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Backing Into Network Operations

When asked to participate in this clinic, I gave the tentative title "Backing Into Network Operations" for my paper because I thought it might be useful to discuss some principles of planning for and consensus making within networks which I had derived the hard way from my experience directing two computer-based networks—networks which were entered into by chance rather than design. (In addition, the Washington University School of Medicine Library is a member of three other networks: the Regional Medical Library, the Regional Medical Program, and the Higher Education Coordinating Council, so that we have experience on both sides of networks.) It seemed that it might be helpful to examine the mistakes which we made and the generalized conclusions which we might draw from them as hypotheses to be tested in other networking operations, as well as a comparison with some other, more carefully planned, networks now in existence. I therefore devote the beginning of my paper to describing the two networks we have been involved in, merely as background to understanding, and not as another "How I do it good in my library" paper.

PHILSOM

The first and oldest network which the Wasington University School of Medicine Library runs is PHILSOM (Periodical Holdings in the Library of the School of Medicine). Started in more primitive form in 1963 from plans of Irwin Pizer, now director of the Health Sciences Library of the University of Illinois in Chicago, and Donald Franz, formerly of the Washington University Computing Facilities, it is now used as a serials control mechanism for seven

medical libraries throughout the country. These include, besides our own library, the Library of the National Institutes of Health, the medical school libraries of the Universities of Missouri in Columbia, Utah in Salt Lake City, Texas at San Antonio, Illinois at Chicago, and Saint Louis University. In addition, the University of Missouri includes data for its Veterinary Library and its Veterans Administration Hospital Library, so we might claim that we are talking about nine rather than seven libraries. The system now has about 8,000 titles in it, approximately 40 percent of which are "dead" titles, with the rest still being received by someone within the network. As mentioned earlier, the system started in a more primitive form for one library in 1963; we thus have a decade of experience with it. Since its inception it has gone through two complete reworkings, each to give more and more sophisticated results, and innumerable small additions and changes. We are now planning a third basic revision to allow more libraries to enter the system, to provide certain things not in the present system, and to investigate the possibilities of going on-line. Obviously, ten years ago neither the available hardware nor the costs would have allowed us the option of an on-line system, so we use a batch system.

Finally, the PHILSOM system has now been adopted by the Union Catalog of Medical Periodicals at the Medical Library Center of New York (the largest national data base for medical serials) to start a PHILSOM network in the eastern U.S. The Cornell University Medical Library and the Medical Library Center of New York itself are the first libraries to be in that network.

The following describes the present system in brief terms:

PHILSOM provides the libraries in the system with certain records on a monthly basis. (Anyone who wishes more information on the details of the system can write to Millard Johnson of the WUSM staff or buy the documentation, which we sell for $7.50.)

The first of these records is the monthly list of holdings of the serials, meant for the reader and the reference staff. We provide exact holdings, one of the decisions we assumed a priori, rather than making it rigorously. Also noted is bibliographical history, shelving location, multiple sets, presence or absence in *Index Medicus*, and any informational notes the librarian wishes to include.

For serials librarians we provide a much more elaborate and less easily read "work copy" which gives by codes for each library such items as the vendor of the serial, the price paid for it, when the subscription must be renewed, the number of bibliographical volumes per physical volume, whether the title page and index is bound in, whether the title is still being received, the subjects of the journal, and whether it is indexed in *Index Medicus*, among other things.

Each month a library receives binding slips for journals reported in complete form, with the slips formated in the way the binder at our library wishes it. This is another problem I will discuss later when I discuss "backing into the system."

The libraries also receive a list of journals which need to be renewed within the fiscal year, and a list of journal issues which were expected to be received but were not reported–a kind of "claims list" or "gaps list," where a later issue was checked in, but not an earlier one.

Finally, the library receives a box of IBM cards, one card for each issue of each journal which is expected to be published the next month.

The bill comes separately for our services. We do cost accounting and change our prices in relation to costs, of course. We also do "on demand" work with the data we have; a library can specify what it wishes, we cost it, make an estimate, then do the work for that price, if the requesting library agrees to it. So far, such special work has included:

1. binding slip changes for the National Institutes of Health so that the set number of the title appears (i.e., Set 1, 2, . . .) on the binding slip, and an internal code for NIH use; and
2. a list of current titles only without holdings or other information, for the University of Illinois.

