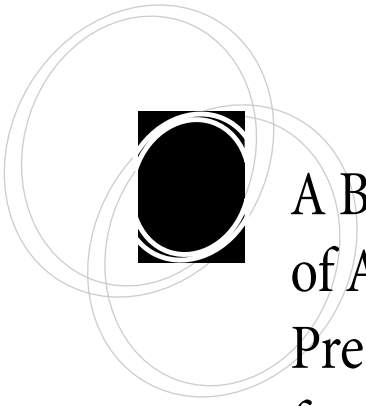

A Brief History of the Future of Academic Libraries: Predictions and Speculations from the Literature of the Profession, 1975 to 2000 —part one, 1975 to 1989—

Gregg Sapp and Ron Gilmour

" I never think about the future; it comes soon enough."[1]

Albert Einstein

abstract: During the last quarter of the twentieth century, the literature of academic librarianship was replete with articles predicting, anticipating, speculating, or cautioning about future possibilities for the field. The seminal works of F. W. Lancaster, who was one of the early predictors and enthusiasts of "paperless information systems," are the key points of departure for this literature. This article (which covers the period of time from roughly 1975 to 1989), as well as its second part (1990 to 1999), employs a citation-tracking method for gathering and reviewing this literature. Each work discussed in this article cites either Lancaster's work, or another work that cites it, so that the resulting literature review has grown from a common source of thought. The aim is to provide an analytical overview on how academic librarians saw and attempted to shape the future of their field during a period of unprecedented change.

Einstein was right. The future came, soon enough. Throughout the latter half of the twentieth century, and especially over its last twenty-five or so years, librarians could see clearly that much, if not everything about libraries would change. The social, economic, political, and (perhaps above all) technological forces driving change were omnipresent and unstoppable. What was unknown, however, is exactly

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how and in what ways the institutions of libraries would be changed. This uncertainty was the source of both great hope and great concern.

In response to these situations, there arose within the professional literature of librarianship a body of speculative and conjectural writings that attempted to analyze current conditions and to anticipate or to plan for the future. The bulk of this literature was written by academic librarians and administrators, and thus represents their particular perspectives. Because of the symbolic potency of the year 2000, many writers focused on that year, and hosts of articles were written that began with a statement such as: "By the year 2000, libraries will . . ." It may be enlightening to revisit that literature—not so much to assess whether certain writers were right or wrong—but to gauge how their thinking changed and to identify those issues that are still evolving or unresolved.

For this article, the point of departure is the book that is arguably the most influential piece of predictive writing among late twentieth century library publications: F. W. Lancaster's 1978 *Toward Paperless Information Systems*.[2] The method for identifying relevant material is citation tracking. With the exception of the first section, every item discussed in this article either cited that book directly, or another work that cites it, and so on. Hence, the ideas presented here are part of a true organic literature, which has flourished from a common source. Certainly not *every* work in the citation family tree of that widely read book is listed here—that would be an unmanageably large body of literature. This is meant to be representative, not comprehensive. Every item selected for inclusion either makes or responds to specific predictions, or is cited in a predictive or anticipatory context related to the future of academic libraries. Not all of these items were written solely or even primarily to forecast the future. The predictive component of the overall piece might be secondary or incidental; still, to be included here that must be the part or context in which it was cited.

These works tend to be essays, editorials, addresses, or "thought pieces." If there is any quantifiable research, it is generally taken from attitude surveys. Thus, the material examined herein provides glimpses into what librarians were thinking about, what they viewed as the greatest challenges, threats, and aspirations for their profession during a period of massive transition. It should also be noted that, with the certainty that more change will come, the ideas and experiences of librarians who lived through these periods of time provide models for planning, directing, and managing future transitions.

1975–1984

Preliminaries: Lancaster's Influences and Precursors

Lancaster was not the first to envision paperless information systems; nor, indeed, was that person an academic librarian. From the tremendous advances in research and development undertaken in support of the war effort, there emerged a heightened appreciation of the potential for applying new tools and techniques toward information management, and this led to the birth of what came to be called "information science."[3] One of the field's first and most ardent proponents was Vannevar Bush, Chair of the National Defense Research Committee. It was his widely-read article, "As We May Think,"

published in *Atlantic Monthly,* that introduced the possibility of automated information systems to a broad public.[4] Although he was not writing for an audience of librarians, his ruminations about the possible uses of mechanical calculating devices, photographic reproduction, and audiovisual transmission of information resonated within the profession. He developed an intriguing vision:

> Consider a future device for individual use, which is a sort of mechanized private file and library. It needs a name, and, to coin one at random, 'memex' will do. A Memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory.
>
> It consists of a desk, and while it can presumably be operated from a distance, it is primarily the piece of furniture at which he works. On the top are slanting translucent screens, on which materials can be projected for convenient reading. There is a keyboard, and sets of buttons and levers. Otherwise, it looks like an ordinary desk.[5]

Much of the information that the user could read on the memex's screen would be projected from microforms. Memex was much more than a mere storage device, however. It could be used to classify and retrieve information in unprecedented ways:

> The owner of the memex, let us say, is interested in the origin and properties of the bow and arrow. Specifically he is studying why the short Turkish bow was apparently superior to the English bow in the skirmishes of the Crusades. He has dozens of possibly pertinent books and articles on his memex. First he runs through an encyclopedia, finds an interesting but sketchy article, leaves it projected. Next, in a history, he finds another pertinent item, and ties the two together. Thus he goes, building a trail of many items . . . [6]

Computers did not exist at this time, but many of the infant technologies that would lead to them were already being developed and applied to practical uses. Bush presciently anticipated what a computer could do, even before one had been invented. This article directly and profoundly influenced the thought of later generations of librarians, including Lancaster.

