

HISTORICAL NOTES

SUNY Biomedical Communication Network: Irwin Pizer

Irwin Pizer addressed the twenty-fifth anniversary meeting of the Upstate New York and Ontario Chapter of the Medical Library Association in 1989. The following excerpt, taken from Pizer's written text of his speech [1], focuses on the history of the State University of New York (SUNY) Biomedical Communication Network, the first online information retrieval service for biomedical literature. Pizer oversaw the development of the network as its initial director, while he was director of the library at SUNY Upstate Medical Center at Syracuse. The network, which operated from 1968 to 1977, provided access to journal article citations, monograph cataloging records, and serials information. In addition, experiments in in-depth subject indexing of monographs, online shared cataloging, and vocabulary mapping were undertaken [2, 3]. The network, with thirty-two member libraries at its peak, was the first to operate on a wide regional basis [4] and included state, private, and federal institutions [5]. The portion of the speech reprinted below is a firsthand account of a pioneering venture in library automation. Where possible, it is augmented with references to published literature to verify or add information. However, it also represents Pizer's own perspective on events, without response from other involved parties.

Today one is keenly aware of the need for, and practicality of, user-friendly search systems. Many people think that this is a concept that has evolved from years of system development in which mediated approaches were first required and then refinements were made to permit the end user to interact with the system. This is not the case, and the SUNY Biomedical Communication Network was designed from the beginning as a user-friendly (then termed user-oriented) system. It was not, perhaps, as user-friendly as today's search systems,

but it did enable user[s] to perform [their searches] without assistance. Trained librarian searchers, however, found the query system cumbersome, and it was not long after the inauguration of the system that an expert mode was developed to allow the knowledgeable searcher to directly input a search formulation.* Non-SUNY libraries were considered from the beginning, and the network extended beyond New York State to [the National Library of Medicine] (NLM) and to the [Francis A.] Countway Library [of Medicine of Harvard University]—in part because of those libraries' valuable contributions of machine-readable databases.

The early 1960s were a time of great ferment and anticipation as universities began to explore the ways in which computers could be applied to the teaching process and to the handling of information. EDUCOM was formed as a university cooperative, and the State University of New York formed its internal counterpart, called INTRACOM. One of the INTRACOM tasks was the analysis of the provision of library and information services. In 1965, a task force on medical libraries consisting of SUNY medical librarians (Miriam Libbey, Helen Kovacs, Joseph Benforado, [M.D.], and myself as chair) was formed to study the problem [8].

The first report was completed in August 1965 and proposed the establishment of the Biomedical Communication Network.† The re-

*The philosophy changed from one of encouraging users to perform their own searches to that of training intermediaries, due to user preference and quality control of retrieval [6, 7].

†The report called for an online, real-time, user-friendly system that would integrate the functions of the library from users' points of view [9].

port was accepted by INTRACOM in January of 1966 and submitted to the university administration. It was then approved as a vital step toward the realization of aims to provide better service to the faculty and student populations. Funds were made available in the 1966/67 budget year, and I was appointed director of the network, which was based in Syracuse and administered through the [Upstate] Medical Center. In addition, the network was designated as a pilot project for the entire university library system. In that way, the knowledge and experience gathered in establishing the network would provide valuable data at a later date. In view of this charge to the network, some of the decisions [that] were taken in the various stages of development reflected this wider purpose, [for example], the adoption of the Library of Congress record format, later known as [Machine Readable Cataloging] (MARC) and experimentation with depth indexing of book materials. The developmental costs of the network over the years from 1965 to 1968 were in excess of \$1,000,000. Contracts with [NLM] provided approximately an additional \$100,000, and each member of the network paid the costs of its own terminals and a percentage of the telecommunication costs [10].

One of the first tangible results of the network was an improvement of telecommunication links between the Buffalo, Syracuse, and Brooklyn libraries to expedite transmittal of interlibrary loan requests. The IBM terminals, which had been selected for the network (IBM 2740), were installed in December 1966. Special arrangements were also made with [NLM] and, beginning in October 1966, all requests were sent to NLM via teletype, which resulted in priority processing. Later in the network

development, [when] a 2740 was installed at NLM and they became full network members, it was no longer necessary to rekeyboard requests for TWX transmission.