In order to come into the PHILSOM network a library must send us the information about the journals it has. This information comes in two parts: bibliographic information and housekeeping information. The bibliographic information (title, bibliographic history, cross references, starting dates, and the like) is the same for each copy of the journal, of course, so that if the PHILSOM network already contains that title, the new library need not repeat the information. (Most medical libraries now find the large majority of their titles already in the system.) But each library has its own, unique, housekeeping information, and there is no way to know where the new library shelves its sets of the title, how it binds it, from whom it receives the serial, or how much it pays for it. These facts must be coded for us by the entering library, and any changes must be reported to us by them. For titles new to the PHILSOM network, both bibliographic data and housekeeping information must be supplied; I will discuss this problem later.

Once the library has entered our network, it updates its records by sending us punched cards: for issues received in the ordinary course of time, the library merely returns to us the punched receipt card which the computer has produced and we have sent to them in anticipation of the receipt of that issue. For journals which are so irregular that there can be no anticipation

cards, or for back issues suddenly received by the library, a punched card must be made and submitted. Since most medical libraries have machines to punch their cards, they usually do so for us, but we can handle coded sheets instead, if that is more convenient for the outlying library. We check all basic data input to make sure that it is consistent with what has been placed in the computer previously—we do not want to try to update a holding, for example, with a card for a twenty-fifth issue when the journal is listed as having only twenty-four issues per volume.

There are probably many other details of the PHILSOM system which might be described, but I believe that these facts are sufficient to provide the background for the discussion later of generalized conclusions on networks.

Problems With PHILSOM

I will discuss some of the difficulties which we have had with the PHILSOM network. Later, I will do the same with our cataloging system; finally, I will try to derive some principles of networking operations which seem applicable in other similar situations.

The most important difficulty encountered concerns the fact that the system was originally designed for one library and then adapted to many. This implies that we believed that the situations in medical libraries were sufficiently similar so that the same program could do for all. In general, this has turned out to be correct—most medical libraries stock the same journal titles, most place serials in their periodical records; most bind them in the same bibliographic way; most have the same problems of claiming missing issues, renewing subscriptions, paying their bills, and determining their budgetary situation each month.

On the other hand, there are many individual needs for which the PHILSOM system was not designed. For example, because we developed PHILSOM for ourselves only, we worked with our binder to produce binding slips formated in the way in which he wished them; but other binders use different record-keeping methods, and we have just begun to work on individualizing this portion of our program.

Secondly, we have come across the same problem of title entry which everyone else finds. When the Medical Library Center of N.Y. began a union list of serials of some eighty-eight medical libraries in the New York area fifteen years ago, Jacqueline Felter, then director of the Union Catalog of Medical Periodicals, said she thought there must be eighty-eight different ways to enter any medical serial in existence. Any cooperative scheme requires standardization, of course, and we have found some of the serials librarians in

our network adamant about the correctness of their form of entry. In desperation we decided to adopt the entries—right or wrong—of an external group, and chose the same Union Catalog of Medical Periodicals at the Medical Library Center of N.Y. which, as noted before, is the largest repository of medical serials in the country. This has reduced the complaints to grumblings, but it has by no means solved the problem. Every time a new title is published which is likely to be subscribed to by more than one library, it is probable that we will get more than one entry for it. We ask the New York group to act as final arbiter, and we refuse to accept any variation in the main entry, though we add as many cross-references as are requested. The reason that serials librarians react in this way is one of the generalized conclusions I propose to draw later.

A third difficulty we have found—and one we were not prepared for—is the need for continuing education of the people handling the serials in our member libraries. Serials librarians come and go, and serials clerks seem to have a half-life of about the same magnitude as deans of medical schools. As a result, to the difficulty of first instructing the staffs of new libraries on how to use PHILSOM is added the problem caused by the fact that outgoing staffs rarely transmit much information to new staff members. We have tried to handle this by a detailed manual of 130 pages, by sending a member of our staff to the new library when it enters the system and at any time thereafter when it requests aid, and by publishing a weekly news bulletin, *PHILSOM Newsletter*, which attempts to give instructions, bring member libraries up-to-date on new facets of the network, explain changes, etc. If only the person receiving this *Newsletter* would pass it on to all who handle PHILSOM, our problems would be substantially lessened!

