Current Comments

Also See: "How Will New Technology Change Characteristics of Libraries and their Users."

Björn Tell and the Future of Information Services

Number 3 January 15, 1979

I have always been fascinated by, indeed preoccupied with, the future. So I was pleased to write about it in the article which follows. The opportunity arose when I was asked to contribute to a festschrift in honor of Björn Tell.

Knowledge and development: reshaping library and information services for the world of tomorrow celebrates the sixtieth birthday of the noted Swedish librarian.[1] I believe my contribution—"How will new technology change the characteristics of libraries and their users?"—is a particularly appropriate topic for a work honoring Björn Tell. His long career has been marked by an unusual ability to foresee the potential of advanced technology in the library and information world.

Björn's career has been so long and varied that it is difficult to do justice to it here. After serving as head librarian at the Stockholm School of Economics from 1952 to 1959, he was appointed to the post of head librarian at AB Atomenergi, the Nuclear Research Establishment at Studsvik. While he was there he produced the first computerized union catalog of periodicals in Sweden. While he was director of libraries at the Royal Institute of Technology in Stockholm (1963-1973), he created the search programs, selected the data bases for, and implemented a computerized selective dissemination of information (SDI) service. Since 1973, he has been the director of libraries at Lund University. He has also continued to act as an advisor for many international groups. For instance, as chairman of the Documentation Advisory Group of the European Space Agency, he has influenced work on the development of a system which will deliver full-text copies via satellite.[2]

Björn Tell's international reputation enabled the editors of his festschrift to gather articles from scholars, administrators, and information scientists from many countries. The table of contents appears in Figure 1.

Contributors include Elin Törnudd, Director of the Helsinki University of Technology Library, Espoo. I first met Elin in the early 1950s when I worked at Johns Hopkins. In collaboration with Taina Koivula, also of Helsinki University, Elin contributed a piece

Figure 1: *Knowledge and development: reshaping library and information services for the world of tomorrow. A festschrift for Björn Tell.*
Edited by S. Schwartz & U. Willers.
Royal Institute of Technology Library, (Stockholm), 1978, 307 pages, $15.00, ISBN: 91-85212-35-0

on "Student attitudes to the library"[1] (p. 217-24).

Additional contributions came from scholars in the U.S.S.R., Canada, France, and Britain, as well as the Scandanavian countries. For example, A. I. Mikhailov and R. S. Gilyarevsky of Moscow's VINITI (All Union Institute of Scientific and Technical Information) contributed a paper on "Informatics and librarianship — common trends and future"[1] (p. 131-46).

A highlight of the volume is the bibliography compiled by Ola Palmaer of the Royal Institute of Technology Library. A prolific writer, Björn Tell has written more than 1,000 articles and books. Palmaer also wrote a paper, "Bibliography as biography" for the book[1] (p. 247-52).

As I reread the paper which follows, I was reminded how dangerous it is to write about the future. Technology is changing so rapidly that you can hardly catch your breath before some statement is obsolete.

For example, video disc technology is moving quite rapidly. The National Library of Medicine (NLM) is conducting experiments

with video discs for storage of both audio-visual and computerized digital data.[3] Leonard Bernstein, director of the Lister-Hill Biomedical Communication Center, has great expectations for video discs in NLM's future handling of medical information.

Jack Goldman, chief scientist and senior vice president of Xerox, has also predicted that "by the 1980s, the entire contents of the 18 million books in the Library of Congress" could be "stored on 100 optical video discs."[4] Furthermore, books stored in digital form could be transmitted to users' homes over wideband TV cables. Copies could even be printed as required.

Research on the use of holography for information storage also continues to make headway. The Library of Congress is sponsoring research performed by Dr. Charles Ih of the University of Delaware that may eventually lead to the use of holograms to store the Library's 20 million feet of color films.[5] According to Dr. Ih, color films fade dramatically when stored under ordinary conditions. Holograms would provide compact, permanent storage of film while preserving the original hues.

