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Network—Or All Hang Separately

"They that weave net-works shall be confounded."
Isaiah XIX.9 (1611)

Over the past few years, there has been increasing talk of "networking." This word has meant two quite different things in library usage. First, it has meant resource sharing, efforts to reduce the cost of duplicating facilities and collections through primarily interlibrary loan agreements. Second, it has meant distribution through telecommunications of information services. The latter sense is the more recent, but the older sense is the more important because the telecommunications systems now emerging promise to allow a new age of library cooperation. Before describing this new promise, I would like to present my reasons for believing the fulfillment of the promise to be nearly ineluctable.

The library is one of the remaining labor intensive areas of our social endeavor, which means that the labor costs of running a library make up the major cost of operations. For smaller libraries, labor represents a smaller cost than that of acquiring and housing a collection. In larger libraries, the cost of labor exceeds all other costs. The cost of books is rising rapidly. *The Bowker Annual* estimates the price of books is rising 15 percent per year,[1] twice as fast as the cost of living! Other prices, including subscriptions and housing costs are also rising. But labor costs are also rising, and so far, there are very few ways to offset these rising costs through labor-saving devices or procedures.

There have, of course, been many efforts to apply automation. It is my impression that these efforts have largely failed to provide real cost benefits.

Certainly, the efforts of the System Development Corporation to sell ALPS (Advanced Library Processing System) and IBM's effort on ELMS (Experimental Library Management System) have not been resounding successes. I believe that the primary reason for the lack of success of these systems is that they really have not yet offered major cost savings. Neither of these nor others designed for operation in *one* library can make any real dent in the million dollars a day spent on cataloging in the United States.

Automation has been successful, however, in another way; it has opened the door for a whole new series of information services—the on-line retrieval services. I will not describe the on-line services of the National Library of Medicine nor their background; these have been covered in detail in another recent article.[2] I would like to discuss one aspect of the service: its confounding growth rate. Figure 1 shows the growth rate of the use of MEDLINE since June 1972 in terms of annual search rates. MEDLINE is now operating at a rate of 240,000 searches per year. Since June 1972, its use has grown at a rate of 13 percent per month, doubling every six months. February was up 30 percent from January, and March was up 30 percent from February. When searches were done in batches in 3-6 weeks, MEDLARS provided 16,700 searches in its peak year. MEDLINE is now operating at nearly fifteen times this rate. This increase has been cost-effective. MEDLINE service is provided with the same budget previously used for MEDLARS.

But MEDLINE is only one such information service. When it was first offered over a nationwide network in February 1972, it was the first such nationwide on-line bibliographic service. It now has many complementary services.

In this area, there are now three competing retrieval systems, ORBIT, BASIS-70, and DIALOG-RECON. The whole realm of discourse is changing from what would be "nice" (how can we seduce a few users?) to what is efficient (how can we serve all those beating on the door?). We at NLM regret some of the capabilities we have given the user, e.g., the ability to search all terms beginning with the same two or more letters, because they seriously reduce the response time to all users. BASIS-70 does not have this capability and may be more viable for the lack. The systems listed in table 1 now have or will have national audiences.

Table 2 lists data bases now available for on-line searching. Thus, although I am not sure of the exact numbers, there appear to be nearly 3 million citations to the scientific literature available for on-line searching. Before July of this year, these will all be on the network of TYMSHARE, Inc. By fall 1973 TYMSHARE's network will be connected to the ARPA network to interconnect at least 63 computers, all technically available from any node

Organization	System	Data Bases
NLM	ELHILL (ORBIT)	MEDLINE, COMPFILE, SDILINE, etc.
NLM (Informatics)	RECON	TOXICON, including CBAC, Toxicology Bibliography, Health Effects of Environmental Pollutants, etc.
System Development Corporation	ORBIT	ERIC Chem. Abst.-Condensates
Science Information Association	BASIS-70	NTIS Chem. Abst.-Condensates
Lockheed Information Sciences	DIALOG	ERIC NTIS PANDEX

Table 1. Systems with National Audiences

Data Base	Estimated No. of Citations
MEDLINE	425,000
COMPFILE	288,000
TOXICON	220,000
ERIC	115,000
NTIS	150,000
Chem Abst.-Condensates	1,000,000
PANDEX	400,000
OCLC	590,000
TOTAL	3,188,000

Table 2. Data Bases Available for On-line Searching

on either network. Thus, on-line, networked information services have found a new group of user needs and begun a new breed of library services. But "on-line" has not yet reached the user.