Among the activities, which were taking place in the early 1960s, [directly affecting] the eventual development of the network was work on a number of union lists of serials. It was recognized that sharing among the units of [SUNY] was severely hampered by the lack of a union list. In order to ameliorate this situation, I developed a proposal in August 1965, which called for the compilation and publication of a union list of currently received serials on all campuses, together with information on the holdings for each title. The project was planned in a number of phases, which would take place over a number of years. The later phases would see the addition of noncurrent serials and holdings for all libraries. Continuous updating was a feature of the plan. Each campus was also given the option of receiving its own information in a form [that] would allow it to reproduce and locally distribute its own records.

The task, while large, was not undertaken *de novo* but built upon some existing work in the two-year colleges, as well as data supplied by Syracuse University for some 6,000 titles [that] needed only machine reformatting. A checking edition was published in December 1965, which contained 12,000 titles. This was distributed to all campuses for addition and correction. A hidden feature of the checking edition was the incorporation of fictitious titles for each school. This was done to verify actual checking of information, and not all schools found these entries. The first edition of the list was published in the fall of 1966 and contained entries for 17,000 titles. The second edition, published in December 1967, had grown to more than 25,000 titles, and, by the end of July 1969,

the file contained entries for almost 40,000 titles held by ninety-three institutions in New York State.

Once the system was in place for producing a union list and the database had been developed, it was possible to compile additional lists on contract for other organizations. . . . The New York State Library Division of Library Development contracted for the production of the *New York State Union List of Serials*, whose scope was broadened to include entries for a number of major collections such as the American Museum of Natural History. . . . The union list database performed important functions in the Biomedical Communication Network.

As work continued on the implementation of the network, it became clear that close cooperation with [NLM] was necessary and vital to the success of the system. Joseph Leiter, [Ph.D.], associate director for library operations, was a staunch supporter of the network and arranged for the network to use the [Medical Literature Analysis and Retrieval System] (MEDLARS) tapes, which ultimately allowed online searching, and for provision of NLM's Current Catalog tapes. In addition, NLM contracted with the network to convert its early Current Catalog records to MARC format so that they could be shared by other libraries. All contracts with NLM were successfully completed. It should be noted that the MEDLARS tapes were searchable through the network more than two years before NLM began its AIM-TWX search service.

IBM support was another vital element of the network's development. Once the initial planning for the system was completed, IBM was an active partner in the development and implementation of the system, providing one full-time programmer to work on the project and making equipment available on an expedited schedule. From 1965 onward, there were also close

cooperative ties with Henriette Avram of the Library of Congress who was extremely helpful in the process of translation of the NLM Current Catalog tapes to MARC format. . . .

As the network was designed, it was evident that mass storage of data was a major aspect of the hardware requirements. The files would be large and complex, as would be the indexes to the data in the files. IBM had announced a new mass storage device called a Data Cell, which permitted rapid access to the information stored at a relatively low cost. It had a capacity of 400 million bytes with a data rate of 55,000 bytes per second. The machine looked like an oversized refrigerator and contained a large drum divided into segments filled with magnetic tape strips. When data on a strip was needed, the strip was raised from the storage cylinder and wrapped around a read head. After use was concluded, the strip was returned to its storage unit. The machine was an amazing piece of mechanical and electronic engineering, but it was the mechanical aspects [that] defeated it. After many attempts to make the machine functional, IBM withdrew it, and it was replaced with multiple disk storage drives [11].

It is, I think, important to realize the full extent of the network plan, in part because some of its features have never been achieved by subsequent systems, and some have been discovered anew in the 1980s. It was clear from the start that for a user-friendly system to be effective, it would need to allow users to input their own terminology rather than require them to look up MeSH terms to conduct a search. The difficult task of mapping vernacular medical language to MeSH was undertaken by Dr. Alexander Cain at Syracuse, and, by 1969, considerable progress had been made toward achieving a working vocabulary [12]. [NLM] is still working

on the development of a unified medical language for the same reasons that were evident in 1965. The work on the network thesaurus was, unfortunately, lost when the network was moved from Syracuse to Albany in [1971]. The importance of the tapes containing the information was not recognized, and they were erased. Had this work continued, it is quite possible that user search formulation would be far more advanced today and much easier.