An increasingly large problem, now that more libraries with more titles are in the PHILSOM network, is the size of the printouts which we require our computing facilities to produce. It exceeds all the time and line jobs done for any other use of the facilities, printing over one-half million lines monthly; and even though it is run in the middle of the night, it causes scheduling difficulties. A time is reserved for us, and if we do not get onto the computer at that time, it may be a week later before there is an equivalent amount of time available. Explaining this to the other libraries, where serials librarians have traditionally not been bound by such tight time schedules, causes one difficulty. The vagaries of the postal service and the air freight which we use to send materials back and forth to the network also cause problems with the scheduling of our printouts. We have taken the firm stand that we will not wait beyond the deadline for input each month without very good reasons and a decision by me to change this rule. Generally, one such experience suffices until the library changes its staff again.

The size of the printouts are partially due, of course, to the fact that the system was "backed into"—developed for one library and then multiplied for the other libraries. Although no library receives the entire output of the computer, the total is too large for reason, and is one of the grounds for our planning to redo the entire system and (hopefully) go on-line.

Cataloging

In this section I will discuss our computer-based cataloging system and our attempt to work this into a network operation.

Cataloging is one of the most difficult library procedures to automate because the quality of cataloging and bibliographic description is based on variables that by their nature do not lend themselves to programmed manipulation, but require unique judgments to determine. As a result, most systems of computer-based cataloging are more or less printing mechanisms, with the pure aspects of bibliographic description supplied by the human cataloging staff. This is in strong contrast to the various attempts to do computer indexing of natural text; that is, to use the computer to derive the very elements of the indexing. Even with this, however, computer cataloging is a real challenge because of the multiplicity of elements which must be handled and the difficulties of writing an algorithm which can describe the multiple variations within any element. About all such systems as the MARC cataloging can—and have—done is to standardize the order in which the elements are stored and retrieved; but the elements themselves are still provided manually by a human cataloger. This is, of course, the purpose of MARC: to be a format for the transfer of bibliographic data.

I do not say this to denigrate computer cataloging. I am not a believer in the all-or-nothing principle in intellectual work, no matter how efficient it is in allowing our bodies to perform physical movements. A requirement that the computer do everything, even those things better and more efficiently done manually, is as self-defeating as a requirement that everything be done manually. I wish merely to describe the situation, so that we can see how it fits into the question of networking operations.

In spite of the difficulties with cataloging in libraries—both manual and computer-based—it is the *sine qua non* of librarianship. Without it the acquisition of material is like the stacking up of volumes in huge bins; there is no access to their contents except through the tedious job of turning over each volume in turn. When the WUSM Library was able to persuade its dean to give an annual sum for experimentation in librarianship, without regard to the actual running of the Library, beginning in 1962, one of the decisions taken was that it would try to manipulate the most basic records of medical libraries

(serials and the catalog) by computer means. I have already described here our experiences with serials: and Doris Bolef and I have also published explanations of some of our experiences with computer-based cataloging.[1] (Incidentally, when Bolef and I described some of our failures, we were deluged with scurrilous correspondence and letters to the editors, as if we had broken faith with a religious concept! No wonder few librarians report such failures.)

We decided to design a completely new cataloging system using MARC format because it looked, at the time, as if the three major libraries–NLM, LC and NAL–were going to resolve their differences and put all their bibliographic data on MARC tapes. Using the computer programming already in use and the experience we would have gained, we thought we could serve as a center for the libraries–university, public and special–in the St. Louis area. We could pick off data from the MARC tapes for acquisition and cataloging purposes and then print lists or cards in accordance with individual library requirements. We thought we could serve as a pilot network for other communities in the nation.

For reasons to which we are not privy, efforts to include NLM and NAL bibliographic data on the MARC tapes seem to have been abandoned, which took us out of the running to go on with this networking experiment. The death knell was sounded, however, when one of the largest libraries in the St. Louis area that was to serve as a keystone, that had initially announced its support and cooperation, began to drag its heels for financial and political reasons.

