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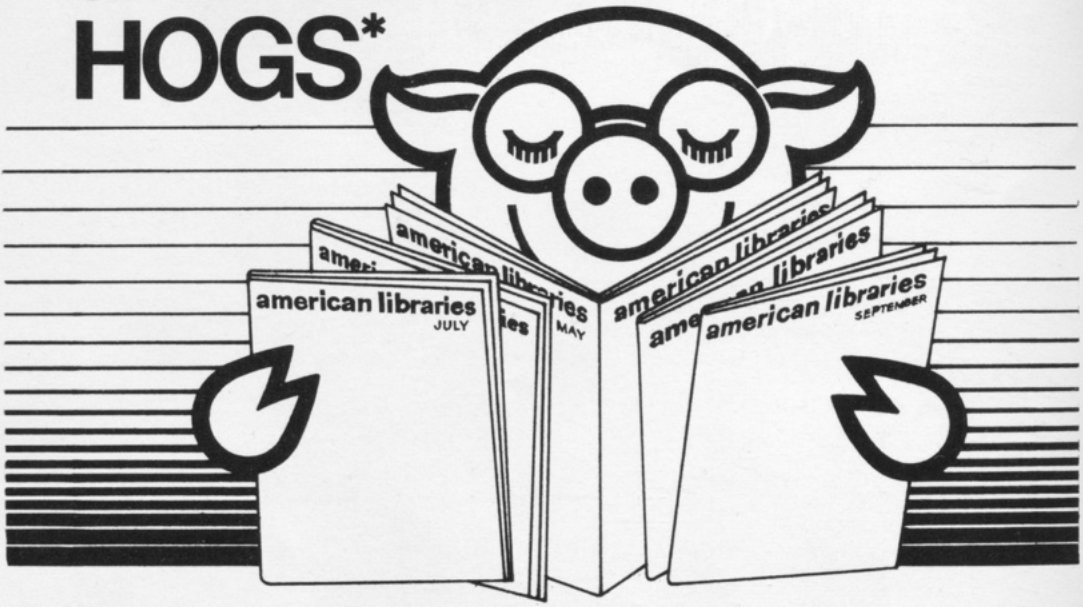

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A Little Navel Examination

Proposition: The formal structure of an organization is only one element in the success or failure of the organization in attaining its objectives; in most cases structure is not a determining element. Corollary: In most organizational situations, success can be achieved in the context of more than one formal structure.

Proposition: Substantial or extensive scrutiny by the membership of an organization of its formal structure is an indication of organizational distress with consequences and implications beyond that of mere structure.

* * *

The organizational structure and the membership composition of ISAD have been altered in the recent past by the inclusion within the division of two sections: Audio-Visual, and Video and Cable Communications. The change, in my opinion, is a good one for at least two reasons. First, it provides a framework within ALA to focus the human resources which are active in applying various technologies to library operations. Second, it enhances opportunities for cross-fertilization and stimulation of ideas within the division.

The centenary of the American Library Association serves to accentuate not only the change, but the pace of change, since the days when the typewriter could be perceived as the significant device to revolutionize bibliothecal activity. The days of minicomputers, videocassettes, and ultrafiche are with us, and the widespread relevance of laser technology and artificial satellites to even the traditional operations of information science is close at hand. A chaotic world for librarians? Perhaps, but we should remember that not Dewey, nor Bliss, nor Ranganathan, nor even the pundits of the Library of Congress have been wildly successful at compartmentalizing and categorizing the realm of knowledge for any great period of time. It has never been the mission of classification theorists to stem or slow the development of technology (although that might simplify their labors); it is, however, part of the mission of ISAD to extend and to explicate such development in efforts compatible with the general goals of librarians, especially on the North American continent.

The existence of ISAD as a functioning unit of the major professional library organization in North America can and should prove a hospitable arena for the exciting technical facilities available to us today and awaiting our utilization tomorrow. ISAD offers the ALA headquarters office as

a channel for responding to and referring inquiries for information and advice. *JOLA* serves as a forum for discussion, controversy, and stimulation, and as a record of achievements. The seminars, institutes, and preconferences developed largely by the divisional Program Planning Committee have called attention to promising technological devices and sharpened consideration of controversial and problematic issues. Ongoing substantive working sessions of organized subunits of the division provide opportunities to influence public policy and to help establish recognized standards and definitions relating to equipment, protocols, and records representing the raw materials of the information world.

All of us who are currently members of ISAD as well as those considering participation should profit from the broadened scope of the division. ISAD is not yet completely adjusted to the structural change; the Period of Adjustment may well continue for some time to come. The next year may be marked by movement toward changes in nomenclature of the division, its units, and journal, and these may be accompanied by additional procedural (bylaws) revision. Such changes should be developed and viewed as means toward ends—that is, as ways of facilitating opportunities for interaction and for achieving both divisional and general professional goals.

The two sections, AVS and VCCS, have now been part of ISAD for over a year. They have established organizational machinery in the form of officers, committees, and bylaws, and are represented on division-wide boards and committees. They are taking action on a number of fronts: legislation, continuing education, networks, and standards. As a latecomer to the worlds of video, cable, and audiovisual media, I am delighted to be associated with the excitement and the pioneering spirit of the sectional interests. On the part of those of us who have been nurtured in the more traditional and conservative mold of automation and information science, I welcome the sections and look forward to a long and rewarding partnership.

Joseph A. Rosenthal
President—ISAD

The Cost of On-Line Bibliographic Searching

Michael D. COOPER and Nancy A. DeWATH: School of Library and Information Studies, University of California, Berkeley.

A cost analysis of 411 on-line bibliographic search requests was conducted. The study involved monitoring the time that thirty-five individuals in four public libraries spent processing these requests. The study identified a set of seven tasks that are performed for each request and determined the average time and cost for each of the tasks. The average total direct search cost was $28.41 exclusive of telephone line charges. This figure included the data base connect charges of $17.29. The average time to process a request was 7.8 calendar days. A wide variation in the cost and time figures was found among the four libraries.

INTRODUCTION

On-line bibliographic searching is becoming commonly used as an aid to the reference librarian and researcher. Commercially available systems, such as Lockheed's DIALOG and System Development Corporation's ORBIT, provide access to a multitude of machine-searchable data bases for this purpose. Many issues remain unresolved with respect to on-line searching and include questions such as the effectiveness of on-line searching, methods for training searchers, and optimal search strategies at the terminal. This paper examines the cost of on-line searching: the charges that are incurred for connection to a commercial search service, the cost of printing bibliographic citations, and the cost of the reference librarians' time.

There are a number of reasons for studying the cost of on-line searching. First, on-line searching is a close substitute for some forms of non-computerized bibliographic searching. If this is the case, and if the end product is the same, then it is important to know how the costs of the alternatives compare. Second, the provision of any new service implies either additional funding or a diversion of funds from one type of service to another. Finally, costs can provide a basis for making pricing decisions. It seems quite likely that in the future users will have to pay for on-line bibliographic search services. The question is, how much? While there are numerous ways to set prices (e.g., loss leader, marginal costs, cost recovery),

costs can play an important part in their establishment.

The cost data reported in this paper were compiled as part of a project conducted by the Lockheed Palo Alto Research Laboratory under the sponsorship of the National Science Foundation's Office of Science Information Service. As part of the study, Lockheed's on-line reference retrieval service (DIALOG) was made available to the public through four public libraries in the San Francisco Bay Area. On-line search services were provided at no cost to patrons during the first year of the project (August 1974 through May 1975) and at a reduced cost during the second year (June 1975 through May 1976).

Lockheed and the Cooperative Information Network (CIN), an intertype library consortium in Northern California, placed terminals in four CIN public libraries: Redwood City Public Library, the San Mateo County Library, the Santa Clara County Library, and the San Jose Public Library. These libraries cover urban, suburban, and rural areas. Two large universities, numerous private and community colleges and many research and development centers are close by. The libraries themselves include two decentralized county libraries, and two centralized city libraries with branches of various sizes.

The individuals who performed interviewing and the on-line searching had, for the most part, no previous experience with on-line searching.* They were given Lockheed's usual training course and during the project developed their competence as searchers, but they received nowhere near the intensive training that, for example, the National Library of Medicine gives its MEDLINE searchers.

The experimental nature of this project differentiates it from the normal search situation. During the first year of the project, search time was free, and searchers were able to experiment with the system while conducting patron searches. They were under no pressure to keep the searches short and efficient. On-line search times, and subsequently connect costs, reported in this paper may be somewhat higher than they might be were this not an experimental project.

PREVIOUS STUDIES

The development of adequate statistical (time, cost) monitoring mechanisms in on-line systems has been slow. Monitoring programs took a large leap forward with the advent of commercial systems which require precise recording of user-system interaction time for accurate billing purposes.

Monitoring of the user-system interaction can take many forms. The simplest measurements deal with elapsed search time, time spent searching particular data bases, and frequency of command utilization. In one of the earliest studies Summit reported elapsed search time, number of index

* It should be noted that one of the authors of this paper was also one of the searchers being studied, an employee of San Mateo County Library. It is hoped that no bias resulted.

terms used in a search, number of Boolean expressions used in a search, and number of citations printed by the system.[1] Another analysis of particular note was a study by Benenfeld et al., who computed the time required to discuss the search with the patron, the search time at the terminal, the number of citations printed out, and the total user cost of the search.[2] Benenfeld's experience indicated user costs per search in the range of $28 to $56, depending on the data base used. Lawrence, Weil, and Graham also gathered cost data on bibliographic searching, and Elman surveyed some of the previous studies and presented his own computations, indicating that an average on-line search cost $47.[3,4] Another aspect of on-line search costing that has received some attention in the literature is the cost of operating the computer equipment. Lancaster has reviewed some of the literature.[5] It is apparent that this area of cost analysis needs considerably more investigation before the internal economies of on-line searching can be settled.

METHODOLOGY

The procedure for obtaining the data from which to compute the cost of on-line bibliographic searching required the cooperation of all individuals engaged in processing the on-line search requests. A set of seven tasks was defined, including reference interview, originating library preparation, DIALOG library preparation, search, DIALOG library follow-up, originating library follow-up, and follow-up with patron. A form was then developed to collect data describing the amount of time spent on each task, the date on which the task was performed, and the individual who performed the task. This time sheet traveled with the search request through its processing. As completed time sheets were received, they were numbered and coded for computer processing.

Costs were developed both for each search performed and for each task within a search. Each task could be performed by a different individual. In order to arrive at the direct labor cost for a search, it was necessary to multiply the pay rate for each individual involved in the search by the number of minutes each spent at a particular task.

In addition to the labor cost of a search, two other costs must be considered. The first is the fee paid to the commercial search service (in this case, Lockheed) to access their data base. This fee is a function both of the length of time one is connected to the system via telephone line and of the particular data base (such as ERIC, NTIS, Psychological Abstracts, etc.) being searched. For each request, multiple data bases may be searched. In computing the on-line cost for a search, the cost per hour of accessing each data base was multiplied by the connect time to arrive at a total data base connect cost.

The second nonlabor cost element is the number of bibliographic citations printed at the vendor's computer center and sent by mail to the searcher's location. A charge is made for these off-line prints, adding to the total cost of the search.

Several other factors could be included in the cost of a search. The major omission of this study was the cost of telephone line charges. Since all the libraries were relatively close to Lockheed's computer center, they dialed directly to the center without the use of an intermediary service such as TYMNET. If an intermediary service had been necessary, these charges would have to be included in the total search cost.

Other cost elements excluded from the study were terminal rental costs, physical space charges, and indirect costs of overhead, administration, supplies, etc. Basically, the cost figures presented here summarize the direct costs of on-line searching.

The data for this study were collected during February, March, and part of April of 1975, six months after the project had begun and while the service was still free to all users.

It should be emphasized that the data come from self-reports of the library personnel. Such a method is less accurate than an outside measure but was the only practical way to collect the amount and variety of data needed.

At the end of the data-collection period, 411 usable time sheets had been collected from the four DIALOG libraries. Of these 411, 33.6 percent (138) were from Redwood City Public Library, 25.1 percent (103) from Santa Clara County Library, 22.6 percent (93) from San Mateo County Library, and 18.7 percent (77) from San Jose Public Library. Branch libraries and other CIN libraries took requests and relayed them to the DIALOG libraries; 16 percent of the requests during the reporting period showed some participation by these other libraries.

THE REQUEST PROCEDURE

A general outline of the DIALOG request procedure is flowcharted in Figure 1. For the data collection, the process was divided into seven tasks which formed the basic reporting units on the time sheet.

The tasks were defined by both where and at what stage of the search process the activity took place. A maximum of two possible types of libraries participated in each search: a library with a terminal (called "DIALOG library") and a cooperating library, a branch library, or other CIN member (called "originating library") which could relay user requests to a library with a terminal. The tasks were defined as follows:

Reference Interview: time that the user spent negotiating the request with a library staff member. This could take place at either a DIALOG library or an originating library.

Originating Library Preparation: if the reference interview were at a cooperating library, the staff there might spend some time recording, researching, and transmitting the request.

DIALOG Library Preparation: time spent on the request at the DIALOG library with no patron present and before performing the on-line search. Typical activities included recording the receipt of the request, filling out forms, and researching search terms.

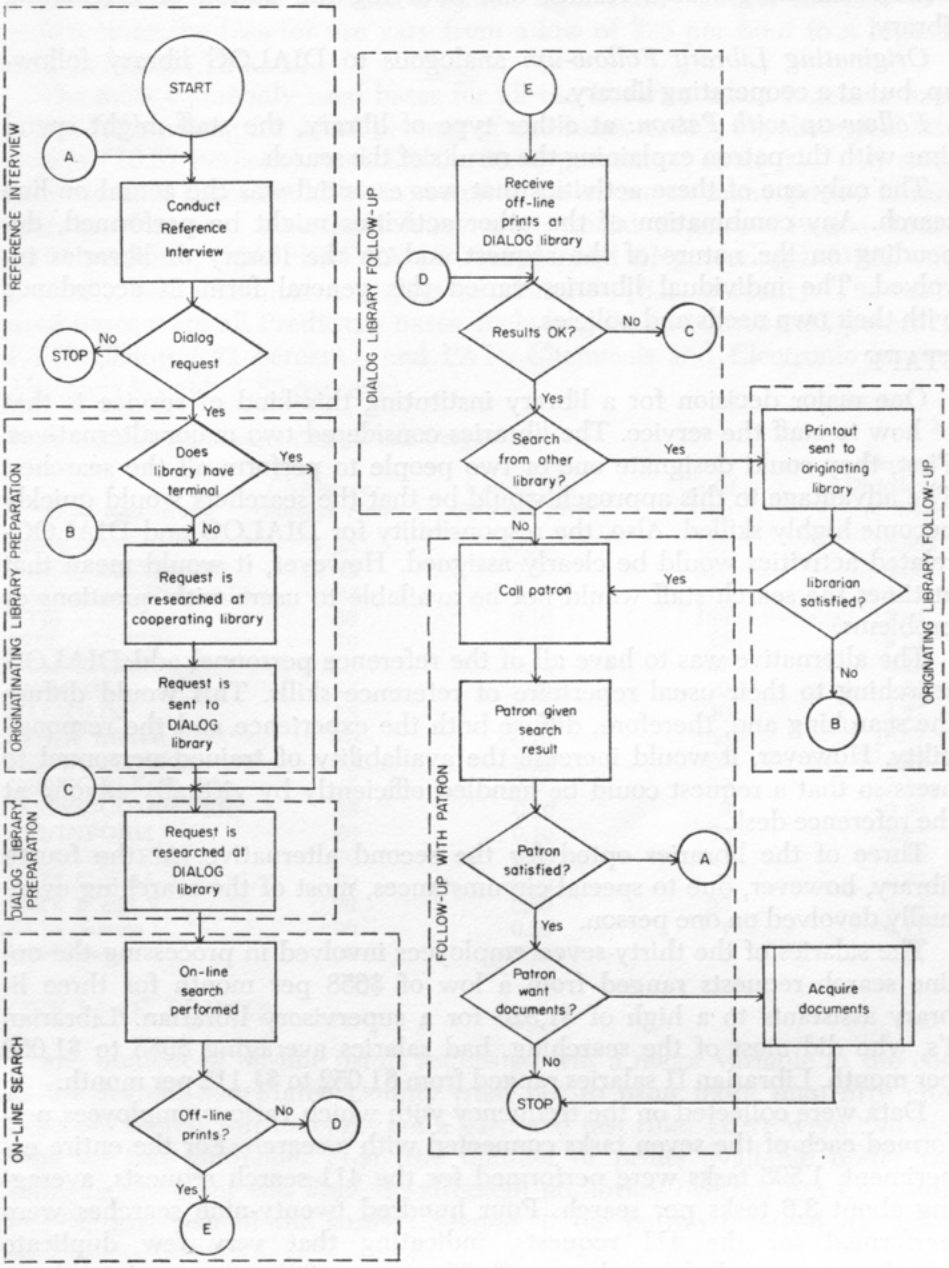

Fig. 1. Flowchart of DIALOG Request Process.

DIALOG Connect Time or *On-Line Search Time:* the actual DIALOG search.

DIALOG Library Follow-up: time spent after the on-line search, with no patron present. Typically this would include filling out reporting forms, examining search results, and notifying the patron or originating library.

Originating Library Follow-up: analogous to DIALOG library follow-up, but at a cooperating library.

Follow-up with Patron: at either type of library, the staff might spend time with the patron explaining the results of the search.

The only one of these activities that was essential was the actual on-line search. Any combination of the other activities might be performed, depending on the nature of the request and on the library or libraries involved. The individual libraries varied this general form in accordance with their own needs and policies.

STAFF

One major decision for a library instituting this kind of service is that of how to staff the service. The libraries considered two major alternatives. First, they could designate one or two people to perform all the searches. The advantage to this approach would be that the searchers would quickly become highly skilled. Also, the responsibility for DIALOG and DIALOG-related activities would be clearly assigned. However, it would mean that at times the search staff would not be available to users with questions or problems.

The alternative was to have all of the reference personnel add DIALOG searching to their usual repertoire of reference skills. This would diffuse the searching and, therefore, diffuse both the experience and the responsibility. However, it would increase the availability of trained personnel to users so that a request could be handled efficiently by virtually anyone at the reference desk.

Three of the libraries opted for the second alternative. At the fourth library, however, due to special circumstances, most of the searching eventually devolved on one person.

The salaries of the thirty-seven employees involved in processing the on-line search requests ranged from a low of $658 per month for three library assistants to a high of $1,325 for a supervisory librarian. Librarian I's, who did most of the searching, had salaries averaging $955 to $1,000 per month. Librarian II salaries ranged from $1,052 to $1,112 per month.

Data were collected on the frequency with which various employees performed each of the seven tasks connected with a search. For the entire experiment, 1,595 tasks were performed for the 411 search requests, averaging about 3.6 tasks per search. Four hundred twenty-nine searches were performed for the 411 requests, indicating that very few duplicate searches were made for each request. There were 301 reference interviews, 46 originating library preparations, 252 DIALOG library preparations, 429

searches, 353 DIALOG library follow-ups, 38 originating library follow-ups, and 176 follow-ups with the patron.

DATA BASES

The choice of data base for a search significantly affects the cost of a search since the fees for use vary from a low of $25 per hour to a high of $150 per hour (Table 1).

The most commonly used bases for all the libraries taken together were NTIS (accounting for 17.84 percent of the bases used), Psychological Abstracts (16.57 percent), and ERIC (13.35 percent) (Table 1).* All three of these data bases could be expected to be of use to many public library patrons. The next most-used bases were Social Science Citation Index (9.51 percent), COMPENDEX (COMPuterized ENgineering InDEX; 9.29 percent), and Chemical Abstracts Condensates (8.23 percent). The least-used bases were all Predicasts bases, including PATS Source (.11 percent), PATS Claims (.21 percent), and PATS Chemicals and Electronic Market Abstracts Weekly (.85 percent).

Table 1. Data Base Connect Charges and Usage

Data Base Name	*Charge per Connect Hour*	*Charge per Off-Line Print*	*Total Uses*	*Percent Distribution of Uses*
ERIC	$ 25	$0.10	125	13.35%
CHEM. ABSTRACTS	45	0.10	77	8.23
EXCEPT. CHILD. ABS	25	0.10	16	1.71
NTIS	35	0.10	168	17.84
SSCI	70	0.10	89	9.51
COMPENDEX	65	0.10	87	9.29
AIM-ARM	25	0.10	10	1.07
NAL/CAIN	25	0.10	40	4.27
PSYCH ABSTRACTS	50	0.10	155	16.57
INSPEC-PHYSICS	45	0.10	25	2.67
INSPEC-ELECT. EN	45	0.10	20	2.14
INSPEC-COMPUTERS	45	0.10	9	0.96
ABI/INFORM	65	0.10	62	6.62
PATS CMA/EMA	90	0.20	23	2.46
PATS C/EMA WEEKLY	90	0.20	8	0.85
PATS F and S	90	0.20	20	2.14
PATS Source	90	0.20	1	0.11
IFI/Claims	150	0.10	2	0.21

OFF-LINE PRINTS

The number of off-line prints requested was a major variable in the cost of the search. San Mateo County tried not to print more than fifty citations per search, but that was not a hard and fast rule. There were two reasons for this guideline. First, the number of prints available under the terms of the grant was limited (although no library overran this limit during the first year of the study). Second, if the patron received too many

* More than one base may be used on a search; these are the proportions of bases used, not of searches performed.

prints with too much irrelevant information, the precision of the search was lessened.

Whatever its effect on the quality of the search, San Mateo's practice of limited off-line prints had a marked effect on searches completed at that library. San Mateo County printed an average of twenty-nine citations per search off-line, whereas San Jose printed sixty-six, Santa Clara County seventy-one, and Redwood City seventy-five. No off-line prints were requested from more than half of the data base uses; this could be because the search results were not satisfactory or because the relevant citations were printed on-line. Further analysis indicated that the searchers varied widely when deciding how many citations were necessary and/or acceptable to the user.

TIME PER TASK

Another major cost factor was the staff time devoted to each task. Table 2 indicates the mean time per task, by library, for all nonzero entries only, i.e., once it is decided that the task is to be performed, this figure gives the average time for the task. The individual libraries' values do not differ far from the group mean. The single exception is search time, which varies from a low of 14.09 minutes for San Mateo County to a high of 30.42 minutes for Santa Clara County, with an overall mean of 22.72 minutes.

