volume 9
number 2

ISSN 0022-2240

journal of library automation

87 *Guest Editorial* — Murray S. MARTIN

89 *Data Element Statistics for the MARC II Data Base* — Martha E. WILLIAMS and Gordon J. SHEFNER

101 *Automated Text Editing: The State of the Art and Its Implications for Libraries* — William SAFFADY

117 *Computer Simulation: A Tool for Analysis of Library Service* — Mary Jane Pobst REED

137 *ISDS, ISBD(S), and ISBD(M) as Cataloging Aids* — Hendrik D. L. VERVLIET

145 *Automated Network Catalog Products and Services* — Maurice J. FREEDMAN

156 *Highlights of ISAD Board Meetings*

167 *Technical Communications*

177 *News and Announcements*

180 *Input*

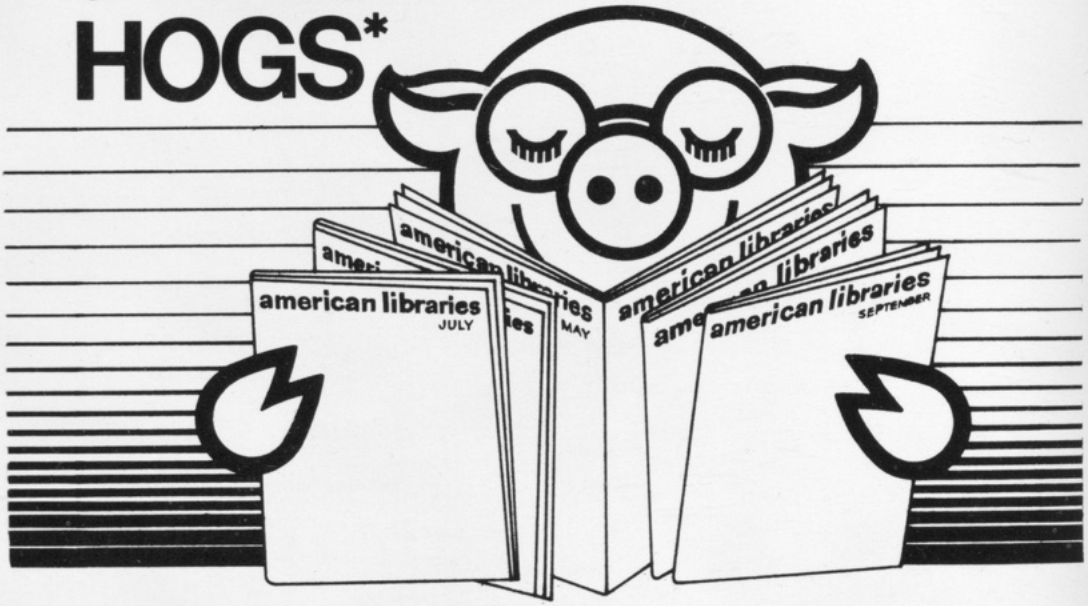
181 *Book Reviews*

186 *Instructions to Authors*

june, 1976

jlauay 9 (2) 85-188 (1976); j libr automat

american libraries HOGS*



Outfox them with copies for everyone

There are several common breeds: the administrator who delays passing along the copy of **american libraries** that comes with the library's ALA membership . . . the staff member who takes the route-slip copy along on vacation to the Costa del Sow . . . the ALA personal member who receives a copy at home and goes around with a smug, all-knowing expression.

You can't blame them for hogging **american libraries.** It's so filled with useful information that reading it takes *time.*

The solution is to oink for one or more additional subscriptions at $20 a year. (Libraries that don't belong to the ALA can now keep up with the field by subscribing directly to **american libraries** at the same price.)

More than ever, **american libraries** keeps all library personnel in the mainstream of the library profession. It makes them more effective in their jobs.

Consider "The Source"— a major section of the magazine that delivers more up-to-the-minute and useful library news in one place than you can find anywhere else. It's filled with reports on official actions, successful programs, things to write for, how to get jobs, educational opportunities, media, technical breakthroughs and other valuable data too important and too timely to be withheld by delay in routing.

And there's the new "Action Line" department that tackles readers' most urgent library questions — another example of the magazine's new emphasis on information and service to working librarians.

Send in the coupon today and you'll soon be able to hog your own **american libraries** with a clear conscience.

*(*No offense intended to such library celebrities as Piglet, Wilbur, Hen Wen or the Empress of Blandings.)*

american libraries

Subscriptions Dept., 50 East Huron St., Chicago 60611

Please send _____ subscription(s) for _____ year(s) (11 issues per year, $20.00)

Send to: _____
Institution
_____
Address
_____
City State Zip

Bill to: _____
Institution
_____
Address
_____
City State Zip

JOURNAL OF LIBRARY AUTOMATION

Volume 9, Number 2: June 1976

CONTENTS

87 *Guest Editorial* — Murray S. MARTIN

89 *Data Element Statistics for the MARC II Data Base* — Martha E. WILLIAMS and Gordon J. SHEFNER

101 *Automated Text Editing: The State of the Art and Its Implications for Libraries* — William SAFFADY

117 *Computer Simulation: A Tool for Analysis of Library Service* — Mary Jane Pobst REED

137 *ISDS, ISBD(S), and ISBD(M) as Cataloging Aids* — Hendrik D. L. VERVLIET

145 *Automated Network Catalog Products and Services* — Maurice J. FREEDMAN

156 *Highlights of ISAD Board Meetings*

167 *Technical Communications*

177 *News and Announcements*

180 *Input*

181 *Book Reviews*

186 *Instructions to Authors*

JLAUAY 9 (2) 85-188 (1976); J Libr Automat

Manuscripts of articles should be addressed to Mrs. Susan K. Martin, Editor, *Journal of Library Automation,* The General Library, University of California, Berkeley, CA 94720. Technical communications and news items should be addressed to Don L. Bosseau, *JOLA Technical Communications,* The Library, Emory University, Atlanta, Georgia. Copies of books submitted for review should be addressed to Peter Simmons, School of Librarianship, University of British Columbia, Vancouver, British Columbia.

Journal of Library Automation is the official publication of the Information Science and Automation Division of the American Library Association, 50 E. Huron St., Chicago, IL 60611; *Executive Secretary:* Donald P. Hammer. The journal is issued quarterly in March, June, September, and December.

The Journal of Library Automation is a perquisite of membership in the Information Science and Automation Division, American Library Association. Subscription price, $7.50, included in your membership dues. Nonmembers may subscribe for $15.00 per year. Single copy—$4.00.

Circulation and Production: American Library Association, 50 E. Huron St., Chicago, IL 60611. Advertising: Leona Swiech, Advertising Traffic Coordinator, ALA Headquarters. Please allow six weeks for changes of address.

Publication of an article or advertisement in the *Journal of Library Automation* does not constitute official endorsement by ISAD or ALA.

Abstracted in *Chemical Abstracts, Computer & Information Systems, Computing Reviews, Information Science Abstracts, Library & Information Science Abstracts, Referativnyi Zhurnal, Nauchnaya i Tekhnicheskaya Informatsiya, Otdyelnyi Vypusk* and *Science Abstracts Publications.* Indexed in *Current Contents, Current Index to Journals in Education, Education, Library Literature* and *Quarterly Bibliography of Computers and Data Processing.*

Microfilm copies available to subscribers from University Microfilms, Ann Arbor, Michigan.

Second-class postage paid at Chicago, Illinois, and at additional mailing offices.

Truth in Packaging, or How to Work with the Administration

Libraries, in common with all other parts of academia, can no longer continue to be all things to all men. Choice between alternatives is now a fact of life. Add strong public pressure for accountability and it becomes clear that all proposals for the development or expansion of library services will receive very close scrutiny. It is doubly unfortunate for library automation that the computer is only now becoming able to make a real contribution to library services. First, because large sums of money are no longer easily available for research and development, planning has to proceed cautiously. Second, because new money is no longer available for added services, corresponding cuts have to be made elsewhere, which is unlikely to endear the computer to librarians already uncertain about the future.

Where does the administrator stand in this? He is aware of the long-term needs for and benefits of automation, but he is also aware of the equally real short-term financial and human problems of realignment. In this dilemma, the administrator must strive to make the best possible decisions, having regard to both economic and political realities.

In making such decisions, the administrator must have available the best advice—in short, the truth. In seeking the truth, the administrator must eliminate the bias which is inevitable in all advice—no one can be committed to a program without some element of bias—in an endeavor to arrive at a just determination of the library's basic needs. The systems staff, because of the peculiarly analytical nature of all computer activities, ought to be of great assistance in this particular area. The sad fact is that too often they have been as partisan as any other department head, concerned only with their own goals and needs. This state of affairs must change if only in the cause of enlightened self-interest.

What then can automation people do? First, they must develop an atmosphere of trust. Any administrator is made cynical by unfulfilled promises, cost overruns and arbitrary changes in routines and goals. Cost estimates, timetables, and plans should therefore be realistic. Automation is expensive. At some future time its operational costs may be balanced by savings effected elsewhere within the library, but right now it will cost money, and money is in short supply. It is dishonest to use these future savings to minimize the apparent outlay. Any proposal should state exactly what is needed and when.

Timing is almost as important as cost. Most libraries must plan ahead for at least two fiscal years and administrators are consequently very aware of future commitments. The operating margin is usually very small, and contingency funds nonexistent. The very noticeable increase in delivery

times for equipment and supplies has given all budgetary planning a nightmarish quality. As the end of a fiscal year approaches, an outstanding purchase order, say $20,000 worth of core memory, becomes a kind of albatross. Will it be delivered in time, or must the necessary money be found next year, with resulting major budgetary readjustments? In other areas, notably personnel, it may simply be impossible to make the necessary changes. Delayed implementation may therefore throw the library's plans into confusion.

For the same reasons, changes may be very difficult, even impossible to make. Any proposal should therefore be prepared with as many alternatives as are reasonable, and should state clearly the effects of these alternatives, on costs, timetables, and results. The proposal must also be as complete as possible. Do not overlook ancillary costs such as transportation, installation, provision of electrical outlets, maintenance agreements, physical plant changes, or changes in personnel. Even $50.00 for electrical outlets can become a *cause célèbre*. The best way of achieving this goal is to prepare a critical path proposal, to review it regularly, and to keep the administration informed.

In all this, the most important thing is lead-time. Today's crisis is yesterday's bad planning. Do not wait until this equipment or that person is so critical that an administrator's hand is forced. The necessary money will be found, but a feeling of suspicion will be reinforced. Any administrator knows the difference between planning and achievement and about the difficulties in making exact forward estimates and is familiar with unforeseen delays. A frank explanation is the best way out. Better a lecture on responsible planning than a collapse of staff morale.

A very important need is to involve other library personnel. Automation can and will have far-reaching effects on library staff and library operations. Bad experiences in the past have made many librarians apprehensive, and operating in an informational vacuum increases this apprehension and increases resistance to change. Indeed, for purely practical and selfish reasons, staff cooperation is essential. Without it the best-laid plans will go wrong. In most cases, too, there will be a gradual phasing in of any new system and the transition will be smoother in an atmosphere of understanding. Librarians, too, can provide helpful insights. After all, they have been dealing with a difficult public for a long time, and they are aware of pitfalls not immediately visible to the systems person.

The intertwining complexities of budgets, the difficulties of intrainstitutional relationships, the increasing pressure of external control—these are the daily facts of an administrator's life. Choice between alternatives is necessary, and anything which contributes towards making that choice the best possible is beneficial. Anything which makes it more difficult is undesirable.

Murray S. Martin
Associate Dean of Libraries
The Pennsylvania State University

Data Element Statistics for the MARC II Data Base

Martha E. WILLIAMS: research professor, Coordinated Science Laboratory, and director of the Information Retrieval Research Lab (IRRL), University of Illinois at Urbana-Champaign; and Gordon J. SHEFNER: programmer, Information Retrieval Research Lab, University of Illinois at Urbana-Champaign.

The Information Retrieval Research Laboratory of the University of Illinois regularly calculates certain statistics associated with the MARC II data base. These are presented for the benefit of other processors of this file. Statistics pertaining to data element occurrence, data element length, and distribution of records by Dewey Decimal division and Library of Congress class code are given. These statistics can be valuable in the preparation of user profiles and search strategies.

INTRODUCTION

Preparatory to processing data bases for information retrieval purposes, the Information Retrieval Research Laboratory (IRRL) at the University of Illinois at Urbana-Champaign, in accordance with good management practices, regularly calculates a wide variety of statistics for each data base handled. The statistics are generated for several purposes: (1) to determine the utility of various data elements as search terms based on the likelihood of an element's appearing in a record; (2) to determine the anticipated cost/time required for processing a file (search time being linearly related to file size); (3) to estimate future file size (and increased processing costs) based on growth rate observed over one-, three-, six-, and twelve-month intervals; and (4) to compare predicted costs for retaining whole records on the processing file with the costs for retaining selected elements from a record to estimate sizes for inverted files and to select segments for inversion, etc. (Bear in mind that the objective here is information retrieval and not catalog card preparation or other library-related activities.) This paper presents statistics associated with the MARC (MAchine-Readable Cataloging) II data base—the bibliographic, monographic data base produced by the Library of Congress.[1] In this file, each bibliographic reference constitutes one logical record in the file.

Inasmuch as many of the statistics we generate regularly had been calculated for the MARC year 1969–70 by Gerald L. Swanson, Systems Office,

Columbia University Libraries, we compared data for the two MARC years 1969–70 and 1974–75.[2] Data selected for comparison were those where changes had been expected to occur or did occur.

These statistics are provided here for the benefit of other processors of MARC II files who may not generate these data themselves but who may find them of interest. All data were calculated on an IBM 360/75; programs were written in PL/1. All the annual statistics for 1974–75 including those presented in this paper required less than thirty minutes of computer time.

STATISTICS

The 1974–75 MARC II file was distributed in fifty-two issues between April 1, 1974, and March 31, 1975. The total number of records in the data base for the year was 124,355. Annual statistics for 1974–75 relate to all 124,355 records.

The 1969–70 MARC file was comprised of 52,294 records distributed in fifty-four issues. The Columbia study discarded 2,829 records—juvenile records—leaving 49,465 or 94.6 percent of the original records for statistics generation. The impact that the elimination of these records and the difference between the fifty-four-week year and the fifty-two-week year may have had on skewing the statistics is assumed to be slight.

The number of records per issue for 1974–75 ranged from 1,076 to 4,104; the average was 2,391. The average number of records per issue decreased over the year. The average for the first month was 2,824; for the first three months, 2,547; and for the first six months, 2,435.

The maximum record length for 1974–75 year was 2,032 characters, the minimum record length was 263, and the average was 666.418 with a standard deviation of 192.004. The average record length for 1969–70 was 636, indicating an increase of 5 percent in the average record size in terms of characters over the four-year interval. Records are comprised of data elements (or tagged fields), and the average record for the year 1974–75 contained 11.45 elements, 10.59 of which were unique.

Statistics at IRRL are provided on a weekly basis and cumulative data are generated on a one-month (four weeks), three-month (thirteen weeks), six-month (twenty-six weeks), and annual (fifty-two weeks) basis. The statistics relating to data element occurrence per tagged element are calculated for total occurrences for the year, total number of records in which the element occurred, percent of records in which the element occurred, and average number of occurrences per record for all records in which the element occurs. Calculations pertaining to data element length (not including tags for data) per tagged element are made for maximum length, minimum length, and standard deviation. The distribution of records by Dewey Decimal division based on the digits preceding the decimal point in the Dewey numbers is calculated as well as the distribution of records by Library of Congress class code based on initial two-character designations.

Table 1. MARC Statistics for One Year (1974–75)—Data Element Occurrences

Tag	*Total Occ.*	*Total Rec.*	*Percent of Rec.*	*Occ. Per Rec.*
15	31805	31803	25.574	1.00
20	68505	68499	55.083	1.00
25	307	307	0.247	1.00
40	100	100	0.080	1.00
41	9273	9271	7.455	1.00
43	50545	50533	40.636	1.00
50	124288	124272	99.933	1.00
51	418	415	0.334	1.01
60	3820	3820	3.072	1.00
70	19	19	0.015	1.00
82	120218	120207	96.664	1.00
86	1109	1109	0.892	1.00
100	98802	98801	79.451	1.00
110	14385	14883	11.566	1.00
111	2705	2705	2.175	1.00
130	471	471	0.379	1.00
240	6387	6385	5.134	1.00
241	8	8	0.006	1.00
245	124357	124355	100.000	1.00
250	17813	17813	14.324	1.00
260	124356	124354	99.999	1.00
300	124134	124132	99.821	1.00
350	32007	32005	25.737	1.00
400	119	119	0.096	1.00
410	2515	2419	1.945	1.04
411	20	20	0.016	1.00
440	10279	10050	8.082	1.02
490	28715	27534	22.141	1.04
500	64530	51882	41.721	1.24
501	68	68	0.055	1.00
502	492	489	0.393	1.01
504	59632	59385	47.754	1.00
505	4822	4822	3.878	1.00
520	7024	7020	5.645	1.00
600	17280	14362	11.549	1.20
610	7029	6414	5.158	1.10
611	140	130	0.105	1.08
630	1186	1048	0.843	1.13
650	158686	90953	73.140	1.74
651	27936	20276	16.305	1.38
700	43696	34193	27.496	1.28
710	15480	12571	10.109	1.23
711	349	344	0.277	1.01
730	1420	1314	1.057	1.08
740	5634	5269	4.237	1.07
800	87	86	0.069	1.01
810	8706	8293	6.669	1.05
811	28	28	0.023	1.00
840	2499	2424	1.949	1.03

1. Data Element (Tagged Field) Occurrences—Data element occurrence statistics are generated on a weekly basis and cumulated on a one-, three-, six-, and twelve-month basis. Twelve-month data for the year 1974–75 are presented in Table 1. The column marked "Tag" indicates the MARC tag numbers. The "Total Occ." column indicates, for each tag number, the

total number of times that data element—including multiple occurrences per record—occurs in the data base. The "Total Rec." column indicates the total number of records that contain the particular element at least once. "Percent of Rec." indicates the percentage of occurrence for those records in which the element occurred. And "Occ. per Rec." indicates the average number of occurrences per record for records in which the element occurs.

Comparisons of data element occurrences are made with the 1969–70 file for elements that occurred in at least 10 percent of the records (nineteen out of the forty-nine tags) in the 1974–75 file. Table 2 provides twelve-month cumulative statistics for 1974–75 together with the twelve-month statistics for 1969–70, and the final column of the table gives the change in percentage of occurrence from 1969–70 to 1974–75. Differences in element occurrence data between the various 1974–75 cumulations are not significant (the average change in percent is 2.01 percent from highest to lowest). However, differences between the 1969–70 and 1974–75 annual statistics are significant and range from –26.53 to +29.79, the average variance being 4.87 percent. Of the nineteen elements that occurred in 10 percent of the records or more, seven changed less than 1 percent; the remaining twelve had an average variance of 7.54.

The average number of data elements (fields) occurring per record—including multiple occurrences per record—increased from 10.70 in 1969–70 to 11.45 in 1974–75. The average number of distinct elements increased from 10.03 in 1969–70 to 10.59 in 1974–75. Two elements not present in the 1969–70 file (043, geographic area code and 086, Superintendent of Documents classification) are found on the 1974–75 file. One element (652,

Table 2. MARC Statistics—Data Element Occurrence

Tag No.	*Columbia U. 1969–70 12 Months*	*U. of Illinois 1974–75 12 Months*	*Change in Percent Occurring 1969–70 to 1974–75 +/– Percent*
15	22.66	25.87	+ 2.91
20	28.29	55.08	+29.79
43	——	40.64	——
50	99.30	99.93	+ .63
82	95.77	96.66	+ .89
100	76.32	79.45	+ 3.13
110	15.91	11.57	– 4.34
245	99.98	100.00	+ .02
250	13.96	14.32	+ .36
260	99.96	99.99	+ .03
300	99.93	99.82	– .11
350	52.27	25.74	–26.53
490	24.62	22.14	– 2.48
500	38.20	41.72	+ 3.52
504	47.81	47.75	– .06
600	8.82	11.55	+ 2.73
650	70.98	73.14	+ 2.16
651	11.58	16.31	+ 4.73
700	22.81	27.50	+ 4.69
710	13.52	10.11	– 3.41

political jurisdiction subject heading) present in the earlier file is no longer present in the MARC II records.