In the following years, the drive toward applying forward-looking solutions to traditional problems of information management was spearheaded by librarians and researchers in information science. For example, Hans Peter Luhn was experimenting with machines that performed keyword indexing. Mortimer Taube's five volumes of *Studies in Coordinate Indexing* reported on numerous applied research projects conducted at his company, Documentation Incorporated.[7] The technique of coordinated indexing, later to be called inverted indexing, combined new organizational techniques with a system that matched corresponding documents to their records on punched cards. Ralph Shaw predicted development of a system that would use coded punched cards with a "rapid selector," although he admitted that in order to be beneficial any system would have to be much speedier than any based upon current technologies.[8]

Prior to Lancaster, probably the most influential and stimulating early writing on the potential of computer technology in libraries was J. C. R. Licklider's *Libraries of the Future,* published in 1965 by MIT Press.[9] In 1961, the Council of Library Resources, which had been established by the Ford Foundation, enlisted Dr. Licklider to conduct

"research on concepts and problems of libraries of the future." His team consisted of engineers and psychologists affiliated with Bolt Beranek and Newman, Inc., a consulting engineering firm. Thus, they brought entirely different kinds of expertise and perspective to the subject. The monograph is their final report to the Council.

Licklider began by stating that the physicality of printed books makes them intrinsically inefficient means for storing, organizing, and retrieving information. Automated "precognitive systems" with random access and content accessible memory, parallel processing functionality, and hierarchical program structures could, in theory, retrieve and deliver specific bits of encoded information on demand. He lists seventeen criteria of a precognitive system. They merit detailed citation because most could not be met by any print or manual system:

1. Be available when and where needed.
2. Handle both documents and facts.
3. Permit several different categories of input, ranging from authority-approved formal contributions . . . to informal notes and comments.
4. Make available a body of knowledge that is organized both broadly and deeply . . .
5. Facilitate its own further development by providing tool-building languages and techniques to users. . . .
6. Provide access to the body of knowledge through convenient, procedure-oriented and field-oriented languages.
7. Converse or negotiate with the user while he formulates his requests and while responding to them.
8. Adjust itself to the level of sophistication of the individual user.
9. Permit users to deal either with metainformation . . . or with substantive information, or with both at once.
10. Provide the flexibility, legibility, and convenience of the printed page at input and output . . .
11. Facilitate joint contribution to and use of knowledge by several or many coworkers.
12. Present flexible, wide-band interfaces to other systems . . .
13. Reduce markedly the difficulties now caused by the diversity of publication languages, terminologies, and "symbologies."
14. Essentially eliminate publication lag.
15. Tend toward consolidation and purification of knowledge instead of, or as well as, toward progressive growth and unresolved equivocation.
16. Evidence neither the ponderousness now associated with overcentralization nor the confusing diversity and provinciality now associated with highly distributed systems.
17. Display desired degree of initiative, together with good selectivity, in dissemination or recently acquired and newly needed knowledge.[10]

While he acknowledged that no such system currently existed, the first task was to simulate and demonstrate techniques and systems which, although they cannot yet be

implemented fully, "can be set forth in a dynamic form that is sufficiently realistic to facilitate evaluation and further investigation."[11]

The bulk of the work is devoted to studying human-machine interaction and the psychology of information seeking. For physical input of information, he proposed that light-pens and/or keyboards could be used to place queries. Input devices would be connected to a processing machine, and both input and output could be displayed on a screen. Within the processor, user input would be translated into machine language, which would in turn run search and retrieval applications. It was essential that this translation process be accurate, and to ensure correct communication he anticipated an evolution toward "user-oriented" languages. It was possible to imagine that in advanced systems the computer could retrieve information as fast as the user could think. It could also respond to changes in direction of the user's queries. Three of the areas where he saw the most promise for research were natural language processing, associative linking between information resources, and question-and-answering systems.

Outside of the somewhat insular realm of information science, many librarians and academics remained skeptical regarding the potential automation of information processing.

Outside of the somewhat insular realm of information science, many librarians and academics remained skeptical regarding the potential automation of information processing. Haynes McMullen cautioned that: "It is unlikely that the typical university library staff of 2005 will employ any mechanical devices which are not already in existence in 1955."[12] Still, others were more hopeful. In an address at Southern Illinois University, Francis Horn surveyed what he considered to be the major challenges to academic libraries in 1958, and in his concluding remarks stated:

> Business as usual under circumstances that will prevail in higher education in the future, will doom libraries. There must certainly be more mechanical assistance. Automation must come to the library to shorten processing in all departments. Cataloguing especially is in need of attention. Eventually, something must be worked out so that a scholar in Carbondale, for example, can examine materials in Cambridge without leaving the S.I.U Library.[13]

Some fifteen to twenty years later, these polar attitudes toward computerization of library resources and functions were still prevalent. Perhaps the most acerbic naysayer was Ellsworth Mason, whose satirical 1971 article, "The Great Gas Bubble Prick't," was widely read and either hailed or damned; there was no middle ground. In it, he wrote:

> Computerizing library operations at present and projected costs, and with foreseeable results, is intellectually and fiscally irresponsible and managerially incompetent. The proper answer to idiots who beamingly dangle their computerized projects for our admiration is, Why don't you do something useful, instead.[14]

By contrast, as more new and prototype computerized library systems were demonstrated, these were being touted as the wave of the future in libraries. In 1974, Douglas W. Bryant wrote:

> . . . The computer will henceforth be an inescapable component in libraries and shortly will be regarded as the same kind of commonplace as, say, adequate lighting. As elsewhere, we have here a fascinating historical phenomenon: just as the size and bibliographic complexity threatened research libraries with the dinosaur syndrome — just then did the computer appear on the scene.[15]

Thus, there was among some an auspicious sense that information technology would soon transform librarianship, yet there was also a common belief that computers were at best irrelevant, at worst a danger to libraries. These were the very questions that F. W. Lancaster tackled in a series of publications that began in the late 1970s. What is perhaps most critical is that during this period of time, through the efforts of researchers and librarians at many levels, and despite the misgivings of some, the foundations for the computerization of library records and services were being laid.