Table 2. Mean Time per Task by Library (in Minutes)

	Mean Task Time by Library									
	Redwood City		*Santa Clara County*		*San Mateo County*		*San Jose*		*Overall Mean Time*	
Task	*Mean*	*No. of Observation*	*Mean*	*No. of Observation*	*Mean*	*No. of Observation*	*Mean*	*No. of Observation*	*Mean*	*No. of Observation*
Reference Interview	9.65	91	12.92	89	9.97	59	8.57	56	10.50	295
Originating Library Preparation	21.00	1	8.33	2	19.58	42	5.00	1	18.65	46
DIALOG Library Preparation	12.07	45	11.44	45	9.72	76	9.47	57	10.48	223
Search	19.63	138	30.42	103	14.09	91	28.31	76	22.72	408
DIALOG Library Follow-up	9.34	66	12.64	91	16.31	83	9.40	67	12.21	307
Originating Library Follow-up	18.00	2	15.00	2	10.60	38	—	—	11.48	42
Follow-up with Patron	7.58	31	8.03	66	7.79	43	6.52	31	7.61	171

In order to determine statistically if there were differences in the time taken to perform each of the seven tasks across the four libraries, a set of analyses of variances was conducted. These variances are reported in Table 3. The table shows that there were significant differences in the times

taken to perform the reference interview, search, and DIALOG library follow-up.

While the analysis of variance indicated some differences in group means, by itself it did not indicate which of the four libraries' task times was significantly different from any other. To determine this, systematic comparisons of all possible combinations of task time mean values were performed and the results evaluated using Scheffe's test.* Table 3 shows that for the reference interview there was a significant difference between Santa Clara's (SC) time and the times of Redwood City (RC), San Mateo (SM), and San Jose (SJ) but that there was no difference between the latter three means. Similarly for search time, Redwood City and San Mateo were significantly different from Santa Clara and San Jose.

Table 3. Analysis of Variance for Task Times

Variable Name	*Source of Variance*	*Degrees of Freedom*	*Mean Squares*	*F Ratio*	*F Probability*	*Scheffe's Test*
Reference Interview Time	Between Groups	3	270.97	10.24	.000	(RC,SM,SJ) vs (SC)
	Within Groups	291	26.46			
Originating Library Preparation Time	Between Groups	3	184.66	0.21	.892	
	Within Groups	45	897.27			
DIALOG Library Preparation Time	Between Groups	3	85.45	1.16	.327	
	Within Groups	219	73.84			
Total Search Time at Terminal	Between Groups	3	5528.85	21.37	.000	(RC,SM) vs (SC,SJ)
	Within Groups	406	258.71			
DIALOG Library Follow-up Time	Between Groups	3	830.86	19.80	.000	(RC,SJ) vs (SC) vs (SM)
	Within Groups	304	41.96			
Originating Library Follow-up Time	Between Groups	2	111.95	1.36	.272	
	Within Groups	41	83.20			
Follow-up Time with Patron	Between Groups	3	16.73	1.064	.366	
	Within Groups	167	15.71			
Total Time for Search	Between Groups	3	14142.62	19.90	.000	(RC) vs (SC,SM,SJ)
	Within Groups	407	710.70			

PATRON'S PRESENCE

One decision that the participating libraries had to make was whether the requestor should be present during the search. On the one hand, the requestor was often much more familiar with the subject than the librarian was and could provide both an instant evaluation of how well the search was going and perhaps also suggest alternative search strategies. The process of the search might help draw out a noncommunicative patron and help him/her understand what the librarian needed to know.

On the other hand, a user unfamiliar with the search process could slow the search, requiring lengthy explanations during the terminal sessions. The librarian might also prefer not to have someone watching over his/her shoulder during the search.

Ultimately, only one library made a regular practice of allowing the

* The test was conducted at the 0.05 level of significance.

patron to be present during the search. Thus figures are available on the relative lengths of searches with and without the patron, but only for one library.

Of the 103 searches reported, 60 were performed without the patron, and 43 with the patron. The average search time for those with no patron present was 25 minutes versus 37.9 for those with patron present, a difference which is significant at the .01 level. However, the total time required for all tasks varied little; without patron, the average was 56.3 minutes, with patron it was 61 minutes, a difference significant at the .075 level. Thus it is not conclusive that the patron's presence at the search has an adverse effect on total search time. It may be that the patron's presence at the terminal shortens the time required for either the reference interview or for the follow-up with the patron.

COSTS

All the data on times can be translated into costs, using salary and fee schedules. The procedure followed was to calculate directly the actual costs for each search based on the time required, the salary of the person performing the task, and the data base(s) used.

The mean salary costs for each task, by library, are presented in Table 4. The figures for the individual libraries cluster reasonably around the means for the group as a whole. The one exception is originating library figures, for which only San Mateo County had enough observations to be meaningful. The costs were quite low, averaging $1.03 for the reference interview, $1.95 for originating library preparation, $1.02 for DIALOG library preparation, $1.16 for follow-up at the DIALOG library, $1.07 for originating library follow-up, and finally $.74 for the postsearch time spent with the user.

Table 4. Mean Salary Cost per Task by Library (in Dollars)

	Mean Task Cost by Library				
Task	*Redwood City*	*Santa Clara County*	*San Mateo County*	*San Jose*	*Overall Mean*
Reference Interview	$1.04	$1.21	$1.02	$ .80	$1.03
Originating Library Preparation	1.14	.76	2.10	.45	1.95
DIALOG Library Preparation	1.21	1.06	.97	.87	1.02
Search	2.03	2.83	1.47	2.70	2.24
DIALOG Library Follow-up	.87	1.17	1.61	.87	1.16
Originating Library Follow-up	.53	1.39	1.08	—	1.07
Follow-up with Patron	.79	.75	.81	.60	.74

Table 5 presents another analysis of the costs incurred in the on-line search itself. The overall average was $17.29 for computer time, $9.16 for off-line printouts, and $2.24 for the labor at the terminal. This, combined

with $5.02 for all other labor (detailed in Table 4), brings the cost for the entire search process, for all libraries, to an average of $28.41.

The individual libraries differed significantly from this mean, ranging from a low of $19.74 (San Mateo County) to a high of $35.19 (San Jose) and $35.17 (Santa Clara County). Redwood City was a little below the average at $25.33. No one item accounts for the differences.

Table 5. Search Costs (in Dollars)

	Mean Task Cost by Library				
Cost Element	*Redwood City*	*Santa Clara County*	*San Mateo County*	*San Jose*	*Overall Mean Cost*
Data Base Charges	$14.51	$22.16	$10.55	$23.69	$17.29
Off-Line Print Charges	9.73	12.60	3.64	12.96	9.16
Search Labor Cost	2.03	2.83	1.47	2.70	2.24
Labor Cost for All Other Tasks	3.64	5.91	6.22	4.93	5.02
Total Cost of Search*	25.33	35.17	19.74	35.19	28.41

* The total cost is not additive due to differences in the number of observations for each cost element.

COMBINATIONS OF TASKS

In the description of the DIALOG process as it is performed in each library, it was pointed out that the libraries differed in the emphasis placed on different tasks. For instance, one library made no special effort to perform either a reference interview or to spend postsearch time with the patron. On the other hand, another library tried to have the patron submit to a reference interview with a DIALOG staff member.

The greatest number of tasks that might possibly be performed would be for a search that originated in a library without a DIALOG terminal, for which all seven tasks listed on the time sheet could be performed. For a request originating at a DIALOG library, the maximum number of tasks would be five, eliminating the two tasks that are specific to non-DIALOG libraries.

Table 6 shows the 11 (out of 128 possible) combinations of tasks that were most frequently performed. These 11 accounted for 328 of the searches performed, or 80 percent. The most-used single pattern of tasks was number ten in Table 6. This pattern consisted of reference interview, DIALOG preparation, search, DIALOG follow-up, and a follow-up with user; the "complete" DIALOG library pattern. The next most common was pattern seven, the same as ten but with the DIALOG preparation omitted. Given that different patterns of tasks mean that more or fewer steps are performed for each search, it follows that different patterns result in different costs.

Table 6 also shows the mean total search cost for each of the frequently occurring combinations of tasks. The lowest overall mean is the sixth

Table 6. Most Frequent Combinations of Tasks Performed for DIALOG Searches and Total DIALOG Search Cost for These Combinations

Combination Number	Combination of Tasks							Frequency of Occurrence	Mean Total Search Cost for this Combination
	Reference Interview	Originating Library Preparation	DIALOG Library Preparation	Search	DIALOG Library Follow-up	Originating Library Follow-up	Follow-up with User		
1	0	0	0	1	0	0	0	21	15.67
2	0	0	0	1	1	0	0	22	25.50
3	0	0	1	1	1	0	0	21	25.97
4	0	0	1	1	1	0	1	11	25.97
5	1	0	0	1	0	0	0	35	23.43
6	1	0	0	1	0	0	1	10	9.75
7	1	0	0	1	1	0	0	44	28.13
8	1	0	0	1	1	0	1	41	38.08
9	1	0	1	1	1	0	0	40	31.09
10	1	0	1	1	1	0	1	70	34.23
11	1	1	1	1	1	1	0	13	26.07

Note: 0 indicates task not performed; 1 indicates task was performed.

instance, which consisted of a reference interview, the search, and follow-up with patron.

Interestingly, the bare bones search—no task performed other than the actual on-line search—although inexpensive, at $15.67 (number one), was the second least expensive combination.

The most expensive combination, considering all libraries together, was combination number eight, reference interview, search, DIALOG library follow-up, and follow-up with user, at $38.08. The next most expensive was pattern number ten, which includes all the tasks in combination eight plus DIALOG library preparation. The additional task lowered the cost to $34.23. These data on task combinations imply that there is no direct correlation between the number of tasks performed and the cost of the search.

ELAPSED TIME

Two measures of time are important to the user of any kind of search service. One is the time that the user or his/her surrogate actually spends on the search. The use of on-line searching reduces this measure from hours, even days, which must be spent leafing through abstracting and indexing publications, to only minutes spent conferring with the search personnel.

The second measure is waiting time—how long the user must wait from the initiation of the request until the results are received. The waiting time is an indication of how quickly the search service processes the request.

The mean time that requests spent in the system, from the first patron contact until the last task (whatever that was) for all of the libraries together was 7.79 days (calendar, not working, days). For the individual libraries the figures were: Redwood City, 6.02 days; Santa Clara County, 4.87 days; San Mateo County, 14.67 days; and San Jose, 6.79 days. The minimum time possible is one day, and that is for same-day service. In addition, all of the libraries would expedite rush requests, if the patron had a good reason.

When the distribution of waiting time over the tasks performed was further analyzed, the extreme value for San Mateo County was explained by the high incidence of participation of other libraries. An average of five days elapsed between the time that the originating library and the DIALOG library worked on the request before the search, and six days between the time that the DIALOG library finished with it and the originating library took some action after the search. Although the reason for relaying request from branch libraries was the patron's convenience, the patron paid for it in delayed results.

SUMMARY AND CONCLUSIONS

This study has reported the costs of on-line bibliographic searching in

four public libraries in the San Francisco Bay Area using the Lockheed DIALOG system. This study was conducted during a period when search time was provided to the libraries without charge and the searchers were moderately experienced. It was found that there were seven different tasks involved in the search process. In the course of the study thirty-five individuals from the four libraries reported their own processing times for 411 search requests.

Two limitations should be considered in evaluating the results of this study. One is the self-reporting nature of the data. Participants recorded time spent on search tasks rather than being observed and measured by others. Consequently, a possible bias is introduced, depending on the accuracy with which the searchers recorded their times. A second limitation is the experimental nature of the project. On-line searching of the DIALOG system was provided at no cost to the public libraries through a grant from the National Science Foundation. Thus the searchers were under little economic pressure to perform effectively.

Considerable variation in the time required to perform search tasks was found between libraries and between searchers. For example, the average connect time to a data base for an individual search was 22.72 minutes. But this varied from 19.63 minutes at one library to 30.42 minutes at another to 28.31 minutes at a third. Similar variations were found in the overall cost of a bibliographic search: one library's average was $25.38, another's was $35.17, the third was $19.74, and the fourth $35.19. The overall average for the 411 searches was $28.41. The most expensive portion of the overall cost was the actual on-line search time, which averaged $17.29 for all searches. The next most expensive element of the total cost was that of off-line prints—this averaged $9.16 for all searches.

The only element that was omitted from the cost calculations was telephone line charges. This was due to the fact that the four libraries were in close physical proximity to Lockheed's computer center. If this situation did not hold for other searching locations it would be necessary to add the telephone costs. Assume a $15 per hour telephone connect charge through a utility such as TYMNET, and a mean search time of 22.72 minutes. This results in an average telephone charge of $5.68 which, when added to the $28.41 search total, totals $34.09 for the average search.

An understanding of the cost of on-line searching is an important step in evaluating this relatively new technological development. But there are many other issues that need to be studied. It seems particularly important to conduct a comparative cost analysis of manual searching and on-line searching for a similar set of requests. In addition, the costs of the search should be analyzed with respect to measures of user satisfaction in order to arrive at the cost-effectiveness of the process. Little is known about searchers' behavior at a terminal; this should be studied in relation to user satisfaction and search cost. Finally, there are some slight suggestions in the present results that costs are minimized when one spends more time

performing a reference interview or research before beginning an on-line search. This issue needs to be explored further.

The economics of on-line searching are beginning to be understood. Considerable additional work needs to be conducted before the picture is complete.

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A Performance Prediction Model for Bibliographic Search for Monographs Using Multiple Regression Technique

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Possibilities of using regression techniques for predicting, evaluating and controlling the performance of bibliographic search procedures are explored. "Least time" search sequences for bibliographic searching are determined.

BACKGROUND AND INTRODUCTION

Libraries, like other organizations, are concerned with operating requirements that include scheduling, planning work assignments, cost estimation, forecasting, budgeting, manpower control and performance evaluation. Many of these requirements may be performed inadequately because of the inability to estimate manpower requirements for a given volume of work.

This paper explores the possibility of developing a methodology which could be used in studying and establishing manpower requirements, setting production standards, and thus being able to evaluate and control the performance of various departments of a library.

Data for this study were collected from the University of Windsor Library. The book collection of this library is estimated as 800,000 volumes and is growing at a rate of 8 percent per year. The library has a collections development department, which consists of seven bibliographers. Each bibliographer serves two or more teaching departments, depending upon his or her educational training.

The Technical Services Division of the library is comprised of four main departments—cataloging, monographs, processing, and serials. In order to make a book available to the patrons rapidly, these departments have to work together as one systematic unit.

For purposes of this study, the monographs department was selected. This department acts as the intermediary department between the collec-

tions development department and the cataloging department, performing the following functions:

1. Receive requisitions for books from the library bibliographers.
2. Determine if the requisitioned book is already available in the library collection.
3. Check requisitions for bibliographic accuracy and correct errors.
4. Prepare and send purchase orders.
5. Follow up orders.
6. Route items received to the cataloging department.
7. Maintain statistics.

Most of the aforementioned functions performed by the department consist of long cycles, have random demand patterns, and involve clerical operations. The conventional techniques available for work study cannot adequately measure such activities.

Before developing a prediction model for the output of searchers, we made studies to determine the searching sequence so that the expected time of searching was minimized. The conditional probabilities indicating the success of various bibliographic searching tools along with the time for various searching sequences were calculated. The relationship between the time needed to process a requisition and other variables was studied. A linear regression model for predicting the productivity of the searchers was developed. The validation of the model was carried out using the day-to-day functioning of the department.

LITERATURE SURVEY

A survey of library literature indicates that two studies were carried out for deriving least time sequences for bibliographic search. The first study was done by Lazorick and Minder.[1] They took a random sample of twenty-five English-language requisitions and asked the searchers to check each of the five sources, namely *Library of Congress Catalog (LC), Cumulative Book Index (CBI), Books in Print (BIP), Publishers Trade List Annual (PTLA),* and Library of Congress proofslips (PS) to see if the items could be identified with adequate bibliographic details. The percentage of time adequate information found was recorded for each bibliographic tool. Another searcher was given five random samples of ten requisitions and was asked to search the samples in the five bibliographic sources, while being timed separately for each source. The optimum sequence was determined by taking the time consumed to the percent of success and ordering the tests such that the ratios will be in increasing sequence. Their resultant sequence was *BIP, PTLA,* PS, *CBI,* and *LC.*

Lazorick and Minder, in deriving the aforementioned optimum sequence, employed Mitten's technique, which can be stated as follows:

1. For each test, compute the ratio C/R, where C is the cost of the test and R the probability of rejection in that test.

2. Run the test with smallest value for the above ratio first, the one with the second smallest ratio second, . . . , and the test with the largest ratio last.[2]

Fristoe tried to find a sequence involving the least number of searches in bibliographic tools.[3] He based his least time sequence on a purely nonmathematical approach of "minimum number of searches" to get adequate bibliographic information. He started the project with 100 requisitions of current American imprints (all in English) and went through six bibliographic tools (PS, *NUC (National Union Catalog), BPR (American Book Publishing Record), PW (Publishers Weekly), PWA (Publishers Weekly Announcements),* and *CBI*) to see if adequate information was available. After the initial search he found that whatever information he found in *NUC* was also found in PS, *PW* and *BPR*. So he eliminated those tools, except for PS, and was left with PS, *PWA* and *CBI*. He then conducted searches through these three tools in their six possible combinations. He found that the sequence PS, *PWA* and *CBI* was the one which required the least number of searches.

From the above description it can be noted that the previous researchers, in deriving least time sequences, took a small sample of English-language monographs and American imprints. Fristoe based his study on a purely nonmathematical approach. Lazorick and Minder employed Mitten's technique, which does not take into account the conditional probabilities of events.

The present study is based on a large sample of publications which include not only the English language but also other languages, such as French, German, Russian, etc. This study treats the subject using the concepts of conditional probability. It is believed that using conditional probabilities increases the accuracy of the results.

SEQUENCING AS APPLIED TO SEARCHING OPERATION

After a requisition is received, the monographs department verifies the bibliographic information. This operation is necessary to avoid duplication of material already in the library or on order and to ensure that the correct item is ordered.

In this study, a bibliographic searching operation is viewed as an inspection operation in which a searcher uses various available tools to check the correctness of the requisition. The operation is completed as soon as the bibliographic entries in the requisition are verified.

In order to find the expected time of bibliographic searching, a number of bibliographic tools are used in a particular sequence. For this, the Denby method is employed.[4] Denby's model deals with the sequencing of inspection of operations. We assume that a device consisting of n components has failed and each of the n components must be inspected in order to locate the defective component.

If the components (bibliographic searching tools) are examined in the sequence i, j, k, the expected time required to determine the defective components is the time required to examine i, times the probability that i caused the failure, plus the time required to examine j, added to the wasted time of examining i, times the probability that j caused the failure, plus the time required to examine k, added to the wasted times of examining i and j, times the probability that k caused the failure. Calculating the expected time of the sequences, one chooses the sequence which gives the minimum expected time. Expressed mathematically:

$$E(T/i,j,k) = T_i \times P(i/F) + (T_i + T_j) \times P(j/F) + (T_i + T_j + T_k) \times P(k/F) + \ldots \quad (1)$$

It can be extended to any number of components.

PROCEDURE

To calculate the least expected time of the bibliographic search, the following two elements are needed:

1. The conditional probabilities of finding the bibliographic information for a requisition in a particular bibliographic tool, given the success of obtaining such information in other tools;
2. The time required to do the search.

CONDITIONAL PROBABILITIES

Five hundred requisitions of monographs over a period of a year (October 1970 to October 1971) were randomly selected. The staff of the monographs department was asked to go through the *Cumulative Book Index, British National Bibliography (BNB), Forthcoming Books (FB),* Library of Congress proofslips, *Library of Congress Catalog, Canadiana (CAN),* and *Publishers Trade List Annual* and try to find adequate bibliographic information in each of them. This information was recorded by the searchers as shown in Table 1.

Table 1. Sample Requisition Searches

Requisition Number	*CBI*	*BNB*	*FB*	*PS*	*LC*	*CAN*	*PTLA*
1	X	X	–	–	X	–	X
2	–	X	X	–	–	X	X
3	X	–	–	–	X	–	–
4	–	X	–	X	X	–	X
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

The data obtained from this study are displayed in Table 2.

Table 2. Total Sample Requisition Searches

Number of Requisitions	*CBI*	*BNB*	*FB*	*PS*	*LC*	*CAN*	*PTLA*
500	161	78	71	161	307	22	203

These figures show that *LC*, PS, *CBI*, and *PTLA* were significant bibliographic tools.

The conditional probability of finding the bibliographic information for a requisition in a particular bibliographic searching tool, when success of finding bibliographic information in the bibliographic searching tools is given, may be expressed as follows:

$$P(T_i/S) = \frac{P(T_i \cdot S)}{P(S)}$$

where T_i = the ith bibliographic searching tool

$S = \sum_{i=1}^{4}$ number of requisitions found in a T_i

The conditional probability of finding the bibliographic information for a requisition in the $CBI = \frac{161}{2{,}000} \times \frac{2{,}000}{832} = 0.1935$

Similarly, the conditional probability of finding the bibliographic information for a requisition in *PS*, *LC*, and *PTLA* is calculated as 0.1935, 0.369, and 0.244, respectively.

TIME CALCULATION

Seventy-five sample requisitions were selected over a period from October 1971 to January 1972. The staff of the monographs department was asked to go through twenty-four possible sequences of *LC*, PS, *CBI*, and *PTLA* and record the time on the pro forma shown in Fig. 1.

Tools	*Time*	*Tools*	*Time*	*Tools*	*Time*	*Tools*	*Time*
LC	(1)	LC	(1)	LC	(1)	LC	(1)
PS	(2)	PS	(2)	CBI	(3)	CBI	(3)
CBI	(3)	PTLA	(4)	PS	(2)	PTLA	(4)
PTLA	(4)	CBI	(3)	PTLA	(4)	PS	(2)

Fig. 1. Form for Recording Time Sequences for Searching.

To find the least time sequences the following equation was used (Denby's method):

$$E(T/i,j,k,e) = T_i \times P(i/S) + (T_i+T_j) \times P(j/S) + (T_i+T_j+T_k) \times P(k/S) + (T_i+T_j+T_k+T_e)\ P(e/S)$$

where T_m = time of search in the mth tool where $m = 1,2,3,4$
and $P(m/S)$ = conditional probability of search in the mth tool given success (S) where $m = 1,2,3,4$ and i,j,k,e are 1,2,3,4, respectively.

To evaluate the above equation a computer program was designed. The least time sequences for twenty-five requisitions were obtained as shown in Table 3.

Table 3. Least Time Sequences for Sample Requisitions

Requisition Number	*Least Time Sequence*
1	4 3 1 2
2	4 2 1 3
3	4 2 1 3
4	1 2 3 4
5	4 3 1 2
6	4 3 1 2
7	1 2 4 3
8	1 2 3 4
9	1 4 3 2
10	2 1 3 4
11	3 4 1 2
12	2 4 1 3
13	2 4 1 3
14	1 4 3 2
15	4 1 3 2
16	1 3 4 2
17	1 4 3 2
18	4 3 2 1
19	4 2 1 3
20	4 2 1 3
21	4 2 1 3
22	4 1 2 3
23	4 2 1 3
24	4 1 3 2
25	3 2 1 4

The reason for selecting twenty-five requisitions was to have only those requisitions which were found in all the bibliographic tools.

It can be inferred from the least time sequences shown in Table 3 that the most preferred least time sequence of searching is 4 2 1 3 or *Publishers Trade List Annual*, Library of Congress proofslips, *Library of Congress Catalog*, and *Cumulative Book Index*. Based on this finding, a procedure for the bibliographic searching was recommended (Figure 2).