2. *Data Element (Tagged Field) Lengths*—Data element lengths are calculated for all elements weekly. Cumulations are prepared on a one-, three-, six-, and twelve-month basis. Table 3 provides twelve-month statistics for the year 1974–75. Column one specifies the MARC tag number for

Table 3. MARC Statistics for One Year (1974–75)—Data Element Length

Tag	*Max. Len.*	*Min. Len.*	*Avg. Len.*	*S.D. Len.*
15	42	7	12.019	2.766
20	91	8	18.304	7.266
25	22	12	18.811	1.383
40	69	23	30.930	9.323
41	31	5	11.399	1.416
43	39	7	13.103	3.365
50	56	7	20.145	4.766
51	152	12	30.005	11.675
60	48	9	20.136	6.139
70	25	15	19.105	3.024
82	46	6	14.219	4.320
86	48	13	18.200	3.087
100	104	10	27.119	7.584
110	226	5	58.825	27.802
111	189	14	81.127	22.894
130	232	12	44.378	29.166
240	307	9	40.078	18.456
241	74	14	26.375	18.200
245	842	9	89.824	54.927
250	281	7	17.682	14.553
260	283	8	47.652	20.066
300	184	7	26.205	11.248
350	69	7	11.057	3.232
400	99	21	49.042	15.145
410	194	16	59.307	24.019
411	76	23	45.450	15.217
440	171	11	43.997	14.948
490	296	7	43.750	22.886
500	1208	8	60.641	54.901
501	445	50	99.441	61.205
502	455	17	40.604	26.760
504	351	17	33.264	9.412
505	1470	14	261.098	75.470
520	609	13	138.243	46.271
600	228	10	41.676	16.036
610	248	10	44.164	17.667
611	133	14	51.450	21.841
630	95	9	39.133	15.652
650	112	5	33.156	13.972
651	119	9	43.708	15.831
700	220	9	35.430	13.103
710	349	10	54.541	24.212
711	248	14	79.083	31.168
730	268	9	33.168	18.985
740	199	7	40.408	19.992
800	115	40	69.172	17.097
810	259	25	85.442	26.236
811	132	44	87.393	22.170
840	161	13	47.261	16.448

the elements; adjacent columns specify the maximum length of an element, minimum length of an element, and average length of the data entries for the tagged element. The last column indicates the standard deviation. The average lengths for elements for the year 1969–70 and 1974–75 are presented in Table 4. Two elements appear on the 1974–75 file that were not included in MARC in 1969–70, and one element in the 1969–70 file does not appear in the 1974–75 file. Of the forty-seven elements that appeared in both years, forty-four increased in length and three decreased.

3. *Distribution of Records by Dewey Decimal Division*—Distribution data for records by Dewey Decimal divisions are presented in Table 5. The division numbers in the "Division" column represent the digits preceding the decimal point in the Dewey numbers. They are grouped in increments of ten ranging from 0 to 990. All non-numeric Deweys are listed as "others." The "Occurrences" column indicates the total occurrences in all records for each range of ten. The "Percent" column indicates the percentage of occurrence in records that contain Dewey numbers (96.66 percent of all records).

We compared the 1974–75 data with the 1969–70 data for the ten most frequently occurring ranges of Dewey numbers and found that the same ten ranges of numbers had the highest frequency in both years, although the ranking differed. The same phenomenon occurred with the one-, three-, six-, and twelve-month cumulations.

4. *Distribution of Records by Library of Congress Classification Codes*—The distribution of records by Library of Congress Classification codes for 1974–75 is presented in Table 6. Class codes are grouped by the initial two-character alphabetic designations and listed in the "Classification" column. The "Occ." column indicates the number of occurrences in all records for the year. The "Pct." column gives percentage of occurrences for records containing Library of Congress classification codes (99.93 percent of all records). A comparison of one-, three-, six-, and twelve-month cumulations showed no significant changes.

Inasmuch as the Columbia data were presented for single character groupings, we totaled our two-digit groups within the appropriate initial digit groups for comparisons. In comparing the 1969–70 to 1974–75 figures, most of the changes in percentage of occurrence were insignificant. The largest increase was an increase from 16.7 to 20.2 for the "P" category, and the largest decrease was from 15.1 to 13.5 for the "H" category.

USER AIDS

The data element occurrence statistics and the Dewey Decimal Classification and Library of Congress code distribution information can be valuable tools in the preparation of user profiles and search questions when used in combination with various computer-generated aids such as term frequency KLIC (key-letter-in-context) and KWOC (key-word-out-of-context) indexes.[3]

Frequency of occurrence data for DDC and LC numbers indicates the

desirability of searching on either of these elements by themselves instead of using the element linked with a Boolean "AND" to some other search term. If the search is intended to assist the acquisitions department of a specialized or departmental library, then an LC or DDC number might rea-

Table 4. MARC Statistics—Data Element Occurrence

Tag	*Columbia University 1969–1970* Average Length	*University of Illinois 1974–1975* Average Length	*Change in Percent Occurring 1969–70 to 1974–75*
015	8	12	50.0
020	9	18	100.0
025	14	19	35.7
040	26	31	19.0
041	6	11	8.0
043	—	13	——
050	14	20	43.0
051	23	30	30.0
060	17	20	17.6
070	17	19	12.0
082	8	14	75.0
086	—	18	——
100	23	27	17.0
110	50	59	18.0
111	74	81	9.4
130	33	44	33.0
240	36	40	11.0
241	25	26	4.0
245	83	90	8.4
250	13	18	38.4
260	43	47	9.0
300	24	26	8.0
350	4	11	175.0
400	34	49	44.0
410	54	59	9.0
411	63	45	−28.0
440	40	44	10.0
490	38	44	15.8
500	58	61	5.0
501	94	99	5.0
502	30	41	36.6
504	27	33	22.0
505	253	261	3.0
520	144	131	−9.0
600	33	42	27.0
610	36	44	22.0
611	46	51	10.8
630	32	39	21.8
650	26	33	27.0
651	32	43	34.0
652	33	—	——
700	31	35	13.0
710	53	55	3.7
711	73	79	8.0
730	26	33	27.0
740	33	40	21.0
800	77	69	−10.3
810	73	85	16.4
811	69	87	26.0
840	45	47	4.4

sonably stand alone or be "OR'd" with other search terms (other DDCs, LC numbers, or search terms of any type). Some are very discriminatory (low frequency) and others are not (high frequency). Some LC class codes occur only once on a weekly issue of the data base; hence, such codes are useful even on an individual profile basis. When using LC class num-

Table 5. MARC Statistics for Six Months (1974–75)—Dewey Decimal Division Distribution

Division	*Occurrences*	*Percent*	*Division*	*Occurrences*	*Percent*
0	320	0.505	500	258	0.407
10	1196	1.889	510	887	1.401
20	333	0.526	520	202	0.319
30	38	0.060	530	524	0.827
40	0	0.000	540	533	0.842
50	10	0.016	550	727	1.148
60	48	0.076	560	83	0.131
70	153	0.242	570	593	0.936
80	143	0.226	580	309	0.488
90	13	0.021	590	818	1.292
100	29	0.046	600	77	0.122
110	59	0.093	610	2923	4.616
120	81	0.128	620	1875	2.961
130	293	0.463	630	727	1.148
140	32	0.051	640	784	1.238
150	592	0.935	650	1222	1.930
160	36	0.057	660	236	0.373
170	131	0.207	670	100	0.158
180	138	0.218	680	143	0.226
190	182	0.287	690	121	0.191
200	147	0.232	700	439	0.693
210	52	0.082	710	124	0.196
220	422	0.666	720	258	0.407
230	411	0.649	730	380	0.600
240	363	0.573	740	708	1.118
250	116	0.183	750	509	0.804
260	372	0.587	760	173	0.273
270	197	0.311	770	181	0.286
280	314	0.496	780	595	0.940
290	521	0.823	790	1438	2.271
300	2694	4.254	800	690	1.090
310	147	0.232	810	2569	4.057
320	1910	3.016	820	3338	5.271
330	3766	5.947	830	226	0.357
340	3565	5.630	840	558	0.881
350	1279	2.020	850	71	0.112
360	1690	2.669	860	115	0.182
370	1892	2.988	870	42	0.066
380	899	1.420	880	65	0.103
390	439	0.693	890	440	0.695
400	60	0.095	900	214	0.338
410	97	0.153	910	3369	5.320
420	289	0.456	920	603	0.952
430	35	0.055	930	88	0.139
440	59	0.093	940	971	1.533
450	9	0.014	950	364	0.575
460	40	0.063	960	87	0.137
470	10	0.016	970	1834	2.896
480	11	0.017	980	46	0.073
490	202	0.319	990	26	0.041
OTHERS	1553	2.452			

bers as search terms, the profiler must bear in mind the fact that most single records will contain only one LC number. It would be counterproductive, therefore, to try to "AND" two or more LCs. Some records con-

Table 6. MARC Statistics for One Year (1974–75)—Distribution of Records by LC Classification Codes

Classification	*Occ. (Pct.)*	*Classification*	*Occ. (Pct.)*
AC	78(0.06)	DU	411(0.33)
AE	30(0.02)	DX	15(0.01)
AG	56(0.04)	E	4329(3.48)
AI	5(0.00)	F	3521(2.83)
AM	40(0.03)	G	659(0.52)
AP	4(0.00)	GA	48(0.03)
AS	235(0.18)	GB	324(0.26)
AX	1(0.00)	GC	153(0.12)
AY	1(0.00)	GF	91(0.07)
AZ	13(0.01)	GN	517(0.41)
B	857(0.68)	GR	183(0.14)
BC	66(0.05)	GT	147(0.11)
BD	185(0.14)	GV	2054(1.65)
BF	1720(1.38)	H	242(0.19)
BH	45(0.03)	HA	276(0.22)
BJ	247(0.19)	HB	817(0.65)
BK	1(0.00)	HC	1827(1.46)
BL	696(0.55)	HD	4153(3.33)
BM	247(0.19)	HE	823(0.66)
BP	192(0.15)	HF	1728(1.38)
BQ	106(0.08)	HG	1035(0.83)
BR	679(0.54)	HJ	457(0.36)
BS	793(0.63)	HM	547(0.43)
BT	550(0.44)	HN	620(0.49)
BV	970(0.78)	HQ	1171(0.94)
BX	1286(1.03)	HS	66(0.05)
CB	179(0.14)	HT	704(0.56)
CC	42(0.03)	HV	2007(1.61)
CD	112(0.09)	HX	389(0.31)
CE	4(0.00)	J	97(0.07)
CJ	104(0.08)	JA	133(0.10)
CN	5(0.00)	JC	250(0.20)
CR	51(0.04)	JF	134(0.10)
CS	550(0.44)	JK	826(0.66)
CT	240(0.19)	JL	85(0.06)
D	1118(0.89)	JN	292(0.23)
DA	1359(1.09)	JQ	282(0.22)
DB	73(0.05)	JR	1(0.00)
DC	809(0.65)	JS	295(0.23)
DD	221(0.17)	JV	91(0.07)
DE	22(0.01)	JX	900(0.72)
DF	141(0.11)	JZ	2(0.00)
DG	254(0.20)	K	6(0.00)
DH	74(0.05)	KD	477(0.38)
DJ	16(0.01)	KE	1(0.00)
DK	341(0.27)	KF	4776(3.84)
DL	55(0.04)	KT	1(0.00)
DP	114(0.09)	L	116(0.09)
DQ	48(0.03)	LA	2427(1.95)
DR	128(0.10)	LB	2069(1.66)
DS	2089(1.67)	LC	701(0.56)
DT	779(0.62)	LD	90(0.07)

Table 6 continued

Classification	*Occ. (Pct.)*	*Classification*	*Occ. (Pct.)*
LE	4(0.00)	RC	2015(1.62)
LF	38(0.03)	RD	374(0.30)
LG	29(0.02)	RE	131 (0.10)
LH	2(0.00)	RF	67(0.05)
LJ	3(0.00)	RG	212(0.17)
LT	2(0.00)	RJ	395(0.31)
M	29(0.02)	RK	188(0.15)
MC	1(0.00)	RL	42(0.03)
MI	14(0.01)	RM	401(0.32)
ML	1098(0.88)	RS	109(0.08)
MT	252(0.20)	RT	186(0.14)
N	945(0.75)	RX	9(0.00)
NA	622(0.50)	RZ	28(0.02)
NB	215(0.17)	S	592(0.47)
NC	305(0.24)	SB	653(0.52)
ND	950(0.76)	SD	152(0.12)
NE	191(0.15)	SF	554(0.44)
NJ	1(0.00)	SH	306(0.24)
NK	665(0.53)	SK	167(0.13)
NV	1(0.00)	T	357(0.28)
NX	155(0.12)	TA	735(0.59)
OL	1(0.00)	TC	186(0.14)
P	431(0.34)	TD	721(0.57)
PA	319(0.25)	TE	159(0.12)
PB	84(0.06)	TF	99(0.07)
PC	364(0.29)	TG	31(0.02)
PD	20(0.01)	TH	378(0.30)
PE	746(0.59)	TJ	428(0.34)
PF	58(0.04)	TK	892(0.71)
PG	262(0.21)	TL	975(0.78)
PH	34(0.02)	TN	398(0.32)
PJ	142(0.11)	TP	470(0.37)
PK	168(0.13)	TR	335(0.26)
PL	402(0.32)	TS	421(0.33)
PM	66(0.05)	TT	817(0.65)
PN	2346(1.88)	TX	1171(0.94)
PQ	2313(1.85)	U	183(0.14)
PR	5168(4.15)	UA	193(0.15)
PS	2687(2.16)	UB	91(0.07)
PT	359(0.28)	UC	120(0.09)
PZ	9301(7.47)	UD	15(0.01)
Q	588(0.47)	UE	1(0.00)
QA	2106(1.69)	UF	47(0.03)
QB	349(0.28)	UG	94(0.07)
QC	1374(1.10)	UH	16(0.01)
QD	948(0.76)	UM	1(0.00)
QE	1030(0.82)	V	57(0.04)
QF	1(0.00)	VA	66(0.05)
QH	1138(0.91)	VB	7(0.00)
QK	505(0.40)	VC	9(0.00)
QL	1461(1.17)	VE	8(0.00)
QM	93(0.07)	VF	5(0.00)
QP	866(0.69)	VG	20(0.01)
QR	295(0.23)	VK	91(0.07)
QT	1(0.00)	VM	170(0.13)
R	449(0.36)	Z	3288(2.64)
RA	1081(0.86)		
RB	176(0.14)		

tain alternate class numbers, especially in PN and PZ, but these are in the minority.

KWOC indexes are useful for checking recall of search results, occasionally, on an issue basis. (It is feasible to manually scan a week's worth—2000+ records—of MARC, while it is prohibitively time-consuming to scan a year's worth—124,000+ records.) Most of the major abstracting and indexing data bases have a hard-copy counterpart. Since there is no hard-copy compilation corresponding to the MARC II tapes, if one wished to check recall ratios, it would be necessary to produce a hard-copy product to check against. This is a technique used in training information searchers to generate good profiles. The KWOC indexes prepared include all significant title terms alphabetically arranged in the left-hand column. Associated with each term is the Library of Congress card number, the two-letter Library of Congress class code, and the title in which the term was found. A sample from a page of a KWOC listing is given in Figure 1.

KLIC indexes are permuted term lists, for terms found in titles. They present each term in all of its possible permutations. That is, each term is listed alphabetically under each character contained within the term. For example, MARC would be listed in the "M" section as MARC; it would also be listed in the "A" section as ARC/M; in the "R" section as RC/MA; and in the "C" section as C/MAR. Associated with each term is its frequency of occurrence in the data base. A sample from a page of a one-month

```
ACTION          73022288 TC   BIOLOGICAL AND PHOTOBIOLOGICAL ACT
ACTION          73023556 HE   ACTION PLAN (PURSUANT TO PPM 90-4)
ACTION          74006156 BX   GIDEON'S GANG: A CASE STUDY OF TH
ACTION          74006184 LB   PSYCHOLOGICAL STRESS IN THE CAMPUS
ACTION          74160857 HQ   INFORMATION, EDUCATION, AND COMMUNI
                                TIONAL ACTION.
ACTIONS         72079133 KF   NATIONAL GROWTH POLICY: LEGISLATIVE
ACTIONS         74159858 KF   PROSECUTING AND DEFENDING STOCKHOLDE
ACTIONS         74600552 KF   FULL COMMITTEE CONSIDERATION OF PRIV
                                Y ACTIONS IN CAMBODIA AND LAOS,
ACTIVE          73023402 HQ   A STUDY OF ONE-HUNDRED AND SIXTY AC
                                FER IN ATTITUDES AND SOCIO-ECONOM
ACTIVITIES      70091036 DS   THE ECONOMIC ACTIVITIES OF THE JEWS
ACTIVITIES      73008581 GV   SPORTS ACTIVITIES FOR MEN
ACTIVITIES      73093039 LC   AFFECTIVE-HUMANISTIC EDUCATION; GOAL
ACTIVITIES      74154969 HC   INFORMATION ABOUT THE ACTIVITIES OF
ACTIVITIES      74159701 LA   REPORT BY THE DIRECTOR ON THE ACTIVI
                                CEMBER 31, 1972.
ACTIVITY        73081300 QB   SOLAR ACTIVITY AND RELATED INTERPLAN
ACTS            72177575 DC   LIFE OF GENERAL LAFAYETTE, WITH A
ACTS            72220248 LA   THE BOMBAY SHOPS AND ESTABLISHMENTS
                                Y ACTS 17, 53, AND 59 OF 1949, 8
                                ES THEREUNDER AND NOTIFICATIONS,
ACTS            73018621 PS   ALFRED THE GREAT: A PLAY IN THREE A
ACTS            74006815 PR   CUPID AND COMMONSENSE: A PLAY IN FO
```

Fig. 1. Portion of a Page from a MARC KWOC Index.

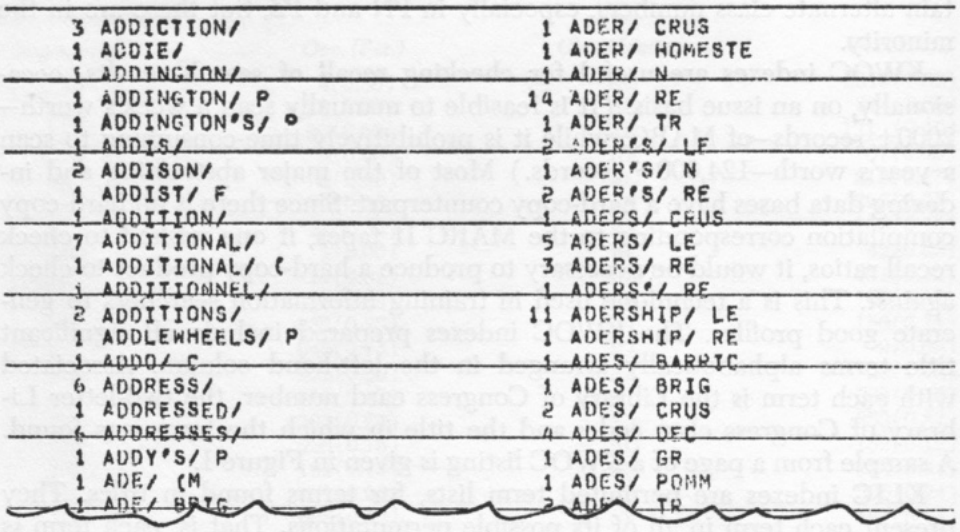


Fig. 2. Portion of a Page from a MARC KLIC Index.

MARC KLIC is presented in Figure 2. KLIC indexes are useful aids for question development. Consulting a KLIC index enables the user to determine where to truncate a search term (either on the left or right side of a desired term fragment) in order to retrieve variant forms of a word (singular, plural, adjectival, verb, etc.) or to retrieve desired common term fractions, e.g., °synth° (° indicates truncation on both the right and left sides) would be used to retrieve not only synthesis but "synthesize," "synthesized," "biosynthesis," "synthetic," and many other terms.

CONCLUSION

It is recommended that those who process data bases for information retrieval purposes should routinely calculate a variety of statistics related to term frequency in order to determine the utility of various data elements as search terms. Statistics such as those presented in this paper, which are, of course, peculiar to the MARC II tapes, coupled with term-frequency KLIC and KWOC indexes, can be useful tools in the formulation of search profiles.