Lancaster's Paperless Information Systems

In 1978, F. W. Lancaster of the Graduate School of Library Science at the University of Illinois, Urbana-Champaign published the monograph *Toward Paperless Information Systems*, wherein he pronounced the "inevitability" of a future, all-electronic system of scholarly communication and described how this would transform librarianship. This work of daring speculation offered the hope that the most critical problems of libraries could be solved by automation, but it also cautioned librarians that resisting or failing to change some of their basic, traditional beliefs could lead to the decline, even the demise of the profession. The question that he put forward, as expressed in the title of a classic article that he also published in *College & Research Libraries* that same year, was: "Whither Libraries? or Wither Libraries?"[16]

Citing Bush, Licklider, and others, Lancaster introduced his book by describing the computerized "library in a desk," which would be the future scholar's lifeline to the universe of digital information. Certainly, he was not the first to imagine this scenario, but he reified the vision for librarians by reporting on the practical steps taken by the Central Intelligence Agency to implement a prototype system called Support for the Analyst File Environment (SAFE). By doing so, he removed the concept from the status of mere conjecture—it was not only possible, but the CIA was so convinced of its usefulness that considerable time, effort, expertise, and money had already been invested to make it happen. Furthermore, many of the same features that made such a system attractive to the Agency could be applied profitably toward the creation and dissemination of scholarly information. Online information could be stored, managed, manipulated, and delivered more effectively than print resources. Previously informal information linkages—the scholar's "invisible college"—could be integrated into stored files and databases. Selective Dissemination of Information (SDI) services could direct files to interested scholars automatically. In an era when scientific frontiers were expanding rapidly, the notion that an article could be published electronically, transmitted instantaneously to multiple users, then organized in databases searchable by natural language was very appealing, and new technologies lent it unprecedented credibility. Not only would this information reach scholars much more quickly, but some otherwise intractable problems of libraries, such as space restraints and the rising costs of resources, would vanish in the anticipated paperless society. Still, the vexing question implicitly contained in this scenario was:

> Can libraries survive in the largely electronic world? Will they be needed when the raw materials with which they have traditionally dealt are no longer available in printed form, but are readily accessible, on demand, to anyone with a terminal and the ability to pay for their use? If libraries and librarians will be needed, what functions will they perform, and who will they perform them? [17]

Those questions cut to the heart of librarianship's professional identity and triggered a rabid debate, which is still ongoing in the literature.

Lancaster saw the evolution of digital information systems as predetermined, and he implored librarians to accept this as fact. The transition would begin first in the hard sciences; by the year 2000, paperless information systems would prevail in all fields, with print surviving principally for recreational reading.[18] Special and technical libraries would spearhead the revolution, with academic libraries following their lead. While acknowledging that technological obstacles would have to be surmounted, Lancaster considered social and psychological factors to be greater impediments to the realization of his vision. Librarians, in particular, might be prone to resist, since these changes could be perceived as threatening to their livelihoods. A favorable alternative that Lancaster predicted, though, was the de-institutionalization of librarians.[19] Rather than being confined to their libraries and limited by the resources contained within them, future librarians might instead operate on a freelance, consulting basis, working from home offices to mine the wealth of networked databases and customize information packages for their clients. The expertise of librarians would be highly valued in a society where diverse, complex, and multitudinous information resources required special skills in order to exploit them effectively. This could become the role of future librarians, but only if they seized it for themselves.

Of the fate of the institutions called libraries, Lancaster clearly recognized the possibility of their elimination, either through obsolescence or by having their functions usurped by others. In *Toward Paperless Information Systems* Lancaster hedged that he felt it likely that some form of physical library would continue to exist, if for no other reason than to provide access to people who have no other means of obtaining it themselves. Even so, its business might be relegated to that of a "printout center." In these capacities, libraries might serve an interim, transitional role until the complete adoption of paperless communication systems. Along the way, however, many of the most basic features of libraries might disappear entirely. In conclusion, Lancaster suggested that libraries were moving in the direction envisioned by Robert S. Taylor, who foresaw a "library without walls."[20] By 1982, when he published *Libraries and Librarians in an Age of Electronics*, he explicitly stated that he expected the "disembodiment" of the traditional library to be essentially complete by the year 2000.

Lancaster wrote that he expected *Toward Paperless Information Systems* to be controversial: ". . . not all readers will be able to accept the inevitability, the desirability, or even the feasibility of a world in which much professional communication is electronic. Five years ago, I would not have been willing to accept these things myself."[21] Nevertheless, despite his expectations and the previously mentioned ambivalences toward electronic information systems in the profession, the reviews were largely positive, at least acknowledging the work as a contribution toward stimulating necessary dialog. In the *Journal of Documentation,* Gerard Salton wrote that Lancaster ". . . offers much

food for thought, as well as a not unlikely blueprint of what is in store for the future."[22] Writing in the *Journal of Academic Librarianship,* Michael Buckland praised: "This is a tract for the times—a combination of evidence, prediction, and enthusiasm,"[23] and in *College & Research Libraries* Audrey Grosch warned: "Lest we all think we can hide our heads in the sand and play ostrich, information specialists and librarians should realize that we see ample evidence of what Lancaster addresses in this volume . . ." and "Whether we accept it or not, paperless information systems will slowly permeate our work and even affect our lifestyles and our leisure, perhaps more than we would care to admit."[24] Charles Meadows opined in *Library Quarterly* that "I not only agree with the author's thesis, but I feel it will come about in a more dramatic way than he implies."[25] Not all reviews were so enthusiastic, but there were few if any that dismissed Lancaster's predictions as unworthy of continued discussion.