PREDICTION MODEL

To predict the output of the monographs department, a model was developed which is based on the multiple-regression technique. The model is:

$$T = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 \qquad (2)$$

where a is the intercept and b_1, b_2, b_3, b_4 are regression coefficients.

The total time in a day (T) was calculated as the number of searchers divided by seven working hours each day and was treated as the dependent variable. Miscellaneous jobs performed, such as preparing monthly statistics, etc., were assumed to be indirectly related to other works. The other independent variables were the number of requisitions processed x_1, the

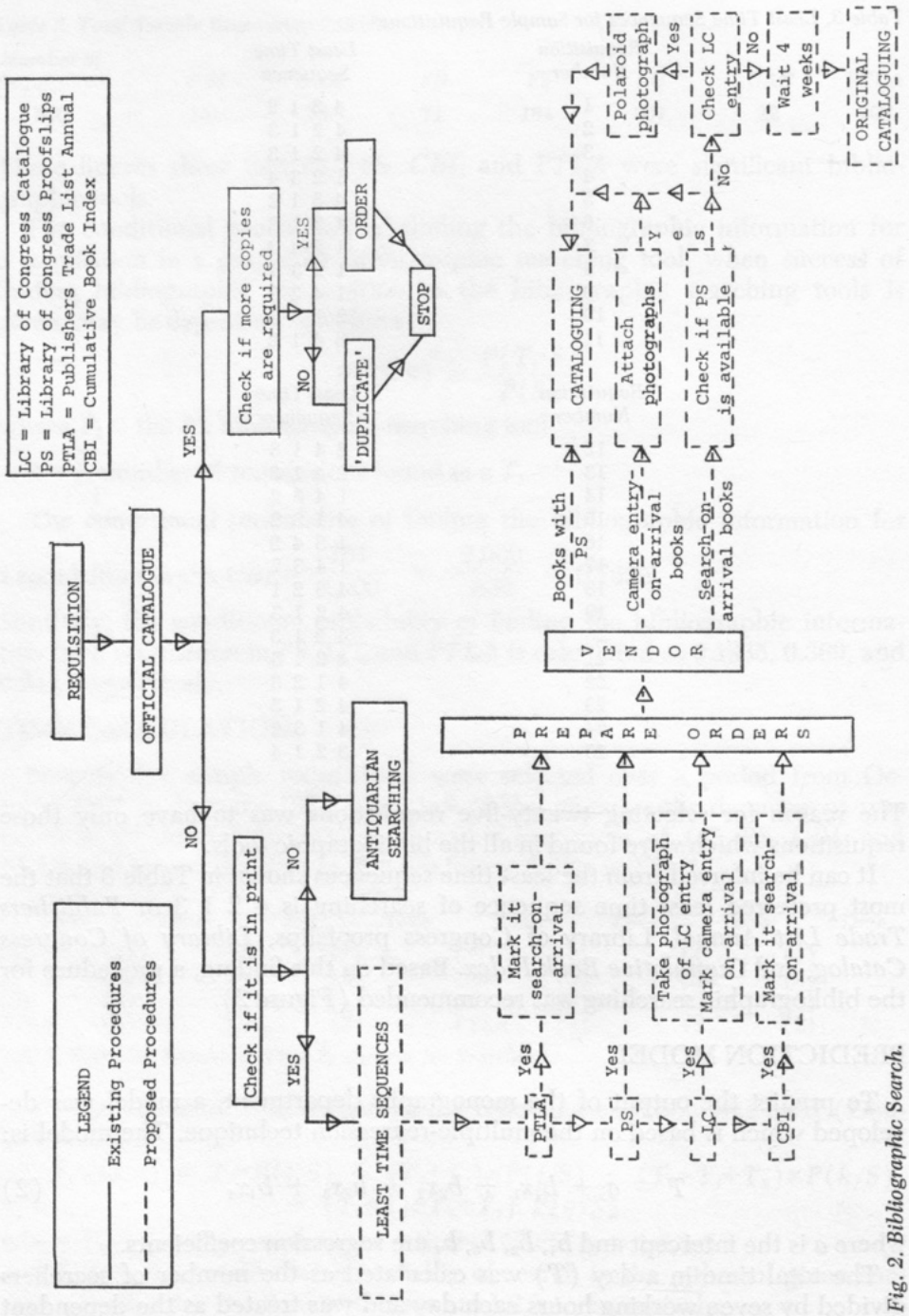

Fig. 2. Bibliographic Search.

number of search-on-arrival books x_2, the number of photographs taken for LC entry x_3, and the number of proofslips filed x_4. The staff of the monographs department was asked to record the daily output in the sample pro forma shown in Fig. 3.

Time (T)	*No. of Requisitions Searched (x_1)*	*No. of Search-on-Arrival (x_2)*	*No. of Photos Taken (x_3)*	*No. of PS Filed (x_4)*
8:30–9:30				
9:30–10:30				
10:30–12:00				
12:00–1:00				
1:00–2:00				
2:00–3:00				
3:00–4:00				

Fig. 3. Form for Recording Departmental Output.

Data for a period of sixty days from January 17, 1972, to February 28, 1972, and from May 23, 1972, to July 4, 1972, were collected. The results obtained by the computer run are shown in Table 4.

Table 4. Regression Coefficients

	Variable Number	*Correlation**	*Regression Coefficient*	*Computed T-Value*
x_1	2	.140	b_1 = .0818	4.00
x_2	3	.408	b_2 = .1144	5.34
x_3	4	.001	b_3 = .0139	0.75
x_4	5	.386	b_4 = .0032	3.90

Intercept: a = 46.842

Substituting the values of the intercept, the regression coefficients b_1, b_2, b_3, and b_4 in the regression equation (2), the model would be:

$$T = 46.842 + .0818x_1 + .1144x_2 + .0139x_3 + .0032x_4$$

Multiple Correlation: .671
Standard Error of Estimate: 7.9

Table 5. Analysis of Variance

Source of Variation	*Degrees of Freedom*	*Sum of Squares*	*Mean Squares*	*F-Value*
Attributable to Regression	4	2,936	733.8	11.8
Deviation from Regression	55	3,433	62.4	
Total	59	6,369		

* The correlation values are significant at a 90 percent level of confidence.

ANALYSIS OF PREDICTION MODEL

The statistical details of the model are analyzed as follows:

Correlation—All the independent variables have a positive correlation. There is no significant positive correlation in the case of the third independent variable (LC photographs taken).

t-Values—For 90 percent confidence, the computed t-values are found to be significant except x_3.

Multiple Correlation—The coefficient is .67 which is considered to be adequate.

Standard Error of Estimate—With a 95 percent confidence interval the errors of prediction should be within $\pm 1.96Se$ where Se is the standard error of estimate.

$$\pm 1.96Se = 1.95 \times 7.9 = \pm 15.484$$

It was observed from the residual tables, which were prepared by a computer program, that only one observation lies outside the interval. The prediction, therefore, is fairly good.

F-test—With numerator n as 4 and denominator m as 55, from the F-distribution table, it is found that F-ratio is 2.55 with 95 percent confidence. The computer result shows that it is 11.8. A significant relationship exists between the dependent variable and the independent variables (Table 5).

REVISED PREDICTION MODEL

As the number of photographs taken (x_3) was statistically insignificant, this variable was dropped. The model after exclusion of x_3 was:

$$T = a + b_1x_1 + b_2x_2 + b_4x_4 \qquad (3)$$

The program was run again for another set of results as shown in Table 6.

Table 6. Regression Coefficients

	Variable Number	*Correlation**	*Regression Coefficient*	*Computed T-Value*
x_1	2	.14	b_1 = .07955	3.95
x_2	3	.41	b_2 = .11492	5.39
x_4	4	.39	b_4 = .00315	3.84
Intercept: a = 47.778				

* The correlation values are significant at a 90 percent level of confidence.

Substituting the values of the intercept, the regression coefficients b_1, b_2, and b_4 in the regression equation, the model would be:

$$T = 47.778 + .0796x_1 + .115x_2 + .003x_4$$

Multiple correlation: .675

Standard Error of Estimate: 7.87

Table 7. Analysis of Variance

Source of Variation	*Degrees of Freedom*	*Sum of Squares*	*Mean Squares*	*F-Value*
Attributable to Regression	3	2,900	966	15.6
Deviation from Regression	56	3,468	61.9	
Total	59	6,368		

ANALYSIS OF THE REVISED PREDICTION MODEL

The statistical details of the model are analyzed as follows:

Correlation—All the independent variables have a significant positive correlation.

t-Values—For 90 percent confidence the t-values computed are significant.

Multiple Correlation—This is 0.675, which shows an improvement over the first prediction model. It means that the model has a better prediction value.

Standard Errors of Estimate—The errors of prediction should lie within $\pm 1.96Se$ where Se is the standard error of estimate.

$$\pm 1.96\text{Se} = \pm 1.96 \times 7.87 = \pm 15.47$$

It was observed from the table of residuals, which were calculated by the computer for the revised prediction model, that only one residual observation lies outside +15.47 and −15.47. So the prediction is considered to be reasonably adequate.

F-Test—The value from the result is 15.6 and from the table with n as 3 and m as 55 it is 2.78, indicating a significant relation between dependent and independent variables with a 95 percent level of confidence (Table 7).

VALIDITY OF PREDICTION MODEL FROM DAY-TO-DAY WORK

From the monthly statistical reports of the monographs department, the values of x_1 (number of requisitions searched), x_2 (number of search-on-arrivals), and x_4 (number of proofslips filed) were obtained for March 1972, December 1972, January 1973, and February 1973. These values were substituted in the revised prediction model as follows:

March 1972

$x_1 = 2{,}829$, $x_2 = 1{,}641$, $x_4 = 25{,}684$ and the number of working days = 25

$$T = 47.77 + \frac{.079\times 2{,}829}{25} + \frac{.115\times 1{,}641}{25} + \frac{.003\times 25{,}684}{25} = 67.34$$

Number of working hours per day = 7

$$\text{Predicted number of searchers} = \frac{67.34}{7} = 10$$

Actual number of searchers = 15

December 1972

$x_1 = 1{,}287$, $x_2 = 721$, $x_4 = 8{,}896$ and number of working days = 17

$$T = 47.77 + \frac{.0796 \times 1{,}287}{17} + \frac{.115 \times 721}{17} + \frac{.003 \times 8{,}896}{17} = 60.38$$

Number of working hours per day = 7

Predicted number of searchers = $\frac{60.38}{7} = 9$

Actual number of searchers = 12

January 1973

$x_1 = 2{,}271$, $x_2 = 1{,}053$, $x_4 = 24{,}601$ and number of working days = 22

$$T = 47.77 + \frac{.0796 \times 2{,}271}{22} + \frac{.115 \times 1{,}053}{22} + \frac{.003 \times 24{,}601}{22} = 64.84$$

Number of working hours per day = 7

Predicted number of searchers = $\frac{64.84}{7} = 9$

Actual number of searchers = 13

February 1973

$x_1 = 2{,}179$, $x_2 = 1{,}290$, $x_4 = 11{,}702$ and number of working days = 19

$$T = 47.77 + \frac{.0796 \times 2{,}179}{19} + \frac{.115 \times 1{,}290}{19} + \frac{.003 \times 11{,}702}{19} = 75.69$$

Number of working hours per day = 7

Predicted number of searchers = $\frac{75.69}{7} = 11$

Actual number of searchers = 12

The summary of validation calculations are shown in Table 8.

Table 8. Summary of Validation Calculations

Month/Year	*Predicted Number of Searchers*	*Actual Number of Searchers*
March 1972	10	15
December 1972	9	12
January 1973	9	13
February 1973	11	12

CONCLUSION

The regression model as developed in this work is useful in exercising control over the output and manpower requirement of the monographs department. Based on the study, the library has reduced the number of searchers without any decrease in productivity. The same technique can be employed in developing regression models for other departments of a library. We hope that other libraries may benefit from this study.

ACKNOWLEDGMENT

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The authors wish to thank the reviewers for providing valuable comments.

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Survey of Data Collection Systems for Computer-Based Library Circulation Processes

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The purpose of this study is to present a comparative analysis of operational data collection systems used in library circulation processes. This study should provide an initial guide to library administrators in the selection of such systems.

A survey was conducted of libraries with computer-based circulation departments asking for a description of the equipment in use and an evaluation of the system. Equipment manufacturers were contacted to obtain complete descriptions of the capabilities and characteristics of various data collection systems.

Summaries and analysis of responses from both the manufacturers and the libraries are included.

In recent years, the increased capacity for file storage and sorting and the increased speed of processing have made the computer a valuable tool for file-processing applications of the type used in the circulation process. The availability of computer time was once a big problem for libraries, but the multiprogramming capability of modern computers has enabled computing centers to give better and more timely service.

Data collection processes (recording the transactions in machine-readable form) have also been improved. The ability to collect data on magnetic storage instead of punched cards has increased the speed of collection and reduced the noise level. Photoelectric (instead of wire brush) reading of punched cards has aided the accuracy of collected records. Programmable terminals with panel lights can now guide the operator in collecting and handling circulation transactions.

A survey was conducted of over 330 libraries requesting a description and an evaluation of the data collection system used in each circulation department. The libraries were selected from references in library automation literature either by citation or inclusion in previous surveys. Also all state universities and other major universities were contacted.

Responses were received from over 200 libraries, about 80 of which have manual systems. There was no way to distinguish between computer-based and non-computer-based manually punched card systems, so these responses were not analyzed. Also the photographic systems, Recordak and Regiscope, were omitted because only the transaction number is machine-readable, which does not allow book or borrower searches. The on-line systems which use only keyed input were also omitted, leaving eighty-one responses on the data collection systems.

DATA COLLECTION SYSTEMS IN USE

There are several data collection systems currently in use. Most were designed for industrial purposes but can be adapted to a library inventory control application. Some new companies are designing specific library systems, selecting hardware from a variety of manufacturers to form a configuration which specifically performs library procedures. In either case, a data collection system for computer-based circulation procedures should:

1. be convenient to users and staff,
2. collect complete and accurate records of borrower, material, date of transaction, and type of transaction, and
3. make records easily and rapidly accessible.

Over forty companies were contacted for this study to solicit literature and information on existing library circulation data collection systems and hopefully to stir the imagination of some which had not previously had experience in the field. An attempt was made to obtain information on each system concerning input and output possibilities, error checks of the machinery, operating procedures, and cost (see Appendix).

The survey indicated that three systems, the IBM 357, Mohawk Data Sciences, and IBM 1030, were most frequently reported, accounting for almost 75 percent of the applications. As shown in Table 1, five other systems make up the remaining 25 percent of the applications. Data reported for IBM System 7, CLSI, and Singer System Ten are too limited to support detailed comparisons or general conclusions but are included in this report for information.

Table 2 gives some of the capabilities and characteristics of the data collection systems available at this time. Detailed cost figures are difficult and costly to obtain and usually require many assumptions or arbitrary cost distribution for shared processes. The figures included here do not attempt to cover circulation costs; they represent only the best available estimate of the monthly rental cost, excluding service and maintenance contracts, for a system with two input stations. In some systems, this figure includes extended computer processing; in others it does not. It is hoped that this will give at least a rough relative cost for the various types of equipment.

The Addressograph, Standard Register, and IBM 357 systems have the advantage of having date due and return record automatically produced,

*Table 1. User Evaluation of Data Collection Systems for Library Circulation Processes**

Manufacturer	Number of Responses	Average Annual Circulation	Average and Standard Deviation†									
			Reliability	SD	Accuracy	SD	Speed	SD	Noise	SD	Ease‡	SD
Addressograph	6	168,000	2.2	1.0	2.3	1.2	2.1	.4	2.5	1.0	2.8	.4
Standard Reg.	8	130,000	2.6	.5	2.7	.5	2.3	.7	1.5	.8	3.1	.6
IBM 357	27	174,000	2.5	.7	2.9	.7	2.7	.9	1.3	.5	2.7	1.0
Mohawk	20	295,000	2.8	.8	2.9	.9	3.6	.5	3.1	.8	3.2	.6
IBM 1030	14	289,000	2.9	.7	3.1	.9	3.4	.6	3.2	.9	3.5	.7
IBM System/7	2	160,000	3.0	1.4	3.5	.7	3.5	.7	2.5	.7	3.0	1.4
CLSI	3	1,547,000	3.3	.6	3.5	.7	3.5	.7	2.0	1.0	3.3	.6
Singer	1	592,000	3.0		4.0		3.0		1.0		4.0	

* Results from eighty-one responding libraries in survey taken Fall 1974.
† Poor = 1, Fair = 2, Good = 3, Excellent = 4.
‡ Ease of training staff.

Table 2. Summary of Characteristics of Data Collection Systems

Manufacturer	*Input*	*Output*	*Due Date Notification*	*On-Line File Inquiry*	*Speed**	*Approximate Monthly Cost*
Addressograph	Embossed Badges, Keyboard	Card	Punched Card	None	Unavailable	Unavailable
Standard Register	Card, Badge, Keyboard	Card	Punched Card	None	10.8	$150
IBM 357	Card, Badge, Cartridge or Keyboard	Card	Punched Card	None	6.0	350
Mohawk	Card, Badge, Keyboard	Magnetic Tape	Stamped	None	4.5	890
IBM 1030	Same as IBM 357	On-Line	Printed Slip	All Files	6.0	500
IBM Sys/7-2790	Card, Badge, Keyboard	Disk, Panel	Printed Slip	Delinquent Borrower and Requested Books	Unavailable	2,400
CLSI	Bar-Encoded Labels, Keyboard	Disk, Display	Stamped	All Files	Unavailable	2,000
Checkpoint	Same as CLSI	Magnetic Tape	Stamped	Same as IBM 7	7.0	1,160
Singer	Card, Badge	Disk, Magnetic Tape	Stamped	All Files	Unavailable	Unavailable

* Seconds per charge transaction.

and low operating cost. The disadvantage of these systems is the high noise level and lack of operator assistance.

The Mohawk Data Sciences system gives a marked increase in speed and improvement in noise level. Also the magnetic tape of transaction records can be delivered for batch processing more easily than trays of cards. The availability of seven digits of time data allows accurate sequencing of records concerning the same book so that the most recently processed record is recognized. The main disadvantage is the lack of any automatic date due information, requiring the staff to hand stamp each item.

The IBM 1030, if on-line, allows access to all files but has only a few indicator lights to aid the operator, while the IBM System/7-2790 can access only the files of delinquent borrowers and requested books, but has a panel with nine transaction buttons and a programmed display to guide the operator.

The CLSI system allows access to all files; has indicator lights to signal delinquent borrowers, requested books, and data requirements; but requires that the date due be stamped on borrowed material. At much less cost, Checkpoint searches a 2,000-address core storage on charge transactions for borrower validity and, on returns, for request status. The transactions are recorded on magnetic tape for batch processing. The date due has to be manually stamped. The Singer System Ten allows on-line inquiry of all files and produces a magnetic tape for updating the files by batch processing.

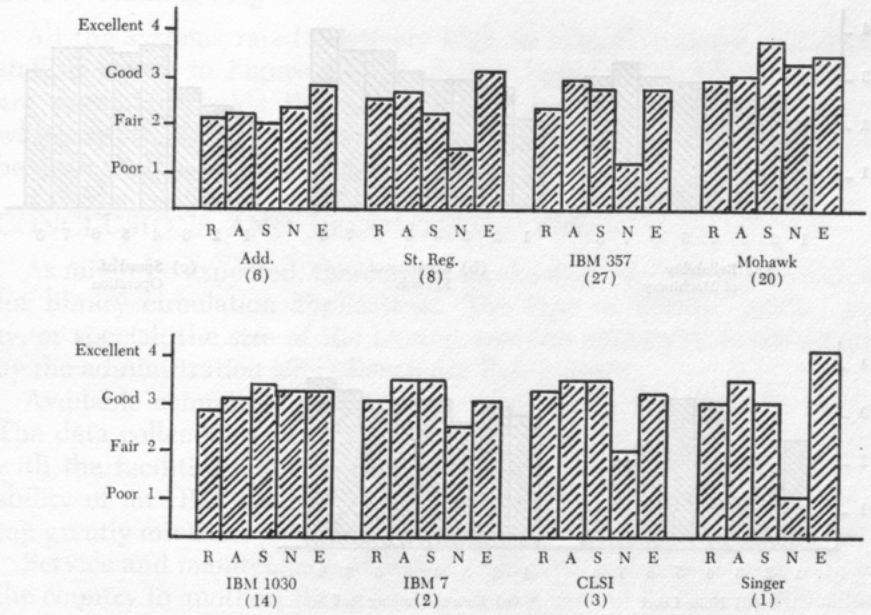
More and more libraries are finding the query of delinquent borrower files a necessity for the desired level of control of loaned materials. A much higher level of service is offered in speedy, quiet transactions for the patrons and in immediate detection of requested material. This also allows books to be available for circulation more quickly.

The administrators of a library do have a wide choice of circulation data collection systems to choose from at a wide range of costs. This includes systems offering a variety of features suitable for libraries of different sizes, different types, and different levels of service.

SYSTEM EVALUATION

Respondents were asked to rate the performance of their systems with respect to reliability, accuracy, speed, noise level, and ease of staff training. For each attribute, a performance level of poor, fair, good, or excellent was recorded. These criteria were rated on a numeric scale of one to four for the purpose of analysis.

Table 1 presents the mean rating recorded for these evaluations, along with the standard deviation of each. While it is difficult to draw firm conclusions from such subjective data, it is interesting to note that most responses range from fair to good, with only a few attributes scoring in either the poor or excellent categories.



Legend
R—Reliability of Machinery
A—Accuracy of Records
S—Speed
N—Noise Level
E—Ease of Training Staff
(6)—Numbers in parentheses indicate number of responses

Fig. 1. User Evaluation of Performance of Data Collection Systems (Survey Taken Fall 1974).