REFERENCES

1. Library of Congress, Information Systems Office, *MARC Manuals Used by the Library of Congress* (2d ed.; Chicago: American Library Assn., 1970).
2. Gerald L. Swanson, *Selected Statistics Based on L.C. MARC Bibliographic Records* (Systems Office, Columbia University Libraries Technical Note no. 2 [Sept. 1970]).
3. Martha E. Williams, "Experiences of IIT Research Institute in Operating a Computerized Retrieval System for Searching a Variety of Data Bases," *Information Storage and Retrieval,* 8:57–75 (1972).

Automated Text Editing: The State of the Art and Its Implications for Libraries

William SAFFADY: School of Library and Information Science, State University of New York at Albany.

This paper presents a state-of-the-art review of automated text-editing systems capable of more efficiently and effectively producing typewritten documents in libraries. Emphasis is placed on equipment configurations, recording/storage media, basic and special editing capabilities, and present and future trends.

The introduction to *Library Technology Reports'* evaluation of electric typewriters emphasizes four groups of typewritten documents that are of special importance in library work: correspondence, multipart forms, catalog cards, and bibliographies.[1] This list could easily be expanded to include book pockets, spine labels, management reports, grant proposals, and other products; typewritten documents are the primary vehicle of written communication in library administration, technical services, and information services. Yet, as important as typewritten documents are, library management, like its counterpart in business, has long recognized the considerable clerical costs involved in their creation and has tried, with varying success, to reduce those costs without a corresponding reduction in productivity.[2, 3]

In 1964, IBM introduced the MT/ST (Magnetic Tape/Selectric Typewriter), the first magnetic media automated text-editing device. The MT/ST helped overcome shortcomings inherent in conventional typing by capturing typewriter keystrokes on a magnetic storage medium in addition to recording them on paper. Besides automatically typing repetitive documents, it allowed typists to easily correct errors and make changes in previously typed text without extensive retyping. While its primary market was business and legal offices, the MT/ST found its way into some libraries, and its unique advantages in various technical services applications have been described by a number of users.[4–9] Here was automation without a drastic reorientation in work steps, complex systems and program development, extensive cash outlays for equipment, or recruitment of special staff. Even opponents of automation conceded the machine's potential as a cost-effective alternative to conventional document creation techniques.[10, 11]

Today, increased operating expenses resulting from inflated prices and rising clerical wages have intensified the need to reduce document-creation costs in much the same way that the expense and inefficiency of clerical bookkeeping spurred the development of automated data processing ten years ago.[12] Text-editing technology is now the most dynamic facet of the new "word processing" industry—an industry that combines automation and systems techniques to more effectively and economically produce written communications, especially typewritten communications.[13–17] Many librarians, however, remain unfamiliar with both the concept of automated text editing and the ability of currently available equipment to put automated document creation at low cost within reach of all types and sizes of libraries. In marked contrast with business automation and administrative management periodicals, library literature has yet to deal comprehensively with either word processing in general or automated text editing in particular. This paper tries to fill this void in the literature by reviewing the state of the art of automated text editing and discussing its implications for libraries. The review of equipment and technology that follows is not exhaustive. Specific products are mentioned only to illustrate special features and capabilities of interest to librarians.

OVERVIEW

Librarians familiar with clerical work methods analysis know that diminished productivity, and consequent increased expense, are the inevitable result of three shortcomings inherent in conventional typing:

1. Repetitive text, like the information on the main entry catalog card, must be manually retyped to produce additional typewritten originals. Even when xerography or offset duplication is used to produce card sets, the elements in the tracings paragraph, already typed correctly once, must be retyped at the top of each card, with the possibility of error occurring in the retyping.
2. When errors do occur, the usual methods of correction (erasure, overlaying with opaque material, or starting over) interrupt keystroking, take considerable time, and can deface documents. Because errors are so difficult to correct, most typists reduce their keystroking speed, especially near the end of a document when error would spoil otherwise acceptable completed work.
3. Entire documents must be retyped to accommodate even minor revisions or format changes. Bibliographies, for example, must be completely retyped to insert a single additional entry in alphabetical order.

Kleinschrod estimates that a secretary who ostensibly types sixty words per minute actually produces about three or four per minute when all retyping and error correction routines are considered.[18] The Friden Flexowriter, and other automatic paper tape typewriters described in library literature, solved the problem of repetitive typing, but their limited error-correction and document-revision capabilities made them less than accepta-

ble for many library document-creation applications, except as components within more sophisticated systems.[19–22] Text-editing programs have been developed for use with large-scale computers, but many such programs are complicated by stringent editing rules and elaborate coding requirements.[23–26] Since computer text editing normally takes place in a time-sharing environment with off-line printing, librarians must run the risk of delays and low priorities.[27]

Occupying a middle ground between the technological limitations of automatic typewriters and the time-sharing requirements of computers, currently available text-editing equipment offers librarians dedicated systems for document creation with the ability to correct and revise text as well as automatically type repetitive material. These basic capabilities, and other special features, are described and discussed in the sections that follow, but, before reviewing specific text-editing systems, librarians should be aware of some characteristics of the wider fields of word processing and office automation.

As might be expected in the case of a dynamic technology, the word-processing industry and market of the 1970s is frequently compared to the data-processing industry and market of the 1960s.[28–30] The structure of the two industries certainly invites the comparison. IBM is the leader in both fields. In fact, IBM really created the word-processing and automated text-editing market that other companies now share, and it is the only company that currently markets the full spectrum of word-processing products —dictation equipment, text-editing equipment, and copiers. As with computer peripherals, some of the most sophisticated text-editing equipment is being developed by relatively small companies whose limited sales and support force restricts their marketing efforts to large cities. Only Olivetti, Sperry-Remington, and Xerox, a newcomer to the field of document creation, have the resources to challenge IBM in all geographic markets.[31]

Like data processing, word processing and automated text editing have an evolving jargon and a cadre of systems analysts, field engineers, support personnel, and consultants who speak it. Advances in text-editing technology can occur so quickly that equipment introduced only a few years ago now seems a generation old. Even though many librarians have yet to "discover" the MT/ST, IBM no longer manufactures it, and most knowledgeable systems analysts consider it obsolete.

As a final point of comparison, libraries have been a neglected market in both word processing and data processing. In automated text editing especially, the word-processing industry has emphasized business and legal markets. Law journals regularly feature descriptions of text-editing systems, and trade periodicals regularly print case studies of representative legal and business office applications.[32] By way of contrast, these same trade periodicals have reported only one case study involving a library application.[33] Because they share the general population's lack of familiarity with libraries, marketing executives and sales personnel do not so much ignore the library market as overlook its potential. As a result, librarians in-

terested in text-editing equipment will find themselves educating sales persons in much the same way that they are educating the data processing industry. This situation may change, however, with the recent entry into the text-editing field of Xerox, a company with great strength in educational and library markets.

TEXT-EDITING EQUIPMENT CONFIGURATIONS

The basic text-editing equipment configuration consists of an input device, an output device, and a control unit. Data entered via keystrokes on the input device are captured by the control unit and recorded on magnetic media (tape, card, or disc) for later correction, revision, or playback by the output device. This basic configuration is available in several variations. The most popular one combines the input and output devices in a single typewriter, usually an IBM Selectric. The convenience and versatility of interchangeable typing elements is the obvious attraction of the Selectric and accounts for its popularity with typists. By using it as the input/output device in their equipment configurations, manufacturers of text-editing systems can overcome resistance to change at the very point where typist and system meet. There is, however, no agreement among vendors on the particular model of Selectric that is best suited to automated text editing. Savin Business Machines, evidently feeling that it makes little difference, attaches its Wordmaster text-editing control unit directly to the customer's own office Selectric, using a special baseplate. Redactron Corporation, Sperry-Remington, Wang Laboratories, Trendata, and others prefer the model 745 heavy-duty I/O Selectric, the same unit used as a terminal in data processing equipment configurations. It is reported to be quieter and more reliable than its standard counterpart. The CPT Corporation, contending that the unreliability of the office Selectric results from its many mechanical parts, uses a standard Selectric modified with an electronic keyboard in its Cassetype System. The System 1222, Wang's newest addition to its line of text-editing equipment, also features an electronic keyboard, electronic tabbing, and electronic spacing, although Wang makes these modifications to the heavy-duty rather than the standard Selectric. This trend toward the replacement of mechanical, moving typewriter parts with electronic assemblies should continue in newly introduced systems. Librarians responsible for equipment procurement must weigh any additional costs involved against the anticipated advantages.

With the introduction of new single-element typewriters by Remington, Adler and others, non-IBM equipment will assume greater prominence as input/output devices, but, at the present time, IBM dominates the text-editing peripherals field as surely as it dominates computer mainframes. There are, however, three typewriter-based text-editing systems that use other than Selectric equipment. Olivetti and Royal both use their own key-bar typewriters as the input/output device in their S-14 Mastermind Word Processing System and Computer Typing System respectively. The Royal typewriter has an electronic keyboard and prints at 250 words per minute,

as compared with 180 words per minute for the Selectric and Olivetti's Editor 4. Librarians interested in either system should inquire about the availability of library keyboards. In certain library applications—for example, when the same stored keystrokes are to be used to produce both human-readable catalog cards and machine-readable bibliographic input—the Selectric typewriter, with its interchangeable typing elements, holds a definite advantage.

The most interesting departure from the Selectric input/output device is the Xerox 800 Series Electronic Typing System which uses the Diablo Hy-Type printer. Xerox owns Diablo Systems which developed the Hy-Type as an alternative to Selectric terminal printers in data processing equipment configurations.[34] Like CPT's Cassetype and Wang's System 1222, the Xerox typewriter uses electronic assemblies rather than mechanical parts, but its outstanding feature is an interchangeable print wheel designed to compete with the Selectric's single element. Xerox claims a printing speed of 360 words per minute, making it the fastest typewriter currently available.

Regardless of speed or the prevalence of electronic components, combined input/output text-editing equipment configurations have one obvious disadvantage: the keyboard is not available for input while output is being printed. Turner criticized the MT/ST as a catalog card production device on this point.[35] The disadvantage can be overcome by having a dedicated, relatively simple device for input, and a more sophisticated system for editing and output. Redactron, for example, offers a "family" of upward-compatible systems, ranging from the Redactor Power Typewriter, an economical input device with limited editing capabilities, to sophisticated single- and dual-station card and tape units for text editing, manipulation, and printing. A more productive, and more expensive, alternative equipment configuration combines a cathode ray tube (CRT) display with a keyboard as the input device and utilizes a high-speed, computerlike impact printer for output. Information entered via the keyboard is displayed for editing on the CRT screen. When all desired corrections and revisions are completed, the information is dispatched to the printer, leaving the keyboard again free for input.

Three such display-oriented text-editing systems are currently available in selected geographic markets. The Linolex Word Processor, developed by Linolex Systems and marketed by both Linolex and the 3M Company, is actually a minicomputer programmed for text editing. Videotype I is a single-station display unit developed and marketed by Lexitron Corporation. The Vydec Editor, developed by Vydec, Inc., uses a magnetic "floppy" disk as the storage medium. While the design of all three of these systems resembles computer peripherals, operation emulates ordinary typing, thereby minimizing training problems and overcoming operator resistance. Lexitron's Videotype I, for example, frames a letter-size document on the CRT screen and offers operators the option of bottom-line text entry with copy scrolling identical with the way paper moves up in a typewriter car-

riage. Display-oriented units now account for only about one percent of text-editing system placements, but industry experts expect them to increasingly displace typewriter-based text-editing systems during the next five years.

For libraries, a considerable disadvantage of currently available CRT systems is their relatively high price. The Vydec Editor, priced at around twenty thousand dollars, is more than twice as expensive as a sophisticated typewriter-based device like Wang's System 1222 and about four times as expensive as CPT's Cassetype System. Proponents of display units claim improved productivity, however. Bruce Payne and Associates, an independent consulting firm, compared Lexitron's Videotype I with the MT/ST and the IBM Mag Card I, concluding that in the editing of single-page legal documents, the CRT device increased productivity up to 40 percent, largely by enabling operators to spend more time keyboarding rather than watching a typewriter automatically play back previously typed text.[36]

CONTROL UNITS

Whatever input/output configuration is used, text-editing control units have two basic functions: to *record* text entered via keystrokes in machine-readable code on a storage medium, and to *read* the code and display or print the text in human-readable form. Control units themselves are usually divided into two broad groups: shared processors and dedicated processors, sometimes called "stand-alones." The division is based on the ratio of input and output devices to the control unit. Shared processor systems are actually time-shared computers, capable of serving many users at once. The Accutext System, a product of Comptek Research, Inc., can control up to sixteen Selectric I/O terminals simultaneously. Computext, developed and marketed by the LCS Corporation, is built around a Digital PDP-8/E minicomputer which can accommodate multiple users of both Selectric and CRT terminals.

Dedicated processors vary in design, construction, and logical circuitry. The most sophisticated systems have magnesium oxide semiconductor (MOS) memories similar to those used in the newest generation of computers. The use of integrated electronic components permits updating of machine capabilities as new features are introduced without extensive modification of basic system architecture. Unlike general-purpose computers, most text-editing systems are preprogrammed by their manufacturers using read-only memory techniques.

In terms of system architecture, dedicated processors have a stored program, logical circuitry, and a memory. Systems can be categorized into two groups, based on the nature of the memory and its relationship to the recording/storage medium. The IBM Mag Card I, Redactron and Sperry-Remington single and dual-station card and tape units, Wang's System 1200, and the Xerox Series 800 Electronic Typing System are examples of dedicated processors in which the memory holds only a few lines of text and serves primarily as a buffer for keystrokes, transferring them directly to tape or card when a carriage return is registered on the keyboard. Dur-

ing playback, recorded text is read from the medium back into memory for decoding and printing. The operator has the impression of recording directly onto and reading directly from the tape or card, without any awareness of the memory's existence or purpose. The earliest systems of this type—the IBM MT/ST Model-II or the IBM Mag Card I, for example—had a single tape drive or a single card gate. Library MT/ST users soon learned the advantages of dual station units.[37] Dual-tape units like the Wang System 1200 can merge fixed and variable information from two tapes—main-entry catalog card text from one tape with added entries and subject headings from another, for example—and copy information from one tape to another. Unlike single-station units which can record information from keyboard to media only, dual-station systems can record from media to media as well. The Redactor Dual Media Editing Typewriter, developed by Redactron, is a unique unit consisting of one tape drive and one card gate. It can read from either tape or card and record from key to tape, key to card, card to tape, and tape to card.

The IBM Mag Card II, the Linolex Word Processor, and the Vydec Editor are examples of text-editing systems in which the medium functions as auxiliary storage for encoded text that must be corrected, revised, and manipulated in memory. Keystrokes are recorded into memory, edited, and then transferred to magnetic card or tape for off-line storage. For later printing or additional editing, stored information must first be read back into memory. The memory in these systems is much larger than in the previously described group, being about 3K in the Vydec Editor, 8K in the IBM Mag Card II, and 8K expandable to 32K in the Linolex Word Processor.

In both media-oriented and memory-oriented systems, the operator communicates with the control unit by using special keys mounted on either the input device keyboard or on the control unit itself. The first group of these keys initiates basic system operations such as recording into memory or onto media, printing, editing previously recorded text, or duplicating recorded text from media to media. A second group of keys initiates forward or backward motion in memory or through the media by character, word, line, or paragraph for purposes of recording, printing, editing, or duplicating at a specific point in the text. Keys in this group also control special word and character string search features described below. A third group of keys records special codes into memory or onto media. These codes instruct the control unit to retain a given space, hyphen, or carriage return when adjusting line lengths during text reformatting; to print a document in single- or double-space; to repeat a given portion of text; to underscore a given character, word, or line; or, in dual-station units, to merge information from two tapes.

With the exception of the Linolex Word Processor, currently available dedicated processor text-editing systems are not interactive and do not prompt the operator with instructions as many time-shared systems do.

RECORDING/STORAGE MEDIA

Automatic typewriters such as the Friden Flexowriter or the Autotypist use punched paper belts or paper tape to capture keystrokes. Although the economy of paper recording/storage media still attracts some users, the introduction of the MT/ST, with its magnetic tape cartridge, was the first step toward today's virtually complete displacement of paper tape by magnetic media for text-editing applications requiring easy error correction or extensive revisions. The MT/ST cartridge itself has since been increasingly displaced by magnetic cards and magnetic tape cassettes, and there is a growing feeling that cards and cassettes will themselves be displaced by "floppy" magnetic disks.[38, 39]

As the name implies, magnetic cards are specially coated, tab-sized recording/storage media. As originally designed, and still used, by IBM for its Mag Card I text-editing Selectric typewriter, each card has a capacity of fifty lines of up to 100 characters per line, for a total card capacity of 5,000 characters. In actual recording, a certain number of character spaces per line, depending on the margin settings, are reserved for later insertions and text changes. Redactron and Sperry-Remington, the other manufacturers of magnetic card systems, use a card with a 10,240-character capacity (sixty-four lines of 160 characters each). Again, only a portion of the available character spaces in each line are used during the initial recording of text. The intent with both types of cards is to establish a one-to-one correspondence between medium and typed document, which can then be filed together.

One disadvantage of magnetic cards is a relatively high unit cost which can amount to as much as one dollar per typed document. This cost can be reduced somewhat by using the magnetic-striped paper cards recently introduced by Redactron, but a more significant disadvantage of cards for library applications arises from the fact that, with the exception of administrative correspondence and reports, there is no one-to-one correspondence between the storage capacity of cards and the length of any library typewritten documents. At 5,000 character spaces, the IBM magnetic card is too large for most catalog card or order-form typing, while, at 10,240 character spaces, the Redactron and Sperry-Remington magnetic card is too small for bibliographic lists. To the library systems analyst trying to select recording/storage media on the basis of a thorough analysis of applications, magnetic tape cassettes offer both more appropriate storage capacity and reduced costs.

Familiar to librarians who use audio recording equipment, tape cassettes have become an increasingly popular recording medium in remote data collection computer applications as well.[40] As used in automated text-editing systems, the cassette format consists of two or three hundred feet of computer-grade magnetic tape in a protective housing with a self-contained supply and take-up spool. Depending on the system and recording method, each cassette can store from 30,000 to 130,000 characters—the

equivalent of between fifteen and twenty-five magnetic cards. This will accommodate multipage bibliographies, while cataloging data can be typed in batches for printing on continuous-form card stock. As with magnetic card recording, some of the available character spaces on tape are reserved for later insertions, so actual cassette capacity will be somewhat less than the maximum. In most systems, however, the operator has some control over the amount of reserved space, and, in any case, a cassette allows greater storage capacity than an equivalently priced number of cards. With the exception of the cassette used in Lexitron's Videotype I, recording is unidirectional, that is, on one side of the tape only.

Olivetti, in a departure from the cassette format, uses a large cartridge of fourteen-track magnetic tape in its S–14 Mastermind system. Each cartridge has a capacity of 250,000 character spaces, making it the highest capacity text-editing recording/storage medium. Cartridges are priced at around one hundred dollars each.

Like computer tape files, text-editing tape cassettes and cartridges are limited to serial access to particular portions of recorded text. Cards permit a kind of random access, but it is achieved only at the expense of storage capacity and with the aid of manual filing. Disk storage solved the problem of random access for computers and the "floppy" disk or diskette is probably the text-editing recording/storage medium of the future. The diskette is a magnetic coated mylar square, eight inches on each side and one-eighth inch thick. Each diskette has a capacity of about 200,000 characters. Any location on the diskette surface can be accessed in less than one second, as compared with search times in excess of a minute for cassette systems. Depending on the quantity purchased, diskette prices range between six and eight dollars each, making it the lowest priced recording/storage medium in terms of character capacity per dollar expended. The Vydec Editor and Linolex Model 4000 are the only currently available text-editing systems using the diskette.

EDITING CAPABILITIES

Regardless of the complexity of the equipment configuration or the capacity of the recording/storage media, automated text-editing systems must be able to automatically type repetitive text, easily correct errors, and make insertions or deletions in previously typed material without extensive retyping. Automatic typing of repetitive text can be accomplished by the most primitive systems and does not involve any actual "editing" in the sense of text change or manipulation. Once keystrokes are captured on the media or in memory, the operator need only replay the previously recorded material a sufficient number of times to produce the desired number of typewritten originals. Librarians who have seen the Autotypist, with its wide paper belts on which text is prerecorded, know that automatic repetitive typewriters function much like player pianos. Special instruction codes can be used to automatically rewind the media and reprint text on continuous forms stock without an operator in attendance.