Other Visions of Information Technology in Libraries

Lancaster's predictions were perhaps the most sweeping and radical, but he was far from the only person contemplating the changes that information technology would generate within libraries. In his 1983 monograph *The End of Libraries*, James Thompson declared that the edifice of the research library would soon crumble under its own weight, to be superseded by the electronic library.[26] Before this could happen, he and others often cited two factors as key. One, as noted by Howard Fosdick, Gerald Lundeen, and Alan E. Guskin, Carla J. Stoffle, and Barbara E. Baruth, was the widespread availability of personal computers.[27, 28, 29] This seemed likely to happen because, even while the power of computers was increasing, costs were steadily declining. The second was the ability for these machines to connect and communicate. Hank Epstein observed that this would require advances in telecommunications technology and that, of the various types of networks that might be developed, distributed networks had probably the most usefulness for library applications.[30]

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One of most frequently-cited articles in the literature of librarianship during this period was not written by a librarian. Lewis Branscomb, vice president and chief scientist at IBM, wrote in the prestigious journal *Science* that information will be "the ultimate frontier."[31] Envisioning computers with self-replicating memory cells, patterned after the DNA molecule, he expected that their storage capacities would be virtually limitless: "The computer of the year 2078 will contain the data memory equivalent to that of 16,000 human brains." They would thus become much more than mere calculating devices, so that as computer circuitry would be integrated into other machines—typewriters, televisions, telecommunications, motion pictures, etc.—they would become the basis for all of our tools and the primary conduit for all of human communication. Although Branscomb speculated about the effects of rampant computerization on sev-

eral social institutions, the library was not among them. Nevertheless, these visions, put forth by a noted scientist, added more fuel to discussions among librarians about paperless information systems.

In a digital library, equipped with universal workstations, the services that would be provided and the information-seeking behaviors of users would be qualitatively different from those in a print library. Manfred Kochen coined the term "compunications" to describe the merger of communications and computer technologies, and from this union information could be extracted, customized, and shared in unprecedented ways.[32] The new field of online literature searching provided one example. Martha E. Williams espoused a vision of "transparent systems" with seamless interfaces between databases, which could be searched simultaneously.[33] Colin Bell and Kevin P. Jones speculated that expert systems could be designed to use natural language, thereby overcoming the limitations of controlled vocabulary searching.[34] These developments suggested new ways of organizing and accessing knowledge. Bill Katz wrote that subject queries would become more complex, because of shifting barriers between fields of knowledge and the increasingly interdisciplinary nature of scholarship.[35]

Speculation and theory aside, librarians were rooted in the present, encouraged by the prospects of new initiatives, and saw perhaps the most promising glimpses of an electronic future in the foundations that were being laid in that day. Already, some major and enduring projects had been successfully introduced. For example, the vast potential of bibliographic networking had been demonstrated, first by the development of the Library of Congress's standard for a Machine-Readable Cataloging (MARC) record in the 1960s, making it possible to exchange records between dissimilar systems, and, second, by the online inauguration of OCLC in 1971, which proved the functionality of networking and, in particular, its potential for facilitating group cataloging and resource sharing. At the local level, as reported by E. J. Josey in a 1974 article on the future of academic library services, research institutions were planning their own electronic library projects— e.g., the SUNY Task Force on Library Data Centers' networking goals and Stanford University's "Bibliographic Automation of Large Library Operations using a Time Sharing System" (BALLOTS). In some respects, however, Josey remained conservative in his assessments, such as when he wrote that, in the year 2000, "Even with the computerized services, most of the small and medium size academic libraries will only have one or two terminals in their libraries."[36] Ten years later, Richard De Gennaro was more assertive, but still struck a balance:

> I believe the right goal for a research library in the next decade is to plan and implement a comprehensive program for using computer and communications technologies to add a powerful new electronic dimension to supplement and enhance its traditional collections and services. At the same time, it must continue to strengthen its traditional collections and services . . . The electronic dimension cannot be developed at the expense of the traditional. . . [37]

Thus, across this decade, at many levels, libraries continued to straddle two information environments — eager to embrace the technological one, but unwilling to abandon the print one.

Collections and Technical Services

Apart from Lancaster's bold predication of a fully automated system for scholarly communication, many within academic librarianship were already applying computerized systems to traditional library functions and current problems. In many ways, technical services were especially well suited for automation. Allen B. Veaner saw this as natural due to the processing needs, labor intensity, and costs of technical services work. He urged an active research agenda in such areas as the preparation of a new cataloging code, the design of an integrated serials control system, the development of a universal technical processing terminal, and even potential uses of robotics in physical processing.[38] Michael Gorman went so far as to write "On Doing Away with Technical Services Departments," in which he suggested that automated processing "will free professional librarians from all ordering, claiming, receipt processing . . ." and "at least 80 percent of cataloging."[39] By contrast, Patricia G. Oyler, a library school professor, countered "Technical services is alive and well!" arguing that future technical services librarians would evolve into systems analysts and skilled managers.[40] Either way, as Maurice Freedman succinctly put it, "For better or worse, the future of technical services is inextricably tied up with automation."[41]

At any academic library, perhaps the most conspicuous manifestation of the automation of technical services was the appearance of its online catalog. Throughout this period of time, a great many academic libraries developed or introduced their first generation catalogs. In their 1979 monograph, *The Future of the Catalog*, S. Michael Malinconico and Paul J. Fasana sequentially described the coming evolution from traditional, to "computer supported," to fully "on-line interactive" catalogs, then outlined a parallel transition plan from the first, to the intermediate, and ultimately to the latter that might be realized in a hypothetical academic library system.[42] The various contributions in Freedman and Malinconico's anthology *The Nature and Future of the Catalog*, derived from papers presented at a series of institutes sponsored by ALA's Information Science and Automation Division, broadly represented the early state-of-the-art and anticipated near-term developments in the field.[43] As with so much of the futuristic literature of this era, the divergence of opinion was notable. The greatest disagreement pertained not to whether automated cataloging would come about, but at what pace and to what degree it would proceed. For example, Kenneth Bierman foresaw a gradual and incomplete transition where he predicted that by 1985 the majority of libraries would still rely exclusively on print catalogs, and that it would not be until the year 2000 that research libraries would undertake major retrospective conversion projects.[44]