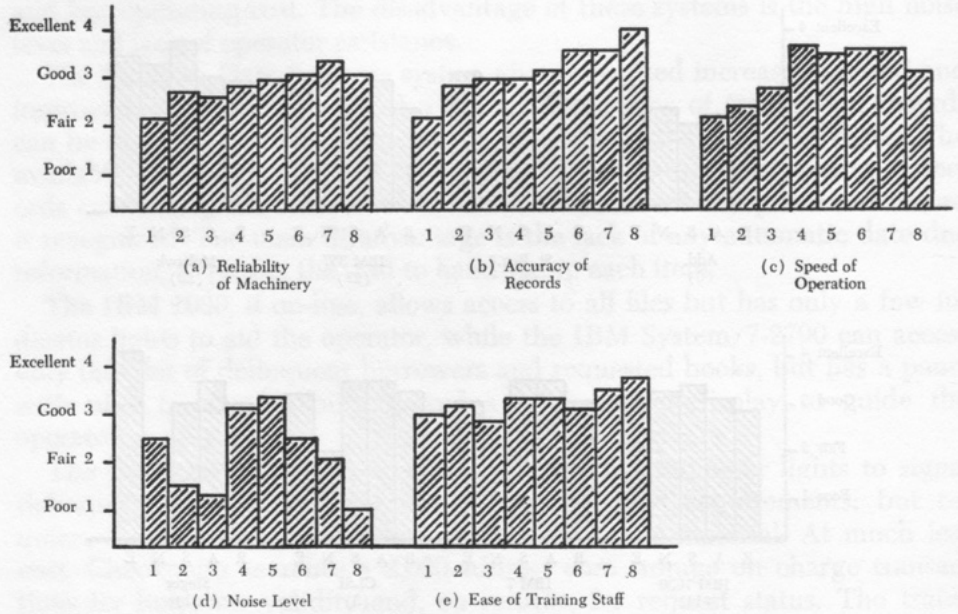
Overall system performance is more easily seen through examination of Figure 1. It is at once apparent that users were most dissatisfied with the noise level of automated data collection systems and generally most satisfied with processing speed and ease of training. In all cases, respondents rated system accuracy higher than machine reliability.

Reliability of Machinery

Figure 2(a) shows that Mohawk, IBM 1030, and the newer systems are rated best on reliability of machinery. This is probably explained by the lack of punched-card output. The Addressograph, Standard Register, and IBM 357 systems cause a great deal of wear on the machinery in the mechanical punching of cards.

Accuracy of Records

The accuracy of records appears to be related to the time of development of the system as shown in Figure 2(b) with Addressograph low and Singer System high. Manufacturers have been able to improve their equipment or implement new systems as technology develops.



Legend	*Number of Responses*
1—Addressograph-Multigraph	6
2—Standard Register	8
3—IBM 357	27
4—Mohawk Data Sciences	20
5—IBM 1030	14
6—IBM System/7	2
7—CLSI	3
8—Singer System Ten	1

Fig. 2. Comparison of Performance Evaluations of Data Collection Systems (Survey Taken Fall 1974).

Speed of Operation

The Mohawk system is ranked highest in speed in Figure 2(c), but it must be kept in mind that only the charge transaction is being considered. In the IBM 1030, IBM System/7, CLSI, and Singer Ten systems, for very little more time, a borrower's identification number is checked against the delinquency file. Improvements in technology can increase the speed of data collection systems in general.

Noise Level

Figure 2(d) indicates that the IBM 357 and Standard Register systems give the most problem in noise level. This can definitely be related to the mechanical punching which takes place in these two systems. Mohawk and IBM 1030 rank highest in this category. The lower ratings of the CLSI and Singer systems may be explained by the keying operations associated with each.

Ease of Training Staff

All the systems rated relatively high in ease of training the circulation staff as shown in Figure 2(e). Indicator lights, labeled buttons, or panels are present to guide the staff through the transactions, the majority of which are routine and are handled automatically. The exceptions can then be dealt with by experienced personnel.

CONCLUSIONS AND RECOMMENDATIONS

As might be expected, there is not an absolute best data collection system for library circulation applications. The type of library—public, university, or special; the size of the library; and the amount of service supported by the administration affect the choice that is made.

Available computing facilities is another factor that must be considered. The data collection system must have output that can interface effectively with the facilities which are to be used for further processing. The availability of an IBM System/7 or IBM System/3 for other library processes can greatly minimize the cost of computer-based circulation processes.

Service and maintenance offered by manufacturers vary from one area of the country to another; therefore this factor should be thoroughly examined before selection is made.

Taking into consideration the objectives of the library, the information needed at a certain speed, and the service the patrons should be able to expect, there appear to be four choices available:

1. a manual system, which has obviously the lowest equipment cost because a large part of the work is done by the patron, but allows data collection by untrained people and requires a great deal of the patron's time;
2. an off-line batch-processed system which is in the next lowest equipment price range but involves very little manual input of data and allows lists of circulation files, automatic production of fine and overdue notices, and statistical analysis of circulation transactions;
3. a hybrid system using a minicomputer for query of small, on-line files for detection of delinquent borrowers and requested books; or,
4. an on-line system, the most expensive, using typewriter or display keyboard terminals which allow immediate file updating and data retrieval.

Library administrators must decide on the trade-offs of these various factors, taking into consideration the available budget.

Point-of-sale terminals which are used in more and more retail establishments appear to have the possibility of being adapted to library circulation processes as computing costs decrease.

Further studies need to be made when these systems have been in use long enough for an evaluation, but this study can be used as an initial guide for library circulation departments in the selection of data collection equipment for automated circulation systems. Obviously it does not

contain a complete evaluation of the technical considerations and cost information necessary for the final decision concerning equipment choice, because such data were not readily available and resources for obtaining the information were not within the scope of this study.

APPENDIX

Addressograph-Multigraph

The Addressograph-Multigraph system is not well documented in the literature, and current information was not available for this study; therefore, the description given is not complete.

The system works similarly to that used for credit cards in service stations. A set of cards prepunched with a transaction number is processed by an imprinter. Borrower and book identification are provided by means of embossed badges. The due date is set on the imprinter.

One card can be placed in the book as due date notification and the return record. The charge record is processed by an optical scanner which reads the numeric information and transmits it to a keypunch machine. Alphabetic information must be punched manually. The punched card is used to update the circulation files. The transaction number on the return card can be used to clear the item from the files on return of the book.

Standard Register Source Record Punch

The Standard Register Source Record Punch is very compact—19 inches wide, 17 inches deep, and 12½ inches high—making it convenient to use on a circulation desk.

It requires a prepunched two-part card form and can use the following types of input:

Forty columns from a prepunched master book card
Ten columns from a prepunched borrower identification badge
Six columns from an internal setting for standard due date
Four columns from an internal setting for a circulation desk number of a library identification code
Six columns from a keyboard for an additional due date to override the standard due date.

These data elements are combined to produce the punched and printed two-part card form, one of which can be placed in the book as date due and return record, the other serving as the charge record.

IBM 357 Data Collection System

The IBM 357 data collection system has the capability of combining three machine-readable input records in order to produce a punched-card output record which can be used as input for a data processing system.

The input station consists of a card reader, a badge reader and either a cartridge reader or a manual-entry unit for variable data. In a library circulation application, each book or other item which can be circulated has, in a book pocket, a card punched with unique identification of the material. Each patron has a plastic identification badge punched with a unique identifying number. Variable data information can be set on cartridges or on a manual-entry unit. The type of transaction (charged or return) can be entered by the manual-entry unit or by prepunched transaction cards. Four digits of time data can be supplied to the output station by a readout clock.

The control unit combines these data items and transmits the information at twenty columns per second to the output station, which is a modified printing card punch. The resultant punched cards are used to update a master file.

In some installations two cards are produced at the time the patron produces his badge and the book for check-out: the charge card and the return card which is placed in the book with the master card. The return card can serve as date due notification. When the book is returned, the return card is simply removed from the book and placed with other records waiting to be processed. Therefore the book can be reshelved rather quickly. In other installations only the charge record is punched at check-out time. When the book is returned, the master book card is processed again to produce the return record.

There are lights on the stations to indicate when the power is on and the station is ready for use. Also, a light indicates that a required input has not been inserted or that an error has been detected during transmission. The system checks record length and character codes. If no errors are found, a validity punch is put in column eighty-one of the output records.

A system may include up to twenty input stations transmitting to each output station. A backup output station can be used automatically by a switch or can be in a convenient location to plug into when the on-line output station is inoperative. The stand-by can be used off-line for standard card punching.

Mohawk Data Sciences 4400 Data Collection System[*]

The Mohawk Data Sciences 4400 data collection system allows punched card, punched plastic badge, and keyed input. A keyboard consisting of thirteen key columns allows entry of a transaction code, a date due code, book identification for missing book cards, and borrower identification for missing badges. A date/time generator with seven digits is available.

The output record can be recorded on punched cards, paper tape, or magnetic tape, or the input data can be transmitted directly to a computer. The recommended and most common output unit uses one-half-inch magnetic tape. The computer-data entry keyboard (C-DEK) reads, transmits, and records data at 1,000 characters/second. An average time for a check-out transaction is four and one-half seconds; the time for check-in is three seconds.

A transaction column with indicator lights guides the operator. Lights show which data should be entered—card, badge, or keyboard. Each key lights up when depressed for visual verification of data entered. Hold buttons allow multiple entries of books with the same borrower, loan period and transaction type. If a type of information is entered which is not necessary for the particular transaction, transmission is prohibited until the keys are cleared and data entered correctly.

Incorrect entries are not released for output and various technical checks such as record length, parity, missing characters, and invalid characters are made on the data so that many inaccuracies are detected before being transmitted to the output unit. The output recorded can have a read-after-write check (a bit-by-bit comparison between data memory and magnetic tape) to assure correct data recording and detect defective tape. The transaction may be repeated and is written to a new section of tape. If an error is detected, the record on tape is flagged so that it will not be processed.

An output unit will handle up to sixteen input units. A backup recorder can be used as a key-to-tape source data entry unit. A multiplexor can simultaneously record on an additional tape in order to provide backup.

IBM 1030 Data Collection System

The IBM 1030 data collection system has card, badge, cartridge, and manual-entry input capabilities. It also can be a terminal from which inquiries by card or manual entry can be made of computer storage. A code for the book or borrower can be used

[*] Colorado Instruments merged with Mohawk Data Sciences in 1971.

to calculate date due information. A digital time unit can supply the time of day in hundredths of hours to computer storage and/or to a card punch. The card punch checks record length and character code and punches a code in the column following the last column of the record to indicate validity. Signal lights indicate data requirements not met.

For a discharge transaction, the book card and a special return badge are inserted. The time required for this is six seconds.

A printer can be attached for producing date due slips. It can also record messages from the computer as an inquiry or a program step (such as to indicate on return if a book has been requested by another borrower). When the system is on-line, a borrower badge and an inquiry card can be inserted in the input unit to cause all files to be searched for all material held by that borrower and all fines owed.

Checkpoint System

The Checkpoint circulation system is based on bar-encoded pressure-sensitive labels which are affixed to loan material and borrower identification cards. These labels are read by a light-sensitive hand-held pen which is stroked across the label. The data are collected on magnetic tape for later computer processing or transmitted on-line to a computer.

At the charge terminal, the "ready" light is illuminated when a borrower's card is in place. The pen is drawn lightly across the book and borrower labels. The borrower number is checked against the delinquent borrowers' file. A warning light shows if the borrower should be prohibited from checking out any material. If there is no warning light, the book is manually date stamped.

The discharge terminals require scanning of only the book label. Audible and visible indications are given if the book is in the "hold" file.

The composite terminal can handle both charge and return functions and also renewals and requests. Delinquent borrowers and requests are entered into the system by this means. Manual input data are entered by depressing an appropriate function button and keying numeric data on this composite terminal. The system can handle 500 transactions per hour.

A check digit is built into the label code to ensure accuracy of data. Tape copies of the transaction logs and tape give the system backup.

CLSI

CLSI has developed a stand-alone system with its own computer and printer for all processing and reports. The circulation control system uses a light pen to optically read bar-encoded labels. All items that can be circulated and all borrower cards have numeric identification labels which are used to search on-line files. The operator is notified on check-out if a borrower is delinquent and on check-in if a book has been requested.

The operator is guided through normal transactions by a light panel on the light pen terminal. When the charge terminal is ready for a charge transaction, the "check-out" light is on. When a patron card is inserted in the slot, a light labeled "patron" comes on. The patron label is read by drawing the light pen across the label. When the label has been successfully read by the terminal, the "enter" light goes out. The "busy" light shows briefly as the patron ID is checked to determine its presence on the delinquent borrowers file. If it is, the "exception" light comes on, the transaction sequence is terminated, and further action must be taken at the keyboard terminal to resolve the delinquency. If the patron's record is clear, the "standard loan period" and "item" indicator lights while the item's status is checked on the request file. Additional items may be checked out without rereading the borrower ID.

At the check-in terminal, the light pen is used for reading labels for each item. The system clears the record from the file of books in circulation and checks for each item

on the file of requested material. If the record is found on the request file, the operator must read the "acknowledge" tab on the terminal before continuing to read labels from returned books.

If the item is overdue and the patron is present and pays the fine, the overdue check-in tab is read. Otherwise the system generates a fine notice.

A keyboard/display terminal is used for functions not available on the light pen terminals: regular charge and return transactions that are out of order, such as charging out material to delinquent patrons or patrons with missing IDs; placing patron requests; patron registration; and other exceptional transactions.

IBM System/7-2790

The IBM System/7 computer and the IBM 2790 data communications system can be combined into an effective circulation control system. The area station reads card and badge input and accepts manually keyed numeric and transaction function data. The station uses a program-controlled operator guidance panel which directs step-by-step activity to be followed for each of twenty-four possible transactions. Up to sixteen stations can be attached to the System/7.

Visual display on the area station can be used to verify keyed data, to display information about delinquent borrowers, and to give the amount of time a reserve book is overdue. Notification of requests on discharge makes the books immediately available for reshelving. Fine payments can be entered and credited to the patron. A printer can be attached for date due slips.

Disk storage is on-line for data collection, file inquiry, and updating. At the end of the day the files are transmitted to the host computer for processing, and updated files of delinquent borrowers and requested books are transmitted back to the disk for the next day's business.

Panel lights alert operators of error conditions. If a wrong type of identification card is inserted, the transaction is stopped.

Transmission takes place at 500,000 bits per second. The resultant data are compared with transmitted data to ensure that no transmission errors were introduced.

Singer System Ten

The Singer System Ten circulation system includes a System Ten computer, a disk drive, a tape drive, and up to ten Model 100 data collection stations.

These input stations accept data from punched card, punched badge, a numerical keyboard, and ten function keys. The time of day, the station number, and a sequence number are included in each transaction record. The display screen on the terminal gives messages to guide the operator through the transactions. Edit programs make checks before clearing data for the transaction file, which is stored on the disk unit.

The disk has a capacity of 10 million characters and therefore can store other files for on-line interrogation. At the end of the day, the files are transferred to magnetic tape for batch-processing on a host computer, which produces updated files and listings.

The Application of the Instructional Development Process to a Module on Flowcharting

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The instructional development process can be used by information science faculty for instructional design and evaluation. This paper presents a six-step instructional development model consisting of introductory analysis, task analysis and behavioral objectives, test construction, media/method design and development, testing and revision, and validation and evaluation. Each of these steps is described in the context of developing an instructional module on flowcharting.

INTRODUCTION

Instructional technology has been defined as ". . . a systematic way of designing, carrying out, and evaluating the total process of learning, and teaching in terms of specific objectives based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction."[1] The process of designing, carrying out, and evaluating instruction has, in turn, been called *instructional development.* The instructional development process can be used in developing programs, courses, or sections of courses within an information science curriculum.

Most teaching faculty will agree that developing such programs, courses, or sections of courses is a complex undertaking. All too frequently the typical approach taken is intuitive. Fortunately, after a series of trial runs, a faculty member gains proficiency in the development process. In some cases the faculty member follows a very systematic plan, and in some cases the faculty member evaluates the outcome of the learning. However, in other cases this is not the situation at all. Little, if any, attempt is made to ascertain and document what the students should learn and what and how well the students have learned. By using the instructional development process, a faculty member can be assured of approaching instruction systematically and of gathering data which can be useful for instructional decision making in determining which mix of media and method is most cost effective.

The School of Library Science at the University of Southern California was in the process of evaluating its information science curriculum. It was decided that it would be most useful to approach the information science curriculum by using the instructional development process. It is obvious that this is a rather time-consuming undertaking; consequently, it was decided to apply the instructional development process to a test area in order to ascertain whether the actual development process and evaluation data would, indeed, be useful. One instructional module, a discrete separate unit of instruction similar to a topic on a course outline, was chosen for instructional development.

Prior to a discussion of instructional development, some preliminary information is required on the criteria which were established by the information science faculty for selecting the test module. A test module should fit the following:

1. the module should be part of the information science curriculum and presently taught by the developer;
2. the module should be of the correct length, that is, allotted from three to five hours of traditional classroom instruction;
3. the module should be directed toward a lower level of cognitive learning, specifically one that involves the development of some cognitive skill;
4. the module should be amenable to independent learning approaches.

A list of modules which are part of the information science curriculum were matched against these criteria (the module list was adapted from the work of Jack Belzer).[2] Several instructional modules matched with these four criteria, including flowcharting, file and forms analysis, and costing techniques. The module on flowcharting was chosen as a test area, owing to the fact that there was the least amount of "how-to" literature in this area.

INSTRUCTIONAL DEVELOPMENT MODEL

A review of the literature of instructional technology indicates that numerous instructional development models are in existence, including those of Banathy, Kemp, and Cavert.[3–5] For the purpose of this study, these models were synthesized into a six-step model which was followed in developing an instructional module on flowcharting.

This model consists of:

1. introductory analysis,
2. task analysis and behavioral objectives,
3. test construction,
4. media/method design and development,
5. testing and revision, and
6. validation and evaluation.

INTRODUCTORY ANALYSIS

The first step involves the design of a *management plan* to organize the

instructional development. All the tasks that needed to be accomplished in the development of the module on flowcharting were listed. From this listing, a PERT chart was constructed. This chart provided a graphic and time representation of the development plan.

This first step also involves the gathering of any information which could influence the design, specifically the listing of various *design constraints* such as budget, time, and space. For this particular instructional module, the main constraint was monetary. A media/method choice was desired which would not require any large expenditure for audiovisual software development or module use. It was also important for the developed materials to have wide utility in diverse locations, such as in the classroom, in the library, or at home.

In the introductory analysis the *target population* needs specification. Obviously, the audience level will affect the nature of the design. For the module on flowcharting, the primary target population was master's degree students in library science. It was also specified that the materials should be developed for possible use in library staff training and development programs in systems analysis and library automation.

Instruction does not exist in a vacuum. New learning is laid upon a foundation of old. Thus it is necessary to indicate what level of learning or *entry behaviors* the target population brings to the instructional module. The entry behaviors were stated as "having an understanding of basic systems terminology and concepts, specifically input, output, process, storage, system, and systems; and an elementary acquaintance with library and/or business operations."

TASK ANALYSIS AND BEHAVIORAL OBJECTIVES

Tasks and behavioral objectives are statements of activities learners are to perform. However, behavioral objectives are more quantitatively and precisely formulated. Typically, the tasks are listed and then refined into behavioral objectives by indicating how well and under what conditions the learners will perform them. For the instructional module on flowcharting the *main task* was "to construct flowcharts of manual processes." The *main objective* was that "the learner will choose a manual process and will document this process using standardized flowcharting techniques with no logical or drawing errors."

A hierarchy of learning exists. Certain subtasks need to be accomplished before the main task can be performed. Likewise, certain subobjectives are required before the main objective can be achieved. Thus, a series of subtasks and subobjectives which lead up to the performance of the main task and main objective need formulation. For example, before the learner can flowchart a process, "the process must be analyzed into its individual activities." This is an example of a *subtask*. Stated in behavioral terms, this becomes a subobjective. The *subobjective* states that "the learner will specify

in writing all the individual activities which are required for the functioning of the process."

For the module on flowcharting there are a total of twenty-eight subtasks and twenty-eight subobjectives.

TEST CONSTRUCTION

It is typical to construct tests after teaching students the subject material. However, the instructional development process requires the development of three separate tests prior to the actual design of instruction and learning by the students: the entry test, the pretest, and the posttest. The *entry test* measures the learner's ability to meet the entry behaviors, in this case a basic understanding of systems and library or business procedures. An example of an entry test item is shown in Figure 1.

Any system involves at least three basic elements. These include:

a. data, forms, files
b. input, storage, output
c. input, process, output
d. information, activities, products
e. none of the above

The correct answer is c.

Fig. 1. Example of Entry Test Item.

Correct responses to the entry questions indicate to the instructor that the student is ready to proceed with the instruction on flowcharting. If the student does not attain a specified score, the instructor assigns some remediation.

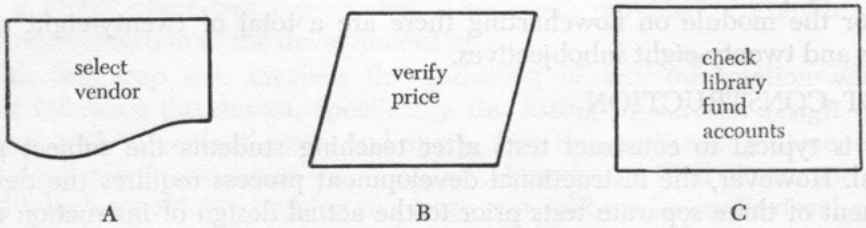
Each of the behavioral objectives is translated into two test items: one measures the amount of learning a student brings to the instructional module (the *pretest*); the other measures the learning outcome of the instructional module (the *posttest*). The data resulting from these tests can be used to measure achievement in various ways, such as the achievement of the initially stated objectives, the gain scores of learners between pretest and posttest, and the comparison from one learner to another. For the module on flowcharting there are a total of twenty-nine pretest and twenty-nine posttest items, one corresponding to the main objective and one for each subobjective. An example of a pretest or posttest item is displayed in Figure 2.

It should be noted that the tests were constructed as paper-and-pencil items. Although other media choices exist, this method was deemed the most suitable testing medium since flowcharting is a paper-and-pencil process.

MEDIA/METHOD DESIGN AND DEVELOPMENT

The *choice of media/method* is a complicated process. Fortunately, there are selection guides available in the instructional technology literature. Jerrold Kemp provides one of the better of these selection guides.[6]

Which of the following flowchart symbols reflect processes. Please circle the letter(s) which corresponds to the correct response(s).



The correct response is C.

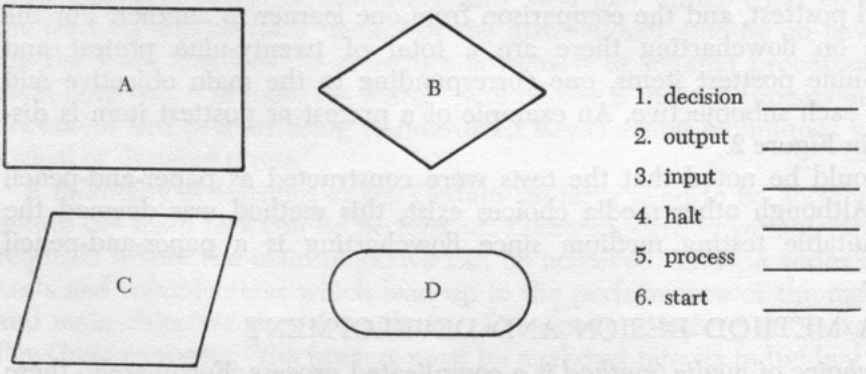
Fig. 2. Example of Pretest or Posttest Item.

For the module on flowcharting, the programmed instruction text approach was chosen. The reasons for this choice include the fact that this media/method fits the design constraints. Programmed texts do not require large expenses for software development or use as do other media choices, such as instructional television or multimedia kits. Programmed texts can be used at various locations, including in the library and at home. Also, the programmed text approach, as compared to other media choices, facilitates the development of the flowcharting skill—the drawing of charts on paper.