We began, then, in 1963/64 to work on producing book catalogs from computer-based information, and we have continued to do so ever since. We thus have nine years of machine-readable cataloging in our files, representing both pre- and post-MARC format rules, and in 1968/69 we transformed our pre-MARC catalog into MARC format automatically by an excellent program worked out by Glyn Evans and the programmers at our computing facilities. We published annual catalogs from 1964 to 1968; these (like the early automobile which looked like a buggy) very much resembled older printed catalogs.

When 1968/69 came, however, we wished to produce a five-year cumulated catalog, but found to our horror that the cost had gone up so greatly that our budget could not afford this traditional form of catalog. At this point we decided to experiment with Computer Output Microfilm. Feeling, however, that few of our readers would use microfilm directly, we decided to try what the salesman said was perfectly good technology: namely, to blow up the microfilm to readable size and print that. The salesman's story was far from reality.

In addition to printing our cumulated catalog from COM, we tackled the problem of the cost of annual reprintings of the same data. In order to make it possible for a reader to find everything the library has in one place, the catalogs of libraries since the end of the nineteenth century have been infinitely accumulating files. New items are interspersed among old ones, which are never purged unless the book is lost, withdrawn, stolen, mutilated, or otherwise removed physically from the collection. Some questions have been raised recently about the value of this system in the sciences, where new material supersedes older material, but no library has had enough courage to try this on its catalog of holdings.

All of this means that in a printed catalog—and I use the word printed in a wide sense of "reproduced"—one must interfile new material into the old and then reprint the entire list; otherwise, as our previous experiment when we hid the card catalog has shown, a reader may be required to search as many as five alphabets at one point in the cycle before he can determine conclusively that the library does not contain a particular work.

What we did, therefore, was to divide the catalog into the bibliographic record and the indexes to that record. The full bibliographic record (the "register") was printed up in accession number order. Thus, to add to that list, one need only print accessions received since the last printing. The indexes, by name, by title, by subjects, by added entries, and the like, were shortened to act merely as pointers to the full bibliographic information in the register for the use of the person who wanted "corroborative detail for an otherwise bald and unconvincing narrative." For the person who merely wished to get the book in question, we supplied the call number in the index. It was this index which had to be added to each year by interfiling the new with the old, but since the index entries were generally only one line long, the cost was not as great as printing the whole record would have been. We have continued this scheme ever since 1968/69.

We take pride in this work, even though it has not been an unqualified success in the only way in which I believe librarians ought to consider something successful—namely, the usefulness to the library user of the products of his imagination and endeavors. What makes us proud of this development is that we tried to use the computer as a new technological methodology, not as a simulator of what had been done previously manually. I have said in another context that the unit record catalog card which we have inherited from the time the Library of Congress began to sell catalog cards at the turn of the century was based on the requirements of the printing press and the card catalog. In designing a system for a new methodology, I fear we have tended to fall into the trap of using the new system to produce the old results. We like to think that our catalog is a feeble effort to take a new look at things.

(This has not kept us from producing traditional catalog cards from our computer record also; I will discuss this network below.)

Under an agreement with the local Regional Medical Program's Library Project, we had agreed to sell them copies of our cumulated catalog, to be distributed to the 100 small hospitals in southern Illinois and eastern Missouri under their umbrella of services, so that interlibrary loans might be facilitated. We did so, but the poor legibility and lack of education of the librarians thoughout the Regional Medical Program's Library Project on how to use the catalog made it very rarely used. I cannot blame them, as legibility was not good. It certainly was simpler to call or write us about a book a hospital wanted than to try to find out from our catalog whether we had it.

We were all ashamed of the physical appearance of the printed catalog, but proud of its contents and of our ability to use the computer for this purpose. In the next year, therefore, we decided not to blow up the microfilm in the COM, but to make microfiche for the libraries to use. The snag here, of course, was that a reading machine was required to use the fiche, and most of these hospitals were too poor to afford such a luxury, while the departments in our own medical center felt no need for one when they could lift up the receiver and call our reference staff. Consequently, we wrote a small grant request to the National Library of Medicine to allow us to purchase 125 DASA reading machines and distribute them free to the 100 hospitals in the Regional Medical Program and the 25 departments of our medical center. We also specified that a librarian must deliver the machines in person and explain their use and the use of the microfiche catalog, so that the educational message could get across.