The computer's powerful capabilities for improving bibliographic and database control would make the online, interactive catalog a fundamentally different kind of tool than a traditional catalog. Several writers championed the unprecedented possibilities. Veaner wrote:

> The online catalog, with its capacities for self-examination through analysis of its use, for the first time provides this profession with an incalculably valuable tool—the opportunity to study and learn just how much cataloging is needed and what data elements are appropriate to a varied population of users . . . Online systems give researchers an unequaled opportunity to design systems based upon *actual* user requirements and *actual* user behavior.[45]

Allen Kent saw information gathered from online catalogs as being very useful for collection development, possibly providing information that would challenge traditional assumptions of acquisitions theory.[46] In a similar vein, Norman Stevens made distinctions between what would comprise the "ideal" catalog from the perspectives of general users, individual users, and professional librarians.[47] The face of the catalog presented to each group might be different, according to the needs and uses of each. The idea of combining electronic resources for universal access also began to be discussed. Frederick G. Kilgour enthused that "The most exciting prospect for the next several years is the integration of the catalog and information supply functions, whereby it will be possible for the information seeker at his personal computer to obtain an items almost as rapidly as he can locate a catalog entry."[48] Nancy J. Williamson further expected merging the online catalog with indexes and subject bibliographies.[49]

Finally, while at the majority of academic libraries, the implementation of an online public access catalog was the most immediately compelling future goal, it was clearly recognized that, by doing so, expanded and enhanced networking opportunities would be supplemental benefits. Henriette D. Avram and Sally H. McCallum, for example, foresaw that the need to agree upon necessary technical standards for systems would also lead to more cooperation and resource sharing.[50] Thompson believed that progress would be slower if work was done at the local level, and that the key to accelerated development was to exploit the combined resources contained within bibliographic utilities.[51] Gorman pointed out that any electronic library was, by its nature, part of a larger whole, the ultimate realization of which could be a national and even international library system.[52] Ironically, he opined, this would not result in a "paperless" society, but a "paperful" one, although electronic technology would provide the means by which to effectively manage this glut of paper. Josey confidently predicted that by 2000 "All academic libraries will be a member of at least one library network."[53]

Academic Libraries and Social Change

In a 1979 article, Margaret Monroe outlined a four-step strategy for predicting and planning for the future. This process involved:

> First, the identification of the forces at work; second, the analysis of probable impacts of one force upon another that will affect the future; third, identification of the preferred (and rejected) elements of the future, with the forces that control those elements; and finally, the strategies to be pursued for strengthening the preferred elements and for controlling the rejected elements.[54]

To many librarians, the "forces at work" of modernity seemed more complex, more radical, and more demanding than any that the profession had faced in the past. Library literature thus reflected a heightened expectation that the coming changes in librarianship, and indeed all of society, would be truly revolutionary.

In the mid-1970s, colleges and universities, and by extension their libraries were in a state of tumultuous transition; some might say crisis. The campus turmoil of the late 1960s and early 1970s left many people feeling cynical and even overtly negative about academe. Enrollments declined, costs rose, budgets decreased, and, as De Gennaro remarked, there was a growing resignation that "The last two affluent decades may well

have been a temporary aberration or perhaps the glorious end of an era in the history of the growth of research libraries."[55] Of the 58 research libraries, 38 reported adding fewer volumes in 1973/74 than they had in 1971/72.[56] One disturbing factor driving this trend was that the costs of journals were devouring more and more of acquisitions budgets, and inflation was spiraling upward. There was a growing sense that there was not time to wait for the future to arrive; it had to be forced. As Louis Vagianos wrote in 1976: "Today is Tomorrow."[57]

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"We are in an Information Age," Vincent E. Giuliano proclaimed in his "Manifesto for Librarians." Despite this truth, "libraries are information institutions that still derive their ethic, style of operation, and organizational principles from an earlier age of industrialization."[58] The transformation of libraries would require that they establish new relevance and purpose; he suggested that they must evolve into "information access centers." Likewise, Pauline Wilson borrowed from the works of sociologist Daniel Bell in writing that, in post-industrial society, competition would prevail in all spheres of endeavor, and librarians could only compete with other information service providers by being innovative and entrepreneurial.[59, 60] Citing John Naisbitt's popular "Megatrends" theories, Barbara Conroy suggested that library managers develop a marketing approach to developing, promoting, and evaluating their services.[61, 62] According to Theophil Otto's Delphi survey, a panel of academic librarians and library directors preferred that library administration courses be taught as a branch of business management and administration.[63] Throughout the literature, there was a recurrent concern that social change might outpace libraries' ability to change along with it, and that traditional expertise was no longer sufficient.

Parallel to these social changes was rapid and massive technological change, and the psychological factors that both encouraged and inhibited it. Guskin, Stoffle, and Baruth invoked Alvin Toffler's "Future Shock" in describing how profoundly these changes would alter the landscape of academic libraries.[64, 65] Similarly, Susan Artandi noted that the world supply of information was increasing and that the individual in the "knowledge society" faced the possibility of "information overload."[66] She continued: "Superimposed on the new information environment is a sophisticated information technology in the dual role of being both the cause and the cure of the problems."[67] Joseph Becker concurred: "While there is great cause for optimism, the painful problems that lie ahead cannot be ignored. Technology alone cannot do the job; it will also require expert social engineering."[68]

What could libraries and librarians do to ameliorate these conditions? Many, such as Stephen K. Bailey, Willie L. Parson, and Guskin, Stoffle, and Joseph A. Boisse, emphasized the educational role of libraries, not so much in direct instruction in the hands-on use of technology, but in teaching analytical and critical thinking skills essential to make good use of it.[69, 70, 71] Specifically, Bailey observed that, because change would become a constant in the future, college and universities would of necessity become life-

long learning institutions.[72] Higher education must therefore redefine its values and mission to recognize that students will continue learning beyond graduation, and their education must invest them with the ability the adapt to change, to cope with practical life situations, and to empower them to work effectively within their communities. He urged librarians to examine their collections and services within that context. This would require academic librarians to reconsider some traditional assumptions; for example, as Parson noted, the metaphor of the library as the "center of the university" contains within it an implicit hubris.[73] A more pedagogically effective and socially responsible paradigm for the future must be focused on the users, not the institution.