Once the media/method is selected, other media design decisions are made. These include the *sequence* of the instruction, that is, linear or branching, and the *format* or the location of instruction, questions, and answers in the programmed text. The specific type of media design decisions do vary by type of medium. For example, the choice of film medium would require decisions such as whether to use black-and-white or color film, silent or sound film, and reel or continuous film loops.

After reading the appropriate subject matter, the student is expected to

Now please match the following symbols with their correct functions.



1, C; 2, B; 3, B; 4, D; 5, A; 6, D

Fig. 3. Example of Frame from Programmed Text.

respond to a question. Figure 3 illustrates the choice of linear format for the seventy frames in the programmed text.

The student is instructed to use a four-by-six-inch card to expose only the frame information (a frame refers to one instructional unit in the program). The black dots on the page act as guides to make sure the answers are not accidentally exposed. In some cases the answers are located on other sections of the programmed text. This is true for more complicated frames such as the one illustrated in Figure 4. The answer to this example is illustrated in Figure 5.

Now look at the following flowchart. This flowchart is drawn incorrectly. Draw a correct version of the flowchart on the following blank page. The correct version of this flowchart will be found on page 75 of this text.

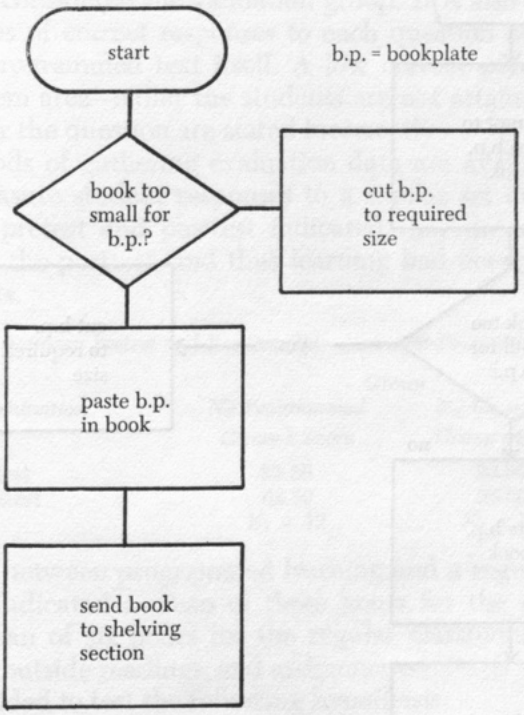


Fig. 4. Example of Complex Frame from Programmed Text.

TESTING AND REVISION

One part of the instructional development process involves personal editing and editing by experts. *Personal* editing requires that the developer recheck the program for correctness of grammar, presentation, and logic. *Editing by experts* involves other information science faculty checking the program for grammar, presentation, and logic, as well as for correctness of subject matter.

Also included in this phase of the model is *developmental testing*, or the

Note: Possible options/alternatives exist for drawing this flowchart correctly, such as the use of line connectors rather than page connectors, regular output symbol followed by a halt instead of the file symbol.

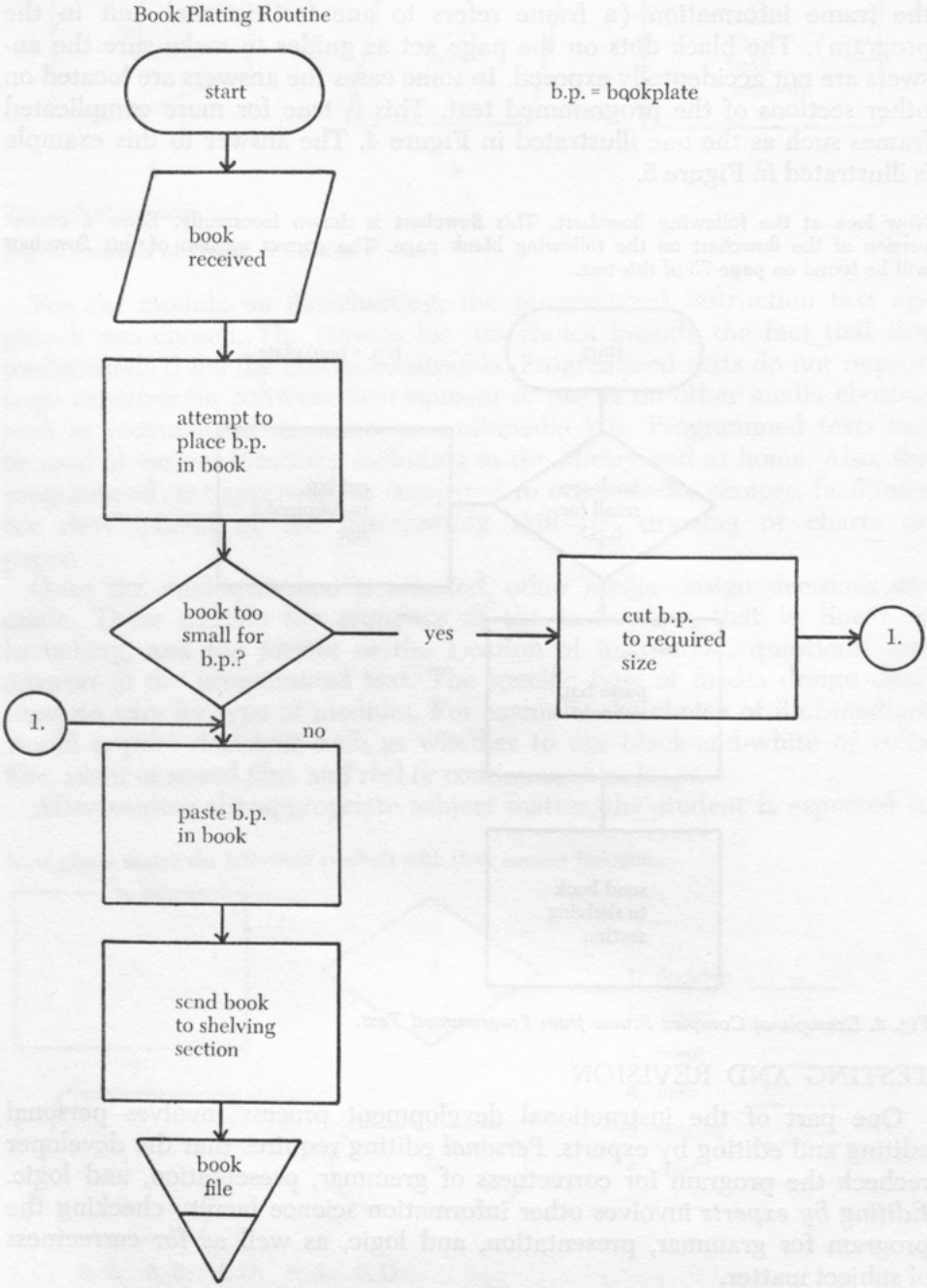


Fig. 5. Correct Version of Complex Frame.

use of the designed materials by typical learners. In this particular case, four library school students used the program, made appropriate comments, and indicated problem areas. The feedback from these typical learners, as well as the feedback from the information science faculty, is used to refine the program.

VALIDATION AND EVALUATION

The final step in the instructional development process consists of *validating the program* to ascertain whether the students did indeed attain the initially stated objectives. This is accomplished by determining what percentage of students answered the questions on the posttest correctly. In this case, 95 percent of the questions were answered correctly by the twelve students who were considered the validation group. It is also possible to determine percentages of correct responses to each question on the posttest, as well as in the programmed text itself. A low correct percentage indicates a possible problem area—either the students are not attaining the objective, or the stimulus or the question are stated incorrectly.

Various methods of gathering evaluation data are available. The pretest and posttest measure student responses to a similar set of questions. Gain scores between pretest and posttest indicated that the students attained higher scores on the posttest, and thus learning had occurred. Table 1 displays these results.

Table 1. Gain Scores between Pretest and Posttest (Based on a 66-Point Total)

	Group	
Examination	N_1: *Programmed Group* $\bar{x}$ *Score*	N_2: *Classroom Group* $\bar{x}$ *Score*
Pretest	22.58	23.00
Posttest	62.50	55.50
	$N_1 = 12$	$N_2 = 12$

Learning time between programmed learning and a regular classroom instruction group indicated a mean of three hours for the programmed approach and a mean of six hours for the regular classroom approach (this included lecture, outside readings, and assignments).

It was also decided to test the following hypothesis:

H_0: There is no difference in the performance of the twelve students in the programmed instruction group from that of the twelve students in the regular classroom instruction group regarding manual flowcharting.

Using the Mann-Whitney U test, the following data were generated:

$R_1 = 121.0$

$R_2 = 178.0$

R_1 and R_2 are the sum of the ranks of the difference between the pretest and posttest scores for each group.

$$U = n_1 n_2 + \frac{n + (n + 1)}{2} - R_2$$

$$U = (12)(12) + \frac{(12)(13)}{2} - 178.0$$

$$U = 44$$

Using a table of the critical values of U with $n_1 = 12$ and $n_2 = 12$ at .05 the value of 42 is indicated. Hence H_0 is tenable, and there is no significant difference in the performance of the two groups.

An instrument was developed to *assess the attitude* of the learners. It appears that the programmed learning approach fares as well if not slightly better than the regular classroom method. Comments from the students using programmed instruction indicate that they like the approach better, owing to the fact that they are able to proceed at their own speed and at their own convenience. On the other hand, students did not prefer programmed instruction as a replacement for regular instruction. In discussing this point with students, it was determined that some felt they were missing additional subject content and examples which could be supplied by the instructor. Others indicated that they missed interacting with the instructor and fellow classmates. Students appeared equally divided in their reactions to the use of programmed instruction as a supplement to regular instruction. See Table 2 for results of this attitude survey.

The cost of the programmed instruction was compared to the cost of regular instruction. It was determined that (1) the operating costs were less for programmed instruction, (2) the development costs were high for programmed instruction, and (3) the costs were comparable if development costs are amortized (see Table 3).[7]

CONCLUSION

The instructional development process was useful in developing a module on flowcharting. Not only did the process provide a systematic approach to the development but it also assisted in developing what is believed to be an accurate and validated instructional unit. As a by-product of the instructional development process, cost-effectiveness data were generated for use in comparing alternative teaching/learning approaches. In this study, the cost-effectiveness data consisted of results of the costing, the student learning times, the learning outcomes, and the attitudinal responses. The cost-effectiveness factors associated with each of the two teaching approaches appear to indicate that the programmed instruction approach achieves a slightly more favorable rating. This conclusion is based on the following: costs for the twelve learners in both groups were comparable, there was no difference in the learning outcomes of both groups, and the programmed instruction approach required less learning time and obtained slightly higher ratings from the students. As a result of these findings, the programmed text on flowcharting has become a regular part of the instruc-

Table 2. Results of Attitudinal Assessment

Attitudinal Question	*Group*	*Response*				
		1	2	3	*4*	5
1. The module on flowcharting was stimulating and challenging.	RI	2	7	3	1	0
	PI	2	8	1	1	0
2. The material was well organized.	RI	8	3	1	0	0
	PI	10	2	0	0	0
3. The material had clear explanations.	RI	6	4	1	1	0
	PI	7	3	0	2	0
4. Too much material was presented.	RI	0	3	1	7	1
	PI	1	2	2	6	1
5. The material was too difficult.	RI	0	0	2	9	1
	PI	0	1	1	10	0
6. The material was trivial.	RI	0	0	0	3	9
	PI	0	0	0	6	6
7. Standards for student performance were reasonable.	RI	1	8	3	0	0
	PI	1	10	1	0	0
8. The module related to the rest of the course.	RI	9	3	0	0	0
	PI	11	1	0	0	0
9. I enjoyed this module more than others in the course.	RI	2	9	1	0	0
	PI	11	1	0	0	0
10. PI is a preferred method to regular instruction.	PI	0	0	5	6	1
11. Other modules in the curriculum should be programmed.	PI	5	4	0	3	0
12. I enjoyed learning via PI.	PI	7	4	0	1	0
13. This module should become a permanent part of the course.	PI	10	1	1	0	0
14. This PI module should be supplemental to the regular approach.	PI	2	3	1	6	0

RI = Regular Instruction Group
PI = Programmed Instruction Group

Scale
1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

Adapted from David D. Starks, Barbara J. Horn, and Thomas P. Slavens, "Two Modes of Computer Assisted Instruction in a Library Reference Course," *Journal of the American Society for Information Science* 23:276 (July-Aug. 1972).

Table 3. Summary of Regular Instruction Costs versus Programmed Instruction Costs

Cost Factors	*Cost: Regular Instruction*	*Cost: Programmed Instruction*
Operational Costs		
Personnel	$73.51	$31.45
Supply	0.25	7.50
Equipment	n.s.	0.16
Total	$73.76	$39.11
Developmental Costs		
Personnel	0	$1,289.07
Supply	0	10.94
Equipment	0	2.39
Total	0	$1,302.40
Amortized Cost per Module*	0	31.01
Total Cost per Module	$73.76	$70.12
	N = 12	N = 12

* Based on 42 uses in 6 years

tion on systems analysis.[8] In addition to programmed instruction, one hour of classroom instruction is devoted to flowcharting. This provides the instructor the opportunity to present additional flowcharting examples and allows students to interact with the instructor and fellow classmates on the topic of flowcharting.

It should be noted that in other test situations different media alternatives may be required. Also, in other situations different cost-effectiveness factors may need to be taken into consideration, such as calculating costs on a per student rather than per module basis, calculating costs associated with applying the instructional development process, and matching learner aptitudes with learning approaches (aptitude-treatment-interaction) to achieve possible significant differences between media/method choices. The instructional development process should not be viewed as a panacea or as rigid lock-step procedures but rather as a process which appears suitable for use in information science curriculum design. As a result of this test, the instructional development process is being applied to other modules and courses within our information science program.

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Highlights of ISAD Board Meetings

1976 Annual Conference
Chicago, Illinois

First Meeting
Tuesday, July 20, 1976

The meeting was called to order by President Henriette Avram at 10:00 a.m. The following were present: BOARD—Larry Auld, Henriette Avram, Gerald Brong, Roberto Esteves, Judith Hopkins, Sue Martin, Joe Rosenthal, and Ruth Tighe. ABSENT—Frederick Kilgour and Helen Schmierer. GUESTS—George Abbott, Kandy Brandt, Judith Corin, Maurice Freedman, and Arthur Plotnik. STAFF—Donald Hammer, executive secretary, and Dorothy Butler, administrative secretary.

Donald Hammer introduced Dorothy Butler as the new administrative secretary for ISAD and LAD.

The Midwinter minutes were approved. The agenda was adjusted and additions were made.

REGISTRATION FEES FOR PRECONFERENCES AND INSTITUTES. Since it is the responsibility of the division to fix registration fees for preconferences and institutes, the question arose regarding charging ISAD members less than non-ISAD members and charging more for non-ALA members. Mr. Hammer pointed out that he has tried this before with the Library Administration Division and had no problems. It was the consensus of the board that Mr. Hammer should be given permission to adjust the registration fees accordingly for preconferences and institutes.

RESOLUTION OF LITERACY AND LEARNING SERVICES. In regard to the resolution of Literacy and Learning Services, it was MOVED and SECONDED

THAT the resolution be endorsed.

After some discussion, the ISAD Board policy that it should not pass on matters that do not pertain directly to ISAD was invoked. The motion was DENIED.

MERGING OF COLA AND MARC USERS DISCUSSION GROUP (MUDG).

Ms. Martin reminded the board of the previous discussion on merging COLA and MUDG. She stated that it seemed to be the feeling of those pres-

ent at the COLA-MUDG meeting that MUDG does have its place. Their meetings, which usually take place at the beginning of the Annual Conference, may be considered to be an orientation session in which feedback can be taken back to MARBI to provide a basis for discussion later in the conference week. Consequently, Ms. Martin suggested that the proposal of merging the two discussion groups be withdrawn. The board decided that MUDG could meet on Sundays from 1:00–3:00 and COLA could meet at 3:30–6:00 p.m. It was also decided that the discussion groups meetings should appear as programs so that they will be placed correctly in the printed program for Annual Conference.

Mr. Freedman announced that the JMRT/ISAD program will continue every year in the 2:00–4:00 p.m. period.

Ms. Martin announced that Madeleine (Lennie) Stovel from BALLOTS is the new chairperson of the MARC Users Discussion Group.

DIVISIONAL VICE-PRESIDENTS' SPECIAL MEETING/BUDGET. Mr. Rosenthal explained that this meeting was not basically one of action. It was in effect a meeting to raise the consciousness level about the financial situation of the divisions. The divisions were told that they should be financially sound by January 1977 or have sound financial prospects. Decisions would be made in January 1977 regarding the future divisional structure of ALA, presumably by the Executive Board.

Various options of divisional structure were discussed at DISC, such as the merging of divisions and the dissolution of divisions. A fair amount of discussion lent itself to money that might accrue to divisions and some clarification of the transitional period and the guidelines for finances during the transitional period. The idea that profits from institutes should be usable by the divisions and be a regular part of the divisions' budget was favorably discussed. Another meeting was planned for October 1976 to review the plans made to financially stabilize the divisions.

Mr. Rosenthal suggested that the ISAD Board discuss the financial position of the division. In doing so, he brought out that DISC was considering innovative ways to get money for the divisions. One way of doing this is to give the divisions a percentage of the conference registration fees. Another way would be the expansion of continuing education programs, advertising, and publications. It was the general consensus of the board that Mr. Rosenthal give ISAD's approval to giving the divisions a portion of the conference registration fees.

Mr. Hammer announced that the division is one of three divisions in ALA with an increased membership within the past year. ISAD has increased its membership by 294 members as of this June. The remaining divisions have lost members, some substantially. In contrast, Mr. Kirk's report showed that almost all of the divisions are behind financially because they did not attract the members expected this year. This report is based on personal dues only, ignoring expenditures or the lack of them, insti-

tutes, organizational dues, etc. Mr. Hammer had invited Mr. Kirk to come and explain his report to the board at his convenience.

Ms. Avram pointed out that the ISAD Board takes the position that ISAD is interested in increasing its membership, but can also survive by continuing to sponsor institutes which are viable to the division.

In regard to our increased membership Mr. Hammer pointed out that the creation of the Video and Cable Communications Section and the Audio-Visual Section helped to increase our membership substantially this year.

A long discussion followed on income from ISAD's published material and the advertising of it. It was suggested that announcements and advertising materials be included in the institute brochures sent out and that advertising space be bought in *American Libraries* and other journals.

In order to settle the matter of a portion of the ALA conference registration fees going to the divisions, Ms. Avram took a vote on the support for Mr. Rosenthal to go to DISC with ISAD approval of the divisions' taking a percentage of the registration fees. The vote was affirmative.

CONSIDERATION OF JOLA ADVERTISING. Ms. Martin relayed to the board the favorable stand of the ISAD Editorial Board on the issue of removing *JOLA* advertising from ALA's Publishing Services, and letting *JOLA* assume the responsibility of acquiring its own advertising. A long discussion took place on the feasibility of *JOLA*'s handling its own advertising, on present obligations that must be met contractually, and on possible technical problems. It was MOVED by Larry Auld and SECONDED by Ruth Tighe and

VOTED, That the Board of Directors follow the recommendations of the ISAD Editorial Board that *JOLA* assume the responsibility for securing its own advertisements for a period of 18 months beginning with this (1976) Annual Conference.

Concerning the problems of our having present contracts to contend with, Mr. Brong suggested that ISAD buy out the contracts, assuming we profit from securing advertising ourselves.

Ms. Avram indicated that the above motion should be sent to Robert Wedgeworth, Ruth Frame, Don Stewart, and Guy Marsh, informing them of our intentions.

Regarding ISAD's financial status, Ms. Tighe showed concern that ALA Council might look at the budget and declare ISAD financially unsound. She questioned whether the board should take formal action and pass it to Council. It was decided that formal action was not necessary at this time and that Mr. Rosenthal would pass our stand on through DISC.

Mr. Freedman offered to package an "introduction to library automation" kit for future sales which could lead to more revenue for the division. The board had favorable comments on this idea, but no decision was made at this time.

Continuing her report on the Editorial Board, Ms. Martin requested, among other things, that the Video and Cable Communications Section and the Audio-Visual Section become more involved with getting manuscripts to her for publishing. Additionally, she requested that the board members informally contact people who are working on projects and suggest that they write up their projects for *JOLA*.

Suggestions offered by various board members included having "theme issues" of *JOLA* and soliciting manuscripts.

Concluding, Mr. Rosenthal announced the new appointments for the 1976–78 committees. He also announced the winners of the 1976–77 elections: Vice-President (President-Elect)—Maurice J. Freedman; Board of Directors Member-at-Large—Mary Jane Reed; Video and Cable Communications Section Vice-Chairperson/Chairperson-Elect—Louise Mortimer; Audio-Visual Section Vice-Chairperson/Chairperson-Elect—Herman L. Totten; Audio-Visual Section Executive Committee Members-at-Large—Maggie Rodgers and James L. Limbacher.

The meeting was adjourned by Ms. Avram at 12:00 noon.

Second Meeting
Thursday, July 22, 1976

The meeting was called to order by President Henriette Avram at 8:10 a.m. The following were present: BOARD—Larry Auld, Henriette Avram, Gerald Brong, Roberto Esteves, Judith Hopkins, Sue Martin, Joe Rosenthal, and Ruth L. Tighe. ABSENT—Frederick Kilgour and Helen Schmierer. GUESTS—Stanton F. Biddle, Judith Corin, Walt Crawford, Mel Kirk, Irving M. Klempner, Philip L. Long, and Michael Malinconico. STAFF—Donald P. Hammer, executive secretary, and Dorothy Butler, administrative secretary.

Ms. Avram stated that she went to the National Computer Conference sponsored by the American Federation of Information Processing Societies, for the first time in many years. She noted the large number of affiliated organizations there and felt that ISAD should belong to AFIPS and through our Program Planning Committee take a more active role in the computer conferences. It was therefore MOVED by Ms. Tighe and SECONDED and

VOTED, That ISAD pursue the feasibility of membership in AFIPS on behalf of ISAD or ALA, as the case may be.

It was decided by the board that Mr. Hammer should look into membership costs, etc., and report back to the board at the January meeting.

MEMBERSHIP RECRUITMENT. It was announced that ISAD has produced an inexpensive brochure, which was passed out to the board members. With the idea that a change might be made in ISAD's structure,

a limited number of copies were reproduced. Mr. Rosenthal announced additionally that Ms. Corin is the incoming representative to the ALA Membership Committee and any instructions from the board should go to her. Ms. Tighe expressed concern that membership information concerning ISAD is very hard to get. She felt that something similar to the RTSD volunteer form might be published in *American Libraries*. Mr. Esteves also announced that a brochure for VCCS is in the planning stage. The feeling that we should coordinate our efforts so that there is some consistency in our membership promotion materials was expressed by Ms. Tighe. She hoped that we could develop some type of logo so that an ISAD statement could be recognized wherever it appeared.