Although these and other rapid changes have made many of my speculations realities a little sooner than expected, most readers will not be aware of all of them. Futurists try to make reasonable guesses about the future so that we can prepare for most contingencies. My colleague F.W. Lancaster of the University of Illinois has covered similar grounds of late.[6] He has also dealt with the paperless society.[7]

A festschrift is always a fine tribute to a living person. Better he should enjoy the pleasure while he is alive. But a mere collection of papers cannot adequately express the emotional content of a long friendship. So I take this special opportunity to wish Björn Tell a happy birthday. My ISI® colleagues and I are grateful for the encouragement and advice he has provided on numerous occasions.

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How Will New Technology Change the Characteristics of Libraries and Their Users?

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Reprinted with the permission of the publisher from S. Schwarz and U. Willers (eds): *Knowledge and Development—Reshaping Library and Information Services for the World of Tomorrow A Festschrift for Björn Tell.* Stockholm: Royal Institute of Technology Library, 1978.

ABSTRACT

It is difficult to say in exactly what ways new technology will transform libraries in future years. Will anyone need libraries as we now know them if, as predicted, the general population will soon have on-line searching capability in their homes? What kinds of library services will be needed to acquire, store, retrieve, and disseminate materials stored on disks or through holographic methods? And what kinds of librarians will be best suited to manage the information centers of tomorrow, whatever form they may take? These and other questions are discussed. Although the outlook is generally optimistic, a realistic note of caution is also introduced.

There are today a plethora of technologies potentially useful to libraries, many in competition with each other. In the future we may use video cassettes, reel-to-reel video tape, or videodiscs to view films, plays, etc. We may routinely transmit and receive information via co-axial cable, telephone lines, microwaves, satellite, or all four means when appropriate. And our computers may use magnetic bubbles, optical memories, or holographic devices for storage. Which of these technologies will finally predominate is less important than the changes they will cause in the form and function of libraries.

Most librarians have ambivalent feelings about the coming changes. They can see many of the benefits to be derived such as speedier access, better control over a wider variety of materials, and less clerical work. But some aspects of the new technology are threatening. Familiar classification systems and search strategies may be rendered ineffective. So personal skills will need to be upgraded and the training of new library staff will become more complex. Acquisitions activities will require contact with an ever-widening group of suppliers. So a host of unfamiliar business practices will have to be learned. More importantly, new and diverse user groups from the information conscious society will require services previously unthought of. Imagination, flexibility, and ability to communicate will be even more important prerequisites for librarians than ever before (1).

To the extent that librarians are not willing to deal with the uncertainties of change, the benefits of new technologies will be difficult to obtain. For example, many large university libraries do not offer a computerized selective dissemination of information (SDI) service to their research communities (2). I'm sure one reason for this situation is a lack of support from librarians concerned about the ramifications of implementing such a service. Librarians worry that presently satisfied users may mistrust a computerized service. They fear the budget impact, increased requests for articles, and the hours which might be expended on profiling.

Not enough people have had the foresight and courage of Björn Tell who was in-

strumental in implementing the computerized SDI system at the Library of the Royal Institute of Technology in Stockholm. Björn knew that such a major undertaking needed programs to deal with the secondary problems that would arise. So he saw to it that the programs were implemented and modified as needed. It is no wonder, then, that he could eventually use these words when describing the effect of the SDI service on the library staff: "They are more and more concerned with meeting the user's need for information rather than books" (3).

Perhaps the most far-reaching of the information technologies on the horizon is interactive on-line searching systems which use ordinary home television sets — with minor modifications—as computer terminals. It is likely that within the next decade this type of service will be available to individual homes throughout Europe and North America.

Viewdata, a system of this type sponsored by the British Post Office, will undergo extensive public testing during the latter part of 1978. To use Viewdata, a subscriber dials a local telphone number. This ties his or her television set into a minicomputer in which pages of data are stored. The viewer "orders" a particular page (a still message) by pressing numerical keys on a key pad. The page selection process starts by keying one of ten broad subject choices. Then, one out of ten subsets of the first choice displayed is selected, and so on. One out of a million pages could be selected in this manner (4).