Error correction and text-revision capabilities distinguish text editing from mere automatic typing. Unlike paper tape, magnetic media and semiconductor memories are easily correctable, since recording over a given portion of the media or memory erases the content. During input, detected errors can be immediately corrected by backspacing to the point of error and striking over the mistake with the correct character or characters, erasing the incorrect text on the media or in memory and replacing it with the correct text. In CRT systems, this strikeover action removes the error from the screen as well. In typewriter systems, the strikeover results in a blemished first draft, but this does not matter since the operator's goal during the draft stage is to enter all text correctly onto the media or into memory for later playback as a perfect typewritten original. The typewriter-based IBM Mag Card II avoids blemished first drafts by using the Correcting Selectric as the input/output device. The Correcting Selectric uses a special combination of typewriter ribbons that dissolves incorrect characters, thereby removing them from the paper during the strikeover-error-correction routine.

To correct errors detected during proofreading, the operator must use special command keys, described above, to move through memory or the medium, by character, word, line, or paragraph, to the point of error, then strike over the mistake with the correct text. Text can be inserted or deleted using this same technique. Special command keys again instruct the control unit to suppress the printing of a given character, word, or line or to delete it entirely from memory or the medium. The length of possible insertions depends on the type of system being used. Memory-oriented systems generally permit extensive insertions, limited only by the character capacity of the memory. Single-station card and tape units reserve a certain number of character spaces during recording for later insertions. Insertions longer than the reserved number of character spaces can be made directly to paper by automatically playing back recorded text to the point of the desired insertion and manually typing the additional text. Characters in excess of the reserved number of spaces will not be captured on the medium. Dual-station units can capture these lengthy insertions, however. The operator transfers text from the draft tape to a second tape up to the point of the desired insertion; instructs the control unit, using special command keys, to record onto the second tape only; and manually types the additional text. The end result is two tapes, the first containing the unchanged original draft, the second containing a revised text with insertions.

In addition to these basic editing capabilities, automated text-editing systems increasingly incorporate special features designed to facilitate input and enhance the appearance of printed output. When instructed through special command and code keys, for example, the IBM Mag Card II, the Olivetti S–14 Mastermind, and the Wang System 1200 will automatically center titles and headings and align decimal points in statistical reports. To speed the movement of the control unit through a magnetic

tape cassette during error correction and text-revision routines, Redactron and Wang offer a word-search option. Using special command keys, the operator can quickly advance the tape to any line by typing the first word of that line. The Linolex Word Processor will search the interior of lines as well, stopping at the first occurrence of a specified character string. The Linolex Word Processor is also unique in allowing operators to make global changes, correcting all occurrences of a given error with a single command. The IBM Executive Mag Card, the Xerox Series 800 Electronic Typing System, and Lexitron's Videotype I give typewritten documents a more attractive appearance through proportional spacing, in which each typed character occupies only the amount of space equal to its width. In conventional monospacing printers, each character occupies the same amount of space on a line, regardless of its width.

In many library applications, text typed correctly once must be retyped in order to alter the output format or to rearrange the order in which discrete text elements are printed. The same typed text that is used to create catalog cards, for example, is sometimes used, in an altered format with different line lengths and margins, to create accession or SDI lists. Some automated text-editing systems can create both documents without retyping by adjusting line lengths and margins through the conversion of spaces to carriage returns and carriage returns to spaces. The Olivetti S–14 Mastermind, for example, allows the operator to specify line lengths and page lengths in advance of printing. To enhance the appearance of typewritten documents, the contour of the right margin can also be specified. Using the Wang System 1200, an operator can choose from three output formats. Text can be printed exactly as it is entered, without any changes in line lengths, or margin contour can be adjusted to reduce raggedness by instructing the control unit to establish a "hot zone," a specified number of spaces before the right margin. A carriage return will be activated during the printing at the last available recorded blank space within the zone. If the last word in a line is so long that it extends through the zone, the system will stop printing at the beginning of the zone to allow the operator to make a hyphenation decision. When right-margin justification is desired, the System 1200 reads ahead on tape, inserting a sufficient number of spaces between words during printing to make all lines the same length.

Catalog card sets are the outstanding example of a library document on which clerical labor is needlessly expended in retyping text in order to rearrange the order in which discrete elements appear. Subject headings and added entries, typed once in the tracings paragraph of the main entry card, must be retyped at the top of individual cards as well. Depending on the system, dual-station text-editing equipment, and large-capacity single-station units like the Olivetti S–14 Mastermind, can eliminate needless retyping in either or both of two ways. Main entry text can be recorded on one tape as fixed information and merged during printing, using special command keys, with subject headings and added entries recorded on a second tape as variable information. Again, depending on the system used

and the storage capacity of its media, an entire thesaurus of subject headings could be recorded on the variable information tape with special codes on the other tape directing the control unit to select and print only those headings appropriate to a particular main entry.

In a second approach to this application, discrete elements of the main entry text—author, title, imprint, collation, subject headings, added entries, and so on—can be recorded on one tape as separate fields of information separated by special codes. The second tape would then contain a "program" of special commands instructing the control unit to assemble the fields in a specified order during printing to produce card sets. By altering the program tape, book pockets, spine labels, and other documents can be created from the same recorded text.

This document assembly feature overcomes one of the most severe limitations of automatic typewriters and other special-purpose automated equipment: the inability to use information recorded for a single purpose to produce multiple bibliographic products.[41] It should prove especially attractive to librarians who want to adopt a total systems approach to typewritten document creation by capturing as much information as possible on the recording/storage media at the time an order is typed; editing the recorded text to insert or delete information necessary to the production of catalog cards, book pockets, and spine labels; then reformatting these data to create bibliographic lists or using OCR fonts to create machine-readable bibliographic input.

PRESENT AND FUTURE TRENDS

Careful examination of the most sophisticated special features of currently available systems suggests that automated text editing is developing and will continue to develop in two directions: (1) technological improvements will result in simplified input, speedier output, and increasingly computerlike capabilities; and (2) increased marketing sophistication will result in closer ties between text-editing equipment and related systems and services in other fields of information handling.

With regard to technological improvements, several text-editing systems now offer alternative equipment configurations for faster output. Lexitron's Videotype I offers customers a choice of two printers. The first is a proportional spacing IBM Executive Typewriter that prints at about 130 words per minute; the second is a monospacing Diablo impact printer operating at 360 words per minute. With the Linolex Word Processor, the Diablo printer is standard, but a draft printer that operates at 1,750 words per minute is available as an option. Redactron recently announced that tapes recorded on its single and dual cassette units can be printed on Versatec's Quick-Writer 3, a stand-alone impactless printer that can reproduce text at 6,000 words per minute, using a proprietary matrix electrostatic wiring technique developed by Versatec Word Processing. A. B. Dick is reported to have a similar high-speed, impactless text-editing printer, using jet-ink technology, in development.

Recent developments in simplification of input have been less dramatic. Electronic keyboards, with suppressed print capability, and CRT displays speed input somewhat, but keystroking will remain a slow, laborious, but necessary task until voice-to-media-to-printer systems are developed. Here again, the Linolex Word Processor is unique in supporting a punched-card reader and a second keyboard as optional peripherals for applications where throughput is limited by input speed.

Text-editing systems manufactured by companies with backgrounds in computing and data processing tend increasingly toward computerlike functions, either as standard or optional features. Wang's System 1222, for example, features a "masked search" capability that allows the operator to search through and print from a prerecorded list on tape. Entries on a tape containing names and addresses of participants in a SDI program can be preceded by a string of descriptive identifiers representative of the participant's SDI profile. The string can be up to ninety-eight characters in length. Thus, a string such as MONO/ARTS/REPTS/CLASSIF/RETRIEV/AUTOMAT might be used to identify a participant interested in receiving monographs, articles, and reports relating to classification, information retrieval, or automation. Any element or elements of the string can be used for sorting. When a monograph on information retrieval is received, for example, a list of SDI participants to be notified of the book's arrival can be generated by instructing the System 1222 to search for and print names and addresses following descriptive strings containing MONO and RETRIEV. Wang claims that the masked search feature is ideal for sorting tasks that are too time-consuming for manual handling and too small to warrant expensive computer time. The Olivetti S–14 Mastermind offers a similar feature, which it calls "information qualification."

Although text-editing systems are now preprogrammed by their manufacturers, there will probably be a gradual trend toward customer-developed software. For libraries, this will bring advantages and disadvantages. On the positive side, library-application software packages can be developed to meet specialized needs. Libraries will no longer have to make do with capabilities intended primarily for business or legal markets. On the negative side, one of the attractions of automated text-editing equipment is that it can be operated by clerical personnel without technical expertise or training in programming, and that libraries who want to automate their document-creation systems can do so without recourse to expensive, specially trained staffs. The introduction of programming capability could bring with it the development of the same high-overhead, labor-intensive environment that now plagues many data processing installations, and could erode the cost-effectiveness potential that now makes automated text editing an attractive alternative to large-scale computerization.[42]

Turning to the increasingly close relationship between automated text editing and related fields, IBM, Redactron, Sperry-Remington, and Wang offer telecommunication capability as an optional special feature.[43] Intro-

duced in 1972, the IBM Communicating Mag Card can transmit data to another Communicating Mag Card or to any computer capable of supporting an IBM 2741 Selectric typewriter terminal. Transmission speed is 14.8 characters per second (134.5 baud). The Wang 1220TC has all of the text-editing capabilities of Wang's System 1200, but can also communicate with other 1220TC units or with a computer. Like the IBM Communicating Mag Card, the 1220TC emulates the IBM 2741 terminal. Speed is 14.8 or 33 characters per second, depending on whether the receiving unit is a computer or another 1220TC. Redactron offers a varied array of text-editing systems capable of communicating with computers, IBM Communicating Mag Cards, other Redactron communicating equipment, TWX, or Telex teleprinter terminals. With the ability to address the vast TWX or Telex networks, Redactron equipment can interface with existing library programs for the transmission of interlibrary loan requests and similar data. By taking advantage of its text-editing capabilities, librarians can reduce long-distance telephone charges by preparing data off-line prior to transmission.

Redactron also markets a system for converting its text-editing magnetic cards and cassettes to industry-compatible computer tape, or for converting computer-compatible tape to Redactron cards or cassettes for further text editing. A similar system converts MT/ST cartridges to computer magnetic tape.[44]

IBM, Redactron, and Wang text-editing systems are designed to operate in conjunction with photocomposition and typesetting equipment to produce written communications for mass distribution. The Model DC-203 Magnetic Tape Converter, manufactured by Graphic Products Corporation, is designed to convert MT/ST cartridges to TTS or other coded, punched, paper tape used in the typesetting industry. Wang's Photocomposition Input Option consists of a fifty-character-per-second paper-tape punch connected to the System 1200. Its produces TTS-coded punched paper tape for use with Photon, Mergenthaler, Compugraphic, Singer, or other photocomposers using six-level tape. The implications for printed index production, the reformatting of text typed for catalog cards in order to produce printed book catalogs, and similar library applications are obvious. More significantly, the close link between automated text editing and printing/publishing means that text will increasingly be captured in machine-readable form at its source—a requirement if libraries of the future are to realize the potential of mechanized information retrieval.

REFERENCES

1. "Electric Typewriters," *Library Technology Reports* (March 1966).
2. Richard M. Dougherty and Laurence E. Leonard, *Management and Costs of Technical Processes: A Bibliographic Review, 1876–1969* (Metuchen, N.J.: Scarecrow, 1970), esp. p.15–39.
3. George Fry and Associates, Inc., *Catalog Card Reproduction* (Chicago: American Library Assn., and Library Technology Program, 1965).

4. Robert I. Hirst, "Adapting the IBM MT/ST for Library Applications: A Manual for Planning," *Special Libraries* 59:626–30 (Oct. 1968).
5. Donald L. Pieters, "Magnetic Tape Typewriter Speeds Catalog Card Production in College Library," *Special Libraries* 61:513–15 (Nov. 1970).
6. Ann T. Brown, "Use of the MT/ST at a Remote Facility to Produce Catalog Cards," *Special Libraries* 63:240–44 (May/June 1972).
7. Erika Love, "Commentary on 'Magnetic Typewriter Speeds Catalog Card Production in College Library,'" *Special Libraries* 62:242–45 (May/June 1971).
8. Erika Love and Soo Lee, "Reclassification and Documentation in a Medium-Sized Medical Center Library: The MT/ST System in the Simultaneous Production of Catalog Cards and a Computer Stored Record," *Medical Library Association Bulletin* 59:41–49 (Jan. 1971).
9. G. A. Curtis, "The Magnetic Tape Selectric Typewriter and the Production of Catalog Cards," *Illinois Libraries* 54:221–24 (March 1972).
10. Ellsworth Mason, "The Great Gas Bubble Prick't; or, Computers Revealed—by a Gentleman of Quality," *College & Research Libraries* 32:183–96 (May 1971).
11. Ellsworth Mason, "Automation or Russian Roulette?" in F. W. Lancaster, ed., *Proceedings of the 1972 Clinic on Library Applications of Data Processing* (Urbana: University of Illinois, 1972).
12. "What It Costs to Produce a 250-Word Document," *Administrative Management* 33:46–47 (April 1972).
13. B. W. Tertaglia, "Economics of Word Processing," *Journal of Systems Management* 24:8–14 (Nov. 1973).
14. Charles Cumpston, "Automated Typing Systems Move the Words Out Faster," *Administrative Management* 34:41–52 (June 1973).
15. Rick Minicucci, "Text Editors: Speed, Specialization, Simplicity," *Administrative Management* 35:56–58, 70 (Nov. 1974).
16. "Word Processing Now and Its Future," *The Office* 80:67–71, 197 (Sept. 1974).
17. L. Smallwood and G. M. Stone, "Exit Girl Friday, Enter Automated Word Processing," *Infosystems* 19:30–34 (Aug. 1972).
18. Walter Kleinschrod, *Word Processing* (New York: AMACOM, 1974).
19. Fry and Associates, p.39, 67.
20. Joseph H. Treyz, "Equipment and Methods in Catalog Card Reproduction," *Library Resources & Technical Services* 8:267–78 (Summer 1964).
21. A. C. Turner, "Comparative Card Production Methods," *Library Resources & Technical Services* 16:347–58 (Summer 1972).
22. Paul J. Fasana, "Automating Cataloging Functions in Conventional Libraries," *Libraries Resources & Technical Services* 7:350–65 (Fall 1963).
23. Steven J. Austreich, "Editing and Setting Text By Computer," *Administrative Management* 33:49–50 (Nov. 1972).
24. Steven J. Austreich, "Computer Word Processing," *The Office* 78:16–18 (Oct. 1973).
25. Steven J. Austreich, "Computers Advance the Art of Text Editing," *Administrative Management* 34:71–73 (Nov. 1973).
26. John W. Pancoast, "Time Sharing for Word Processing," *The Office* 75:60–64 (Feb. 1972).
27. Richard De Gennaro, "The Development and Administration of Automated Systems in Academic Libraries," *Journal of Library Automation* 1:75–91 (1968).
28. Buyers' Laboratory, Inc., "Automatic Typing Equipment—an Evaluation," *Law Office Economics and Management* 13:159–66 (Summer 1972).
29. Walter Kleinschrod, "The 'Gal Friday' is a Typing Specialist Now," *Administrative Management* 32:20–27 (June 1971).
30. George Simpson, "WP, Not EDP, Will Lead the Trend Toward the Integrated

Office System," *Administrative Management* 33:32 (Sept. 1972).
31. Walter Kleinschrod, "Opinion: The Shoe Drops at Last," *Word Processing World* 1:44 (Nov.–Dec. 1974).
32. Daniel J. Premo, "The Wang 1200 in the Law Office," *Law Office Economics and Management* 13:167–71 (Summer 1972).
33. "Word Processor Prints Cards for Libraries," *The Office* 80:105–6 (Sept. 1974).
34. "Xerox Brings Out Its First Text Editor," *Word Processing World* 1:24 (Nov.–Dec. 1974).
35. Turner, p.357.
36. Bruce Payne and Associates, Inc., "Performance Comparison—Videotype vs. MT/ST and MC/ST," *Word Processing Report* (Feb. 1, 1972).
37. Curtis, p.224.
38. Randy J. Goldfield, "Word Processing Media," *The Office* 80:128 (May 1974).
39. "Word Processing's Other Side: A Market with More Than Machines," *Office Products* 102:32–40 (Nov. 1974).
40. J. L. Butler, "Comparative Criteria for Minicomputers," *Instrumentation Technology* 17:67–82 (Oct. 1970).
41. Frederick G. Kilgour, "Library Catalogue Production on Small Computers," *American Documentation* 17:124–31 (July 1966).
42. Harry T. Larson, "EDP: A Twenty Year Ripoff," *Infosystems* 21:26–31 (Nov. 1974).
43. "CMC/ST Doubles as Terminal for Remote Computers," *Administrative Management* 33:61–62 (Dec. 1972).
44. Love and Lee, "Reclassification and Documentation," p.242–45.

Computer Simulation: A Tool for Analysis of Library Service

Mary Jane Pobst REED: Associate State Librarian for Research and Planning, Washington State Library, Olympia, Washington.

This report describes a particular approach to a library problem: the utilization of computer simulation to provide data on how best to serve the citizens of the state of Washington through delivery of library materials by mail, with patrons ordering from a printed catalog of materials. Emphasis is on methodology rather than findings; investigative techniques of the study include literature search, on-site observations, personal interview, statistical analysis, and mathematical modeling, as well as computer simulation. The computer-manipulated model is based on probability distributions, relationships between components in the system, and time sequencing.

INTRODUCTION

Mail circulation of library materials is not a new service in Washington State; the North Central Regional Library in Wenatchee, among the pioneers of the nation, has operated a highly successful mail-order service since 1968.[1] Since this method was reaching library users who might otherwise have only limited access to library materials, directors of other district library systems became interested in establishing such a service. It was suggested that a study be undertaken to ascertain the viability of and best procedure for extending the service statewide.

The primary question to be answered by the study was whether the library users of the state would be most effectively served by one Mail Order Delivery (MOD) center or by some larger number of centers. Assuming that mail-order delivery of books is of positive value among library services, the charge was to ascertain the most efficient pattern for offering service to certain types of citizens who have been either unserved or served with difficulty. A comparative cost analysis of mail versus other methods of service was not included, since already existing mail delivery operations in the state were considered successful and worthy of emulation.

Experience in Washington State formed the backbone of the study, with information from elsewhere serving to corroborate or modify the findings in Washington. The initial approach was made through a literature search. Chief relevant sources were a report on the 1973 ALA Conference

on Books by Mail and a report on a books by mail study in Pennsylvania.[2,3] The three existing mail-order service centers in Washington were examined on-site, and a number of librarians throughout the state were interviewed.

Analysis for population scatter and educational level in the state were based on the 1970 U.S. Census and figures published by the Washington State Office of Program Planning and Fiscal Management.[4,5]

The U.S. Postal System's processing of packages was tested empirically; the three existing centers mailed packages to district library directors throughout the state, keeping records as to times en route from center to home and return.

The methods for the study, with the exception of computer simulation, were of a traditional nature: literature search, on-site observations, personal interview, statistical analysis, and mathematical modeling. The statistical and mathematical data provided input for the simulation model which described the interrelationships of components and procedures of the mail-order delivery systems in a format that could be processed by computer. The generalized model was constructed on the basis of procedures at the presently operating centers, and the model was exercised to simulate service to the state's projected MOD library users under several different policies.

The remainder of this report will describe the computer simulation technique. Readers interested in the complete study and its findings are referred to ERIC document ED 094713.[6]

COMPUTER SIMULATION

Frequently an operational problem in a library or other organization must be solved within specified constraints: required performance at minimum cost, maximum performance for specified cost, or (as in the present study) some optimum balance. Conventional techniques may be inadequate—intuition without objective verification is a chancy approach, statistical and mathematical analysis may tend to oversimplify the situation, or the data necessary for sufficient precision may be lacking. Furthermore, testing a set of alternative solutions in practice might overly perturb the existing system.

Simulation is a tool, and its use demands considerable effort for understanding the problems, goals, and energy expenditures needed to effect an efficient or useful-in-context system. Computer simulation can aid in problem definition, contribute to system design, measure sensitivity of the design to the change of system load parameters, predict alternative systems' performance, and aid in selection of final design from among alternatives.

The representation of the system—the dynamic analog, its rules and relationships—is defined as the model. The exercise of the model under various specific policies or conditions is defined as simulation.