In short, Beverly P. Lynch succinctly characterized the attitudes of most academic librarians during this period when she stated, "Over the next decade or two, academic and research libraries will either get better or worse. They will not remain the same."[74]

1985–1989

Allen Veaner and "The Next Decade in Academic Librarianship"

In 1985, the Association of College and Research Libraries' (ACRL) Personnel Study Group commissioned Allen B. Veaner, a library consultant, to provide a working paper to "explore the implications of the changes to be expected in the foreseeable future (1985–1995) in the environment, mission, functions, of academic libraries (from junior colleges to large research universities) on librarians and librarianship." The two-part paper, "1985 to 1995: The Next Decade in Academic Librarianship," was published in the May and July, 1985, issues of the journal.[75]

In part one, Veaner began by summarizing several factors that would shape the context of academic librarianship. In doing so, he chose not to discuss the change agents themselves (i.e., technology, economics, politics, etc.), but rather their impacts upon the profession, particularly focusing on administration and the professional/ institutional context of change. A key point underlying his discussion was that few in academe fully appreciated how much the profession of academic librarianship had already changed, much less how much more it would continue to change. In the minds of most faculty and higher education administrators, "academic librarians as they now exist are but keepers and custodians of the containers."[76] Librarians shared much of the blame for the prevalence of this perception. That must change, and Veaner argued that the tools and trends for change were at librarians' disposal.

The entire enterprise of scholarly communication was evolving in ways that tended to de-institutionalize information. Libraries could not and should not expect to retain a monopoly over information. Still, in an era where there was strong political will to privatize and deregulate industries, it was imperative for academic librarians to solidify their position as the primary information providers at their institutions. Scholarly information, Veaner wrote, cannot be "canned," for "information and knowledge are spiritual relationships among humans, mental constructs that exist in the mind—not as marks on paper or bits on disks."[77] He also predicted that de-institutionalization will not be complete: ". . . no matter what technological advances occur within the next decade, human beings will continue to rely upon systems of recorded knowledge that

reside in collections maintained by institutions dedicated to the preservation and communication of their content to the community of students, researchers, and scholars."[78] In terms of marketing ourselves, he suggests that librarians emphasize "the concept that the library is not a place but a service."[79]

In order to advantageously position themselves for future success, libraries and librarians must break down traditional barriers, both internally between functional departments and externally between themselves and other players on campuses, in particular computer centers. Librarians needed to increase their visibility within the university community through teaching, publishing, and service. For librarianship to flourish, "Programs are sorely needed to make educational administrators aware of what academic librarianship is truly about."[80] Veaner saw faculty status as a possible step toward equity, but noted that "the solution to the academic librarians' status problem is not likely to be reached in the bureaucratic arena or on the floor of the academic senate," but possibly through political alliances with teaching faculty.[81] Even then, he suggests that equality might exist only on paper and not in a socially meaningful sense.

While the means for positive change were available, there were also obstacles. The breakup of the academic library's monopoly on information inevitably would result in competition from external, non-academic entities. This would cause an increasing number of information resources to be marketed directly to the user. Many principles from the for-profit sector could be profitably applied to library services. Since trends suggested that staffing levels would decline, libraries would provide achievement-based incentives for productive librarians. One field ripe for innovation was developing interfaces to databases and systematic mechanisms for document delivery. Still, for all of these changes, Veaner predicted that the "durable library" would survive, because none of its would-be competitors could possibly provide its breadth of services or equivalent access to the collective information resources of the world.[82]

In part two, Veaner endeavored to answer the question: "What types of skills, abilities, and attitudes will the academic librarian need in 1985 to 1995?" There would be no standardized model or formula for academic librarians in the future—indeed, multiplicity and diversity would increasingly characterize the profession.[83] Librarians would need to be flexible in dealing with a wide spectrum of working and learning styles. Among the manifest skills that Veaner itemized were: (1) an entrepreneurial attitude, (2) a willingness to leave behind superseded tools, (3) mechanical and technological aptitudes, (4) excellent communication skills, (5) an in-depth understanding of higher education, and (6) financial management skills. In essence, he argued that ". . . academic librarians' responsibilities have shifted heavily from production to management," and that core administrative skills would be necessary at all levels in the profession.[84]

To instill these qualities in the next generation of librarians, Veaner took a critical look at library education. First of all, library schools did too little recruitment and screening of applicants. Second, teaching the hands-on traditional functions, such as cataloging and reference, did little to foster the intellectual and managerial skills that would be needed in the future, so new courses in administration, including financial control, human resources management, and political science were needed. Third, ACRL should become a more active participant in the accreditation process and the setting of academic standards. For example, he suggested that ACRL should at least consider creat-

ing standards to define separate tracks for students with interests in different fields of librarianship. "To sum up, ACRL should, above all, lay heavy stress upon academic librarianship as a life of the mind, a path of intellect, and a creative force in producing a knowledgeable, educated citizenry."[85] The article concludes with eighteen multi-faceted recommendations for actions that ACRL should undertake.