It was suggested by Mr. Hammer that *JOLA* should carry a page for membership in ISAD. Ms. Martin responded by stating that she would look into it. The Post Office has fairly rigid restrictions concerning forms in journals. During this discussion it was noted that subscriptions to *JOLA* have increased.

ISAD/LED COMMITTEE ON EDUCATION FOR INFORMATION SCIENCE SYMPOSIUM. Mr. Klempner informed the board of the status of the planning for an institute concerned with education for information science initiated by the ISAD/LED Committee on Education for Information Science. The endorsement of the board for this particular conference is being asked. The plans are that the conference be held on April 25, 1976, at the State University of New York at Albany. The major group being addressed would be library school educators and library school deans. It is the aim of this committee that the program deal with strategies for change within a library school environment and be aimed at library school faculty who are still offering only traditional library courses. Speakers will deal with particular courses, core courses such as cataloging, reference, or history of books and printing courses, and show how these courses have been handled from the point of view of broader information handling rather than just training individuals for working in libraries.

The State University of New York at Albany has committed itself to provide minimal contingency funding for speaker fees, etc., of approximately $600. As a minimum, the endorsement of the ISAD Board is desired. Mr. Klempner stated that he was not asking for funding from the board.

Mr. Rosenthal and Mr. Hammer brought out the fact that ALA will place a 13 percent or 2 percent overhead charge on the conference depending on whether or not an ALA unit is the primary sponsor. Mr. Klempner responded by saying that he understood that, and the State University of New York at Albany would bear the administrative costs. It was MOVED by Ms. Hopkins and SECONDED by Ms. Tighe and

VOTED, That the ISAD Board endorse the ISAD/LED Education

Committee Symposium for Education for Information Science to be held in Albany, New York, on the 25th of April, 1977.

PROGRAM PLANNING COMMITTEE REPORT. Mr. Malinconico reported that the Program Planning Committee proposes to sponsor two repeat institutes on The Future of the Catalog, with a modified program in April in New York and one in May on the West Coast. It is planned that RTSD be asked to cosponsor them. In their long-range planning they are also hoping to sponsor an institute on Automated Circulation Systems in September 1977. The final decision will be made at Midwinter 1977; additionally, a networks institute is being planned, concerned with policy in the formation of a national bibliographic network. The Library of Congress has agreed to redo the Library of Congress Processing Department institute which last year was a great success.

Mr. Rosenthal announced that RTSD is considering a program at the 1977 Detroit Conference on the AACR. If that program occurs, they are interested in ISAD cosponsorship. It was MOVED by Ms. Hopkins and SECONDED and

VOTED, That the ISAD Board of Directors endorse the recommendations of the Program Planning Committee related to the offering of institute programs in 1977 and that the committee move ahead in developing the institutes as proposed under the sponsorship of the Information Science and Automation Division.

Mr. Malinconico informed the board that the joint program put on by ISAD and JMRT was so successful (more than 200 people present) that JMRT is more than willing to do it again as a program at the 1977 Detroit Annual Conference.

He asked the board's approval to offer JMRT's members the institute registration rates that only ISAD members get, and in exchange they will make available the use of the travel network which is a series of places to stay free of charge for people traveling to ALA conferences. No vote was taken on the matter.

AUDIO-VISUAL SECTION PRECONFERENCE. Mr. Brong announced that the Audio-Visual Section is in the process of developing a one-day preconference for the 1977 Detroit Annual Conference. The concept of the preconference would be the presentation and analysis of new technologies and the impact of these new technologies on libraries as related to nonprint media systems and devices, e.g., video disc, compressed speech, etc. The tentative title is "New Technologies and the Impact on Libraries." The program will be concerned with the substantive issues, and administrative and fiscal problems that will relate to them.

It was decided to schedule it for Friday, June 17, 1977.

CLENE. In regard to CLENE, Ms. Avram felt that ISAD is doing a good job as far as continuing education is concerned and so is CLENE.

She was worried, however, that effort could be wasted through duplication. Mr. Rosenthal's feeling was that ISAD has a successful continuing education program and he did not want to see it get bogged down as a result of getting tied up with CLENE. After much discussion, a procedural suggestion was made by Ms. Tighe to Mr. Hammer that he send a copy of the ISAD Board minutes to CLENE with special attention to the report of the Program Planning Committee.

LIBRARY INSTRUCTION ROUND TABLE. The matter of the establishment of the Library Instruction Round Table was set aside as not being pertinent to ISAD's interests as long as the concern with it was organizational. ISAD may be concerned with it later if it is established.

MEL KIRK'S REPORT. Mr. Kirk was welcomed by Ms. Avram, president, to explain his report, which was briefly discussed at the last session. He tried to put the whole problem into perspective by explaining that dues transition is controlled by two documents (one for each year of the transition) to suggest guidelines to be followed by divisions. There had been difficulty trying to predict what income would be in the year 1975–76 because it was uncertain as to the number of personal memberships each division would be able to attract and maintain. In trying to bring together some data that would help the divisions to project how they should operate this fiscal year, Mr. Kirk came up with the suggestion that data on personal membership income as of June 20, 1975 (the last possible date for which the 1975 data could be assembled) should be the basis for projecting income for 1976. As it turned out, there has been a 14 percent additional personal membership attrition for all the divisions up through May 31, 1976, since the end of the previous fiscal year. ISAD in this business fares very well because it had, as of the end of May 1976, approximately 1,715 personal members, as compared with 1,650 as of August 31, 1975. ISAD therefore experienced a growth in membership over the past nine months as compared with the twelve months last year. Mr. Kirk feels that ISAD is in the position that it will not need as much of a subsidy as was expected.

Ms. Avram stated to Mr. Kirk that ISAD feels that it is self-sufficient due to the income of its institutes. Apparently Mr. Kirk does not consider the institutes as a source of income. Mr. Kirk explained that any funds earned after September 1, 1975, and forward are considered a source of income to the divisions, including funds from institutes. It is, however, prudent to budget those funds in the next year rather than in the year you generate the surplus. Ms. Tighe felt that the mechanism used to determine the state of solvency of the divisions is artificial in that it considers only membership dues. If you consider the total income and change the principle by which you determine whether or not a division is solvent, then ISAD is no longer insolvent. Mr. Kirk does not know how we are going to come out financially from the institutes held after September 1, 1975, be-

cause his books will not be closed on them until next year's closing. According to ALA's policy, the books are not closed on institutes until the second annual closing after they occur. The reason for this policy is that preconferences take place in June or July and not all of the expenses are usually paid by the August 31 end of the fiscal year. The books are then held open until the end of the next fiscal year. This policy should not interfere with division planning as enough data are available for planning purposes even though ALA has not closed institute accounts. Ms. Martin pointed out that if ALA uses Mr. Kirk's figures to plan the divisions' programs association-wide, ISAD is considered a subsidized division and could be penalized and subsidized even though we do not need a subsidy. Mr. Kirk stated that ALA does not keep a running total by division *reflecting all sources* of income of a division in one total. The information is available in the totals of several funds. Mr. Kirk was asked by Ms. Tighe to give some sort of reassurance that division solvency is not a function of membership dues and somehow ameliorate the statements that keep coming out in the literature that ISAD is not solvent. Mr. Kirk agreed that divisional solvency is not dependent on membership dues alone and then discussed the problem of time-lag in budgeting and fiscal reporting and the problems of the transitional phase as the reasons for incomplete data being published. The fiscal reporting operations of ALA were discussed until time ran out.

TELECOMMUNICATIONS COMMITTEE. Mr. Long read a report on the Telecommunications Committee. Among the items included in that report was a discussion on a news release that announced further work on network protocol made possible by the joint work of NCLIS and the National Bureau of Standards.

Ms. Tighe stated "that in her personal opinion it very clearly was a tactical error that someone from NCLIS or the chairperson of ISAD did not officially appear at the first meeting of the Telecommunications Committee during this session of ALA to offer the news release and to be available to answer questions or to explain."

Ms. Avram stated that she intended to be there and to have copies of the news release, but because of meeting conflicts, which she has had all week, she could not make it.

Ms. Tighe offered, on behalf of NCLIS, to write a letter apologizing and saying that they would do whatever they could to rectify that tactical error.

Mr. Long mentioned that there are other issues besides protocol. The committee points out that according to the news release, when the protocol development is completed, it will be forwarded to ANSI, ALA, and ASIS for consideration in the development and adoption of standards directed to the library and information science community. The committee apparently objected to referring this proposed standard to three organizations be-

cause of the time loss involved. The committee wished to convey the sense of the kind of confusion and upset that has taken place.

Ms. Avram then pointed out that the ISAD Board approved the meeting held at the Library of Congress which was to include ANSI representation, CLR, ISAD and its sections, ASIS, NCLIS, etc.

Mr. Long then stated that the point is "where does this leave the ISAD Telecommunications Committee; does it relieve us of our charge?"

Ms. Tighe asked if there were not other issues that the ISAD Telecommunications Committee can address. She pointed out that the work the committee has done is being accelerated through this because it was identified as a significant need. The chairperson and other members of the Telecommunications Committee are included on this NCLIS committee.

Ms. Avram then reviewed the history of the project from the time Mr. Hammer called her attention to Joseph Becker's statement at the San Francisco Conference ISAD program that NCLIS would sponsor a meeting intended to determine ISAD's place in the national program. Ms. Avram and Mr. Hammer agreed that ISAD should carry out a project that it really could do and network protocol was eventually decided upon as something ISAD could do and as something that was really needed. The ISAD Board approved the idea, Mr. Trezza was contacted, and he offered $3,000 for meetings. Ms. Avram then asked Mr. Long to write a statement on the matter. The total figure was in the area of $37,000. The aforementioned meeting in Washington was then held. NCLIS then wanted a formal proposal and suggested that NBS be asked to supply a resource person to do the work, i.e., the day-to-day writing, attend meetings, etc.

NBS agreed to provide someone for this duty at a cost of $35,000. Mr. Trezza agreed to spend that money to accelerate this effort. NCLIS then took the project on and it then became an NCLIS task group with representation from all those groups. It was also agreed to develop protocol for the information field as a whole, not just for libraries.

The meeting adjourned, with this matter to be taken up at the next session.

Third Meeting
Thursday, July 22, 1975

The meeting was called to order by President Henriette Avram at 2:05 p.m. The following were present: BOARD—Larry Auld, Henriette Avram, Gerald Brong, Roberto Esteves, Judith Hopkins, Sue Martin, Joe Rosenthal, Helen Schmierer, and Ruth L. Tighe. ABSENT—Frederick Kilgour. GUESTS—Stanton F. Biddle, Kandy Brandt, Walt Crawford, Maurice Freedman, Philip L. Long, and Harriett Marshall. STAFF—Donald P. Hammer, executive secretary, and Dorothy Butler, administrative secretary.

BYLAWS AND ORGANIZATION COMMITTEE. Helen Schmierer

reported on the meeting of the Bylaws and Organization Committee. Their recommendations were as follows: the name of the division and its function statement should be changed to reflect the current activities and the current and projected areas of interest of the division. It would appear that the division is moving toward being a technology utilization division, in line with the Salmon report of 1973 that recommended that the division broaden to include the educational technologies. The committee also believes that all of the ALA units in these interest areas should be brought into the division.

Sections of the division should be constituted each to encompass a broad type of technology, for instance, audiovisual technology, computing technology, video cable technology, and two other areas that seem appropriate are reprographic technology (the suggestion has already been raised that RLMS might logically belong in such a division) and preservation of library materials technology. There are other kinds of technology utilization activities of the association, some of which are in LAD, particularly in the area of equipment, office equipment and other kinds of equipment, used in libraries. If the division is reorganized along these lines, the part of the division concerned with automation (the original ISAD) should be constituted as an automation section within the division.

The committee suggests that these broader concerns be addressed by the ISAD, A-V, and VCCS boards at the Midwinter 1977 Meeting in Washington, and that the proposed reorganization be discussed by and voted upon by the membership of the division at the 1977 Conference at Detroit. The committee recommends that this proposal receive high priority for action and suggests that the addition of any other new sections or any other reorganization of the division be held off until this more basic issue of what the division is about can be settled. Mr. Rosenthal informed the board that there will be a subcommittee of DISC looking into the matter of overlapping of divisions. He commented that these ideas would probably be of interest to that subcommittee. After much discussion it was MOVED by Ms. Tighe and SECONDED and

VOTED, That the Board approve for discussion by all ISAD units at the Midwinter 1977 meeting the proposal for a change in the organization and name of the Division to reflect its focus as a technology utilization unit.

The Bylaws and Organization Committee proposed the following function statement for itself as it has felt that the lack of such a statement has interfered with its work.

The responsibility of the ISAD Bylaws and Organization Committee is to maintain the bylaws of the Division and its Sections and to report on changes proposed to these bylaws to the divisional Board and to the sectional Executive Committees as required.

The Committee is to advise the Board of Directors, and through it the divisional membership, on the establishment, functions, and discontinu-

ance of sections, committees and other units of the Division as the needs of the Division may require.

The Committee should advise the section Executive Committees, when requested, on the establishment, functions, and discontinuance of sectional committees and units of the section. In addition, on an annual basis, the Bylaws and Organization Committee shall review the functions of sectional committees and this report should be submitted for review at Midwinter meetings.

After discussion, it was MOVED by Mr. Rosenthal and SECONDED and

VOTED, That the function statement of the ISAD Bylaws and Organization Committee as stated by Ms. Schmierer in her report, be adopted by the ISAD Board.

The committee also made a recommendation about the membership of the Bylaws and Organization Committee. It was approved at the last board meeting that the committee shall include a representative from each section within ISAD: the committee would like to suggest that the past president of the division be a member of the committee, a representative of each section, a chairperson, and one or two other people to make an odd number of members on the committee.

After a session of questions and answers, it was MOVED by Mr. Esteves and SECONDED by Mr. Auld and

VOTED, That the Board accept the new membership recommendation of the Bylaws and Organization Committee.

Ms. Schmierer then went on to ask the board's approval of the following procedure for representation of proposals to the board. Anyone who wants to propose a change in the bylaws or in the organization should present the proposal *in writing* to the board, including a justification for the proposed establishment, change, dissolution, etc. The committee can then act on it and report back to the appropriate unit within the division.

The procedure was accepted by consent.

At this point in the discussion Ms. Tighe brought up the matter of the presentation of requests for action by the board. She felt that any motions, resolutions, or statements requiring a vote or any action by the board should be submitted to the board in writing and that at least a few minutes should be provided for perusal of such statements. She stated that she found it difficult to follow some of the more complicated matters that were coming before the board for a vote without having anything in writing to study. She objected to voting on complex matters without an opportunity to think about them or see them.

Ms. Avram then asked the executive secretary to make it a matter of record that from this point on all recommendations or action items to this board must be given in written or typed form prior to their discussion.

The discussion then returned to the Bylaws and Organization Committee report. It was proposed by the committee that an organization manual be written with a function statement for each committee and the proce-

dures and bylaws of each unit contained in it. During the fall, a letter would be sent to every committee chairperson, including the function statement of each committee, asking the committee chairperson to review the function statement and write in any corrections or additions that they want to have considered. At Midwinter the Bylaws and Organization Committee will go over all of the statements and sort them out once and for all. In the meantime, the committee will put out a temporary division manual, hopefully by September. It was MOVED by Mr. Rosenthal and SECONDED and

VOTED, That the ISAD Board favors the development of a divisional organization manual featuring a listing of the divisional units, with a function statement for each, and names and addresses and terms of members, as proposed by Ms. Schmierer in her report for the ISAD Bylaws and Organization Committee.

The Bylaws and Organization Committee proposes that committees with the same function or treating the same activities that are established in the division and its various sections bear the same name for the sake of uniformity throughout all the units of the division. The best example of this suggestion is the nominating committees.

No action was taken on the matter.

The Bylaws and Organization Committee also proposed that in addition to the three members on the divisional nominating committee that are required by the bylaws, the chairperson from each section's nominating committee should also serve on the divisional nominating committee, but in an ex-officio capacity. It was MOVED by Mr. Brong and SECONDED by Mr. Esteves and

VOTED, That the ISAD nominating committee have as ex-officio members the chairpersons of each section's nominating committee.

Ms. Schmierer also proposed that a group of people be constituted to work especially on conference programs. This group should include the divisional president, vice-president, the executive secretary, the incoming sectional chairpersons, and a person from the particular city where it is to be held. It was MOVED and SECONDED and

VOTED, That the Board expand the Programming Planning Committee to include a representative from the host city of the conference of the following year.

The Bylaws and Organization Committee also proposed the establishment of a Planning and Budget Committee for the division. It was proposed that from the division, the vice-president/president-elect, and from the sections, the chairpersons and vice-chairpersons constitute this proposed committee. After discussion through which the board decided that such a committee was not necessary, it was MOVED by Mr. Rosenthal and SECONDED by Ms. Tighe and

VOTED, That the previous motion (Midwinter, 1976) of the ISAD

Board regarding establishment of a Budget and Planning Committee be tabled.

In conclusion, Ms. Schmierer reminded the board that the bylaws state that a general membership meeting must be held every annual conference and ISAD has not had a general membership meeting in some time.

The board thanked Ms. Schmierer for her report from the Bylaws and Organization Committee.

ALA LEGISLATIVE ASSEMBLY REPORT. Mr. Biddle asked the endorsement of this board to amend Title 5 of LSCA and increase aid for large, urban public libraries. It was MOVED by Mr. Rosenthal and SECONDED and

VOTED, That the ISAD Board not respond to the request of the ALA Legislative Assembly that divisions endorse the proposed Title 5 of LSCA expanding support of urban libraries, as outside the field of expertise of the ISAD Board.

He also asked the board to review and comment on the pamphlet "Federal Legislative Policy" and send such comments to the ALA Washington Office. The board decided that copies of these pamphlets should be sent to them and they would individually respond by mail to this issue.

TELECOMMUNICATIONS. Mr. Long read the NCLIS press release concerning the proposed project to establish a standard network protocol. He then stated that the problem breaks down into seven questions under the generic question as follows:

What now are the responsibilities of the ISAD Telecommunications Committee vis-à-vis the NCLIS/NBS effort?

1. Is the committee responsibility on protocol now ended? Should the committee be recharged or expanded?
2. Is there any formal relationship between ISAD Telecommunications Committee and the NCLIS task forces?
3. Where are the loyalties of the ISAD Telecommunications Committee members who are appointed to the NCLIS/NBS effort to lie in case of conflict?
4. At the end of the NCLIS/NBS efforts, what actions are foreseen to be required of ALA, of ISAD, and of ISAD Telecommunications Committee?
5. What is the controlling mechanism of the NCLIS/NBS effort?
6. What is foreseen to be the charge of the NCLIS/NBS effort?
7. Should ISAD Telecommunications Committee just simply march along as if nothing had happened?

Mr. Rosenthal proposed that the members of the ISAD Telecommunications Committee act as the ISAD representatives and when the NCLIS/NBS effort produces a product, that the Telecommunications Committee review it and make recommendations to the board, which could then endorse or not endorse or make recommendations to NCLIS/NBS.

After much discussion, Mr. Long read the formal proposal of the Telecommunications Committee, which was as follows:

The Committee RESOLVED unanimously that it be recommended to the ISAD Board of Directors that the Board express support for the NCLIS/NBS effort to develop a protocol for computer to computer communication and that the Board further express the sense of the Telecommunications Committee that members of the Committee designated to serve in the NCLIS/NBS effort would be pleased to represent ALA, ISAD, and the Telecommunications Committee of ISAD in the development process and upon completion of the NCLIS/NBS work, that the Telecommunications Committee would be pleased to coordinate review of this work within the American Library Association.

It was MOVED and SECONDED and

VOTED, That the ISAD Board endorse the recommendation of the ISAD Telecommunications Committee concerning the NCLIS/NBS effort in developing a national telecommunications protocol.

The board then recommended that the Telecommunications Committee re-examine their charge as given in the *ALA Handbook of Organization* and proceed with their work under their charge.

METRIC CONVERSION. In regard to the Metric Conversion Standards Task Force, the board MOVED and SECONDED and

VOTED, That the incoming Vice President/Pres. Elect be empowered to confer with appropriate persons in RTSD to form an interdivisional committee on this subject.

ISAD VCCS. Regarding the resolution submitted by the Executive Committee of the ISAD VCC Section, it was MOVED by Ms. Avram and SECONDED by Ms. Tighe and

VOTED, That the ISAD Board adopt the resolution proposed by Mr. Esteves that the ISAD Division of the ALA does hereby support the National Citizens Committee for Broadcasting in pursuing negotiation of its prime-time public affairs programming guidelines with the broadcast television industry.

In closing it was MOVED by Ms. Tighe and SECONDED and

VOTED, That the ISAD Board commend Ms. Avram for her signal contribution to ISAD during her year of heroic and devoted service as President of the Division.

Technical Communications

Proposed New FCC Rulemaking Proceeding on Instructional Television Fixed Service (ITFS)

The purpose of this notice is to inform all present and future ITFS users and others of FCC staff efforts looking toward a wide-ranging new Notice of Inquiry and Proposed Rule Making for ITFS. No staff action has any effect until endorsed by the full commission, and no new rules can be put into effect until all interested parties have an opportunity to be heard.

The ad hoc ITFS Coordinating Committee is an informal, open-ended, committee organized at a meeting called by Philip Rubin of the Corporation for Public Broadcasting and chaired by Frank W. Norwood, executive director of the Joint Council on Educational Telecommunications (JCET). The meetings have included members from the National Education Association, the U.S. Catholic Conference, the National Association of Educational Broadcasters, and the Department of Health, Education, and Welfare, among others. The meetings are open to all, and this article is a step in engaging the participation of those who cannot come to the meetings in Washington.

The FCC staff from several bureaus, including, in particular, the Common Carrier Bureau, the Office of the Chief Engineer, and the Broadcast Bureau, have been working since summer 1975 on a comprehensive new ITFS docket for commission action. The staff proposals were discussed publicly and in some detail by members of the FCC staff in a session last November at the NAEB convention in Washington. The ad hoc ITFS Coordinating Committee is aware of some recent modifications, as well. JCET believes the draft currently contains both "good news" and "bad news."

The major changes proposed include—

1. *Opening up eight channels, the F and G groups, to the new Multipoint Distribution Service,* a commercial common carrier service whose biggest present customer is pay television. The FCC's Common Carrier Bureau is quite reasonably concerned because the present MDS band, 2150–2160 MHz, permits only one station per market, a de facto monopoly situation. In the top fifty markets, the band has been extended to 2162 MHz, but even then, only two channels are possible, and adjacent channel interference problems are anticipated.

The proposal stems originally from a petition for rulemaking (RM2213) filed by Varian/Beverly, a manufacturer of ITFS and MDS gear, filed June 14, 1973, but goes beyond Varian's petition to offer MDS operators the chance to displace existing ITFS operations in the F and G groups if they, the MDS operators, will bear the cost of shifting the ITFS systems to lower channels. In situations where no lower channels were available, MDS would be precluded from expanding into the ITFS band.