Model construction forces the designer to state explicitly his understanding of the system. Once a coarse model of the overall concept has been

established, even though system insight be weak, by using speculative data ranging over the expected operational spectrum, areas of sensitivity can be identified along with the modifications necessary to bring system performance to specifications. By using the same work load and the same time interval, and altering process algorithm or construct, alternative systems can be compared by reference to work output levels. Or, as in the present study, a generalized system can be constructed from existing operations and the effect of alternative levels of work loads can be observed.

Once the model has been developed and confidence established that it is a valid reflection of the real system, a series of parametric simulations can be run to gain understanding of system behavior and to gain feeling and insight into the effect of proposed changes that only real-world system manipulation and operation can otherwise provide. Through the use of simulation, this exploration can be undertaken while the redesign is still a paper concept.

Simulation can provide estimates of the consequences of certain prescribed changes in policy, procedure, and condition. It cannot make policy decisions. It is an analytic tool, capable of providing information of a dimension that can facilitate the execution of certain of a manager's problem-solving tasks.

CONSTRUCTION OF THE MODEL

For purposes of this study, the mail-order delivery model was constructed chiefly on the basis of data derived from the three existing MOD centers in Washington State. Procedures at the three centers were sufficiently similar for construction of a common model; circulation and cost figures (Figures 1 and 2) as well as data on flow of operations were obtained in on-site visits.

Development of the operational data for present centers and projection to service for all the state are shown in Table 1. On the basis of demographic and postal information, service zones were delineated; the Cascade Mountains were taken as the primary dividing line, since the mail test showed a one-day improvement in delivery when exchange was confined to one side of the mountains (Figures 3 and 4). Projected circulation data were based on postal service figures (Table 2). Annual workloads were estimated for various area patterns to serve the state (Table 3).

A chart of materials flow was then drawn up, reflecting the generalized pattern of tasks in the three existing centers (Appendix A). Data on timings for these tasks had been submitted by the centers; means and standard deviations were calculated for each task at each center. On the basis of this and other information supplied by the centers, a set of data on each center was built: quantities of orders and packages, ratios of types of requests (items listed or not listed in the printed catalogs, items with reserve waiting lists), and times for processing steps. Design of the model permits these blocks of information on quantity of materials and timing of tasks to be altered in sequential computer runs by varying the descriptions of

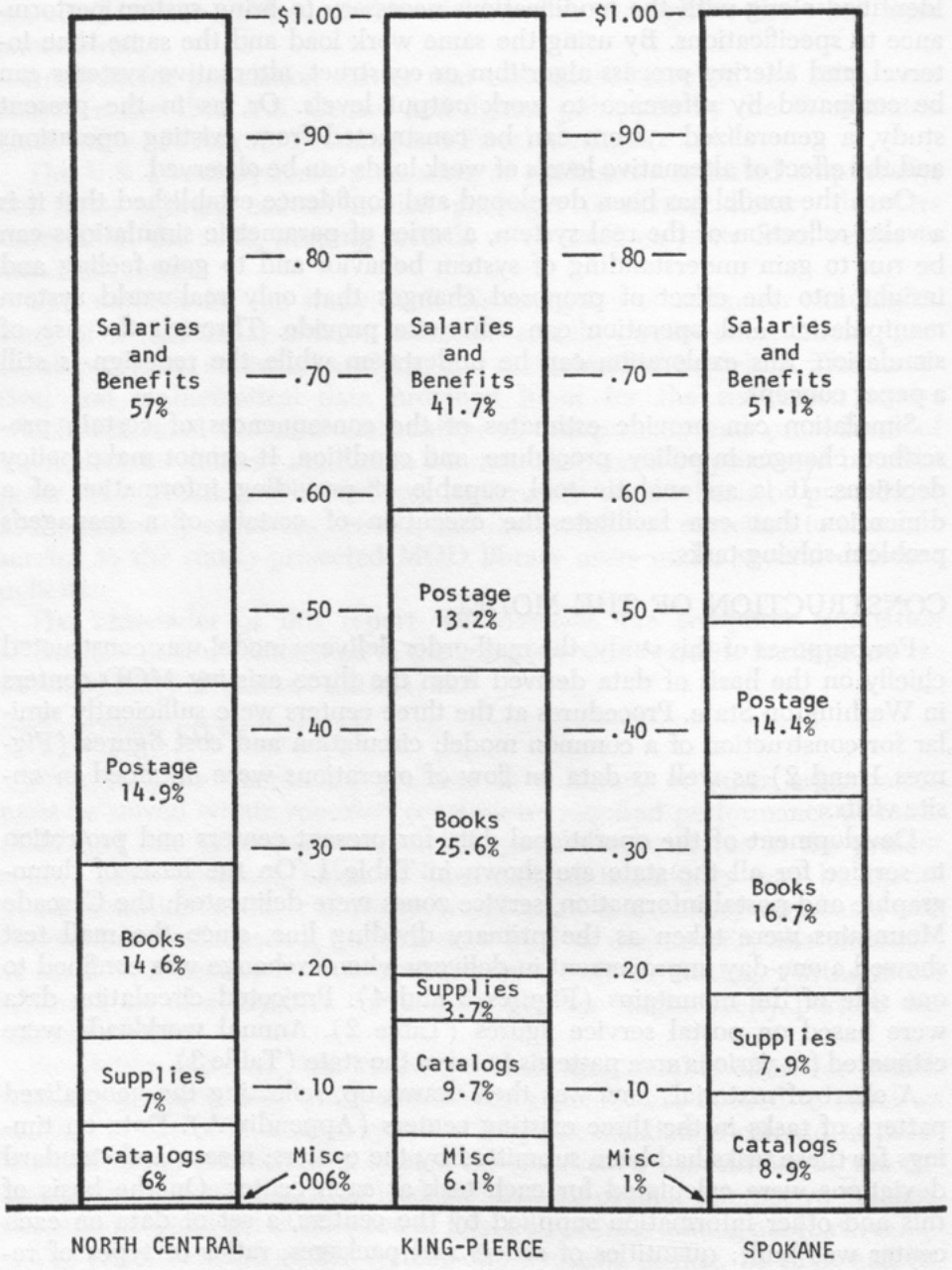


Fig. 1. Allocations for Operating Expenditures, 1973.

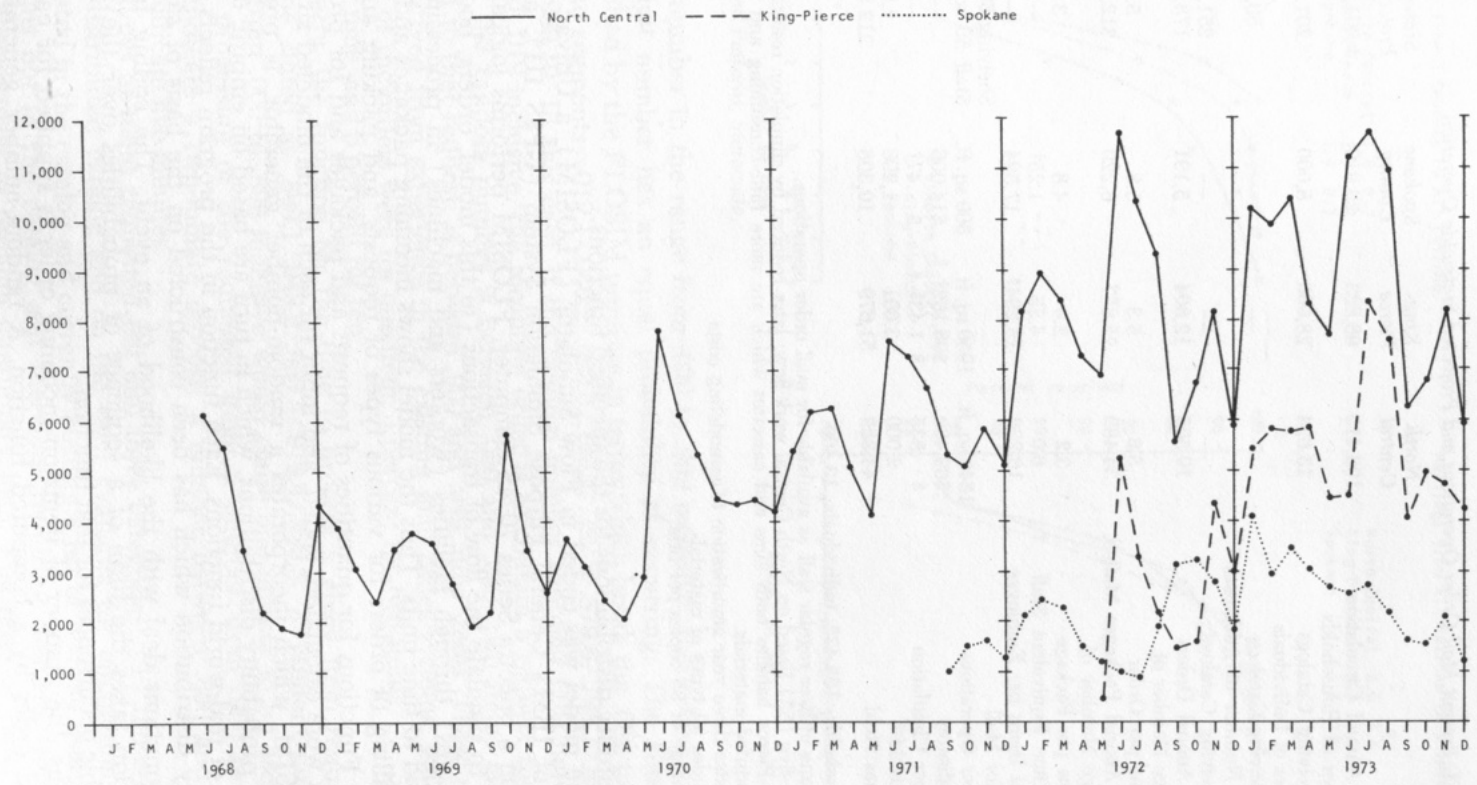


Fig. 2. Washington State Mail Order Centers—Monthly Circulation.

Table 1. Present Mail Order Operations and Projected Statewide Operation

	North Central	*King-Pierce*	*Spokane County*	*Statewide Projections*
Total Annual Circulation	109,415	68,823	29,910	1,001,421
Number of Households Receiving Catalogs	15,624	28,000	8,000	201,182
Number of Individuals Receiving Catalogs	—	—	—	50,000
Total Number of Addresses Receiving Catalogs	—	—	—	251,182
Total Annual Orders	19,505	12,804	5,191	178,832°
Average Number of Items per Order	5.6	5.3	5.8	5.6
Total Annual Packages Mailed	34,489	23,657	6,229	312,668
Average Number of Items per Package	3.2	2.9	4.8	3.2
Full-Time Equivalent Staff	6.0	4.25	1.25†	—‡
Annual Items per Employee	18,236	15,294§	17,594	—
Area for Mail Order Operations	1846 sq. ft.	1950 sq. ft.	500 sq. ft.	Shelving 5000 sq. ft. Staff 50 sq. ft. each
Expenditures	$69,489	$98,162§, ‖	$14,006	—
Cost per Circulation	$ .635	$ 1.43§, ‖	$ .47†	—
Titles Held#	2,000	3,601	1,298	2,500
Volumes Held	44,389	51,679	10,308	212,500°°

° Households: 165,432; individuals: 13,400.
† Spokane utilizes regular staff as available for mail order operations.
‡ Fifty-five (55) based on North Central work flow; later reduced by simulation results to 36.
§ King-Pierce handles both films and cassettes which are more time-consuming and expensive than printed materials.
‖ Includes three year amortization of remodeling costs
Includes all types of materials.
°° Average of 85 copies per title.

probability distributions for the specified functions.

The model was coded in Flow Simulator (FLOSIM), a Univac adaptation of IBM's General Purpose Simulation System (GPSS III), and was run on a Spectra Series 70/45 computer. FLOSIM performs logical operations to simulate the flow of transactions (in this model, orders, books, and packages) through facilities (workers and machines) in processing steps related to time units. Thus the model shows incoming packages and orders, the filling of orders for various types of requests, and packing and shipping. Functions for quantities of requests and packages and for processing times were calculated, coded, and input for each of the modeled situations. FLOSIM, which incorporates a random-number generator, is predicated upon probability distributions, which in turn are based on empiric observations of real-world functions. Each function in the program reflects a probability distribution which has been constructed on the basis of sampling; the functions deal with the likelihood of an event. The coding for each function takes the form of a sequence of probabilities over the span of possible occurrences for that function.

Thus, the number of items on incoming order is supplied for each simulated order by a computed function. A random-number generator sup-

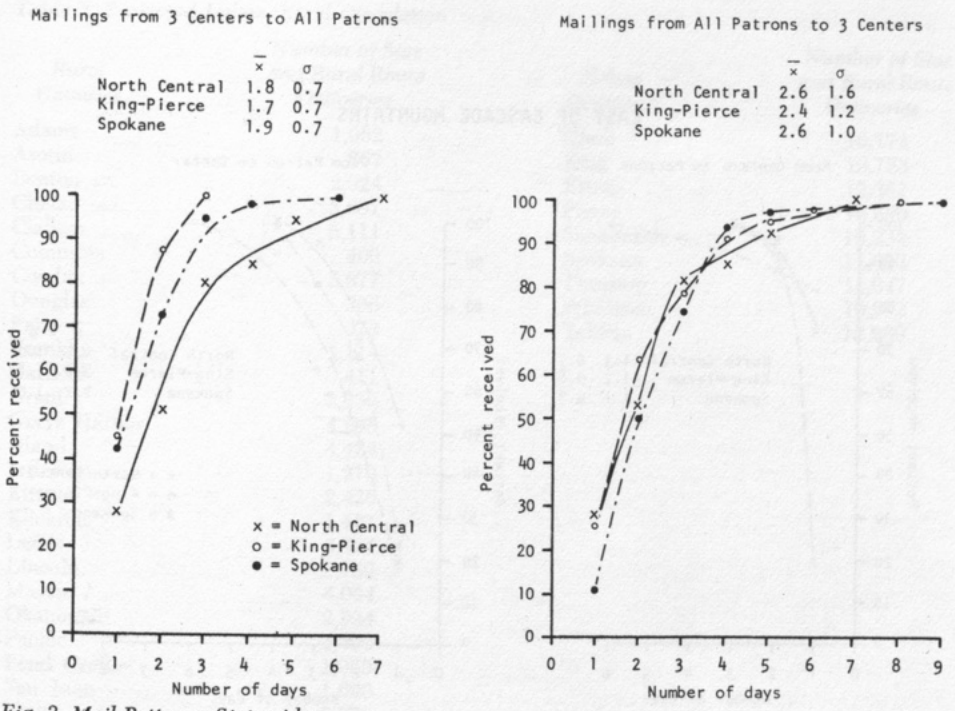


Fig. 3. Mail Patterns, Statewide.

plies a number in the range from .000 to .999 inclusive; theoretically, any three-digit number has an equal probability of occurring. The function is described by the FLOSIM program in terms which break the .000 to .999 span into segments: .019,1/.049,2/.099,3/.199,4/.329,5/.579,6/.799,7/.899,8/.949,9/.999,10. In this case, if the random number supplied falls between .000 and .019 inclusive, the incoming order is to contain a request for one item; if the random number is between .020 and .049, two items are attributed to that request; if between .900 and .949, nine items. These ratios were derived from experience in the existing mail order systems, where 2 percent of the orders were for one item, 3 percent for two items, . . . 5 percent for nine, and 5 percent for ten.

Similarly, the function for the time to process a given item requested might be stated as .899,1/.949,2/.969,3/.979,4/.999,5. A random number falling from .000 to .899 inclusive would cause one minute to be ascribed for the processing of the requested item; a number from .900 to .949 would indicate a two-minute process; a number between .980 and .999 would indicate five minutes.

The types of items requested fell into three categories: (1) those listed in the distributed catalog and on the shelf available for circulation; (2) those listed in the catalog and currently bearing a list of waiting users; and (3) items not in the catalog and therefore requiring delivery from the parent library itself or through interlibrary loan. The ratio of these cate-

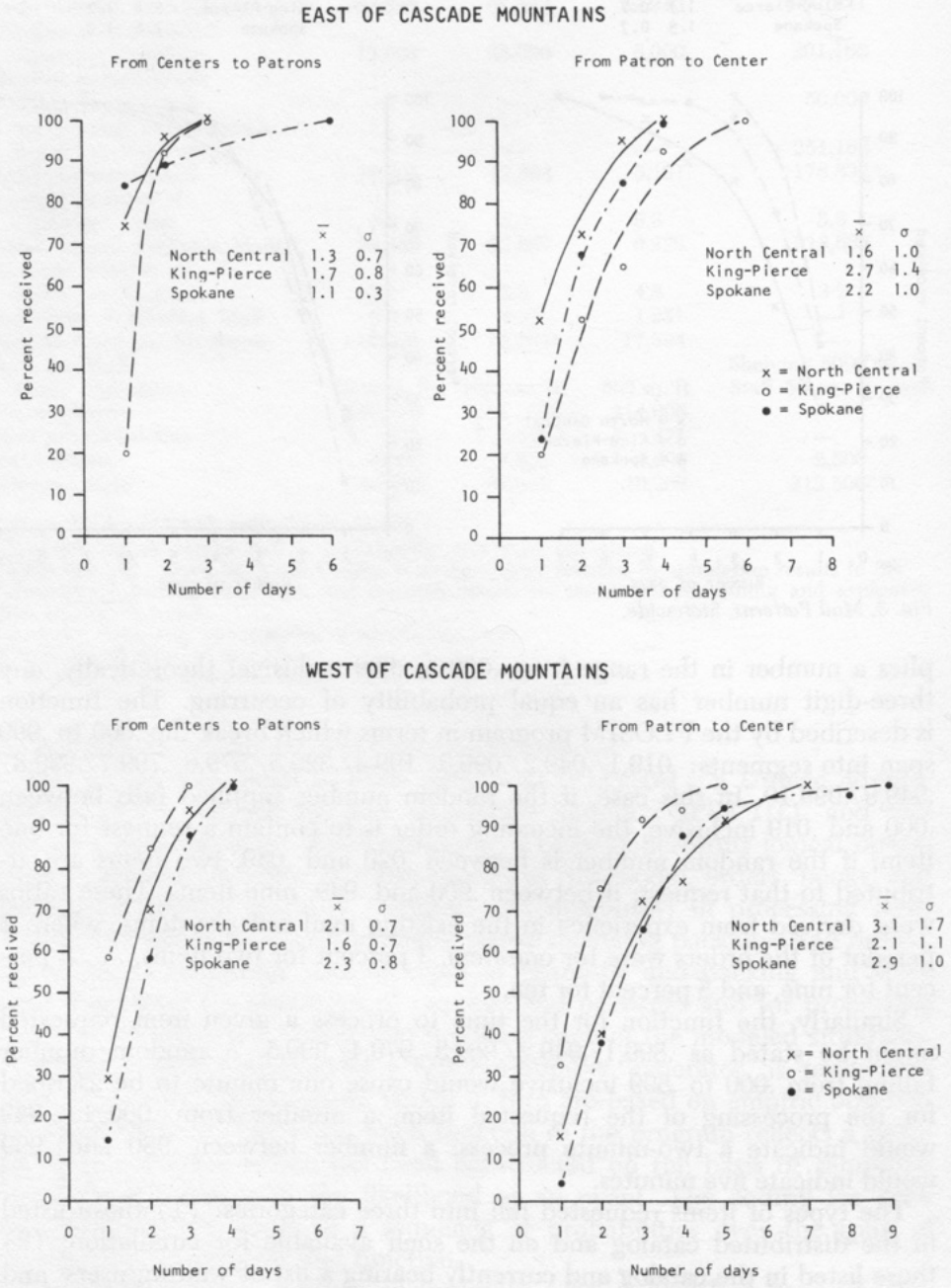


Fig. 4. Mail Patterns to and from Addresses East of Cascade Mountains and to and from Addresses West of Cascade Mountains.