The immediate response to Veaner's ideas was generally positive, with some specific criticisms. Four librarians—Jane B. Robbins-Carter, Johannah Sherrer, Deborah Jakubs, and Charles B. Lowry—wrote their reactions to Veaner in a joint article published in the same issue as part two of his paper.[86] Robbins-Carter agreed with his contention that traditional boundaries in library organizations would blur, but further argued that new specializations would emerge, especially in developing services for individual academic disciplines. She also wrote that, although Veaner had made many specific recommendations to reform library education, he was silent as to the training of support staff, which she viewed as an even more serious problem. Sherrer noted that while most of his assertions were sound, his was not the perspective of a "working librarian," who would see some of his suggested administrative maneuverings as misguided, possibly even threatening. Jakubs criticized him for suggesting that librarians should increase their visibility on campus without first identifying a serious underlying problem—the often unflattering image of librarians. To be viewed as true peers by academic faculty, librarians would need to educate them as to what they do, and what more they could do to support teaching and research. Finally, Lowry was the most unilaterally supportive of Veaner's views. His chief quibble was that he felt Veaner had under-estimated the potential threats to fair-use and copyright law that could result when information is published electronically.

Digital Libraries and De-institutionalization

Over the next five years (and beyond), various writers responded to Veaner directly or addressed the issues that he raised. Several writers were enthusiastic about the idea that de-institutionalized, electronic resources could expand the role and purview of the digital academic library. Lawerence E. Murr and James B. Williams wrote that "*Library* as a place will give way to *library* as a transparent network."[87] Mark Kibbey and Nancy H. Evans maintained succinctly that "The network *is* the library," and Gorman, stressing the resource sharing possibilities of networking, almost seemed to shout: "There is no longer such a thing as a library, there is only THE LIBRARY—a fusion of all libraries through cooperation."[88, 89] Among the features of the digital library were that it would be geographically ubiquitous, available to users from their homes or offices, all hours day and night, and several users could access the same resources at the same time. In this model, Kaye E. Gapen remarked that access costs would become as important, if not more so, than collection costs.[90] Lauren H. Seiler summarized: "On a network, to read is to own."[91]

The necessity to move to a networked library providing electronic access to distributed information was underscored by writers who predicted enormous changes in the nature of scholarly communication. In arguing that future scholarly communication would be conveyed from machine to machine, Donald Case acknowledged that, while this vision was not entirely new, the "missing link" to an all-electronic information

system would be the personal computer. Electronic journals would not be long in coming.[92] How would this system work, though? Writers such as Patricia Battin and Richard M. Dougherty and Wendy P. Lougee considered the roles of commercial publishers and questioned their will and motivation to abandon their profits and control.[93, 94] Several, such as Sharon J. Rogers and Charlene S. Hurt, proposed a non-profit model where articles would be published in an online "scholarly communication system," which could have the effect of enabling scholars and their institutions to retain control of their research.[95] Edward C. Wall foresaw libraries becoming publishers themselves, although Clifford A. Lynch questioned whether faculty would accept or publishers would allow any non-commercial system to flourish.[96, 97] Other models suggested were governmental publishing, repository networking, and acquisitions-on-demand.[98]

A theme that emerged repeatedly in post-Veaner literature was the need for cooperation between academic libraries and campus computing centers. Carlton C. Rochell believed the traditional dichotomy between the two would remain and, citing the computer center's "indifference to the content and value of information" and its "preference for a single format and lack of knowledge about others," relegated it to a support role, analogous to that of the "engineers who designed our stacks or manufacturers who build them."[99] The computer center's sole focus on information in electronic formats was problematic to Timothy C. Weiskel.[100] John R. Sack offered a more even-handed, if somewhat pessimistic view of the two institutions, characterizing both as "hard to use, distant, rule-bound, inflexible [and not] readily assimilated for the scholar's workspace and -time."[101] Barbara Moran spoke of a "much closer relationship (or possibly, a merger) between the library and the computer center, as each discovers that the scholarly information needs of individual institutions can be met only be cooperative effort."[102] David W. Lewis noted that such cooperation has already been implemented in some institutions and that "at least among librarians, the good sense of this approach is no longer an issue for debate."[103]

Of course, virtually all writers agreed that the rise of the digital library would be driven—or hindered—by economics. In that regard, it was discouraging to note that economic predictions for the future of academic libraries and their parent institutions were uniformly gloomy. G. Edward Evans noted that "almost every issue of *The Chronicle of Higher Education* contains news of some school's financial or enrollment problems" and frankly stated that "It is hard to imagine the economics of higher education shifting to a more positive income situation in the foreseeable future."[104] Such fiscal problems would inevitably impact the library, as universities would be more inclined to devote money to programs more likely to generate revenue.

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The question of how libraries will pay for new technologies in an unfavorable economic environment was addressed by a number of writers. Evans noted that the short-term requirement of making information available in multiple formats is likely to put a strain on library budgets.[105] Some saw user

fees for the new services as a way of making the library more economically viable. Clyde Hendrick, for instance, noted that "for charge" services may create opportunities for academic libraries to seek off-campus business.[106] Others (e.g., Nancy C. Kranich), argued against user fees both on practical and ethical grounds.[107] Battin noted that the tradition of offering paper-based services for free and charging for computer-based services is not logical and that library administrations should instead find a way to make essential services available to all who pay tuition "in order to avoid the unacceptable intrusion of economic discrimination into the academic process."[108] Kranich and Evans emphasized the illogical behavior of many libraries in vigorously promoting services and then charging fees for their use.[109, 110] Rochell framed the "fee vs. free" question at the university level, stating that we must "make certain that whatever goes to pay for these activities is not perceived as an increase in the 'library budget' but rather what the university must allocate to support its new, pervasive, information environment."[111]

All factors considered, the vision of a digital library was inherently and fundamentally different from that of a traditional library, and alternative paradigms would be needed to describe it. Richard E. Lucier and James F. Dooley stressed that this re-thinking would be so radical as to require a new "cosmology" of librarianship.[112] Along those lines, Sack hypothesized that as librarians developed networks and electronic collections, the operative service model would evolve from "Ptolemaic," revolving around the library, to "Copernican," where the user resides at the center is connected via networks to a host of satellite resources.[113] Battin noted that whereas the traditional metaphor was that the library was the heart of a university, the electronic library would be more like its DNA, containing the knowledge blueprint of the entire institution.[114] Evans agreed that the trend in libraries was toward de-institutionalization, but he went farther by suggesting that these factors would affect the entire business of higher education.[115] In one possible scenario, the college might exist in a quasi-institutional setting, with on-site instruction, but also off-site distance education delivered to students who never set foot on campus. Another model was that higher education would become a service of "proprietary educational organizations . . . expected to operate in the free market place without government subsidies or tax-exempt status."[116] In either world, some libraries might merge, and others might close entirely.

