

The Changing Role of the Librarian†

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The relationship between libraries and information technology is shown to be a long and continuing one, beginning some 125 years ago, with the conclusion that the historical role of the librarian is still an important one.

Once one has made the obvious comments about the functions of the librarian in communication with mechanized data bases—in acquisition of them, cataloging of them, formulation of profiles for search of them—there would seem to be little more to say about the role of the librarian.

There is one thing more, however. And it concerns the role of the librarian, not the changing one, but the historically significant one: the problem of *document* access, the problem of providing the books or journal articles that all of the information retrieval services may lead us to. Yet this historically significant role would appear to be as important today, with the tools for information access that the computer provides us, as it has been in the past. It may well be that the role of the librarian is not changing as much as we may think it is.

In fact, we sometimes talk as though the things we are doing now are very new, very different, very revolutionary. The new capabilities provided by the computer would seem to make the library into a totally new institution and the librarian into a totally new kind of professional. Certainly we see new kinds of services (SDI, for example), new forms of data storage (microfiche and magnetic tapes), and new terms for functions of the librarian (information science).

But perhaps all of this is not so new and revolutionary. Is the role of the librarian really changing? To answer that question, I am going to ask you to follow me back to a time over 125 years ago and to consider what happened to libraries then and since then. In presenting this history, I am going to simplify and perhaps exaggerate what happened in order to highlight the general trend that has brought us to the point we are at today. Having done that, I am going to return to that same time in history—roughly 125 years ago—two or three more times and consider what happened then and since then in several other fields of human endeavor. I hope that the result of doing this will be an appreciation, if not of the changing role of the librarian, at least of why “information science” is identified with that changing role.

So let us go back to 1847–1849, when hearings were held in London by a Royal Commission “Appointed to Inquire into the Constitution and Government of the British Museum.” At UCLA, we refer to the report of that Commission as the “Panizzi Report,” because the issue of primary concern was the performance of Panizzi as the Librarian of the British Museum.¹ For several years, he was responsible for the creation and production of the catalog of that library and, for several reasons, was subjected to violent criticism for the delays in completion of it and for the content and organization he was putting into it. At the risk of oversimplification and ignoring the issues of politics and conflicts of personalities, the debate in those hearings can be summarized in one question:

Is the role of the library—and thus of the librarian and of the catalog, as the principal tool of the librarian—to provide access to the books in the library or to the content of those books?

Clearly both functions are—and were—important, but each dictates a different form of catalog, a different criterion for organization of it, even a different content for the entries recorded in it. And each identifies a different role for the librarian. If resources are limited, a choice must be made as to which function and role is the crucial one.

In part because of the intellectual power of Panizzi, in part because of the strengths of his arguments, and in part because of the inherent nature of the library, the decision was made that the crucial function served by libraries is to provide access to the books, and that decision set the tone for libraries ever since. This may seem to reduce the role of the library to that of a storehouse and of the librarian to that of a conservator—and such characterizations are made, with deprecatory tone, by those who see the important function as that of access to content. But recognize the fact that if the record is not preserved and if access to it is not available, it is impossible to provide access to the content. If the book or journal is not available, nothing in it is available (unless it has been transferred to some other record, which simply changes the record to be preserved, not the fundamental issue). This elemental fact has implications of overwhelming importance, because it establishes the role of the library *vis-à-vis* other institutions; it determines the ways in which the library allocates its resources; it establishes the context within which the librarian's role is identified; it predetermines what the content, form, and organization of library records will be.

Now, let us see what happened over the ensuing 125 years. The first omen of trouble was, of course, the needs of those who opposed Panizzi (at least those who did so for reasons other than that personal or political malice). They wanted means of access to content. At the very least, they wanted means of knowing what records they wanted from the library. The main entry, descriptive catalog, simply did not meet their needs. The things they asked for (and Crestadoro was probably most explicit in doing so²)—use of the title, use of subject headings and thesauri, use of other clues to content—have since then continually reappeared as succeeding generations struggled with the same problem. Gradually, though I suspect somewhat reluctantly, libraries have incorporated more and more of these tools for limited access to content.

In this respect, it is of more than passing interest to note that Panizzi had his first brush with this problem in an even earlier task—the development of a catalog for the Royal Society. Peter Mark Roget (of thesaurus fame) was Secretary of the Royal Society at the time that they needed to produce a catalog of their collection.³ This was in 1832, and Roget, meeting Panizzi at a dinner party, suggested

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that Panizzi might be interested in the project. Panizzi agreed, but in his inimitable manner proceeded to antagonize those in the Royal Society with whom he had to work, the principal issue being the classification system that they wanted used as the means for organization of the catalog. The problems of main entry, subject headings, classifications, and construction of thesauri were as crucial then as they are today, and they were well identified at the time.

The second omen of trouble was far more subtle and significant—the appearance of the scholarly and technical journal. The obvious value of the journal made the primary function of the library fully as important as it was for monographs, but the problems of access to content were multiplied tenfold. The library rightly took the economic way out. It cataloged and stored the journal as though it were a monograph and then depended upon other means for access to the content—the specialized indexing and abstracting journals.