Table 2. Projected Urban/Rural Circulation

Rural Counties	*Number of Star and Rural Route Deliveries*	*Urban Counties*°	*Number of Star and Rural Route Deliveries*
Adams	1,062	Clark	10,174
Asotin	867	King	19,753
Benton	2,924	Kitsap	12,361
Chelan	3,631	Pierce	16,689
Clallam	5,111	Snohomish	19,234
Columbia	400	Spokane	11,033
Cowlitz	5,677	Thurston	11,047
Douglas	356	Whatcom	10,992
Ferry	373	Yakima	12,269
Franklin	1,114		
Garfield	411		
Grant	3,236		
Grays Harbor	4,298		
Island	4,424		
Jefferson	1,279		
Kittitas	2,426		
Klickitat	1,461		
Lewis	6,594		
Lincoln	1,159		
Mason	4,064		
Okanogan	2,934		
Pacific	1,796		
Pend Oreille	1,055		
San Juan	1,093		
Skagit	9,073		
Skamania	750		
Stevens	3,037		
Wahkiakum	787		
Walla Walla	3,253		
Whitman	2,985		
TOTALS	77,630		123,552
Circulation Ratio	7.0		3.1
Projected Circulation	543,410		383,011
Projected Total Circulation		926,421	
Projected Circulation to 50,841 Individuals		76,300	
Total Projected Circulation		1,002,721	

° Urban defined as "a part of, or easily accessible (geographically) to major urban centers."

gories was expressed by the function: .659,INCAT/.859,RESERV/.999, NOTINC. As these types of requests were met in the program (e.g., 66 percent of items were in catalog and not reserved), varying treatment was given. The times supplied in the previous paragraph are those for INCAT items; the distribution for processing times relative to each of the other categories was constructed in a similar manner from operating experiences.

While this model does not incorporate the effect of leadership quality on operations, this factor could be simulated by a "drag" function, rating leadership on a scale from 0 to 1. This function's value would interact with the functions of the model, to modify operating times and throughput. Similarly, factors such as staff morale, administrative policies, external

Table 3. Estimated Annual Workloads for Simulated Centers to Serve All State

Configuration	*Addresses*	*Circulation*	*Orders*	*Packages*	*Volumes Added per Year*
1 CENTER	252,000	1,002,700	179,000	313,300	222,800
2 CENTERS					
East	64,600	305,800	54,600	95,600	68,000
West	187,500	696,800	124,400	217,800	154,800
3 CENTERS					
East	64,600	305,800	54,600	95,600	68,000
West I	137,500	448,000	80,000	140,000	99,600
West II	50,000	248,800	44,400	77,700	55,300
4 CENTERS					
East	64,600	305,800	54,600	95,600	68,000
West I, N	86,700	260,000	46,400	81,200	57,800
West I, S	50,800	188,100	33,600	58,800	41,800
West II	50,000	248,800	44,400	77,700	55,300
5 CENTERS					
East, W	28,900	132,100	23,600	41,300	29,400
East, E	35,700	173,700	31,000	54,300	38,600
West I, N	86,700	260,000	46,400	81,200	57,800
West I, S	50,800	188,100	33,600	58,800	41,800
West II	50,000	248,800	44,400	77,700	55,300
14 CENTERS					
Average load	18,000	71,600	12,800	22,400	16,000

political influences, and physical working conditions could be included in the model to the extent that numerical values could be assigned.

COMPUTER OPERATIONS

The model was initially constructed to carry each transaction from time of receipt (package of returned books or new order) to completion (books on shelf or mailed to patron). While the modeled situations with few transactions could be run in the computer, a service configuration with any sizable traffic resulted in overloading of the transaction capacity of the FLOSIM package so that the simulation would abort after one or two weeks' throughput. The model was restructured into three sections, each of which generated and terminated its internal transactions: materials returned by patrons, incoming orders, and not-in-catalog processing. With this modification, FLOSIM carried all simulations satisfactorily.

The first simulations modeled the three present MOD operations; comparison of the results of these three runs with actual operations of the centers provided validation of the model. The procedural times for each of the present operations were then simulated against a standard workload; this comparison showed that the operating procedures and times of one center required fewer personnel to cope with the standard throughput. This center's procedures and times were incorporated for simulating the hypothesized configurations of state service, with workloads calculated on the basis of demographic data and experience of patron response at the present MOD centers (Tables 1 & 3). Subsequent runs simulated the statewide service situation, each for one center to serve the area designated:

1. All state
2. Area east of Cascade Mountains (East, W and E)
3. Area west of Cascade Mountains (West I, N and S, and West II)
4. Northern section of west side of state (West I, N and S)
5. Southern section of west side of state (West II)
6. Northeastern part of area 4 (West I, N)
7. South and west part of area 4 (West I, S)
8. Eastern section of east side of state (East, E)
9. Western section of east side of state (East, W)
10. 1/14th of state: average operation for 14 centers covering all the state.

Since each of the present fourteen district libraries is a possible service center for its own district, their hypothetical operations were modeled. It should be noted that some areas of the state remain unserved under this pattern, since the districts do not cover the entire state (Figure 5). The work loads for these model runs therefore do not match the total of the all-state figures.

Each computer run simulated the operation of a specific MOD center for a period of a month. The computer printout shown in Appendix B is the final output from the run to simulate one of the existing centers. Each of the more than twenty runs produced such a report on the model's condition at the end of the first, second, and third workweeks, as well as at the month's end (22 working days = 10,560 minutes) as shown here.

The first two pages of Appendix B give the number of transactions passing through each step of the program during the simulation. The column labeled *current* shows transactions existing in that step at the 10,560th minute, while the *total* column shows the total flow-through in 10,560 minutes, since the simulation began.

Following the current and total transaction count are two tables, the first relating to analysis of facility (staff) utilization and the second relating to queuing of transactions in the workflow. These, in conjunction with the transaction "snapshot" and the other interval snapshots, can reveal over- or under-worked staff members, and can indicate growing bottlenecks in the flow.

Table 1 of Appendix B tabulates the number of packages returned to the mail-order center (2,901 in this simulation) and provides the mean, standard deviation, and frequency distribution of processing times. App. B Table 2 records the number of in-catalog items requested and times for processing them. App. B Table 3 records number of requests and times for processing for reserve items; App. B Table 4 counts requests for items not listed in the catalog and their processing times; and App. B Table 5 tabulates the number of packages sent out and times for packaging.

Personnel requirements for the functions modeled are calculated from the facility tables. An average of .7 utilization as a full-time equivalent for each of the facilities (employees) in the computer model is applied for personnel calculations. This allows a margin for nonproductive activi-

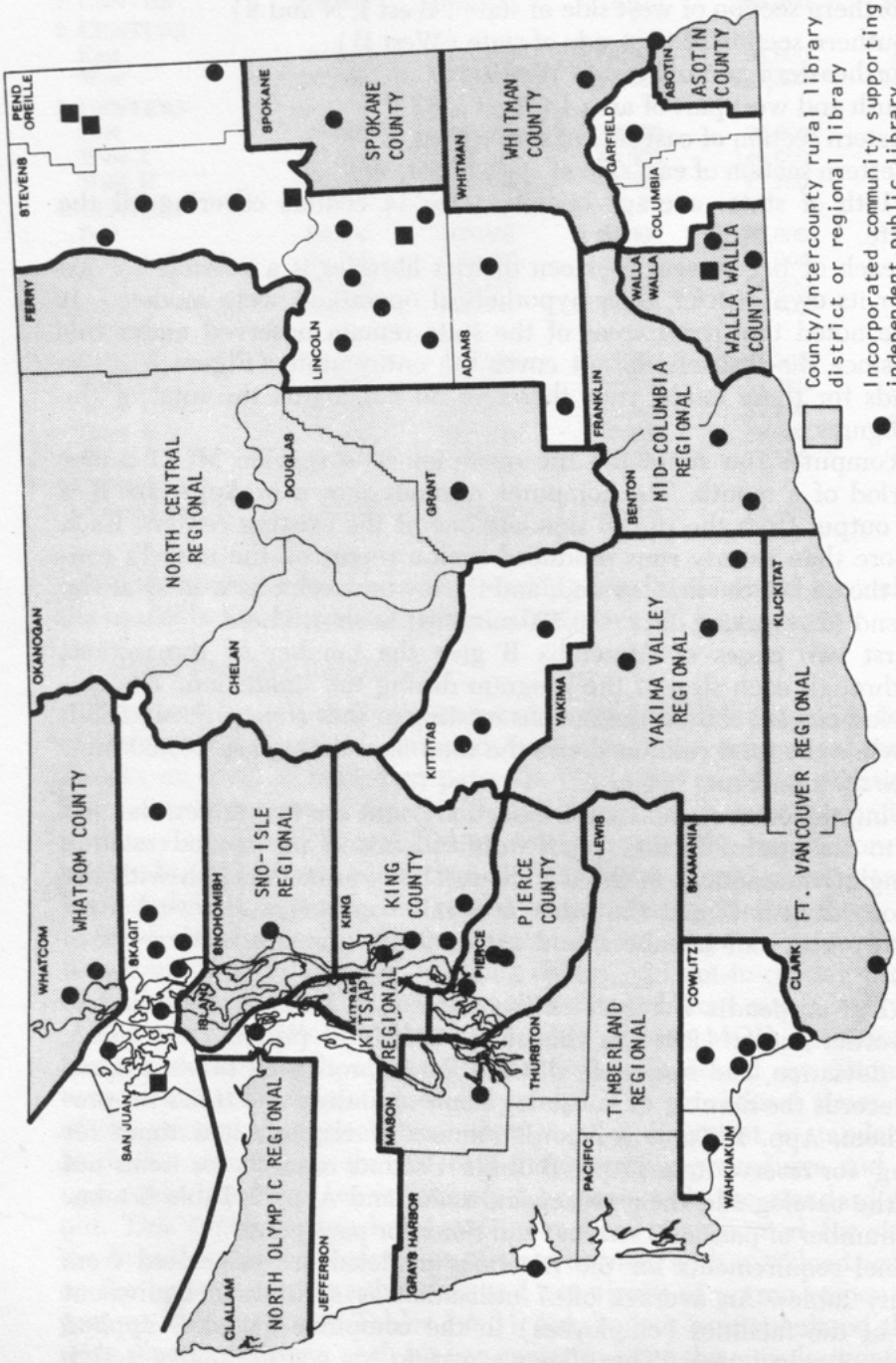


Fig. 5. Public Library Service Pattern in Washington.

ties; experience in operations research has shown this to be a valid ratio. Therefore, the sum of utilization of all facilities for a given process is divided by .7 to derive the number of staff needed for the function. The model does not include tasks related to acquisitions, catalog production, and administration. Because these supporting functions (with the exception of administration) are possible candidates for vendor contracts, and because they are not complex mathematically, they were analytically modeled rather than incorporated in the dynamic computer model.

Table 4 shows the simulation's indication of man-years required for each of the configurations modeled. Column A gives man-years as developed in the computer model, plus administration; column B shows man-years as needed if all support functions (selection, ordering, receiving, processing, catalog production, and mailing) were to be accomplished at each center rather than centralized or contracted to a vendor. If centralized, support functions for the entire state, with up to five centers in operation, would require seven man-years.

Thus one decision factor is somewhat clarified: if a vendor bid for one or all of the support functions is less than the costs projected for those functions, then there are financial advantages in a vendor contract. In other words, for centralized support functions the cost can be projected:

salaries	$ 49,000
catalogs	50,000
postage	94,000
supplies	5,000
space costs	1,000
	$199,000

Similar tables can be constructed for the separate functions on the basis of data in Tables 1, 3, and 5. Since the investigators were not in a position to ask vendors for solid bids on such contracts, only estimated costs were shown. There were indications from at least one reputable vendor that an attractive arrangement was possible.

Table 5a, derived from the projected loads for each of the simulated centers, shows the projected costs for statewide MOD service for configurations of one to fourteen centers. Estimated costs rise as the number of centers increases, with the total circulation held constant.

Since the district library directors of Washington were interested in the possible establishment of district MOD centers (a desirable alternative in terms of local user-library relationships), the computer model was used to simulate these hypothetical MOD operations. Sets of data were developed on the basis of demographic information for each district, with the same task performance times as were used in the simulation of the statewide operation. Manpower estimates for the districts were derived from the computer output; these estimates are shown in Table 4. The total staff to serve the districts (including present MOD operations) totals fifty-two

Table 4. Comparative Estimated Staffing Requirements for MOD Service

Configuration	*Man-Years* *Direct Service and Administration* –A–	*Total Including Support Functions* –B–
I. Serving all state:		
1 Center	29	36
2 Centers	30	38
East of Cascades	10	12
West of Cascades	20	26
3 Centers	31	40
East	10	12
West I	13	18
West II	8	10
4 Centers	32	41
East	10	12
West I, N	8	11
West I, S	6	8
West II	8	10
5 Centers	33	43
East, W	5	6
East, E	6	8
West I, N	8	11
West I, S	6	8
West II	8	10
14 Centers	42	63
II. Serving districts only:		
Asotin County	½	1
Fort Vancouver Reg.	3	4
King-Pierce*	5	7
Kitsap Regional	3	4
Mid-Columbia Regional	2	3
North Central Reg.*	3	4
North Olympic Reg.	2	3
Sno-Isle Regional	4	6
Spokane County*	2	3
Timberland Regional	5	7
Whatcom County	2	3
Whitman County	1	3
Yakima Valley Reg.	2	4
TOTALS	34½	52

* These figures differ from actual operations, since circulation is posited on demographic figures and tasks on North Central Regional Library timings.

man-years, or sixteen more than needed for one center to serve the entire state. Additionally, as can be seen in Table 5b, even with support tasks centralized, the cost of the district centers is estimated to be $683,400 ($72,700 more than one center serving the entire state and $65,000 more than two centers).

It must be noted that the data for the statewide operation include all citizens of the state, while those for the districts include only citizens in the areas currently served (Figure 5), excluding patrons of municipal and association libraries, counties not included in library districts, and the unserved 4.5 percent of the state's citizens. If the total projected statewide

*Table 5a. Estimated Annual Costs for MOD Centers Serving State of Washington**

	Salaries and Benefits	*Books*	*Supplies*	*Postage*	*Catalogs*	*Physical Facilities*	*Misc.*	*Total*	*Cost per Circulation†*
1 Center	$203,000	$222,800	$30,000	$94,000	$47,000	$12,900	$1,000	$610,700	.609
2 Centers	210,000	222,800	30,000	94,000	47,000	13,000	1,000	617,800	.616
3 Centers	217,000	222,800	30,000	94,000	47,000	13,100	1,200	625,500	.623
4 Centers	224,000	222,800	30,000	94,000	47,000	13,200	1,500	632,500	.631
5 Centers	231,000	222,800	30,000	94,000	50,000	13,300	2,000	643,100	.641
14 Centers	294,000	222,800	30,000	94,000	60,000	14,200	3,500	718,500	.717
Districts—not serving all state	245,000	253,000	22,900	71,100	61,600	22,000	7,800	683,400	.901

* Assuming central purchasing, processing, and catalog production and mailing.
† Circulation estimates: all-state = 1,002,720; districts = 758,200.

*Table 5b. Estimated Annual Costs for Serving District MOD Centers**

	Salaries and Benefits	*Books*	*Supplies*	*Postage*	*Catalogs*	*Physical Facilities*	*Misc.*	*Totals*
Asotin County	$ 7,000	$ 2,100	$ 200	$ 600	$ 300	$ 200	$ 100	$ 10,500
Fort Vancouver Regional	21,000	16,700	1,500	4,700	4,500	1,600	500	50,500
King-Pierce	35,000	43,800	4,000	12,300	15,000	3,800	1,500	115,200
Kitsap Regional	21,000	14,000	1,200	3,800	4,200	1,300	400	45,900
Mid-Columbia Regional	14,000	9,800	900	2,800	1,500	800	400	30,200
North Central Regional	21,000	25,500	2,300	7,200	3,800	2,200	600	62,600
North Olympic Regional	14,000	12,200	1,000	3,400	1,700	1,100	400	33,800
Sno-Isle Regional	28,000	32,000	2,900	9,000	8,300	2,800	1,000	84,000
Spokane County	14,000	12,300	1,000	3,500	4,000	1,100	400	36,300
Timberland Regional	35,000	52,100	4,700	14,700	9,400	4,400	1,300	121,600
Whatcom County	14,000	11,700	1,000	3,300	3,500	1,100	400	35,000
Whitman County	7,000	7,100	1,000	2,000	1,000	600	300	19,000
Yakima Valley Regional	14,000	13,700	1,200	3,800	4,400	1,200	500	38,800
TOTALS	$245,000	$253,000	$22,900	$71,100	$61,600	$22,000	$7,800	$683,400

* Assuming central purchasing, processing, and catalog production and mailing.

circulation were allocated among the fourteen districts, to compare with the situation of one to five centers serving the entire state, a model representing the "average district" shows that fourteen centers serving the entire state would require a staff totaling sixty-three man-years—twenty-seven more than needed for one center and twenty more than for five centers serving the state. Estimated costs would be $718,500—$107,800 more than one center, with support functions centralized so that the fourteen centers serving the entire state would require a staff of forty-two—thirteen more man-years than for one center and nine more than for five.

CONCLUSION

The computer program is stored and is readily available for further manipulation. For example, if the administrator of one of the present centers should consider expanding its area of service, new traffic data could

be input to the model to forecast personnel needs for the added load. The model can be used in a variety of situations; the input data must be derived for each in terms of demographic, library, geographic, postal, etc., information. It is necessary to rewrite or modify the model itself only if some different pattern of operations is planned. The procedures modeled are basic to the form of mail-order delivery operation envisioned and practiced in Washington. The model can be adjusted for other states or regions, with data based on local information, and is readily translated into other versions of GPSS language. Application of this simulation technique can provide useful data and insight for management decisions in technical processes, reference work, interlibrary lending, and other operations.

ACKNOWLEDGMENT

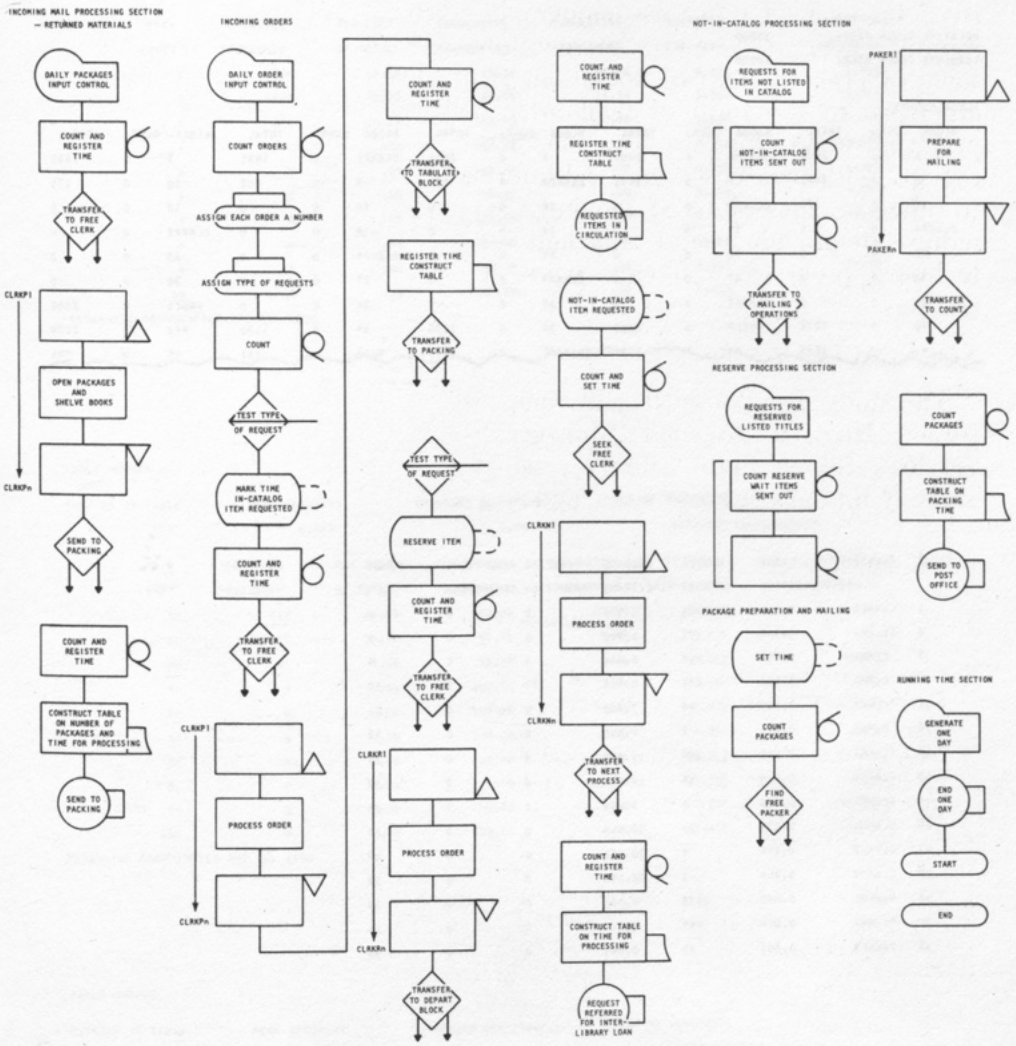
The study was designed, and computer model constructed, by the consultant, Hugh T. Vrooman (Manager, Systems Analysis and Management Services, Illinois State Library); he also shared the work of statistical analysis, findings interpretation, and report writing.