I wish I could say that these things resulted in a large-scale use of our microfiche catalog. The great American psychiatrist Adolf Meyer once said, "The trouble is not that people don't know things, but that they know things that aren't so." We *knew* that once the librarians had microfiched catalogs and a free microfiche reading machine, they would take them to their bosom. Only it is not so, no matter what the salesmen for microforms say!

I have mentioned our experiment of hiding the card catalog and forcing readers to use the computer printouts of our cataloging and ordering procedures. Unless we bankrupted ourselves by continually updating and reprinting items, we found that we were making it necessary for our long-suffering readers to search many alphabets for their information. At that point we agreed that the printed catalog of books was not a satisfactory substitute for a card catalog, whether the printing was done by hot type, as in the 1890s, cold type as in the 1930s, photo-offset as in the NLM's catalogs for the 1950s or our own computer-produced catalog in the 1960s. We therefore returned to

our cataloging system with a new requirement: to produce catalog cards which we could place in our old-fashioned card catalog.

When we were able to produce these cards, it seemed to us and to a few of our friends that the cards we were producing might very well be used by other medical school libraries, most of whom add the same titles to their collections. Admittedly, our selection was somewhat smaller than what some medical libraries encompassed, since we did not collect in dentistry, nursing, or pharmacy; but we felt if we were able to supply the common titles to libraries similar to ours, it would give those libraries more time to do the cataloging for the works we did not process.

At that time, however, the NLM announced plans to sell its catalog cards through Bro-Dart, and again we waited before offering our cards for sale. Any medical library which can obtain NLM cards would be wiser to use theirs than ours, both for the subject and language coverage which we do not have, and for aesthetics, comparing a printed card with a computer-typed card. Unfortunately, the Bro-Dart attempt to sell the cards ran into difficulties. The firm received too few orders to make the scheme viable, and some of the technical problems in reproducing cards clearly were not overcome. After waiting six months beyond the due date for NLM cards, we offered ours.

We now come to the reason that I have given this large spate of history—so I can describe what happened and draw some conclusions from it.

One of the ways we publicized our cards was to send samples to many medical school libraries who, we thought, might be interested in our scheme or had already shown interest in it. We modified our catalog program to omit call numbers, for those libraries which did not use the NLM classification scheme. We arranged for libraries to order cards without the tracings on them, for those who did not use MeSH subject headings. We offered the cards as unit cards or in sets, and we offered them arranged by the computer in one alphabetical array by main entry, or in the arrays we use: name, subject, and shelflist. As a bonus, we offered Se-lin tapes of the call numbers to affix to the spines of the books. To give potential purchasers an idea of what we had, we made available our cumulated catalog and our microfiche supplements to it, and we started a new free listing of recently acquired books—RECAP. This gave the record number of the book, and allowed us to reduce the price to those libraries which gave us this number, thus removing from our staff the time and labor of searching for the record number to print the cards desired.

For a long time we received almost no orders. Catalogers and our other friends in the medical library field often wrote us, congratulating us on our work, but then adding why they were not going to buy our cards. These

reasons are interesting, and the basis of my final conclusions. Some were: the call numbers were placed at the left top of the card and *their* catalog placed them at the right top or bottom or left bottom. The call numbers were too far to the left; they wished at least 3mm space from the margin of the cards. In *their* library tracings were on the back of the card and we printed them on the bottom front. They did not like the type font we used: it was too big or unaesthetic, or just not what *their* catalog had. Some did not like the numbering of our cards (e.g., "card 2 of 2"), and the slight ripple of the top perforations bothered others. Nobody, I am happy to say, complained about the level of cataloging, or said that it was not of the highest quality.