The third omen of trouble was the recognition that libraries, at least large research libraries, were growing at what appeared to be fantastic rates, doubling in size every 5 to 10 to 15 years. In part, this was a result of the natural desire on the part of librarians to meet that fundamental, elemental purpose—to preserve the records of the past and especially those with value independent of content. But another cause of such explosive growth was the underlying growth in publication and especially in journal publications.

So the warnings were there. And then the sky fell in. The Second World War resulted in three things, each of which alone would have produced a crisis for libraries. Together they created "information science" as a new role for librarians:

- (1) Demand for foreign books and journals, especially those in technical fields.
- (2) Spectacular increases in the number and variety of journals in the sciences and technology.
- (3) A flood of publications in the form of documents and reports.

The first of these, librarians gleefully tried (and continue to try) to swallow—with bad cases of indigestion and with cataloging backlogs in the hundreds of thousands of volumes. The second, they wisely continued to leave to the journals for secondary access. But the third, libraries were simply unable to handle. The problem was that documents and reports, as publications, are simply not worth acquiring for preservation. They create all the problems represented by the journal article, without the neat solution of being bindable in the form of a book. They are certainly not worth the cost of descriptive cataloging, and to subject catalog them would be economic insanity. And yet, they have obvious, though ephemeral value to researchers, since frequently these documents, reports, preprints, and other quasi-publications provide the very latest results, the ones of immediate value.

The answer lay in the development of systems—"information systems"—that would do three things:

- (1) Make it easier and more economic to produce means of secondary access to literature of all forms.
- (2) Make it easier and more economic to use them as the means of access to content.
- (3) Provide means of analysis and presentation of the content, so as to reduce its bulk and increase its long term value.

The result was indeed the creation of a role for librarians as specialists in designing such systems and in carrying out the functions involved in their operation—information scientists and information specialists—roles made necessary

by the attempts to apply computer technology to library and information handling contexts.

I am now going to ask you to return with me again to that time 125 years ago, to another man and another development—to Charles Babbage and the "analytical engine."⁴ He envisioned and tried to build "... a machine of the most general nature. Whatever formula it is required to develop, the law of development must be communicated to it (and then it has) the entire control over operations (and) over combinations of algebraic symbols." The mechanical devices that Babbage constructed were unable to function reliably because he was unable to get parts machined to the tolerance required. It took more than 100 years of technological improvement and, eventually, the creation of the electronic age to bring Babbage's vision to realization in the form of today's digital computer. And it is that development that leads us to envision a "new role for librarians."

It is of more than passing interest to note that the primary justification for the Analytical Engine was not that of computation. The reason that the British Parliament saw fit to appropriate nearly £20,000 for development of it was that it would reduce the cost of *printing* mathematical tables (such as those in the nautical almanacs).⁵ It does not take much imagination to conceive of discussions between Babbage and Panizzi on the possibilities of using the analytical engine in the production of the British Museum catalog.

In fact, the relationship between libraries and information handling technology—this "new role for librarians"—has been a long and continuing one. While the use of the analytical engine on the printing of the British Museum catalog may be a figment of imagination, the use of stereotype plates by Jewett⁶ and the role of John Shaw Billings in development of the punched card concepts of Hollerith⁷ are both part of published history. The "library problem" has at all times in the development of computers been a source of inspiration and challenge. And the librarian's role is not really a new one.

When we consider the application of the computer to the problems of the library—whether they are production of the catalog or providing information retrieval services—we immediately face the necessity of handling language. So again I ask you to return with me to that same time, 125 years ago, to another man and another concept—George Boole and the formalization of language.⁸ The work of Boole and his colleagues (especially Augustus de Morgan,⁹ the mathematician, a personal friend of both Panizzi and Babbage) produced a description of the language of logic in formal, symbolic form. They were so successful that the methodology of symbolic logic—what we call Boolean algebra—has provided the basis for design of computers and for searching of automated files for retrieval of information as well as illuminating the nature of language.

Thus, the important point about the "new role of the librarian" is that it is not new. All of the threads that today we bring together in "information science"—and I think that is the proper context in which to view that role—were there 125 years ago. The men involved—Panizzi, Boole, Crestadoro, Babbage, de Morgan, Roget—all knew each other, and many of them worked closely together. The ideas that we identify today with the changing role of the librarian were all there at that time, and have recurred repeatedly since then.

Let me conclude with another, perhaps nostalgic, look at that same period 125 years ago. It is even more remarkable and the coincidences even more revealing when we note that Samuel F. B. Morse (founder of modern communications), John Stuart Mill (another logician and a political economist), Charles Darwin, and Karl Marx were all at their work—and much of it in London—during that same period. Truly a remarkable period!

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Research Information at ICI United States[†]

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The Research Information Section at ICI United States provides background for planning and carrying out the ICI United States chemical and biomedical research programs and supplies technical information to nonresearch units. Information is furnished in the forms of retrospective literature studies, current awareness bulletins, computer-produced bibliographies, and reports of internal research data. On-line services used include MEDLINE, TOXLINE, CHEMCON, and PATS. Current awareness includes a current chemical literature system based on CA Condensates and Central Patents Index, a computerized biomedical literature system with selection from both primary and secondary sources, and a chemical market and business information system based on Predicasts' Chemical Market Abstracts tape.

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The results of these literature studies are reports which may range from comprehensive reviews through shorter

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