gies are to be understood on an analogy with the lamppost. The classification schemes we rely on or dispense with, the catalogs and database systems we use for storage of records, the shelf space and the servers where we house materials, and the vocabularies we use to retrieve them—all of these not only help bring the field into sharp focus, but they also provide innumerable places where items get lost.

Using this as a point of departure, the remainder of the essay sketches a broad outline of library history that divides the field into seven great ages. Krummel observes that there is nothing special about the number seven, so perhaps his seven-league-booted stride from 3000 B.C. to the present age is simple coincidence. If so, it is useful for it enables us to fly high, something not enough of us do very often. When we do, we see extinct volcanoes, the floors of ancient oceans, riverbeds dry for centuries, and immense fields of petrified wood where green forests once flourished. And all this has brought us here.

In the earliest periods of recorded history, libraries and librarians in the agricultural empires of the Fertile Crescent tended working archives housing the evidence of the shared understandings of government. In the Greco-Roman period, the first academic institutions arose, and their libraries served to support them (not included in this necessarily truncated account, in the twilight of Roman domination, Greek-speaking grammarians developed the first systems of textual annotation). By the early medieval period, Christian Europe had supplanted and yet preserved these both with libraries devoted to the glory of God. Renaissance humanism radically challenged this emphasis on the divine and produced materials and collections devoted to celebrating human virtue and courage. Writers such as Francis Bacon—in the Age of Science, which began in the later medieval period under the Franciscan and other orders—substituted for this the idea that knowledge must benefit people, that learning must advance and improve the human estate. By the beginning of the eighteenth century, the spread of literacy had created a larger and more diverse reading public, and by the middle of the following century, that public was a mass audience, reading for many different and sometimes incompatible reasons. And a century after this, which brings us very close to the present, the Baconian ideal was transformed by very rapid technological development, which produced the array of record and material formats and media we all use today.

Krummel concludes with some recommendations for further reading. Unfortunately absent from this list is the book he once hoped to make from this essay, originally given as a lecture back in 1983. Specialists will poke holes—they always do—in the large, overarching framework, but most other readers will, I think, very much enjoy the informal and global treatment. As the author himself admits, much is missing, especially the essential story of libraries in the Islamic world. In the end, *Fiat Lux, Fiat Latebra* creates a blind spot of its own, for there is another fruitful opposition that remains latent, the contrast between *lux* and *tenebra*. The search for knowledge actually creates ignorance: the more we know, the more we do not know. What role do libraries and librarians play in the creation of ignorance? Obviously, this is a subject for another essay.—*Michael F. Winter, University of California, Davis.*

Librarians as Learners, Librarians as Teachers: The Diffusion of Internet Expertise in the Academic Library. Ed. Patricia O'Brien Libutti. Chicago: ALA, 1999. 296p. $27 (ISBN 0-8389-8003-1). LC 99-13042.

As early as 1994, members of ACRL's New York chapter planned a book documenting their experiences learning and teaching the Internet. The resulting collection of more than twenty articles by librarians, MLS students and faculty, and administrators should strike a chord with anyone who lived through the technological changes of the past five years.

The book is organized into four roughly chronological sections:

"Foundations of Internet Expertise in the Academic Library"; "Enlarging the Internet Literature: Early Training and Learning Experiences"; "The Present Tense: The Diffusion of the Internet into the Workflow of Academic Librarians"; and "Preparing Librarians to Teach the Internet." Contributions range from personal accounts to research articles and resource lists. The articles vary in quality, style, and methodology; and there is much overlap in content, perhaps reflecting the light editorial hand of a democratic editor. It would be impossible to do justice to individual articles, so this review focuses on themes that recur throughout the book.

The relationship between learning and teaching has taken some unexpected turns over the years. Rapid technological change forced librarians to learn so that they could teach. At the same time, they found that they had to teach in order to learn. New attitudes had to develop, as technology forced librarians into a learning mode driven by need and (sometimes) curiosity rather than tradition or formal credentialing. Ideally, the result was a new sense of competence for both teacher and learner (if the two can be distinguished), and a diminished fear of both technology and change. Several authors make the point that library school students and practicing librarians experience many of the same frustrations and rewards as other adult learners. David W. Carr's opening essay, "The Situation of the Adult Learner in the Library," provides a thoughtful, humane reflection on this theme.