Information for page display is supplied by over 200 organizations. Viewers may choose to see sports scores, social services announcements, news headlines, even abstracts of recent articles on health, energy, environmental sciences (through ISI® 's SCITEL(TM) service). If a viewer sees an item of special interest on a SCITEL page, he or she may use the key pad to order a copy of the complete article from ISI's OATS® (Original Article Tear Sheet) service.

In Viewdata at even this early phase, it is possible to discern the great and varied potential for society of this type of on-line, interactive TV system. Among its possibilities are computer-assisted education at home, ready information on day-to-day living, and instant information about many specialized areas of interest. But with this kind of service in nearly every home and office, perhaps people will need a library less. This will happen only if the library community disdains to participate in it. In fact, academic, public, government, and industrial libraries could all become major suppliers of information to these systems. For instance, government libraries could prepare bibliographies of government publications for laymen on energy, nutrition, gardening, etc. with prices and ordering information. A public library might run listings of new titles received, and viewers, by using their key pads, could request that a book be reserved for them. A special service for shut-ins might be the mailing of requested books to their homes.

Through Viewdata-like systems, university libraries could also offer a variety of information services of special interest to the academic community. New articles retrieved through the university SDI services could be displayed in this way as could lists of required reading and syllabi for courses. Other services might be a schedule of university events, a list of special shows at university museums, library hours, etc. Students and faculty would merely consult strategically placed TV's—in libraries, dorms, and class buildings—for the information needed.

The next step in interactive video would be direct access to motion video on demand. However, the day when we can request with a key pad the screening of a film on our home TV is in the more distant future—due primarily to the costs of such a system. In the interim, libraries are already beginning to broadcast motion video programs. In fact, the libraries which are offering video services are receiving an enthusiastic public response (5).

In many cases, the library has only a television set and one of the video cassette recorders on the market. Programs of cultural or social significance are recorded and played later at various times in the library for public viewing. This service is a great convenience for those who would

otherwise have missed the programs. It has also attracted people who have never been to a library before.

This simple video service is already raising questions of copyright infringement similar to those raised by the use of photocopiers in libraries. While the copyright question is unresolved, the majority of libraries will hesitate to use the available technology. However if the controversy can be amicably settled, libraries will be able to acquire vast collections of video cassettes. (Videodiscs and reel-to-reel tapes are another possibility, but since the cassette is the most advanced and convenient format, I will speak in terms of video cassettes) (6). Commercial suppliers will doubtless offer pre-recorded TV programs, motion pictures, ballets, plays, and concerts on video cassettes at relatively inexpensive prices. The public, which is already accustomed to the video medium for entertainment and cultural programs, is likely to accept and even demand video cassette collections.

This intense public interest will also create physical problems for libraries. Space must be found within the library for private and group viewing of cassettes. When homes have cassette players, too, decisions will have to be made on the circulation of cassettes. Public libraries with video cassette collections may also encounter the delicate problem of censorship.

Although many libraries now offer movies on 8 or 16 mm film, their collections are miniscule compared to video cassette collections of the future. Furthermore, their films are solely for home use and can be viewed only by borrowers who have the necessary projector and screen. Video cassettes, however, may be easily played right in the library. It is quite possible that some parents will consider certain movies inappropriate for viewing by minors. Even a library which limited its collection to films that won American academy awards (certainly mainstream movies) might meet with controversy over "Klute", "Midnight Cowboy", "Shampoo", and "Cries and Whispers". The threat of a community-wide scandal will probably suffice to stop some libraries from acquiring a collection of cassettes. Alternatively, libraries may wish to restrict their collections to cassettes suitable for family viewing or limit access to the collection to adults.

Once a library begins to tape its own programs, however, a new problem emerges: which tapes would be saved; which erased for other uses? Besides the library staff trained in video technology, will there have to be a tape archivist? What policy will determine the retention or erasure of a tape? At a university, will the tape archives be open to students? How will the tapes be catalogued? Is a single university retrieval system possible through which a student could locate books and articles, a tape of a special lecture given by an eminent scholar when he or she visited the campus, and several tapes of class sessions in which faculty members dealt with the subject?