A recent evaluation of MEDLINE (March 26-30, 1973) shows results similar to those obtained in September 1972 with regard to the involvement

of the requester in his search; in both evaluations it was shown that over 75 percent of searches are run in the absence of the requester. This result is a matter of grave concern, because it means that the on-line system is not being used by those with the information need.

The lack of MEDLINE use by or in the presence of requesters may be partly the inevitable result of the training. Training necessarily presents the complexity of the system in an attempt to provide the trainee with a competence to handle exhaustive searches and complex searching activities. The role of the librarian certainly includes assisting users in such activities, but his or her role is not limited to these functions. Librarians should consider their role as primarily educators. In this role, the goal is self-sufficiency in the student. Like a good parent, the ultimate goal of an educator must be to provide the learner with the skills and desire to be responsible for his own actions.

The major cause for concern is that this nonuse is contrary to the interests of the user community. The medical literature is a vital part of the communication system in medicine. A recent study has shown that clinicians consult the library in connection with at least half their information needs.[3] This same study, however, shows that when they use the library, 75 percent of the time they do *not* consult the librarian but prefer to search the *Index Medicus* or the literature themselves. Contrary to common assertions, clinicians do not appear to delegate information searching to either their assistants or to librarians. This is even more true in research than in patient care; for research information needs, 85 percent of users did not consult a librarian; for patient care information needs, 68 percent did not. This result of the study has a corollary which also deserves mention: since such a small fraction of users consult or delegate their searching to the librarian, the librarian's intuitions and experience on the performance of users is an unreliable guide to user needs and competencies. Clinician needs and behavior patterns cannot be judged by experience with the small minority who ask for help.

The inescapable conclusion of the evaluation and the above study is that MEDLINE is *not* reaching a major fraction of its intended audience. This conclusion is disappointing. Another study has shown that MEDLINE can be used effectively by medical professionals with little assistance.[4] This study showed clearly that subject matter expertise was valuable and that biomedical researchers with such expertise could search nearly as well as personnel who had had six months of training on MEDLARS and years of experience—much more training and experience than is provided in NLM's MEDLINE training courses.

In part, the problem seems to be one of easy access to MEDLINE. The medical user will usually take the shortest route to the information he needs.

As Voigt says: "The user takes the most direct path he knows to the information he wants. He uses the printed sources on the bookshelf in front of him if possible. Thus, his choice is governed to a greater degree by what is easily available than by which source is best."[5]

But speed, according to Ames, is also important:

Overworked as he tends to be and beset by the unpredictable demands of his patients, his teaching schedule, and the many conferences within the hospital, the physician can seldom plan his schedule in advance, and he must grasp such opportunities as may present themselves for reading literature. If thwarted by an article not being immediately available, the physician may well come to the conference or even to the bedside less than optimally prepared. In inserting the reading of scientific articles into a busy schedule, the time factor may well become critical and even something of a "threshold phenomenon." That is, it may be of relatively little benefit to reduce the time needed to obtain an article from 72 hours to 2 hours but make a great deal of difference if the time can be further reduced from 2 hours to 10 minutes and thus make the article available essentially at the time the physician recognizes his need for it.

Most of these same considerations apply also to the investigator, who is also usually a physician. The planning of the next experiment, the pursuit of an exciting new concept, or the write-up of a paper must often be sandwiched into an hour or two of available free time and may be severely handicapped if the reference needed is not immediately available. The need for speed here depends largely on how much it will improve the efficiency of the performance of highly trained and often over-extended men, and this is clearly difficult to evaluate. It is my impression that this is a very important consideration and that having to wait for two days or even six hours for a reference, after its need is recognized, is both wasteful and expensive.[6]

Both of these quotations illustrate that since the user often is forced by his own needs to adopt a cost/benefit approach to information, he may need the greatest payoff in the least time. He may be able to stop fighting Indians long enough to pan a few nuggets from a nearby stream, but may not be able to pan all the gold available.