REFERENCES

1. Michael Lynch, "Mail Order Library Service at North Central: A Brief Overview." (paper, Aug. 17, 1973).
2. Choong H. Kim and Irwin M. Sexton, *Conference on Books by Mail Service, a Report* (Terre Haute: Department of Library Science, Indiana State University, Sept. 1973).
3. Teh-wei Hu, Bernard H. Booms, and D. Lynne Kaltreider, *A Benefit-Cost Analysis of Bookmobiles vs. Books-by-Mail in Pennsylvania* (University Park, Penn.: Institute for Research on Human Resources, Pennsylvania State University, Oct. 1973).
4. U.S. Department of Commerce, Bureau of the Census, *1970 Census of Population: General Social and Economic Characteristics, Washington.* Table 120, Educational and Family Characteristics for Counties: 1970. p.49–290, 293.
5. Washington State Office of Program Planning and Fiscal Management, "Interim Projected Population by County, State of Washington 1940–2000." (draft)
6. Maryan E. Reynolds, Mary Jane Pobst Reed, and Hugh T. Vrooman, *Study for the Design of an Optimum System for Mail Order Book Delivery Service in the State of Washington* (Olympia: Washington State Library, 1974).

APPENDIX A

Work Flow Diagram for Computer Simulation Library—Mail Order Delivery



APPENDIX B

Simulation of One Month's Operation

RELATIVE CLOCK TIME: 10560
ABSOLUTE CLOCK TIME: 10560

BLOCK COUNTS

BLOCK	CURR.	TOTAL	BLOCK	CURR.	TOTAL	BLOCK	CURR.	TOTAL	BLOCK	CURR.	TOTAL	BLOCK	CURR.	TOTAL
1	0	2002	SESAME	0	2002	3	0	2002	CLRKP1	0	1831	5	0	1831
6	0	1831	7	0	1831	CLRKP2	0	171	9	0	202	10	0	171
11	0	171	CLRKP3	0	0	13	0	0	14	0	0	15	0	0
CLRKP4	0	0	17	0	0	18	0	0	19	0	0	CLRKP5	0	0
21	0	0	22	0	0	23	0	0	CLRKP6	0	0	25	0	0
26	0	0	27	0	0	CLRKP7	0	0	29	0	0	30	0	0
31	0	0	CLRKP8	0	0	33	0	0	34	0	0	PROC1	0	2002
36	0	2002	SHELF	0	2002	38	0	1130	39	0	1130	REQ	0	1130
41	0	1130	42	0	113	TEST48C	0	1130	MODA	0	981	45	0	981

RANGE	FACILITY ID	AVERAGE UTLIZATION	NUMBER ENTRIES	AVERAGE TIME/TRANS	SEIZING TRNSACTION	PREEMPTING TRNSACTION	RANGE
1	CLRKP1	0.346	1831	1.995	0	0	1
2	CLRKP2	0.032	171	1.982	0	0	2
9	CLRK1	0.473	725	6.884	0	0	9
10	CLRK2	0.143	231	6.515	172	0	10
11	CLRK3	0.017	23	7.652	0	0	11
12	CLRK4	0.001	2	6.000	0	0	12
22	CLRKR1	0.112	103	11.466	0	0	22
23	CLRKR2	0.024	14	18.214	0	0	23
24	CLRKR3	0.000	1	3.000	0	0	24
26	CLRKN1	0.174	26	70.615	0	0	26
27	CLRKN2	0.029	4	76.250	0	0	27
28	CLRKN3	0.006	1	62.000	0	0	28
33	PAKER1	0.095	1575	0.636	0	0	33
34	PAKER2	0.014	245	0.624	0	0	34
35	PAKER3	0.001	12	0.667	0	0	35

RANGE	QUEUE ID	MAXIMUM CONTENTS	AVERAGE CONTENTS	TOTAL ENTRIES	ZERO ENTRIES	%-ZERO ENTRIES	AVERAGE TIME/TRANS	NZ-AVERAGE TIME/TRANS	TABLE NUMBER	CURRENT CONTENTS	RANGE
1	RETURN	2	0.378	2002	0	.00	1.994	1.994	0	0	1
2	INORDERS	1	0.000	1130	1130	100.00	0.000	0.000	0	0	2
3	REQ	4	3441.409	981	171	17.43	756311.189	604865.773	0	1	3
4	RES	3	0.136	118	0	.00	12.195	12.195	0	0	4
5	NIC	3	0.209	31	0	.00	71.065	71.065	0	0	5
6	NICQ	1	0.000	188	188	100.00	0.000	0.000	0	0	6
7	RESQ	1	0.000	664	664	100.00	0.000	0.000	0	0	7
8	PAK	3	0.110	1832	1242	67.79	0.635	1.971	0	0	8

TABLE NUMBER 1

ENTRIES IN TABLE	MEAN ARGUMENT	STANDARD DEVIATION	SUM OF ARGUMENTS
2002	1.994	0.545	3991.000 NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PER CENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
1	304	15.18	15.18	84.82	0.502	1.822-
2	1407	70.28	85.46	14.54	1.003	0.011
3	291	14.54	100.00	.00	1.505	1.845
4	0	.00	100.00	.00	2.007	3.679
5	0	.00	100.00	.00	2.508	5.513
6	0	.00	100.00	.00	3.010	7.347
7	0	.00	100.00	.00	3.511	9.181
8	0	.00	100.00	.00	4.013	11.015
9	0	.00	100.00	.00	4.515	12.849
10	0	.00	100.00	.00	5.016	14.683

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 2

ENTRIES IN TABLE	MEAN ARGUMENT	STANDARD DEVIATION	SUM OF ARGUMENTS
980	6.820	6.014	6684.000 NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PER CENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
10	810	82.65	82.65	17.35	1.466	0.528
20	125	12.76	95.41	4.59	2.932	7.191
30	41	4.18	99.59	.41	4.399	9.854
40	4	.41	100.00	.00	5.865	5.516
50	0	.00	100.00	.00	7.331	7.179
60	0	.00	100.00	.00	8.797	8.842
70	0	.00	100.00	.00	10.263	10.504
80	0	.00	100.00	.00	11.730	12.167
90	0	.00	100.00	.00	13.196	13.830
100	0	.00	100.00	.00	14.662	15.492

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 3

ENTRIES IN TABLE	MEAN ARGUMENT	STANDARD DEVIATION	SUM OF ARGUMENTS
118	12.195	9.292	1439.000 NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PER CENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
10	66	55.93	55.93	44.07	0.820	.236-
20	32	27.12	83.05	16.95	1.640	0.839
30	14	11.86	94.91	5.09	2.460	7.916
40	5	4.24	99.15	.85	3.280	2.992
50	1	.85	100.00	.00	4.100	4.068
60	0	.00	100.00	.00	4.920	5.144
70	0	.00	100.00	.00	5.740	6.220
80	0	.00	100.00	.00	6.560	7.296
90	0	.00	100.00	.00	7.380	8.373
100	0	.00	100.00	.00	8.200	9.449

REMAINING FREQUENCIES ARE ALL ZERO

TABLE NUMBER 4

ENTRIES IN TABLE	MEAN ARGUMENT	STANDARD DEVIATION	SUM OF ARGUMENTS
31	71.065	34.455	2203.000 NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PER CENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
10	0	.00	.00	100.00	0.141	1.772-
20	1	3.23	3.23	96.78	0.281	1.482-
30	2	6.45	9.68	90.32	0.422	1.191-
40	2	6.45	16.13	83.87	0.563	.901-
50	6	19.35	35.48	64.52	0.704	.611-
60	2	6.45	41.93	58.07	0.844	.321-
70	4	12.90	54.84	45.17	0.985	.030-
80	4	12.90	67.74	32.26	1.126	0.259
90	2	6.45	74.19	25.81	1.266	0.549
100	2	6.45	80.64	19.36	1.407	0.839

TABLE NUMBER 5

ENTRIES IN TABLE	MEAN ARGUMENT	STANDARD DEVIATION	SUM OF ARGUMENTS
1832	0.635	1.097	1163.000 NON-WEIGHTED

UPPER LIMIT	OBSERVED FREQUENCY	PER CENT OF TOTAL	CUMULATIVE PERCENTAGE	CUMULATIVE REMAINDER	MULTIPLE OF MEAN	DEVIATION FROM MEAN
1	1494	81.55	81.55	18.45	1.575	0.332
2	171	9.33	90.88	9.12	3.150	1.244
3	112	6.11	97.00	3.00	4.726	2.156
4	42	2.29	99.29	.71	6.301	3.068
5	13	.71	100.00	.00	7.876	3.979
6	0	.00	100.00	.00	9.451	4.891
7	0	.00	100.00	.00	11.027	5.803
8	0	.00	100.00	.00	12.602	6.715
9	0	.00	100.00	.00	14.177	7.626
10	0	.00	100.00	.00	15.752	8.538

REMAINING FREQUENCIES ARE ALL ZERO

ISDS, ISBD(S), and ISBD(M) as Cataloging Aids

Hendrik D. L. VERVLIET: University of Antwerp, Belgium.

The attempts of the International Standard Bibliographic Description (ISBD) and the International Serials Data System (ISDS) to achieve internationally a greater compatibility of cataloging standards are criticized on two points: (a) the difficulty of automatic recognition of some of the fields; and (b) the difficulty of interfiling descriptions from the different standards into a consistent filing order.

INTRODUCTION

ISBD(M), ISBD(S), and ISDS are becoming familiar as acronyms standing for, respectively: (a) International Standard Bibliographic Description for monographic publications; (b) International Standard Bibliographic Description for serials; (c) International Serials Data System.[1-3]

The first has been drawn up by IFLA's Committee on Cataloging; the second by IFLA's Committee on Serial Publications. The *Guidelines for ISDS* are the work of a committee of Unesco's UNISIST. The three standards can be hailed as symbols of international cooperation; all three endeavor to end or to minimize cataloging in isolation. As things stand now, one may have some doubts about the extent to which the object is attained. It is a fact that ISBD was rapidly and widely accepted, among others, by two of the foremost bibliographic agencies, namely, the British National Bibliography and the Library of Congress. In spite of the reputation of the designers and users of these new standards, some fundamental criticism might be made. This criticism bears on two points:

1. The difficulty (or impossibility) of automatic recognition of some of the bibliographic fields;
2. The difficulty of interfiling descriptions from the three standards into one consistent filing order.

FIELD RECOGNITION

The ISBD standards claim to recognize different bibliographic fields through an elaborate system of punctuation. ISBD(M) formulates this as follows:

> [ISBD] . . . is designed to meet three requirements for the efficient inter-

> national use of [bibliographic] records: first, that records produced in one country or by the users of one language can be easily understood in other countries and by the users of other languages; secondly, that the records produced in each country can be integrated into files or lists of various kinds containing also records from other countries; and thirdly, that records in written or printed form can be converted into machine-readable form with the minimum of editing.
>
> To achieve these aims it was necessary to find a way by which the different elements making up a description could be recognized, by the eye or by a machine, without the need to understand their content. The means adopted is a prescribed system of punctuation. Within any one of the main areas of the description, each prescribed punctuation mark is a signal showing the nature of the element which follows it. This is different from the normal use of punctuation marks, which is to separate words or phrases and at the same time to indicate a particular relationship between them. For this reason, and also because the need to distinguish a considerable number of elements has led to the introduction of some symbols not normally used as punctuation marks, the ISBD(M) punctuation sometimes presents an unfamiliar appearance. It must be remembered that ISBD(M) punctuation is being used in a purely formal way for a particular technical purpose which is only distantly related to its use in a continuous text.[4]

Plainly, these objectives are not reached by ISBD. Feeding "raw" ISBD descriptions into a computer, say by Optical Character Recognition (OCR), would inexorably be doomed to failure. No program for Automatic Field Recognition (AFR) is able to recognize fields unless their place in the sequence is always the same, unless they are specially coded, or unless they are presented in relation to a set of rules such that they can be explicitly recognized by a corresponding computer algorithm.

There are two main cases where ISBD will fail in this respect:

1. Some fields (for example, the edition statement) are not always present, causing at least minor problems for an AFR program which might not correctly identify the subsequent fields. A solution here is to indicate the absence of the field.
2. The author field (in ISBD treated as a subfield or a part of the title field) is not identified consistently. In fact, ISBD does not accept an author field if the author's name is "linguistically an integral part of the title proper or if the title consists solely of the author's name."

As ISBD sees it, the following titles do not contain an author statement:

Report of the Expert Group on Special Care for Unborn Babies

The complete works of Charles Dickens

A solution may be to always indicate the author field, even when it does not exist; this is even unavoidable in the series area, when no author statement whatsoever has been allowed up to now.

Apart from this, it seems that ISBD's phrasing of the definition "linguistically an integral part of title" encourages errors. In the following examples, the first instance contains for ISBD an author's name which is

a "linguistically integral part of title," the second an author's name which is not:

The sermons of John Donne
The homecoming / by Harold Pinter

No linguist would accept this distinction as a "linguistic" one. It is untenable in many languages, such as German or Latin. Moreover, it creates filing problems.

It is questioned whether ISBD will alleviate substantially the workload on catalogers which derives from language barriers of the bibliographic description. Certainly, it never was ISBD's intention to propose standards for cataloging areas of "local" interest, as there are: the heading statement, the holding statement, the area of subject classification or of the subject headings, the shelfmark, the "local" notes. But was it totally impossible to give guidance as to the entry form of the author name? Several national bibliographies are arranged by subject, and some method must be defined to indicate the preferred entry element of the author statement, which is by no means self-evident in less well known languages or in exceptional cases even in widely known languages.

Examples: Johan Willem Frederik Werumeus Buning (Dutch)
Nagy Laszlo (Hungarian)
Jean Paul (German)
Karen Sparck Jones (English)

An indication of the entry element by the cataloging agency would help, even if it would not solve all the problems, especially those arising from diverging national cataloging usages (proper names with prefix, corporate entries beginning with a place name, etc.)

Moreover, for an easy exchange of bibliographical descriptions, another element has to be provided to indicate those cases in which the beginning of the title does not file (titles beginning with articles and nonfiling numerals). In relation to this point, it is evident that the implicit and subtle use of capitalization (which ISBD and ISDS manifestly borrowed from AACR), is wholly insufficient to comply, for instance, with *ALA Filing Rules* 36 B 2b (titles beginning with a nonfiling numeral) or is grammatically inexact, as in the erroneous titles shown below (in both cases, the second word should begin with a lowercase character):

Examples: Un Dimanche en ville, or
Das Deutsche Buch.[5, 6]

Finally, if ISBD is really unusable for Automatic Field Recognition (AFR), and if it can only be used in an eye-readable context, its main interest manifestly lies in a change of the typographic styling of the punctuation. No experiments seem to have guided the new styling towards a greater readability. In its current attire it appears more as a hindrance than as an aid. Especially in the case of an open entry (AACR 163), the prescribed succession of dashes and periods do not seem to enhance readability.

Example: The world of learning. — 1947/48– . – London: Europa Publications, 1947– . –

FILING SEQUENCE

The second point of criticism bears on the implicit incompatibility of the filing logic of ISBD(M), ISBD(S), and ISDS. The three systems, by implication, attempt to provide bibliographical descriptions suitable for a title catalog. Certainly this is commendable, particularly as the title catalog is a normal feature in commercial bibliographies such as *Books in Print* and its counterparts in various languages, as well as being increasingly used particularly in those libraries switching over to automated systems.[7–9] Without doubt, access by title will be a standard feature of the next-generation library catalogs. Too many of the newer cataloging codes take the primacy of the author entry for granted.

In these title catalogs, especially those made up in "page" format, it is evidently sensible to interfile the titles of monographs, serials, and periodicals. If this is done, it will be imperative to abide by one filing logic; without this, the filing order will seem inexplicable to the user and encourage cataloging "standards" rife with inconsistencies between different libraries. To interfile by title the descriptions of ISBD(M), ISBD(S), and ISDS in a way that makes sense, it is necessary that these standards define and distinguish consistently the fields and subfields on which the filing order is to be based. Unfortunately this has not been done.

A comparison of the *ALA Rules for Filing Catalog Cards* (further abbreviated as ALA) with the filing implications of ISBD and ISDS makes this clear.* The ALA filing rules are used by way of comparison, not as an example to be followed necessarily. In fact, the ALA rules were not designed for a title catalog nor for a book catalog, and they may be not well suited for automated filing.

The ALA filing rules for titles distinguish serials and monographs, whether they are anonymous or not (i.e., whether they have a title main entry or not). Monographs are filed as in Table 1.

The filing order for titles in ISBD(M) is implicit. The sequence is called "natural" if no tags are used; otherwise the term "tagged" is used. The natural filing of ISBD(M) results in the filing order shown in Table 2.

The author statement cannot be used as second filing element (as in ALA B) because it is not always recognizable within the title field, and, if recognizable, is seldom presented in a form acceptable for automatic filing. Nor can the date easily be used as ALA's fourth filing element as it cannot readily be captured from the imprint in all cases.

A tagged ISBD(M), enriched, for example, with MARC tags and sub-

* For the sake of simplification, this comparison does not take into account the intricacies of filing by uniform title (organized author arrangements; anonymous classics and sacred books).

Table 1. ALA Filing Order of Monographs

Monographs		
Title Main Entry ALA (A)	*Personal Author Main Entry ALA (B)*	*Corporate Main Entry ALA (C)*
1. Title proper	1. Title proper	1. Title proper
2. Subtitle	2. Author	2. Author
3. Place	2.1 His name	2.1 Its name
4. Date	2.2 His birthdate	2.2 Place of corporation/or its date
	2.3 Other distinguishing terms	3. "Significant" subtitle
	3. "Significant" subtitle	4. Date
	4. Date	5. Place
	5. Place	6. Publisher
	6. Publisher	7. Edition
	7. Edition	
Source: ALA 33 C 4	ALA 33 C 5; 20 E 5; 26 B9-13	ALA 33 C 5; 28 B

Table 2. ISBD Filing Order for Monographs

Monographs
ISBD (M)
1. Title proper (including alternative title)
2. Subtitle
3. Parallel title
4. Place

field codes, certainly would be able to file according to ALA (A); however, it cannot file according to ALA(B) or (C). MARC is unable to identify the category "significant subtitle."

The filing order for serials is more complicated and more confusing; none of the three codes (ALA, ISDS, ISBD(S)) are compatible with each other. ALA distinguishes two kinds of serials: periodicals, including newspapers, and "serials, other than periodicals and newspapers." The following (simplified) Table 3 tries to visualize the ALA instructions.

Table 3. ALA Filing Order of Serials

Serials					
Title Main Entry		*Corporate Main Entry*		*Personal Author Main Entry*	
ALA (P) Newspapers & Periodicals	*ALA (S) Other Serials*	*ALA (PC) Newspapers & Periodicals*	*ALA (SC) Other Serials*	*ALA (PA) Newspapers & Periodicals*	*ALA (SA) Other Serials*
1. Title proper	1. Title proper	1. Title proper	1. Title proper	1. Title	1. Title
2. Place	2. Subtitle	2. Author's name	2. Author's name	2. Author's name	2. Author's name
3. Starting date of publication	3. Place of publication	3. Place of corporation /its date	3. Place of corporation /its date	3. Year of birth of author	3. Year of birth of author
	4. Starting date of publication	4. Place of publication	4. Subtitle	4. Distinguishing terms added to author's name	4. Distinguishing terms added to author's name
				5. Place of publication	5. Subtitle
Source: ALA 33D1	ALA 33 C 4	ALA 33 D 2	ALA 33 C 5; 36 C 1	ALA 33 D 2; 33 B 2	ALA 33 C 5

A main distinguishing feature of the six ALA filing systems is the different treatment of the subtitle; the same is the case for ISDS and ISBD(S).