The changes wrought by video will be substantial and far-reaching. However, there are other technological innovations—of less overall impact in terms of society at large—which will also cause or necessitate changes in libraries and patrons.

One of these—rapid transmission of full text copies of articles, etc.—is an outgrowth of current technologies. Computerized SDI systems and the availability of secondary information services on-line through computer centers like ESA-SDS [European Space Agency—Space Documentation Service], Lockheed, and SDC have brought bibliographic information about new publications to scientists' attention more quickly than ever before. This rapid retrieval of information has in turn sharpened users desire for quick document fulfillment. In response, groups of libraries working in close cooperation with each other have set up computerized union catalogs of their holdings. Thus the whereabouts of a needed document may be quickly ascertained, but getting a copy of it into the hands of the person who requested it still takes time.

Studies in transmitting TV images of microfilm have been discouraging because

standard television equipment cannot reproduce the detail of most texts. However, digital transmission (transmittal by a code as in a teletype or on-line computer system) of a complete text is a more likely possibility. The message is in machine-readable language and thus does not deteriorate in transmission the way a picture of the text itself does. High density storage devices can record vast quantities of material in digital form. One system can record the entire Encyclopedia Britannica on ten square inches (8). Digital transmission of text from one library to another in an information network would seem to be the next step in the chain begun by computerized information retrieval services. This method is particularly attractive because the text can be printed out at the receiving end so that the user can read it from a sheet of paper instead of looking at it on a screen.

The transmission of documents already in print leads to yet another possibility: the completely electronic journal. After all, the main obstacle to the transmission system is the cost of preparing the text in machine-readable form. It is not impossible that a library subscription to a journal will one day buy microfiches of the texts of articles in a form compatible with electronic transmission.

The economic plight of journal publishers is well-known, and one plan for cost-cutting is an "editorial processing center", a facility any number of journals could share, in which texts could be prepared for photocomposition on a word-processing machine and also stored in a computer (9). If libraries and even individual subscribers could be connected to the computer, they could receive on their terminals the text of any desired article—in effect, they would be reading an electronic journal.

Of all the changes which I have discussed, this one is farthest in the future (10). The costs of changing the system and the opposition by those who have an interest in the status quo are great. Adequate payment arrangements for receiving an article also present a problem which will slow implementation of this publishing technique.

In 1945 Vannevar Bush, in his classic article "As we may think", described "Memex", a scholar's information desk which involved mechanized storage and retrieval of the information necessary for the individual's own use (11). Over 30 years later this "desk" has not been created, but the technology for it is at hand. Here it would seem is the system that will diminish the need for the librarian. But Bush did not suggest how the scholar would locate the information he or she deemed worthy of retention in the Memex.

Although science librarians of the future may have little face-to-face interaction with the patron, they will play an important role in the provision of information relevant to the user's needs. Bibliographies of articles retrieved through the SDI system for the patron may be transmitted electronically to the individual's Memex for scanning. In turn, the user can electronically notify the librarian of those texts he or she wishes to see so that the librarian can acquire and transmit those articles for storage in Memex.

Of course, the librarian in this description may not actually work in a library or information center and probably will not be called a librarian. The traditional titles and occupations in the field—in the face of current technology—are already splintering into a kaleidoscope of careers. Information professionals who work within a library system now may be called: data base managers, information managers, SDI co-ordinators. Others have left the library environment, but not the field, by founding their own businesses—as data base producers, information brokers, and freelance librarians. Another new area beginning to grow in terms of careers for information specialists is the education of users—certainly anyone with a Memex is going to need some training before using it.

While libraries and librarians will continue to exist, we will see the advent of the information technologists, consultants, and educators who will also serve the user. Instead of losing their jobs to machines, professionals will discover a broader choice of careers in the burgeoning information field.

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