There are probably many reasons for this lack of direct or cooperative use of MEDLINE. There has, of course, been some difficulty with the system and some institutions pay line charges (some of these do allow users direct use of the system). However, MEDLINE is now available 13 hours a day during the week and 5 hours on Saturday, a total of 70 hours a week. Only six institutions use even close to 70 hours a month. Thus, most MEDLINE
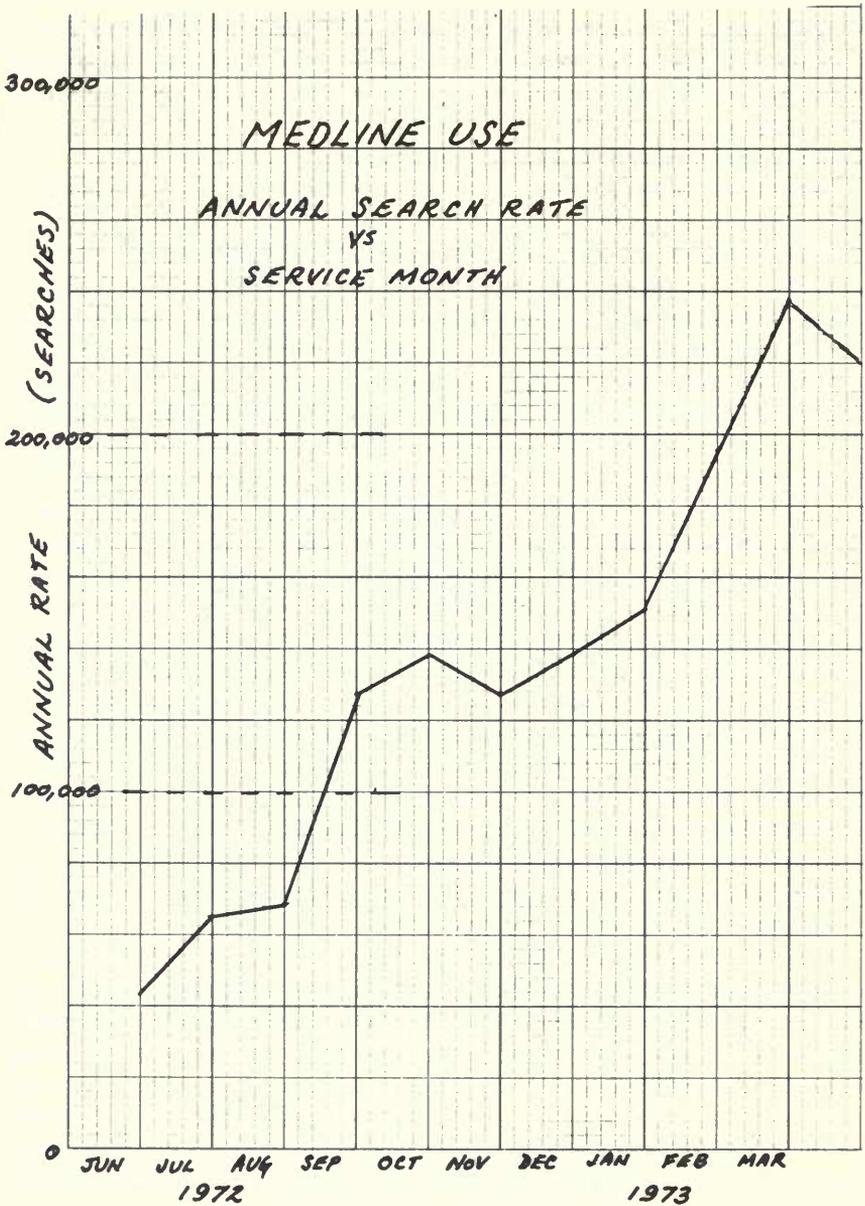
Fig. 1. MEDLINE Growth Rates

terminals are in use less than 25 percent of the time. There appears to be ample time available to allow users access to the service.

In spite of this restriction, MEDLINE has shown the growth rates depicted in figure 1. One can surmise that the real need for rapid information services must be enormous and that, when on-line systems become as readily available as printed indexes and the card catalog, the demand will be very large indeed.

But this information service networking still needs to be combined with the earlier sense of the word, library resource sharing. This combination is under development. OCLC has pioneered in this area. Through that center, cooperating libraries actually share the intellectual effort of cataloging. A book cataloged by any of the Ohio libraries need never be cataloged by another. The Federal Library Committee is trying to organize an effort to put OCLC on the nationwide network used by the other services mentioned above. When this is done, a prototype of a national library network will surely exist. This network will provide rapid information services, but, much more than that, it will begin the process of using telecommunications to permit the intellectual cooperation of libraries. Division of labor may really become possible. A variety of functions could be added to such a network: inter-library loans could be routed through it; a serial check-in service could be initiated to serve many libraries based perhaps on the National Serials Data Program; and if companies handling blanket orders were incorporated, much of the acquisition process could be handled by a resource in such a network.

As stated in the beginning, I believe this development path almost inevitable. Caught between rising costs and user expectations and budget pressures, many libraries will adopt these new systems and services in order to remain viable.

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