2. *An overall look at opening ITFS channels to other noneducation users.* While MDS is perceived as having the most pressing need for new spectrum space, other services are also eyeing the ITFS band, as well. This is likely to be dealt with as a Notice of Inquiry, asking for general comments and suggestions.

3. *Removal of the present requirement that ITFS systems meet "broadcast standards."* Present regulations mean that ITFS must use such expensive gear as quadraplex videotape recorders. Free from the artificial constraints of "broadcast standards," ITFS users could greatly reduce costs by using gear which has demonstrated its satisfactory quality on CCTV and CATV operations or, conversely, make use of more stringent high resolu-

tion standards. (Kessler and Wilhelm proposal, FCC RM 2603.)

4. *Permit greater power by ITFS stations,* either by lifting the present ceiling on transmitter power output (TPO) from ten watts to twenty watts or by establishing a new basis for computing power based (as in FM and TV broadcasting) on effective radiated power (erp).

5. *Permit the use of the 2500-2790 MHz band for long-haul microwave to link ITFS systems.* This would probably involve authorizing wide-band (20–25 MHz) frequency modulated intercity systems to supplement present 6 MHz vestigial sideband AM (VSB/AM) channels.

6. *Allow ITFS systems to feed CATV systems for delivery of programs to end users.* Another Kessler and Wilhelm proposal (FCC RM 2609) would make routine what is now granted by the FCC on a waiver basis: the use of ITFS transmitters to send signals to one or more CATV systems which carry the programs to the schools or other viewing locations. Substantial savings in the cost of receiving antennas and down-converters are possible.

7. *Coordination of ITFS applicants to minimize potential future interference.* As with such other services as MDS, ITFS applicants would be required to notify all potential spectrum users of their plans before their systems are built. The object would be to minimize future conflicts and to maximize the utilization of the ITFS band by requiring each applicant to coordinate with other users and potential users of the spectrum.

8. *Provide guidelines for shared use of ITFS systems.* As currently licensed, ITFS systems are for the use of the licensee. The present rules do not specifically permit an ITFS operator to make his facilities available to others. It is proposed that guidelines be spelled out, indicating what other parties may use an ITFS system under nonprofit terms.

9. *Channel renumbering to assign adjacent channels.* At present, each lettered group consists of alternate channels which, via the down converter, can be converted to channels 7, 9, 11, and 13 on the receiving VHF dial. Commission staff feels that currently available technology will permit use of adjacent channels.

10. *Permission for any type of signal.* ITFS is currently defined in terms of conventional VSB/AM television. Relaxation of the rules would allow the band to be used for data, multichannel audio, high-resolution TV or other new services.

11. *More stringent frequency tolerances,* substituting ±1 KHz for present limits. In addition, the use of precise offsets would promote the practicability of the use of adjacent channels.

12. *Coordination of terrestrial and satellite use of the ITFS band.* The 2500-2690 band is presently allocated for educational and public service satellite service, as well as for ITFS (NASA's ATS-6 operates in this band). Comments will be sought regarding space-terrestrial sharing (ITFS may interface with satellite earth stations, not the other way around) and the possibilities of the development of an integrated system, using the band for intercity traffic via satellite and long-haul microwave and for intracity distribution via conventional ITFS.

Timetable

Work has been going on for many months. First, agreement must be reached on the wording of a Notice of Inquiry and Proposed Rule Making. Then, the bureau chiefs of at least three and as many as five bureaus will have to give their approval. From that point, the document goes to the full commission for its approval, modification, or rejection. At its fastest, the chain of events is likely to take several weeks.

When the full commission acts, it will be to issue a public document called a Notice of Inquiry and Proposed Rule Making. The ad hoc ITFS Coordinating Committee will see that all ITFS licensees and other interested parties get a copy. Everyone will have thirty days in which to send comments to the commission, perhaps opposing some parts, supporting other parts, or suggesting alternative strategies. If more time is needed, which seems likely, no difficulty is anticipated in getting the comment period extended another thirty days or even longer.

After comments are received by the commission, there are another thirty days for reply comments. Again, an extension is usually granted if requested.

It is not necessary to be a lawyer or to employ an attorney to file comments and reply comments. The ad hoc committee will be happy to supply more information and to assist when the time comes.

Interested persons are asked to collect the evidence which will best support this case. Such data as:

1. Present and planned use of existing ITFS systems, including the value, as well as the degree of utilization
2. Hard data on future plans for ITFS, including
   a. Plans of existing systems for expansion
   b. Plans for new systems
3. The anticipated impact of rules changes, such as
   a. Constraints upon planned growth if ITFS channels are lost to other services
   b. Potential increase in ITFS growth if cost of hardware is reduced
   c. Possibilities of a "systems approach" combining ITFS, intercity relay and satellites.

To keep informed, make sure you are correctly listed on JCET's mailing list. Pass the word to others who should be helping in this common cause. Send names and addresses to the Joint Council on Educational Telecommunications, 1126 Sixteenth St., NW, Washington, DC 20036 or feel free to call the JCET (202) 659-9740 as a "hot line" of up-to-date information about what is happening to the proposed inquiry and rule making. Holt Riddleberger, Jeremy Birkbeck, or Frank W. Norwood will be glad to help. Please send along the kinds of evidence that will enable JCET to make the best case with the FCC. You are invited to attend the meetings of the ad hoc ITFS Coordinating Committee.

Editor's Note—Due to the lead time required in publishing, problems in this proposal may have already been resolved, but your comments and concerns will still be of value to JCET.

Communicating Word Processors Herald the "Electronic Office"

A report published by International Resource Development, Inc. (IRD), a market research consulting firm, reviews the past, present, and future development of the market for electronic typewriters which can be used both for text editing and for communications, either with each other or with computers.

Reviewed in the report entitled "Communicating Word Processors" are the implications of the continuing decline in postal services in almost all developed countries, together with rising postal costs. The communicating word processor (CWP) bypasses the postal system by sending text directly from the typewriter of the sender to that of the recipient, over telephone lines, and can double as a timesharing terminal when desired. IRD consultants conducted a pilot study of major corporate users of mail services and word-processing equipment, and concluded that many established markets for business communications, including Telex/TWX, facsimile and office copiers, would be impacted by the movement to communicating word processors.

Also discussed in the IRD report is the connection between communicating word processors and the various forms of electronic mail services which are in operation or are being considered in several countries. The report discusses the possibility that CWPs might operate in conjunction with certain types of electronic mail networks and points to recent moves by Western Union to make their Mailgram electronic mail network accessible to CWPs.

Some CWPs comprise conventional typewriter keyboards and printers, while others have cathode ray tube displays on which the text is prepared. The report discusses the ways in which paper usage will be changed by the increasing use of CWPs and points out that CWPs obviate the need for envelopes, since messages are transmitted electronically from sender to recipient.

Communicating word processors will, like calculators and digital watches, be-

come progressively less expensive, the report predicts, and this will help trigger the expected increase in their use. IRD expects shipments of CWPs to more than quadruple within two years, with many new suppliers entering the market (Xerox recently introduced a communicating version of its word-processing system).

Further details on the report, including a free table of contents and description, are available from IRD at 46 Main St., New Canaan, CT 06840; telephone (203) 966-5615.

News and Announcements

ISAD Institute to Be Repeated in October

The Information Science and Automation Division's (ISAD) three-day Institute on Processing and Automation at the Library of Congress will be repeated, by popular demand, this October.

Again cosponsored by ISAD and the Library of Congress (LC), the institute will be held on October 13–15, 1976, at LC and the Hyatt Regency Hotel, 400 New Jersey Ave. NW, Washington, DC 20001.

The first day will be devoted to tours of the Processing Department of LC. The next two days will be devoted to institute sessions, featuring LC staff members as speakers.

The institute is designed to inform participants of the activities, operations, and future plans of the LC Processing Department. Among the areas to be covered will be the Order Division, the National Bibliographic Service, the Automated Process Information File, the cataloging system, the authority system, COMARC, CONSER, the Cataloging Distribution Service, and the MARC input story.

Registration is $45 for ISAD members, $60 for ALA (not ISAD) members, $75 for nonmembers, and $15 for full-time library school students (on space-available basis only).

For further information and registration forms, contact Donald P. Hammer, Executive Secretary, ISAD, American Library Association, 50 E. Huron St., Chicago, IL 60611. Telephone: 312-944-6780.

Washington Library Network Legislation

In Washington State a promising future for library networks was secured in February 1976 when Governor Dan Evans approved enabling legislation creating the Washington Library Network under the Washington State Library Commission. The new network will utilize the State Data Processing Computer Center in Pullman, Washington. Headquarters for administration, coordination, quality control, and development will be located in Olympia.

Designed to speed and expand library operations and resource sharing, major attention will be given to interlibrary loan, reference and referral, and automated bibliographic information.

The Washington Library Network Computer System is an outgrowth of a 3.5-year project presently utilized on-line by the State Library, eight district libraries, and a four-year college—representing 120 individual libraries in all. The University of Washington is utilizing the on-line capabilities to edit its existing serials records for inclusion in the data base. The project demonstrated the feasibility and utility of libraries combining their cataloging efforts to use a common data processing system and to share data about library holdings. A key element in the success of the project was the *Resource Directory*, a computer-produced catalog of library holdings purchased since 1972.

Significant economies and improvements were realized by project participants, e.g., one library system eliminated a six-month cataloging backlog within eight weeks; and total outgoing loans for all participants in 1974 were 4.5 times the 1972 volume. Also, libraries found that the personnel slack resulting from computer assistance to cataloging procedures has been taken up by mushrooming readers' service efforts. The result was as hoped: improved service without proportionally increased costs.

Significant expansion of the on-line system was implemented beginning July 1, 1976. The Network Computer System

will be expanded to include acquisitions and accounting modules as well as enhanced features in the bibliographic subsystem. Circulation and serials control development is expected by 1977. The University of Washington and Washington State University will join the system during the 1975–77 biennium. Products include cards, book and microfiche catalogs, listings, and multiple order forms for acquisitions.

The *Resource Directory* will be produced on computer-output-microfiche, and some 350 fiche readers are being purchased by the State Library for loan to present network participants.

Additional details about the Washington Library Network can be found in an article by Mary Jane Pobst Reed, in the September 1975 issue of *JOLA*, entitled "The Washington Library Network's Computerized Bibliographic System."

New Video Guidebook for Librarians

The Information Science and Automation Division of the American Library Association has announced the publication of a cable video guidebook for librarians. The book, *Video and Cable Communications, Guidelines for Librarians,* was written by Brigitte L. Kenney and Roberto Esteves and was based on a report of the ALA ad hoc Video/Cable Study Committee established in 1973 by the ALA Council.

The publication is intended for the librarian who is interested in gaining an overall look at the use of video in libraries, who would like to understand the technology, who needs to know how to establish and administer a video unit, or who is seeking information about the legal and regulatory aspect of the field. It can also be used as a staff study-guide for in-service training.

Some of the chapters include video for library services, video for patron use, programming for special groups, financing, hardware, sources for programming software, regulations and franchising, and community organization and resources. There is also a checklist of things to do, sources for information, and an extensive annotated bibliography.

Copies are available (prepaid only) at $3.50 each from the Information Science and Automation Division of the American Library Association, 50 E. Huron St., Chicago, IL 60611. Please make checks payable to the American Library Association. Payment must be included with the order.

ASIS Conference on Information★Politics

The theme of the annual ASIS conference will be "Information★Politics." The conference will be held in the San Francisco Hilton October 5–9, 1976. The week-long conference will begin with an all-day program on October 4 by Library of Congress staff entitled "Library of Congress: Service to Congress and the Nation." The body of the conference will feature three plenary sessions: Aaron Wildaosky, dean of the School of Public Policy at the University of California, Berkeley, will speak about information and policy analysis; Quincy Rodgers, Domestic Council Committee on the Right of Privacy, will describe his work regarding a national information policy for the U.S.; and Alphonse Trezza (National Commission on Libraries and Information Science) and John Gray (British Library) will discuss national and international information systems. Technical and special interest group sessions will comprise the remainder of the conference; almost 100 programs of interest to the information community will be presented. Inquiries should be addressed to ASIS, 1155 Sixteenth St., NW, Washington, DC 20036.

Cable Television Regulation

The House Commerce Subcommittee on Communications, chaired by Rep. Lionel Van Deerlin (D-Calif.), held hearings on the regulation of cable television in May 1976. A panel of witnesses presented testimony concerning the noncommercial uses of cable TV. Leadoff witness was Margaret Cleland, executive officer of the Connecticut Commission on the Educational and Informational Uses of Cable Telecommunications, and formerly

with the Connecticut State Library. Also testifying was Merry Sue Smoller, cable television officer for the city of Madison, Wisconsin, and formerly librarian of the University of Wisconsin Journalism and Mass Communication Library.

The hearings followed a prior subcommittee staff study and may lead to legislation in the next session of Congress to amend the Communications Act of 1934 to encompass cable television. The staff study, *Cable Television: Promise versus Regulatory Performance,* was issued as a subcommittee print in January and recommends a certain amount of deregulation for cable operations. (The subcommittee has exhausted its supply, but reprints are available for $5.00, prepaid, from Television Digest, 1836 Jefferson Place, NW, Washington, DC 20036.)

Public access to cable for the community and for agencies like libraries is one of the issues involved in regulation of cable television. In consultation with the Video and Cable Communications Section of ISAD, ALA will submit a statement for the hearing record.

Library Technology Reports *Covers Video Industry*

Included in the March 1976, volume 2, number 2 issue of *Library Technology Reports* is a special report of Angie LeClercq on "The Video Industry: Equipment, Software, and Library Applications." Ms. LeClercq is assistant professor and head, Nonprint Department at the University of Tennessee, Knoxville. This issue also contains laboratory test reports on six cassette tape recorders for libraries.

Ohio College Library Center Receives Grant

OCLC announced receipt of a $339,319 grant from the W. K. Kellogg Foundation, Battle Creek, Michigan, on June 1, 1976. The center will use the grant to develop a mechanism to link OCLC's on-line computer system with other on-line systems containing information in such fields as law, medicine, chemistry, and biology. "The grant will enormously increase the availability of information to library users," says Dr. James E. Rush, OCLC's director of research and development. According to Dr. Rush the eighteen-month grant project will enable libraries in the OCLC network system "to improve their ability to meet the information needs of library users" by helping them to secure information from data banks across the country.

The grant to OCLC is part of a series of projects totaling $4.25 million that the W. K. Kellogg Foundation is currently funding for information-network programs to strengthen and expand library capabilities to more effectively serve the nation's library patrons.

AV Section Using Revised AACR

The Audiovisual Section of the Descriptive Cataloging Division of the Library of Congress started applying the rules in the revised chapter 12 of the *Anglo-American Cataloging Rules* on March 3. Although the rules have been expanded to cover instructional materials, Library of Congress cataloging will still be limited to motion pictures, filmstrips, slide sets, and sets of transparencies. Video recordings distributed by the National Audiovisual Center will also be included.

The implementation of the revised rules has necessitated revising *Films: A MARC Format,* preparing a manual for use by the MARC Editorial Division, and making changes in the programming in the Cataloging Distribution Service Division. Printed cards and MARC tapes became available in May; these records will appear in the 1976 annual cumulation of *Films and Other Materials for Projection.*

Workshops on Effective Use of OCLC

Kent State University will hold two workshops on the "Effective Use of OCLC." The first is scheduled for October 24–29, 1976, and the second will be February 6–11, 1977. The workshops will focus on mid-management and systems personnel in libraries which are preparing to go on-line or in libraries which have less than one year's experience with OCLC service.

For more information, contact Anne Marie Allison, Assistant Professor, Library Administration at Kent State Univerity, Kent, OH 44242; telephone (216) 672-3021.

Satellite Network for Continuing Education Planned

A satellite-based national network for continuing education is being planned by the Public Service Satellite Consortium (PSSC), it was announced by John P. Witherspoon, president of the Consortium at the Third Annual Conference on Open Learning and Non-Traditional Study, held at the University of Nebraska at Lincoln.

The system would concentrate initially on reaching professional groups such as doctors, engineers, and industrial managers, according to Witherspoon. Once the technical capability is in place, however, a wide variety of compatible activities could be undertaken.

The continuing education network, the feasibility of which is now being explored by the consortium, would be based on commercial satellites, with course delivery to the individual student via cable TV, relays from conventional earth stations, or newly developed small, relatively inexpensive receiving stations which could be installed in hotels, hospitals, industrial plants, or other institutional settings.

The network concept—actually a compatible set of customized networks—is a consortium response to an intensive series of meetings between PSSC staff members and representatives of member agencies. The consortium currently has fifty-five nonprofit members from medicine, education, libraries, public broadcasting, and state government telecommunications.

Witherspoon emphasized that the consortium will not produce course material for the network but will make it possible for consortium members to extend their reach and apply satellite communication to their efforts in continuing education.

Another project of the consortium involves providing technical service to AID and NASA in support of a series of communication satellite demonstrations intended to help third world nations apply modern telecommunications technology to their own development. The AID-NASA effort follows commitments made by Henry Kissinger during an address in Nairobi in the spring of 1976. Three PSSC crews will handle installation and operation of transportable satellite earth stations in more than twenty countries during a two-month period beginning this summer.

Information Service Institute

Area-wide information users in southern New England and New York State are invited to participate in a two-day Information Service Institute on scientific, technical, business, and financial computer-based data systems. The institute will be sponsored by Southern Connecticut State College, Division of Library Science and Instructional Technology, on October 21–22, 1976, at the New Haven Motor Inn. The conference will offer opportunity for personalized training in negotiating on-line searches. Round table and panel sessions will survey data utilization, evaluation, cost and equipment analysis, and personnel training in automated retrieval services. Beginning as well as experienced users are welcome. Further information is available: c/o Dr. Victor A. Triolo, 437 Buley Library, Southern Connecticut State College, New Haven, CT 06515.

University of Chicago Graduate Library School's Thirty-Eighth Annual Conference: "Prospects for Change in Bibliographic Control"

A major event in the Graduate Library School's celebration of its fiftieth anniversary year will be the school's thirty-eighth annual conference: "Prospects for Change in Bibliographic Control," to be held November 8–9, 1976. Abraham Bookstein, Herman Fussler, and Helen Schmierer are codirectors. The conference will be held at the Center for Continuing Education on the University of Chicago campus.

Problems of bibliographic control have long been a central concern of the school and have been the focus of three earlier conferences. Economic pressures on li-

braries, rapidly changing technologies, and organizational changes affecting bibliographic control make another such conference timely and appropriate. The purpose of this conference is to define clearly the state of bibliographic control today, identify the variables that will most strongly influence the evolution of bibliographic control in the future, relate current capabilities to fundamental principles, and consider the available alternatives and their consequences.

Herman Fussler, Martin A. Ryerson Distinguished Service Professor, University of Chicago, will introduce the conference. Other contributors will be: Warren J. Haas, vice-president for information services and university librarian, Columbia University; Doralyn J. Hickey, professor and director of the School of Library Science, University of Wisconsin, Milwaukee; S. Michael Malinconico, assistant chief of the Systems Analysis and Data Processing Office, New York Public Library; Elaine Svenonius, School of Library and Information Science, University of Western Ontario, with Helen Schmierer, assistant systems librarian, University of Chicago; and Ronald J. Wigington, director of research and development, Chemical Abstracts Service. Henriette Avram, MARC Development Office, Library of Congress, will present the final paper and comment on the preceding papers.

For further details about registration, housing, etc., write: Abraham Bookstein, Graduate Library School, University of Chicago, 1100 East 57th St., Chicago, IL 60637.

Control Data and INSPEC Announce Joint Service

Control Data Corporation and the Institution of Electrical Engineers have announced the establishment of a jointly developed service to make approximately 15,000 scientific references available each year through Control Data's worldwide Cybernet data services networks. The new service, which will be called Technology Innovation Alert (TINA), is designed to make information on technological advances available quickly and economically.

The Institution of Electrical Engineers, whose INSPEC organization publishes abstracts of the world's technical and scientific journals, will provide information on new technology in such fields as physics, electrotechnology, electronics, computers, and control for inclusion in a special TINA data base. Control Data Technotec, a service organization involved in technology exchange on a global basis, will be responsible for maintaining and distributing this data base.

Organizations interested in seeking information in the data base may do so through a regular alerting service or by a random search method. Through the automatic alerting service, subscribers select profiles of particular areas of interest, and they are alerted either via a computer terminal or mail whenever an appropriate item is added to the file. The data base is purged regularly of obsolete or low-interest-level items.

Annual membership fee for the automatic alerting service is £500, plus a charge of £30 per profile. However, no charge is made for profiles in excess of fifty, so the maximum annual expense to a subscriber is £2,000. Random searches cost about £6 each, plus a £1 identification fee if details are requested.

The City of San Jose Awards $465,600 Contract for an Automated Library Circulation System

Systems Control, Inc., has received a fifteen-month contract with a value of $465,600 to automate the circulation of books and other items for the City of San Jose Public Library System.

A central computer facility will be installed at the main library with terminals in each of the twelve branches. Materials and borrowers cards will be affixed with uniquely numbered bar-code labels for use with an optical scanning "light pen" attached to each computer terminal. Patron and book status will be instantly available to the operator by means of messages printed on the terminal screen and also by on-the-spot printed messages.

The system is scheduled for implementation in late 1976.

University of California to Automate Library Circulation Operations

CLSI and the University of California have announced the signing of an agreement for a universitywide program for automation of library circulation operations. The agreement calls for CLSI to provide its LIBS 100 automated circulation control system to the libraries of the University of California and for collaboration between CLSI and the university to develop system enhancements in the future. As each campus chooses to implement the system, a separate purchase order will be issued, referencing the initial agreement.

The first installation of the standardized minicomputer-based system was installed at UCLA's University Research Library in June 1976. The UCLA system is the pilot configuration in the program to install the LIBS 100 computer hardware and software package in libraries on each of the nine campuses of the university over a period of several years. When installed in the multicampus environment, the LIBS 100 system will form the basis for a universitywide network for resource sharing and interlibrary loan capabilities, in addition to automating the circulation procedures within each library.

The automation of library circulation operations will increase efficiency and accuracy of record keeping, improve service to library patrons, and provide a more effective utilization of library materials. The LIBS 100 will facilitate resource sharing between libraries on each campus and between campuses within the university. Further, it can eventually provide links with libraries outside the university using automated circulation systems.

Development of the intercampus minicomputer-based library network at the University of California is being coordinated by the Office of the Executive Director of Library Planning, academic vice-president for the University of California System-Wide Administration in Berkeley.

Sidereal Corporation Introduces Micro Net™, A Microprocessor-Based Telecommunications Terminal Designed to Work on All Networks

Sidereal Corporation, a Portland-based telecommunications terminal manufacturer, and Lane Telecommunications, Inc., of Houston, have introduced a new standard four-row keyboard, ASR terminal, Micro Net™. The new Micro Net is controlled by a microcomputer, which gives it universal access to all networks and substantially simplifies its operation.

