

The circulation and reception of Darwinian evolution in its various printed guises has been a long-standing concern for historians of science and others. Whilst attention has been paid to how this reception varied by geography, gender, race, and religion, comparatively little consideration has been given to the communica-

tion of evolution to (and its reception by) children (p. 134). Kate McDowell's chapter is a useful partial corrective to this lacuna, systematically examining the ways in which Darwinian evolution generally, and human evolution specifically, were presented to American children between 1882 and 1922 through lists of recommended books drawn up by the Children's Librarian's Section of the American Library Association. These lists influenced the purchasing decisions of local and school libraries and thus the range of books to which children had access. As McDowell notes, of the approximately two hundred science books recommended in these lists, only about thirty addressed evolution in any way. Few books explained Darwinian evolution directly, and fewer still examined human evolution. McDowell posits a number of explanations for this paucity of explanation, including the conceptual difficulty of communicating the concept of deep time and, more obviously, the controversial religious implications of evolution. Whilst such analysis of content is hugely important, more work needs to be done, as McDowell points out, on how real children encountered evolution and other controversial topics in texts (p. 150).

The role of print in the service of scientific pedagogy is further developed by Sally Gregory Kohlstedt in her examination of textbooks designed to support the teaching of nature study in the United States from the late nineteenth century. The challenge for the authors and publishers of such texts was in positioning their works in such a way that they could speak equally usefully to educators in rural school rooms and to teachers in crowded slums in an industrial city (p. 164). Through an attention to the content and educational philosophy of a number of such texts, Kohlstedt traces the emergence of what she calls a new, more self-conscious genre of pedagogy book—one in which didactic elements were minimized in favor of what we might now describe as interactive and self-directed learning (p. 171).

The more overt didactic potential of print is, however, evidenced by Rima Apple in her study of the printed material (often in the form of pamphlets and posters) distributed by the United States Department of Agriculture to instruct mothers and housewives on questions of domestic economy and nutrition from the mid-twentieth century (p. 181). Apple's discursive analysis of these materials shows how a particular rhetoric of scientific objectivity has historically been used to position meat, specifi-

cally, as a wholesome and necessary dietary component. Certain visual tropes, most notably the food pyramid, have, in Apple's view, clearly and subtly bolstered the ideology of meat (p. 195). In assessing the communicative power of the U.S. government's print culture, much interesting work remains to be done on the lived experience of those to whom these instruction texts were addressed: not so much real readers reading, but real readers eating.

*Science in Print* is bookended, in terms of content and temporal scope, by two single-text studies: Docherty's essay on Faithorne's *The Art of Graveing and Etching* (1662) and Cheryl Knott's reception study of Stewart Udall's *The Quiet Crisis* (1963). Knott's chapter compares the popular and critical response to Udall's text—part of the emergent environmental movement of the 1960s—in its original and twenty-fifth-anniversary editions. Knott shows, through an examination of Udall's papers at the University of Arizona and of contemporary periodical reviews, how wider social and political contexts, as well as the changing professional role of Udall (who was secretary of the interior at the time of the book's original publication), had important influences on the reception of his text; feted in 1963, it was little acknowledged in 1988. Knott's study draws attention to the various nontextual factors which determine the success, or otherwise, of the printed book in finding and influencing its audience.

As a consequence of its detailed case studies and interdisciplinary scope, *Science in Print* will find a receptive audience amongst historians in a variety of specialisms for whom books specifically, and print culture more generally, are important points of focus. As with any collection of scholarly essays, however, this volume is more successful as a state-of-the-field summary than as a clear statement of future directions and priorities. Where some criticism might reasonably be leveled at the book is not in relation to its content but to its production. Not only does the book lack an index (something which is really vital for navigating disparate collections such as this), it contains a surprisingly large number of occasionally distracting typographical errors. These qualms aside, there is very much here that is valuable and suggestive and which makes an important contribution to ongoing interdisciplinary dialogue as to the role and significance of science's print cultures.

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