I have mentioned already our work with the Regional Medical Program's Library Project of 100 small hospital libraries. One of the things which this project did was to offer workshops to the often untrained librarians in these hospitals, and one of the items which RMP wished to show them was the "Stearns List." This is a group of books selected by many physicians through a questionnaire as a minimum hospital library collection for the biomedical practitioners of a hospital. It seemed useful to us that a package deal of purchasing the books and getting an already-made catalog would make the sad little libraries in those hospitals 1000 percent ahead of where they had been. We therefore wrote a small program which allowed an order for the Stearns List and no further rules to produce a catalog of the approximately 250 volumes, already alphabetized and ready to go into the catalog trays, and we were able to offer this to the libraries for a small sum—about $75.

These instant catalogs have been a small seller. The recent floods in Pennsylvania and elsewhere, which wiped out hospitals and their libraries completely, have made it necessary for many libraries to start afresh. To do so, they have asked the NLM for the so-called small research grants of $3,000 each, and NLM in turn has allowed them to buy the Stearns List and our set of cards.

When the second edition of the Stearns List came out and we received no requests for cards for the new package, we gave up our offer. We realized that hospital libraries preferred to choose their own books, using the Stearns List for reference.

This alerted us to the needs of libraries just starting. We have now been in touch with all the developing medical schools to offer them catalog cards for the standard works (and anything else we have) which all new medical school libraries must have. This has been very satisfactory; the medical school at Duluth, Minnesota, for example, has come in with large orders several times, and must now have about 2,000 sets of our cards. The new medical school at the University of South Carolina has also been a good customer, so

that all in all in the last six months our sale of catalog cards has taken a slow but definite turn for the better. What pleases us is that most orders now are repeat ones. Apparently our customers are satisfied with our service. The problem is to add more customers.

We are again in a waiting period, however. The NLM has stated that it would put its cataloging on the TYMSHARE computer lines from which all medical schools access MEDLINE and other data bases at a small connect charge and telephone hookup cost after July 1, 1973. If this is successful and cheap, the same reasons why medical libraries should use that cataloging rather than ours will hold here as I have previously enunciated when discussing the Bro-Dart cards. We are a marginally successful venture economically, and if an alternative manner of obtaining medical cataloging comes into being we should remove ourselves from the sales arena as gracefully as possible.

Discussion

I will attempt to draw some generalized observations from the description of the two networks we run, and then set forth a series of hypotheses about networking in general.

It is a cliché that successful networks depend upon the cooperation of all those involved in them. Yet, as Rose Vainstein pointed out at the ASIS meeting in Washington in October 1972, there are at least three different kinds of cooperation, based on three different kinds of standards of perfectability. First, there is the standard of the ideal: we will do only what is best. Second, there is the engineering standard—we will try to reach the best commercially viable state. And, finally, there is the working standard, which is based on the concept of a tolerance level, the permissible variance from the best possible. I believe that only if the members of the network are willing to accept a working standard and strive for an engineering standard will a network really become viable.

The question, then, is whether librarians generally are so constituted that they will accept someone else's working standard. A look at any serials record or large card catalog will show many variations from the ideal, but the errors are "our" errors, while the errors of a network are "their" errors. Even worse, when there is no standard, the concepts of "our way of doing things" must always prevail over "their way of doing things."

I do not say this to throw brickbats at librarians, but to try to explain some of the effects which we see frequently throughout cooperative ventures in librarianship. Most librarians are people who are asserting their rights as professionals, without being backed up by the mandate of society. Now the

sine qua non of professionalism, as any text on sociology will declare, is that the professional makes his own decisions on the basis of his expert knowledge, for the good of his client, without asking either the client or other professionals about the wisdom of his course. To ask a professional to follow rigidly laid down institutional rules is to ask him to act not as a professional but as a bureaucrat. Few librarians wish to give up what freedom of action they have. Because so many of their actions are bureaucratic in nature, they must insist on their professional rights where they have them.

This has led me, in an attempt to find examples which proved or disproved my point, to ask which had been the most successful networks in librarianship up to now? I think I would point to the sale of catalog cards by LC, the OCLC, and the NLM's MEDLINE network as being extremely successful networking operations. Next, I asked: What characteristics do these things have in common?