Several authors describe their experiences with the Internet over time. Early learning was unstructured, and early teaching stressed the use of tools. Since the arrival of the Web and other user-friendly tools, it has become possible to use the Internet without any understanding of computers, networking, or information storage and retrieval. Whether this is a blessing or a curse depends on your point of view. David J. Franz, in his engaging memoir, "Between Gutenberg and Gigabytes: A New Librarian Makes the Leap," laments that kids today "are raised on AOL. Spoon fed. They are not learning as I did." Others are relieved that the pioneering days are over and they can concentrate on conceptual issues rather than techniques and tools. Anne Woodsworth states in her foreword that "No matter what work arena graduates wish to enter, the core curricula they take will have to incorporate areas such as introduction to information science, information storage and retrieval, database searching, metadata management, knowledge management, information processing, human–computer interaction, electronic records management, indexing, and information systems management, to name a few." The hyperbole here does the cause no good, in my opinion.

Another common thread is the recognition that the Internet is not only something to teach, but also a new medium for teaching and learning.

Heather Blenkinsopp's piece on using the Internet as a teaching tool to connect MLS students with cataloging practitioners is a good illustration. The Internet has made it easier to simulate the workplace, blurring the lines between "school" and "work" in a way that mirrors wider trends in academia.

This collection might serve best as a reference repository of practical advice and Internet teaching resources. Reading it from cover to cover, I became frustrated by the absence of an overarching intellectual framework, as well as periodic lapses in coherence, clarity, and analytic rigor. The bibliographies and resource lists seemed in danger of trying to include everything on or about the Internet, rather than concentrating specifically on teaching and learning. I felt a little the way I do when using the Internet itself: overwhelmed by information overload and an inability to synthesize or even make sense of all the information. The quantity of Web sites, listservs, online tutorials, syllabi, program statements, and other re-

sources is mind-boggling. How is a person to choose?

Anne Woodsworth and Theresa M. Maylone do a good job of pulling together some of these diverse, contradictory elements in their foreword and afterword. But the collection remains no more than the sum of its parts. It never really fulfills the promise of its subtitle, "The Diffusion of Internet Expertise in the Academic Library." I doubt that the fault lies with the authors, or even the editors. It may be that the topic itself is too amorphous or would be better addressed in a monograph. Despite some disappointments, this book is well worth adding to library collections for the practical ideas and tools that it makes available on a topic of importance to all librarians.—*Jean M. Alexander, Carnegie Mellon University.*

Rhodes, Barbara, and William Wells Streeter. *Before Photocopying: The Art & History of Mechanical Copying, 1780–1938.* New Castle, Del.: Oak Knoll Pr., 1999. 494p. $95 (ISBN 1-884718-61-2). LC 98-8045.

The ubiquity and speed of modern communication—computers, photocopiers, e-mail, cellular phones, and scanners—tend to obscure the technological achievements of the preelectronic age when, for the effective conduct of business and government, it also was necessary to make rapid copies of letters, contracts, inventories, shipping manifests, invoices, receipts—the entire galaxy of documents upon which contemporary, transaction-oriented civilization rests. Today's scholars and students take for granted the ready, cheap availability of copies. But how did their predecessors, long before electric power and photography became practical realities, make record copies of data except by laboriously, and sometimes inaccurately, hand-copying everything? How did they efficiently copy their letters and papers?

The surprising answer lies in a forgotten mechanical copying device that originated more than two centuries ago: the copying press, an apparatus that enabled almost anyone in the Western world to make, with considerable dispatch, identical multiple copies of vital documents. In fact, Washington, Franklin, Jefferson, and Madison all used the copying press to generate file copies of their correspondence. The copying press encouraged the rapid growth of scientific communication and publishing, accelerated the expansion of industry, and, ultimately, led to the early establishment of institutions such as the United States National Archives. It was not the Xerox process or the laser printer that first threatened to drown us in a sea of paper. Rather, it was the copying press, invented in 1780 by James Watt, the Scottish-born engineer who perfected the steam engine. Why Watt? Watt was a businessman as well as an inventor. In the course of England's rapid industrialization, he traveled widely to promote his engines and needed to have with him copies of designs and specifications, contracts, and correspondence. Thus, he was powerfully motivated to develop a copying apparatus.

Watt's device, which was to have many imitators, relied on the simple principle of offset, the same principle that led Alois Senefelder in 1796 to invent offset lithography, the printing method that produces virtually all modern newspapers, books, and other mass ink-printed publications. But each exploited offset in a quite different way. Senefelder's use of offset relied on the natural repulsion of water and oil-based inks. But Watt's process relied on inks capable of producing several additional copies onto special paper from an original, handwritten document. In the Watt process, a recently written ink original is squeezed against a fresh piece of unsized paper in a press whose force transfers some of the ink from the original to the carefully dampened copy paper.

After the Watt process was perfected, it spread with incredible speed. "Inventors" brazenly infringed his patents; chemists formulated new inks; manufacturers improved the device and developed mechanical variations; and salespeople flooded the market. The copying press