The Profession of Academic Librarianship

A number of writers argued that increased visibility of the library and librarians at the university level was a necessary prerequisite for many of the sweeping changes which are predicted. Battin laments that many important changes in the information systems of university campuses "proceed with very little involvement or recognition of the function of the institution's traditional information system—the library."[117] Anne Woodsworth et al. noted the need for librarians to be seen as "partner[s] with faculty and researchers in the generation, production, and management of information," a view which represented a substantial broadening of the library's traditional role.[118] Interestingly, perhaps the most forceful article on this topic was by a non-librarian. Hendrick argued for an increasingly aggressive role for the library as a major player in campus

politics, asserting that the library must become a "true power center within the university community" and advocating the Ph.D. for librarians as an important step toward achieving the needed status relative to academic departments.[119] Such a requirement would resolve the ambiguity concerning the status of librarians as the only faculty on most campuses without a Ph.D. The traditional conception of libraries as a service institution, he warned, will lead to "conservatism and lack of bold initiatives" as well as "ineptitude in the struggle for power."[120]

But how was this higher order of status and visibility to be achieved? Many writers shared Veaner's desire to make library education more relevant to the changing times. Michael Buckland forecast that library education would change least in its core values and most in its use of technology, while some of the most challenging changes would occur in the business side of information sciences.[121] Herbert S. White saw that pressures from within the profession, from parent institutions, and ultimately from the public would lead to the need to demonstrate accountability in library education.[122] Stricter accreditation standards was one expected measure. Julie M. Hurd observed that by teaching online search strategies, library schools were teaching new cognitive models for future information management.[123] Writing on the specific need to train future catalogers, Avram lamented that in the past cataloging instruction tended to be formulaic and rule-based, but also predicted that in the future more of the theory of bibliographic management would be taught.[124] By contrast, Edward G. Holley defended library education, writing that it had indeed changed for the better, although for practical purposes it would always lag somewhat behind practice.[125] He also pointed out that for the profession to ever achieve significant qualitative improvement in library education, programs would have to be funded at much higher levels. Without the funds to support higher quality library education, he believed that much of the discussion was merely rhetorical.

As Veaner had vigorously asserted, academic librarians would also need to cultivate advanced management skills. This concern was echoed by various others. Arnold Hirshon distinguished two principles that needed to be internalized and applied by effective library leaders. The first was "vision," the ability to "see beyond the immediate or parochial concerns and project an image of what the library should attempt to accomplish over a period of five, ten, or more years."[126] Creativity, perspective, and risk-taking must almost of necessity be reflected in a leader's vision. "Focus" provided the specifics that lead to achievement of the vision, and among its sub-factors were planning, revision, pragmatism, and patience. Several other writers also stressed the need for holistic planning, although with some new twists. Bruce A. Shuman delved into the techniques used by futurists in other fields to suggest "scenario development" as an important tool for articulating alternative visions for future libraries.[127] Similarly, Hacken suggested that by monitoring the progress made toward predicted outcomes, plans could be revised constantly to stay ahead of change.[128] Charles B. Lowry advocated strategic planning, which was distinct from tra-

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ditional planning in its emphasis on process, team decision-making, goal-setting, and evaluation.[129]

The standard bureaucratic and hierarchical model of library organization, with clear divisions between public and technical services, was challenged by many writers. New roles were emerging and traditional ones were evolving, blurring, and in some cases disappearing. Neal L. Edgar, Maurice J. Freedman, and Michael Gorman all confronted those who predicted the death of technical services by arguing that while technology might eliminate some processing tasks, the intellectual components of technical services work would ensure its survival. [130, 131, 132] Janet Swan Hill saw certain technical services tasks being outsourced, especially in smaller libraries.[133] Robert P. Holley saw future catalogers in all but the largest of libraries as either moving into management, overseeing a paraprofessional cataloging staff, or integrating various specialized duties, such as acquisitions, cataloging, or reference work for some particular subject discipline.[134] In distributed, electronic libraries, innovation had to be stimulated at all levels, rather than compartmentalized by inflexible job descriptions and organizational structures. Lucier and Dooley predicted that libraries would organize so as to build in double-loop communication, between staff and management, and integrate teams for cross-fertilization between units.[135] Inviting staff input into decision-making invests them with greater opportunities, but also creates the potential for uncertainty, disorientation and even anxiety. Thus, redefining roles at all levels, while important and necessary, would require trust, self-awareness, respect, and motivational skills on the part of administration. Further complicating the transition would be the increasing diversity of the library workforce. More would be expected from library staff in the future; the task of library managers would be to motivate them to give more.

Virtually every writer during this period commented that the discussions and debates over these manifold issues would continue into the foreseeable future. Veaner concluded the second part of his landmark article by likening the changes in academic librarianship to another epochal enterprise:

> The excitement of entering the "information age" is not unlike that which the U.S. experienced with the space age and the Apollo trips to the moon. Exciting new technologies, whether in rocketry, telecommunications, or computers, can be seductive and cause us to forget that the mind, not the instrument, should control society's purpose and goals.[136]

These comments reflected not only the magnitude of the challenges ahead, but also revealed that the profession was beginning to sense that it had a true mission to accomplish.

Gregg Sapp is the Head of the Science Library at SUNY, Albany; he may be contacted via e-mail at: gsapp@csc.albany.edu. Ron Gilmore is a Reference Librarian at SUNY, Albany; he may be contacted via e-mail at: gilmr@csc.albany.edu.

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