It seemed that the one characteristic these three networks had in common was that they allowed the librarian to manipulate the store of knowledge out of the standardized bureaucratic mode into the personal-professional mode. By this I mean that in each case the librarian could take the standardized material offered to him and modify it in any way he wished. I believe it was Kilgour who, when asked if his OCLC would allow for variation, replied that he already had as many variations in the systems as the libraries using it. The cataloger can call forth from the OCLC store the catalog card in it representing the book in hand, and then so modify what he receives that it then conforms to his style and contains his mark of identity. LC printed cards have been modified by so many catalogers for so many years that it has become a standing joke among librarians. The MEDLINE system requires not the restrained, elegant, lean Boolean searching required in the older MEDLARS searches, but the bumbling, hit-or-miss attack on a problem which is characteristic of most of us in looking for information; moreover, it allows for modification of the search strategy at any point in time.

Uri Bloch of the Israeli Armament Development Authority is reported to have said that standardization is the universal problem and major stumbling block of all networks. "To expect continuous adaptations to a system . . . is to invite certain disaster,"[2] the *Library Journal* states he said. Once a standard has been accepted, he believes, it should be changed only for the most important reasons.

I hold, on the other hand, that that way brings almost certain failure. Unless one were designing a network to do something that had never been done before, and for which, therefore, no one had made professional decisions about how and how much to do, it seems to me that insisting upon exact

obedience to inflexible rules will always result in dissatisfaction and eventual breakup of a network. It is necessary to take into account in the design of a network the facts of human action and reaction, and instead of trying to make people over, to make one's network responsive to deep-seated emotional needs.

I admit that most people disagree with me. The present Constitution of the United States was adopted after the Articles of Confederation, with its decentralized power structure, proved a failure in the government of a vast country. Carolyn Landis in a recent article in the *EDUCOM Bulletin* on networks and disciplines, says that it is clear that computer center directors participating in networks are caught between conflicting and often irreconcilable demands for service from local users and from network users.[3] Yet it seems that from now on library networks must provide a way to meet these conflicting and often irreconcilable demands which are made on computer center operators and those who administer networks alike. The question we must ask, I believe, is: Can an inflexible computer allow us to have such a flexible network, or do we need to think of library cooperation in terms less like the Articles of Confederation and more like the Constitution of the United States, with vital "network" operations given to the central government, and all other powers reserved to the individual states?

This is my main conclusion. I have a few less important, and perhaps less startling conclusions, which I will mention here briefly.

The most obvious conclusion from our networks is that you cannot make everyone happy, so you have to make the results obtained through the network worth the loss of autonomy, standardization, and personal style which comes about. This is the cost/benefit ratio expressed in human terms, of course, and I will not belabor the point.

Secondly, just as the administrative set-up for a small, closely knit Germanic tribe in the sixth century could not be extrapolated to rule the entire Roman Empire, so the methods used for a single library cannot be extrapolated into a network for a whole group of libraries without serious problems. When a problem changes in size it often changes in quality too; and when solutions worked out for small groups are applied to larger groups, stresses and strains are sure to result. A single library's system can be used as a working basis for discussion when a network is being contemplated, but it cannot be the only item considered.

Thirdly, when methods are irreconcilable—such as the true title for a journal—it is wise not to use the method of any of the libraries in the network, but to go to an outside source for authority. In this way, all are equal, and no one stands out as the leader of the others. Everybody can join

in complaining about how "they" catalog their titles, and a sense of camaraderie may result.

Finally, there is no more important place for continuing education than in the working of a library network. It cannot be assumed that everything is heard, read, or understood, even by the most intelligent with the best emotional stance to the network. Patience, continual work, and strong martinis will always be needed by those running library cooperative networks.

REFERENCES

1. Brodman, Estelle, and Bolef, Doris. "Printed Catalogs: Retrospect and Prospect," *Special Libraries*, 59:783-88, Dec. 1968; and Bolef, Doris, *et al.* "Mechanization of Library Procedures in the Medium-sized Medical Library: VIII. Suspension of Computer Catalog," *Bulletin of the Medical Library Association*, 57:264-66, July 1969.

2. Quoted in: Savage, Noel. "ASIS in Washington," *Library Journal*, 98:136, Jan. 15, 1973.

3. Landis, Carolyn. "Planning for National Networking: A Report on the Spring 1973 Conference," *EDUCOM Bulletin*, 8:4, Summer 1973.