One Micro Net terminal can simultaneously access TWX, TELEX, Tymnet, DDD satellite, private lines, and computers with simple keyboard instructions. It eliminates the need for separate terminals for each network.

Micro Net can access other receiving terminals and communicate directly with them, bypassing expensive code conversion. According to a Sidereal spokesman, Micro Net simplifies all communications procedures with a standard format, four-row typewriter keyboard. Message preparation is standardized on one Micro Net-created tape. The new terminal automatically produces a printed copy of the taped message. Standard keyboard procedures also automatically dial and redial receiving terminals, virtually eliminating the need for an operator to stand by unsuccessfully attempting to access often busy lines.

Other automatic features of Micro Net include an automatic time/date stamp on all messages sent and received, automatic keyboard dialing and redialing, and a minibuffer mode allowing the user to create a short message in the buffer memory and send it automatically without using tape.

Micro Net also has a built-in self-diagnostic capability which allows the operator to isolate difficulties or problems in the terminal, in the microprocessor module, or on the line, minimizing costly maintenance calls. Maintenance, when necessary, is universally available from any Western Union office. Time and money savings are apparent immediately at installations using Sidereal equipment.

Sidereal offers two models, the Micro Net 33 and the Micro Net 35. Both models are available immediately for lease or purchase. For complete technical and pricing information, contact Sidereal Corporation, P.O. Box 1042, Portland, OR 92707, (503) 277-0111; or Lane Telecommunications, Inc., 6906 Harwin Drive, Houston, TX 77036, (713) 780-0640.

Bibliography Available on Microprocessor Applications

An indication of the recent rapid growth in the use of microprocessors is revealed by a bibliography just published by the Library of the Institution of Electrical Engineers (IEE).

The Microprocessor Applications Bibliography covers the period January 1970 to October 1975. Each reference includes a brief summary of the original source and full details needed to locate it. The coverage includes journal and conference papers, books, theses, reports, and patents published worldwide. The new bibliography is available from the Librarian, IEE, Savoy Place, London, WC2R 0BL, Price £2.50.

Joint Conference November 11–13

The Southwestern Library Association (SWLA) and the Mountain Plains Library Association will hold a joint conference at the Albuquerque Convention Center on November 11–13, 1976.

An outstanding program of speakers, workshops, and preconference institutes is being planned around the theme "The Net Worth of Networking." John F. Anderson, director of the Tucson Public Library, and Vern West, head of technical services, Jefferson County Public Library, Golden, Colorado, are in charge of program planning. Featured speakers will include Clara Jones, president of ALA, and Roderick Swartz, Washington State Librarian.

The foreign flavor of New Mexico's largest city offers a festive atmosphere to visitors. The taste of Spanish culture awaiting conventioneers will serve as an introduction to SWLA's post-conference trip to Mexico City. This tour is open to members of either association.

Hasta la vista. Nos vemos en Noviembre.

Institute Scheduled on State Library Agencies and the National Plan

The National Commission on Libraries and Information Science (NCLIS) has awarded a $49,795 grant to the University of Pittsburgh's Graduate School of Library and Information Sciences to conduct a management institute for heads of state library agencies and other key state library personnel. The institute, "State Library Agencies and the National Plan," will provide an update in management training for state librarians, train new state librarians and key personnel in the processes of program planning and evaluation, and assist state library agencies in establishing a correlation between state-level long-range planning and the National Program for Library and Information Services. The first of the two planned training sessions is scheduled for December 1976.

Director of the institute will be Mrs. Brooke Sheldon, lecturer at the Graduate School of Library and Information Sciences, and Dr. Frank B. Sessa, professor at the school, will serve as coordinator. Dr. Sessa, formerly director of the Miami Public Library, is director of the Bureau of Urban Library Research at the University of Pittsburgh and a library consultant of wide experience. Mrs. Sheldon, currently a doctoral candidate at the University of Pittsburgh, was training director for the Leadership Training Institute conducted in 1972–73 by Florida State University for the U.S. Office of Education. Author of the handbook *Planning and Evaluating Library Training Programs,* Mrs. Sheldon is well known as a lecturer on planning and evaluation and has acted as consultant for several states, including California, Ohio, and Maryland, for the WICHE and SLICE regional networks, and for the national Continuing Library Education Network and Exchange.

An advisory committee selected from

members of the NCLIS, staff of the U.S. Office of Education Office of Libraries and Learning Resources (OLLR), and state library agency heads has been named by the National Commission to work with the staff in the planning and evaluation of the institute. The members of the advisory committee are: William G. Asp, state librarian, Minnesota; John A. McCrossan, state librarian, Vermont; Joseph F. Shubert, state librarian, Ohio; Roderick G. Swartz, state librarian, Washington; Nettie B. Taylor, state librarian, Maryland; Carlton J. Thaxton, state librarian, Georgia; Elizabeth Hughey, chief, State and Public Library Services Branch, OLLR; Alan Sevigny, library services program officer, USOE Region V; and Frank A. Stevens, chief, Library Education and Postsecondary Resources Branch, OLLR. Commission members to the committee will be announced.

For further information, please contact NCLIS, 1717 K St. NW, Suite 601, Washington, DC 20036; (202) 653-6252.

Task Force on Computer-to-Computer Protocol Formed

The National Commission on Libraries and Information Science (NCLIS) and the Institute for Computer Sciences and Technology of the National Bureau of Standards (NBS) have joined forces to tackle the problem of developing a high-level protocol for computer-to-computer data interchange directed primarily at library and information science networking applications.

A task force composed of recognized technical experts in this area is being established to develop such a protocol and to identify existing related standards that should be adopted for library and information science applications. This task force, the members of which are being designated by NCLIS, will receive technical and operational support from NBS. The task force meetings will be open to the public, beginning with the first one planned to be held at the National Bureau of Standards on September 1 and 2, 1976.

This expedited development of a standard high-level networking protocol under the sponsorship of NCLIS follows the initial work successfully performed in this area over the past year by the Telecommunications Committee of the Information Science and Automation Division (ISAD) of the American Library Association. It was at ISAD's initiative that this project was brought to the attention of NCLIS, which, recognizing the importance of this endeavor, enthusiastically agreed to support the completion of the task. The new effort will build on the results of the ISAD committee's work and is expected to lead to a proposed standard by September of 1977. The findings of this task force, including a recommended standard protocol, will be provided directly to the American National Standards Institute, the American Library Association, and the American Society for Information Science for their consideration in the development and adoption of standards directed specifically to the library and information science community.

For further information, please contact NCLIS, 1717 K St. NW, Washington, DC 20036; (202) 653-6252.

Book Reviews

A Selective Annotated Bibliography on Library Networking. November, 1975. $1.50.

Computerized Networks among Libraries and Universities; An Administrator's Overview, by Lewis B. Mayhew. November, 1975. 73p. $3.00.

Acronyms and Initialisms of Library Networks. Second Version, December, 1975. 13p. $1.50. Available separately or as a package for $5.00 from ERIC Clearinghouse on Information Resources, Box E, School of Education, Stanford University, Stanford, CA 94305.

These three ERIC papers offer an inexpensive and convenient introduction to certain aspects of library networking. The *Bibliography* offers well over 150 items, virtually all of them published in the 1970s, the vast majority having appeared either as ERIC papers or in the professional literature that most of us at least scan. The list appears to represent an updated version of Miller and Tighe's bibliography from the "Library and Information Networks" chapter of volume nine of the *Annual Review of Information Science and Technology.* While there are no surprises in the list, it should prove useful for those attempting to stay current in this rapidly expanding field.

The list of acronyms and initialisms, similarly, should provide a useful single source of brief information about the growing numbers of cooperative organizations that call themselves networks. While OCLC, SOLINET, PALINET, and many other familiar groups appear, some of us may not yet be familiar with PACFORMET, WORLDS, MILO, CORAL, and several other new organizations. Each organization in the list is described, generally in a single sentence, and an address is given for those who wish to learn more. In each case where a report relating to the organization is available, either through ERIC or in the published professional journals, a citation is given.

The third and largest paper in this package is a summary by Mayhew of networking in libraries and universities. His paper is an attempt to describe the current scene from the point of view of the university administrator rather than the librarian. This removal from an intimate knowledge sometimes weakens Mayhew's work. For example, his explanation of INTREX is very superficial and incomplete, and he seems to be unaware of its demise several years ago. And although TOXLINE is the only information retrieval network he describes, he gives very little detail, fails to even hint at what other subject fields are covered by such systems, and never indicates whether TOXLINE is typical of such systems or not.

Clearly, detailed description is neither the aim nor the accomplishment of this paper. The author intends his work as "a primer regarding networking and . . . an indicator to other relevant literature." In nontechnical language he offers an overview of networking which helps to put library networks into perspective with regard to such nonlibrary-focused operations as ARPANET and the less well-known UNI-COLL. Mayhew describes the failures and problems of networks as well as their successes, and he provides the reader with some idea of the diversity of types of networks. His bibliography offers a number of items that will be new to those who restrict their reading to library journals.

In sum, this package of papers is well worth the small price for those looking for a succinct and nontechnical introduction to the general field of networking. For those more specifically interested only in library networking, this reviewer recommends Miller and Tighe's chapter in volume nine of *ARIST* and Butler's excellent

survey in the September 1975 issue of *JOLA*.

Peter Simmons
School of Librarianship
University of British Columbia

Library Automation Systems, by Stephen R. Salmon. New York: Marcel Dekker, 1975. 291p. $24.50. LC: 75-25168; ISBN: 0-8247-6358-0.

At least once each year someone in the U.S. or England produces a slim volume designed to introduce librarians to the field of library automation. This work is the latest in the continuing series, and it is one of the better efforts of its kind.

In ten chapters, Salmon covers the usual categories of applications: acquisitions systems, cataloging systems before MARC, MARC itself, on-line cataloging systems, the effects of automation on cataloging practices, serials systems, circulation systems, and future prospects. These sections are approached in a historical or developmental sequence, and in this the author is unique. By indicating how each type of application began and by giving some idea of how systems developed to the present stage, he helps his readers to understand how the present state of affairs came to pass and facilitates some educated guesses regarding how the future will develop. This chronological approach is missing from other works of this kind, and they are much poorer for it.

Another welcome departure from traditional introductory texts is Salmon's inclusion of a chapter devoted entirely to problems of library automation. In sixteen pages he attempts to categorize three major problem areas in the field (poor planning, poor design, and poor implementation) and points an accusing finger at the three groups of people responsible for problems: computing center and systems personnel, suppliers, and librarians. He is careful to give examples from the literature, with citations to his sources, and he succeeds well in striking a healthy balance between the blue-sky, everything-will-be-rosy-and-cost-beneficial zealots and the kick-the-rascals-out, absolute negativists.

This work, with its complete index, copious bibliographic references, and chronological bibliographies, will prove useful to the uninitiated librarian and should be a boon to the library school student. This reviewer finds it difficult to recommend it more widely for two reasons: first, that it contains nothing that cannot be found already in other sources and, second, that the price of this thin volume (242 pages of text, including footnotes and illustrations), reproduced in the photo-reproduction of typescript method found most commonly in hastily produced conference proceedings, seems exorbitant and totally unwarranted.

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Farewell to Alexandria: Solutions to Space, Growth, and Performance Problems of Libraries, edited by Daniel Gore. Westport, Conn.: Greenwood, 1976. 184p. $12.50. LC: 75-35345; ISBN: 0-8371-8587-4.

All but the concluding contribution to this book was first presented to a Conference on Space, Growth, and Performance Problems of Academic Libraries, held in Chicago in April 1975, and sponsored by the Associated Colleges of the Midwest. That conference was given a catchy thematic title: "Touching Bottom in the Bottomless Pit."

It must have touched bottom, for the papers are now printed not as *problems* but as *solutions*, if one is to judge from the subtitle of this book, which has an equally catchy title: *Farewell to Alexandria*. It purports to tell us how to kiss good-bye to the gluttonous, ever more obese academic library we have all come to lust after and adore.

Metaphors aside, this is a nice book. Unlike much of library literature, it's a pleasure to read, for many of the contributors, like Ellsworth Mason and the editor Daniel Gore, enjoy the English language and know how to use it with grace, wit, and a measure of cunning.

But solutions? Not really. What we are being offered is old palliatives in new bottles.

Simply put, the problem is that humans keep writing, publishers keep printing, libraries keep buying, and all libraries eventually fill up. What to do? There are only a few answers, as familiar as they are obvious.

One: Build more space.

Two: Make more efficient use of space.

Three: Reduce the number of items in the collection.

Four: Reduce the size of the items in the collection.

To these simple themes there are many variations, and the contributors to *Farewell to Alexandria* play them all, so we read of compact storage, miniaturization, on-line union catalogs, interlibrary loan networks, collection rationalization, storage libraries. In the perfect future, libraries of fixed physical dimensions will weed regularly as much as they acquire, using as criteria records of circulation sensitively interpreted by computers; weeded items will be shipped off to regional storage libraries, which are assumed to be there, ready and waiting; and the same machine-based system which produces and maintains our local catalogs will easily contend with changes in locations and tell us who has what where so that we might be deterred from buying an item which we can obtain through a slickly efficient delivery system. In a later article, "The View from the Tower of Babel" (*Library Journal,* September 15, 1975), Daniel Gore draws upon these conference papers to elaborate on these themes in conjuring up for us the image of what he calls the Phoenix Library. It's a persuasive, logical approach, and we seem to be headed, at librarianship's conventional dragging pace, in that direction. We've been headed in that direction for some time, because William Coolidge Lane, Ernest C. Richardson, and Charles H. Gould, respectively the librarians of Harvard, Princeton, and McGill, were talking about precisely the same things at the turn of the century. The only difference is that we have more technology on our side now, and the things they talked about are actually possible; what seems to be missing is the ability to act on the same grand scale as we think. But the ideas must be good, because we've been thinking them for a long time.

The book's major shortcoming lies in its failure to strike at the real heart of the problem, or to look sufficiently far down the road. The growth problem of libraries is something with which librarians have to cope. But they didn't create the problem. Authors and publishers did, and if one can rely on the gloomy prognostications of our very own academics, there's a welcome darkness at the end of that particular tunnel. There seem to be two major possibilities.

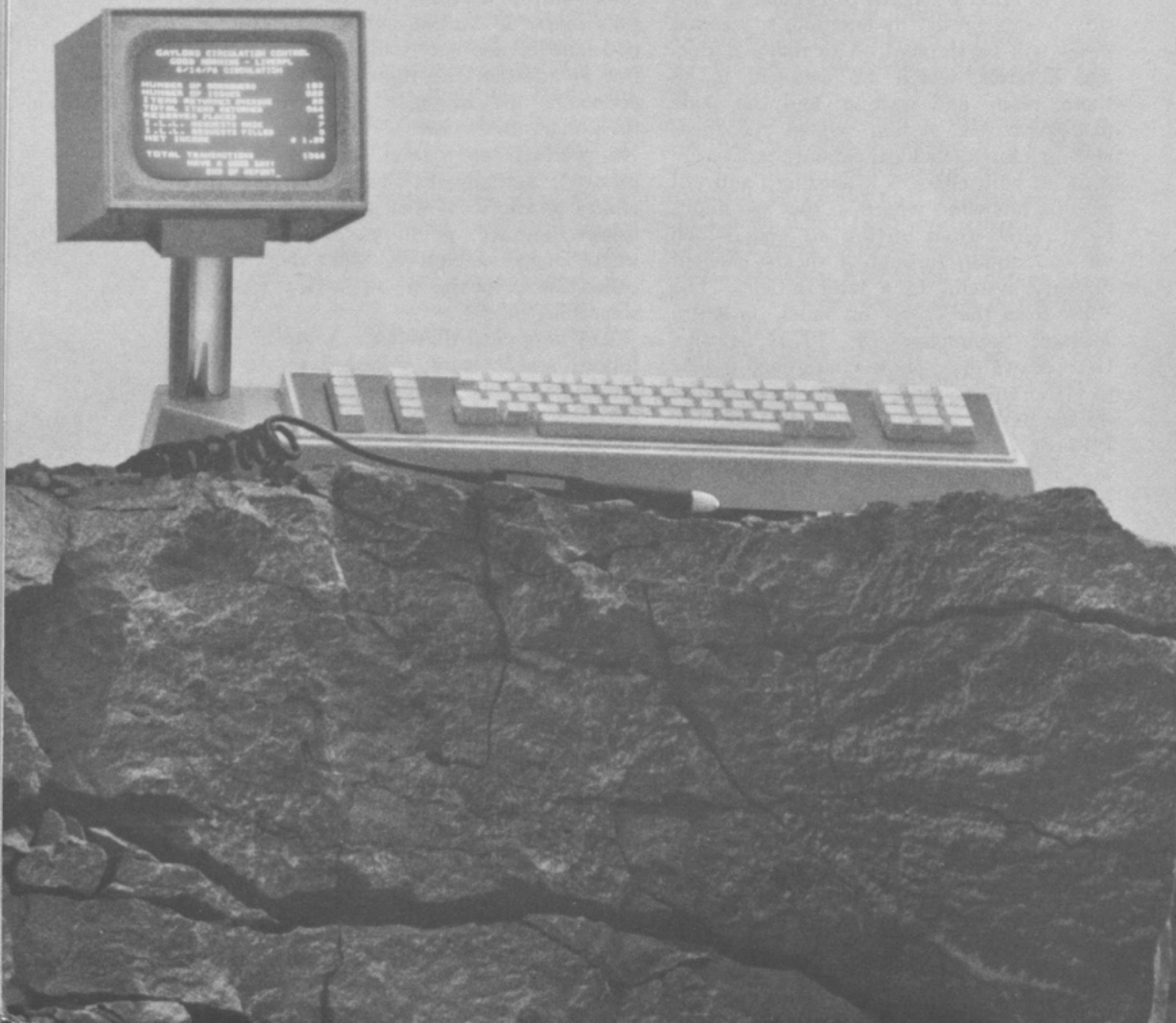
First, a decrease in the number of authors. Plague, famine and war seem to be reasonable possibilities, alone or in combination. They would also be effective in reducing the numbers of readers, who take up even more space in libraries than books.

Second, a decrease in the number of publishers. A Malthusian catastrophe of one kind of another would help here too, but in addition the right combination of economic and ecological collapse would work marvels. No raw materials, no books. No product, no market. No market, no product. Actually, in their increasing inability to afford all that authors and publishers produce, or to store it, libraries might help precipitate what has been called an econospasm, as a step toward something bigger.

Anyway, until these more promising solutions are at hand, *Farewell to Alexandria* summarizes in one place all we know about dealing with the inexorable growth of library collections in the sorry seventies. For the more sophisticated readers of *JOLA,* there are even some impressive formulas that one librarian in a thousand might be able to understand, let alone apply. But just contemplating them gives one the comfortable impression that we in the profession are really on top of it. So, for information and consolation, get a copy of this book to help you decide what you're going to do next. Its contribution to your space problem will be only two centimeters.

Basil Stuart-Stubbs
University Librarian
University of British Columbia

How to get the best Circulation Control System now. And guarantee your library the best system 20 years from now.



The Gaylord Computerized Circulation Control System: An answer to the growing demands of library service.

Plain and simple, libraries provide a service. And for 80 years now, Gaylord has been exclusively dedicated to maximizing that service. In response to the latest demands of today's libraries and library networks, Gaylord, in consultation with computer experts and librarians, has created the Gaylord Circulation Control System.

A complete service

The system satisfies virtually all circulation needs, from handling, issuing and returning items to automatically indicating delinquent borrowers and calculating overdue fines.

It's a complete service that includes equipment, its installation, maintenance and updating, processing of information, preparation of notices and reports, and staff training.

Flexibility

The system has been designed to improve the sharing of library resources, and is expandable regionally, statewide and nationally.

Since you can lease the equipment, rather than purchase it, you will never be "stuck" with obsolete equipment. Gaylord will continuously incorporate whatever technological advances are made, so you will always have the most advanced system available: 5 years from now . . . 20 years from now .

Simplicity

With our system, there is no need to add specialized technicians to your staff. As a matter of fact, Gaylord will teach your present library personnel to operate the system practically overnight.

Economy

Since five to eight people would be needed to perform the tasks that the system does automatically, it saves the library a great deal of money and frees the librarian to improve patron services. Yet it requires no large capital expenditure, and in fact, the system's cost can be defrayed even further if you share it with other libraries.

Gaylord reliability

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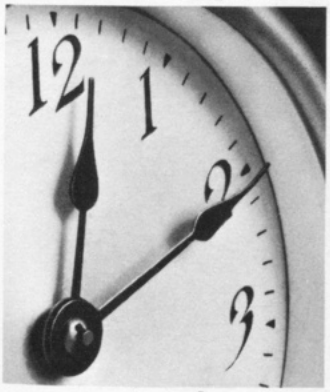

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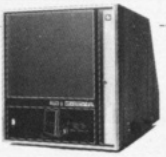

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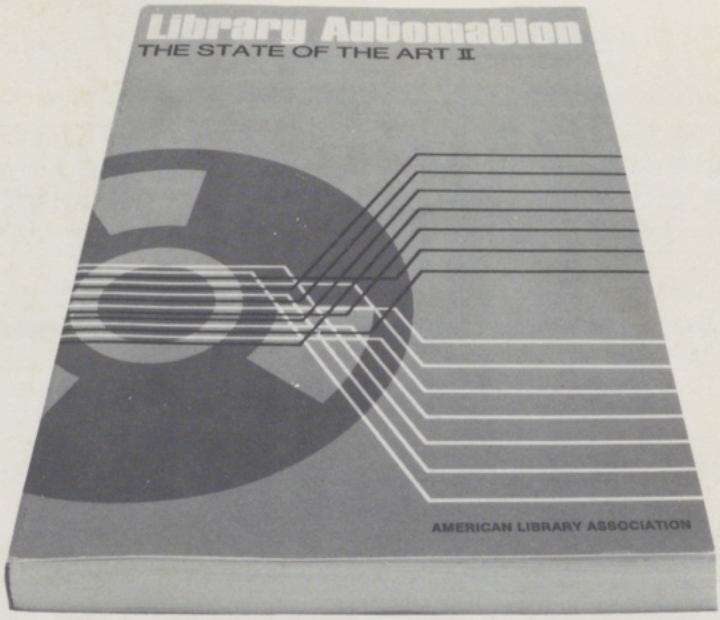

Library Automation

THE STATE OF THE ART II

Susan K. Martin and Brett Butler, editors

These proceedings of the preconference institute, held at Las Vegas, Nevada, in June of 1973, review and evaluate the advances in library automation since the earlier institute in 1967. Unlike the proceedings of the first meeting, they focus on operating systems and operational technology. Leaders in the field present papers reviewing changes in the past five years, a hardware review, four applications reviews (public services, cataloging, acquisitions, and "innovative" applications), a statement of personnel needs, and a forecast for the future. Discussion periods are included in the text and are a valuable supplement to the prepared talks. The volume also includes an extensive bibliography compiled by Martha W. West.

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