Attempts had been made to index monographic material on the same basis as serials, but the network was the first system to make this an integral part of its retrieval program. Depth indexing of books on a chapter-by-chapter basis and, in some cases, indexing within chapters was begun [13], and, by the end of 1969, more than 10,000 monographs had been depth indexed.‡

How did all of these pieces fit together? The user of the network was led through the search formulation by a series of questions. The system then compiled the search strategy and conducted a search of the databases. These consisted of the depth indexed book records, catalog records, union list data, and the most recent five years of MEDLARS records. [Users were] given a selection of entries [that] met the requirements of the search and [were] asked to identify those items [that] were desired [15]. When these were identified, the serial titles were checked against the union list file. . . . If the item was in the user[s'] librar[ies], circulation records were checked to determine the availability of the item. If it was [not owned or] not available, an interlibrary loan [ILL] request was

‡ The monograph files were removed in 1971–1972 to make room for storing more online journal citations. Egeland used the figure of 8,000 monographs, including conference proceedings and symposia, which received particular emphasis [14].

automatically generated at the closest network library [that] was listed as owning the item. . . .

All of these system elements were completed and operational in October 1966 when the network was dedicated. Unfortunately, the ILL request generation portion of the system was never placed in actual operation, because the directors of the network libraries were fearful that they would be swamped with requests. And so, although the programs were tested, this aspect of the service was not made available to [users] [16]. There is still no system in operation [that] ties all of the elements of service together, although a number of systems operate segments of this service plan.

In order to increase revenue, in 1973, SUNY contracted with [NLM] to offer forty ports for MEDLINE searching so that NLM could increase its service capabilities to medical libraries and reduce the search time required for response. NLM had fifty ports available at that time and this represented a substantial increment in the availability of MEDLINE. . . .

By 1974, the maximum geographic scope of the network had been reached. Terminals were available§ at medical libraries in Minnesota, Illinois, Indiana, Ohio, New York, [Massachusetts, and Maryland]. . . and at a number of other libraries. . . . Many other institutions had applied for membership during the implementation and operational phases of the network, but it was not possible to make service available as widely as was desired. . . .**

§ The terminals were dedicated to the system, which was searchable only at the connected member institutions [17].

** The nine original members were SUNY Buffalo, University of Rochester, SUNY Syracuse, Albany Medical College, SUNY Brooklyn, SUNY Stony Brook, Countway, Parkinson's Disease Information Center at Columbia University, and NLM [18].

The political climate changed in 1969 with the appointment of a new president at the Upstate Medical Center. The importance of the library and the network were not recognized, accepted, or appreciated, and it became increasingly difficult to undertake the programs needed. As a result, I decided to accept the position of associate director of libraries at SUNY Buffalo. Although I had hoped to continue as director of the network, the new medical center president replaced me. He then used the network and its physical facilities as a bargaining chip in negotiations with the university administration and gave up control of the network. With the move of the network to Albany, where it was under the control of the university's central administration, it became the major source of income to support the university's computer operations.†† Although the network was the economic source for the computer, it received the lowest priority for service. Response time degenerated, new databases were not mounted, updating of files was delayed, etc. Repeated discussions between the university and the [network] advisory board did not result in an improvement of the situation and there was increasing user dissatisfaction. The advisory committee had become an adversarial body.‡‡ The university administrators felt secure in their position, believing that there were no alternatives possible and actually taunted the advisory committee with this "fact." As a result, in early 1976, members of the board began actively to look for another source for online ser-

†† Egeland stated in 1975 that the move in 1971 enabled SUNY to maintain service at a lower cost to the user within a larger central office computer facility than was possible on the smaller, dedicated computer system at Syracuse [19].

‡‡ Egeland described the role of the advisory groups in determining policy as positive [20].

vice. . . . Discussions were held with a group of programmers and former network administrators about the possibility of beginning a commercial online service. From these discussions, [Bibliographic Retrieval Services] (BRS) was formed, and the majority of the network members signed service agreements to use the new company. BRS began operations in January of 1977, and, by the middle of that year, SUNY decided to discontinue the network, which was no longer financially viable [21].

Problems in network administration increased as nonmedical libraries were added to the list of subscribers. These libraries had needs and desires [that] required the addition of nonmedical databases, §§ the integrated nature of the network began to be lost, and it came to resemble the online services that already existed, such as DIALOG and SDC and, of course,

§§ ERIC and Psychological Abstracts were added by 1974, with new software permitting both free-text and controlled-vocabulary access to multiple databases [22].

BRS. There is no question that it was easier to operate a service that was dedicated to retrieval of information alone than one [that] integrated all library functions. These changes, along with the changed political and budgetary climate of the first half of the 1970s, led to the eventual demise of the program. It had been an exciting and significant step in library automation, and many persons learned and benefited from its existence. The network broke ground in a number of areas and was viewed nationally as a prototype for NLM's regional medical library network and for other networks.

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