For ISDS the matter is quite simple: no provision is made for the subtitle. All kinds of titles are allowed in the system: key-titles, abbreviated titles, variant titles (i.e., parallel and expanded titles), but *no* subtitles. There is one exception, however; if the subtitle is a section or edition title, it is accepted, but not in a uniform fashion (see Table 4). In fact, ISDS is not a full bibliographic system but, from the point of view of a cataloger, solely a system of organizing headings. The natural filing order of ISDS is as follows:

Table 4. The Filing Order of ISDS

ISDS

1. Key-title; includes *sometimes*
   1.1 Author's name in literal form
   1.2 Section subtitle (if the section pertains to subject subseries)
   1.3 Edition subtitle (if appearing "on the publication")
2. Place of publication of first issue
3. Starting date
4. Section or edition subtitle (other than 1.2 or 1.3)

The ISDS distinction of two kinds of section (and edition) subtitles is novel; it can be exemplified as follows:

case 1.2 : *Journal of polymer science. Part A. General papers*
case 1.3 : *Nouvelles de Paris. English version*
case 4 : *Réalités (Paris. English version)*
case 4 : *New York times (Microform edition)*
(*source* : *Guidelines for ISDS*, 4.24; 4.263; 4.262; 4.263)

Transposed to a fictitious but certainly not impossible example, following filing order may occur:

Dialogue. Edition française (New York)
Dialogue. English edition (New York)
Dialogue (New York. Braille edition)
Dialogue (New York. English edition)

The different filing positions of the second and the fourth example will be difficult to explain to anyone but extremely patient users.

Solely the ISDS fields key title and section and edition title, as enumerated in Table 4, are recognizable in most AACR or ISBD(S) descriptions. Conversely, ISDS will not recognize the title proper, the first filing element of ALA, nor the "distinctive title," the first filing element of ISBD(S). Nor will ISDS recognize normally the author field that constitutes the second filing element in ALA(PC), ALA(SC), ALA(PA), and ALA(SA).

Filing with ISBD(S) generates analogous difficulties. Its natural filing order is as follows in Table 5.

ISDS and ISBD(S) differ mainly in the treatment of the edition subtitle

Table 5. The Filing Order of ISBD(S)

ISBD(S)

1. Distinctive title; includes *sometimes*
   1.1 Author's name in literal form
   1.2 Edition subtitle
   1.3 Section subtitle
2. Subtitle
3. Parallel title
4. Place

and the section subtitle, which in ISDS sometimes are in last filing position, but in ISBD(S) always in first position.

Other weaknesses of ISBD(S) are:

1. ISBD(S) will not recognize normally the author field that constitutes the second filing element in ALA(PC), ALA(SC), ALA(PA), and ALA(SA).
2. The edition subtitle and the section subtitle are not delimited unequivocally by the prescribed punctuation. This punctuation occurs also in abbreviations and in authors' names used as titles.
3. The date cannot be readily captured from the imprint, as mentioned above in the discussion of ISBD(M).

In contrast, ISBD(S), enriched with MARC tags, generates a filing almost wholly compatible with ALA.

CONCLUSION

The conclusion is obvious: in a title catalog, ISBD(S) and ISDS cannot be interfiled consistently. ISBD and ISDS must reach an agreement that yields an acceptable filing of titles, when shown sequentially on a page or a screen. If this is not achieved, the endeavors of ISBD and ISDS will have failed. The new schemes may be used sensibly on their own and in bibliographic lists limited in scope or size. It is somewhat amazing, however, that ALA and large libraries such as the Library of Congress, which are aware of the problems of interfiling large quantities of items, up to now seem to support these standards.* On the other hand, the library world has to give some consideration towards the conversion of the traditional filing rules to machine filing.[10, 11] Librarians should be looking with great expectation to the future development of the projected ISBD (General).

We hope that the new norm will bypass some of the inconsistencies of the existing ISBD(M) and (S), that ISDS will consider seriously all consequences of its possible use in a large library catalog, and that ISO/TC 46-WG 3 will strive for serious progress about bibliographic filing in a multilingual context.[12]

* This attitude seems to have shifted lately to a more critical approach, as appears from Mary E. Sauer's paper on "Automated Serials Control: Cataloging Considerations," in the March issue of *JOLA*.

REFERENCES

1. International Federation of Library Associations, *ISBD (M), International Standard Bibliographic Description for Monographic Publications* (1st standard ed.; London, 1974), 36p.
2. International Federation of Library Associations, Joint Working Group on the International Standard Bibliographic Description for Serials, *ISBD (S)—International Standard Bibliographic Description for Serials* (London: 1974), 36p.
3. UNISIST, International Centre for Registration of Serial Publications (Paris: UNESCO, 1973).
4. C. Sumner Spalding, "ISBD: Its Origin, Rationale, and Implications," *Library Journal* 98:121–23 (Jan. 15, 1973).
5. *Anglo-American Cataloging Rules.* North American Text. (Chicago: American Library Assn., 1967), p.348, App. II, English ed.
6. *ALA Rules for Filing Catalog Cards* (Chicago: American Library Assn., 1968).
7. Jay E. Daily, "Title Entry as Unit Entry," *Library Resources & Technical Services* 16:433–44 (Fall 1972).
8. M. Nabil Hamdy, *The Concept of Main Entry Represented in the Anglo-American Cataloguing Rules* (Littleton, Colo.: Libraries Unlimited, 1973).
9. C. Sumner Spalding, "ISBD(S) and the Title Main Entry for Serials," *International Cataloguing* 3:4–5 (July–Sept. 1974).
10. W. R. Nugent, "The Mechanization of the Filing Rules for the Dictionary Catalogs of the Library of Congress," *Library Resources & Technical Services,* 11:145–66 (Spring 1967); J. Dulka and J. Z. Nitecki, "Filing Rules for a Three-Dimensional Catalog," *Library Resources & Technical Services,* 14:485–96 (Fall 1970); J. L. Harris and T. C. Hines, "The Mechanization of the Filing Rules for Library Catalogs: Dictionary and Divided," 14:502–16 *Library Resources & Technical Services* (Fall 1970); Working Party on Computer Filing, "Filing by Computer," *Library Resources & Technical Services Catalogue and Index,* 27:1–16 (1972).
11. The proposals for the new Danish (*International Cataloguing* 3:4–5 (Oct.–Dec. 1974)), and British (*International Cataloguing,* p. 6–8) filing codes differ considerably from the ALA rules.
12. Principles for Filing: Resolution of ISO/TC 46 SC4 at Helsinki, May 1974, in *International Cataloguing,* 3:4 (Oct.–Dec. 1974).

Automated Network Catalog Products and Services*

Maurice J. FREEDMAN: Coordinator of Technical Services, the Branch Libraries, The New York Public Library (New York City).

Four categories of automated network catalog products and services are examined. The advantages and disadvantages of (1) the on-line cathode-ray-tube (CRT) display, (2) the line-printer produced card, (3) the photocomposed book catalog or catalog card, and (4) computer-based microforms are all reviewed. Examples of actual library applications are given for each category.

This paper will concern itself with the kinds of catalog products and services a library can receive or share by participation in a computer-based network or through cooperation in the development of automated systems. Unless otherwise mentioned, all systems discussed are American and MARC monograph-based. The approach taken will be to deal with the products and services by categories of form. The assumption is that the networking which concerns us is computer-based, so the actual products and services described will all be directly or indirectly generated from machine-readable data.

The four categories or formats which will be examined are (1) the on-line cathode-ray-tube (CRT) display, (2) the line-printer produced card, (3) the photocomposed book catalog or catalog card, and (4) microforms produced on computer-output-microfilm (COM) or digital-based graphics display microfilm. These categories each have differing technological attributes, costs, and advantages and disadvantages. Although monographic catalog products and services are the concern of this paper, these formats can be used for serials, any other category of library material, or for that matter a list of automotive parts.

THE CRT DISPLAY OR ON-LINE ACCESS TO THE COMPUTER

CRT terminals have been primarily used for input and maintenance of cataloging data. The Ohio College Library Center, the premier automated

* This article is based on a speech given at the ISAD institute, "Networks and Networking, or How to Automate Without Doing It Yourself," New Orleans, Louisiana, February 1975.

library network, consists of individual terminals located in institutions all over Ohio as well as most other areas of the country, all connected to a computer in Columbus, Ohio. The OCLC system allows participating libraries to first search via the CRT terminal the entire OCLC data base of over two million catalog entries.[1] Within seconds, the entry desired can be displayed on the screen, and the user can accept it or add, delete, or change it to render it consistent with the library's local cataloging requirements. Two other functional activities are performed. If the library can find no entry already in the data base for the title searched, it calls for a worksheet display on the screen and locally enters the cataloging as a new record into the data base. Finally, the union catalog function is available, and is particularly valuable to the original network participants, the academic libraries of Ohio, as well as other networks whose libraries are members of OCLC. Each time an entry is used or a new one added, a notation is affixed to the OCLC record indicating that the user library holds the item represented by that record. It is then possible using a simple search key to find out which libraries have a given piece of material. This information is of tremendous value both for collection development and interlibrary loan. Expensive and unnecessary duplication of collections can be reduced and cooperative acquisition is facilitated through the use of an on-line union data base. These are especially important cost considerations which superficial analyses focusing on card costs and line charges tend to overlook.

In addition to OCLC, Stanford University's BALLOTS (Bibliographic Automation of Large Library Operations Using a Time-Sharing System) project allows on-line access to the MARC data base for the purpose of creating catalog cards for the Stanford University Libraries.[2] It has some similarities to OCLC, but it also has a particularly unique and distinguishing feature. It has a powerful search system: BALLOTS provides searches of its data base by virtually any combination of terms within the catalog record. It allows on-line subject querying of the entire machine-readable catalog file. On a daily basis, reference questions utilizing this capability are telephoned in from many libraries and individuals; these queries are manipulated through the search software in an on-line mode and appropriate citations are given. In addition, Stanford uses BALLOTS for ordering purposes. BALLOTS is developing the capability to include participation and use by other libraries and library networks.[3]

Although no large library currently uses a CRT terminal as a public on-line catalog, it is the Ohio State University (OSU) libraries' plan to do so in the not-too-distant future. The estimated date for this implementation is July 1976. At that time, the card catalog will be closed and no additional cards will be filed into it. Banks of CRTs will complement the card catalog, and the OSU users will have on-line access to the library's holdings.

A chief disadvantage of an on-line catalog is cost. One of the most important functions of a network is to spread the cost of maintaining a huge data base among a large number of libraries. It is most interesting that

computer costs, particularly the cost of being on-line, have been going down, and there are indications that they will continue to decrease as methods and tools of storage and access become simpler.

There are also serious technical problems involved in the use of telephone lines and electronic transmissions. In addition, "Ma Bell" seems much less cooperative than she might be, as will be attested to by most anyone who has tried to schedule speedy installation of appropriate line facilities.

A disadvantage which pertains to the present on-line systems, but is not intrinsic to the on-line process, is the absence of automatic authority control. At present, the only way to change or control authority terms on the OCLC data base is to individually maintain (or change) each occurrence of the term, and to keep a manual authority file against which new authority terms can be checked and established.

The advantages of an on-line system are most attractive. Any library which has had to use a batch process for creating a catalog file will immediately appreciate its value. The batch process usually involves several trips back and forth to the computer. For example, a record is keyed and converted into machine-readable form; a printout or listing is then produced which is used for comparison with the source document. If a correction is necessary, the correction must be keyed and the whole process is then repeated. In addition, with the exception of the University of California's "FIX" program, usually the whole subfield or field must be rekeyed to make the correction.[4] This cycle continues until the proofreader sends an explicit approval to the machine or a sufficient time has elapsed for the computer to assume that the record has become cleansed of both typographical errors and tagging or coding errors. The on-line system allows *immediate* correction of any error, be it a single character or a whole record, thus obviating the tremendous loss of time and editorial expense involved in repetitive proofreading.

However, the on-line display is not as useful as a displayed page for the browser who does not have a specific title in mind or a precise knowledge of the author's last name. At most, a few entries can be viewed at once, while a printed catalog page allows one to browse large numbers of titles at a glance. The kinds of reduction and clarity true of the printed page are currently superior to the display of the CRT terminal. Yet, one should bear in mind that the computer printed catalog is out of date before the user sees it, as opposed to the immediacy and currency of the here-and-now on-line data base. The Ohio State University experience will be of great interest because it will involve the full use by the public of an on-line catalog in a large general research library collection.

Before going on to the next section, reference should be made to Information Dynamics Corporation's (IDC) BIBNET system. There are three separate components of BIBNET; two will be described in this section, and the third will be discussed below. In 1974, BIBNET, a commercial network service, consisted of a minicomputer terminal on-line via a dial-up

telephone to the IDC computer. The primary use of the service was the on-line querying of a central bibliographic file for the dual purpose of creating and collecting cataloging records and holdings data, and printing card sets off-line. A recent enhancement of BIBNET was the loading of the entire MARC file and the additional non-MARC indexes created by IDC into a national data base service time-share network operated by the System Development Corporation. This recent development allows for the widest range of reference and subject queries, as well as the more "traditional" catalog use and addition of holdings for ILL purposes associated with the 1974 version of BIBNET. The New Mexico State Library, as of January 1975, was using the new BIBNET data base service for location searching and interlibrary loan.

LINE-PRINTER PRODUCED CATALOG CARD AND/OR PRINTOUT

These are the most common network products and the use of the service by which these cards or listings are produced is the most widespread of the four categories of products. The line-printer is the device on the computer from which printouts are produced. Large book vendors such as Blackwell North America, Bro-Dart, and Josten's all provide line-printed catalog cards to their customers, as do such institutions as OCLC and the University of Massachusetts.[5] These applications might all be viewed as network examples insofar as the central computer cost is defrayed by the libraries participating in the card service, and the cost of maintaining the data base is shared by the many purchasers of the service.

In addition, the MARC-O project in Oklahoma has been providing a printout service wherein Oklahoma libraries (and more recently other libraries) could request listings of MARC records. The printout service is valuable for the cataloging data and also for the SDI data provided to those wishing to know what is in MARC in a given area of the LC or Dewey classification.

Overall, the chief advantage of line-printed output is that it is inexpensive (or economical) to produce. One can purchase a set of cards from Josten's Catalog Card Corporation for less than thirty cents. All the commercial vendors mentioned provide card sets or kits at rates which cannot be refused unless one is already receiving free Title II depository cards (with their attendant obligations) from LC, or has a book catalog. Of course the vendors do not allow any significant options with respect to modifying those cataloging data. (Blackwell North America seems to offer the most flexibility.) It is difficult to compare the OCLC produced card set with that of the commercial vendors because OCLC's card set is an intrinsic part of a union catalog and national network and is not just a stand-alone card service. On the other hand, the total cost to a library for an OCLC card set is far greater than a commercial set because it includes such costs as line charges, maintenance costs, and terminal costs in addition to the price of the cards. One of the real cost savings OCLC provides li-

braries is that it delivers all of the cards to an individual library in ready-to-file main entry or title arrangement. It should also be noted that OCLC offers tremendous flexibility to its members in relation to the format of the card. OCLC was the first network to allow its users to alter any element of data in the catalog record. None of the commercial firms routinely offer this degree of flexibility.

A chief disadvantage of all of the extant card services, except Blackwell North America's, is the absence of an internal authority control; none of them provide name or subject cross-references with their card sets, thus leaving a large part of the cataloging job undone or still to be done by those libraries still concerned with bibliographic control.

Perhaps the greatest disadvantage of network card services is independent of the network or the computer. As the size of the library increases, the cost of maintaining its card catalog grows. In OCLC's case, the libraries must pay both for the maintenance of the machine-readable data base and the maintenance of their own card catalog. Despite this, Dartmouth University, for example, estimates "(a) . . . net annual savings of $25,000 to $30,000."[6] OSU may be the first to close its catalog and go online, but the overwhelming costs of maintaining large card catalogs will force other libraries to do the same.[7]

In balance we must note that although line-printed cards as commercial or institutional network products are economical, the data base from whence they came and the card catalogs into which they are going are costly to maintain.

THE COMPUTER-PRODUCED/PHOTOCOMPOSED BOOK CATALOG

Next in line as a major product of networks is the computer-produced and photocomposed hard-copy book catalog. There have basically been three major book catalog products: (1) all of the commercially supplied catalogs which almost wholly have been sold to public and school libraries, as well as the in-house catalogs produced at places as disparate as Harvard (the *Widener Library Shelflist*), the University of California at Santa Cruz, and the State of Washington Library Network, etc.; (2) the phenomenon of the *University of California Union Catalog Supplement* for its many campuses; and (3) the development of The New York Public Library bibliographical control and book catalog system. The book catalogs produced in each of these situations represent significantly different approaches to bibliographical access and control.

The commercial book catalog producers have been in the game a long time. The reason public libraries have converted to book catalogs in large numbers is that generally they have many branches in addition to a central library or headquarters, and it is cheaper and easier to have a single book catalog in which an entry appears once rather than multiplied in the several branch card catalogs. It is clear that any system of library branches, be it public or academic, would find most valuable a single compilation of all

the materials in the entire system. This in effect is the Sears-Roebuck concept: the smallest branch library provides direct bibliographic access through the book catalog to the total resources of the system insofar as the central data base contains everyone's holdings, and all of the members, large or small, have access to the materials. Depending on local arrangements, they will also share through interlibrary loan the materials described in that data base.

The *University of California Union Catalog Supplement* (UCUCS) represents the single largest library conversion project.[8] Keeping the cost down and accepting a relatively high error rate were two components of the project. In addition, the first effort at automatic field recognition (AFR) was made with UCUCS. All input was keyed directly from the catalog card rather than from some form of worksheet which included explicit tags and codes, the traditional method. The scope of the project was tremendous: 1.2 million cards were handled, or approximately 750,000 unique titles.

The New York Public Library attempted to create an automated bibliographical control system; in effect, this was an effort to have a computer system which would allow for the control functions associated traditionally with the official catalog. The net result is of great significance. For example, NYPL demonstrated and proved that sophisticated library filing rules can be observed by the computer in the creation of a catalog. (There apparently are those, and they are seemingly having their way, who advocate a wholesale departure from traditional filing rules to rules similar to those which IBM's machines observe.)[9] Of even greater importance is NYPL's solution to the age-old problem of authority control. Two of the salient features of the NYPL authority control system are: (1) any new term entering the file which does not match an existing term or cross-reference is automatically sent back to the cataloger for approval, thus eliminating the traditional search for establishing or verifying authority terms—all one deals with are the terms which do not match. The computer automatically takes care of the vast majority which matched existing terms or cross-references, while in a manual system a human being would have had to search each one individually; and (2) by the use of a single transaction, one can take all instances of a single term and transfer them to another term.[10] This technique solves the problem of manually having to change the term in every record in which it appears. It should be noted that Blackwell North America has developed a subject authority control system.

Several library agencies are served by each of the three kinds of catalog producers. (The New York Public Library consists of an eighty-three-branch system in addition to its several research libraries. In all probability there are many networks or consortia with fewer members.) The union catalog is the real foundation for networking, whether the catalog is used for cooperative acquisitions, shared cataloging, information retrieval, interlibrary loan, or other purposes. The book catalog in terms of economics

is the most practical to produce and use. No terminals or special viewers are required, little special staff training is required, no telephone lines are needed, and most importantly no huge data base need be kept on-line at great expense. (The diminishing costs of on-line data storage are beginning to weaken this latter point.) On the other hand, the book catalog is obsolete the moment the cutoff for a given edition is established, and the printing and binding time can be extensive, as well as having become increasingly more expensive.* Because of the cumulation process and the intrinsic obsolescence of the data, the reader is always forced to look in several places to complete a definitive search; and bad entries, entries representing withdrawn materials, and typographical errors must sometimes remain for as long as an entire year (or even longer) because of the reaccumulation process.

In addition, all of the book catalog systems discussed use the batch input process, which is much more time consuming and troublesome than on-line input and/or maintenance. Keeping track of the printouts and source documents is difficult under the best circumstances, and all too frequently the best circumstances do not prevail.†

Photocomposition or electronic composition has revolutionized book catalog printing. It is important to note that this process wherein the digital information is converted to graphic arts or letterpress quality images, via the computer and the cathode ray tube, allows much greater flexibility than the line printer. The research libraries particularly can go beyond the Roman language alphabets and the single font to which the ALA print chain, despite all of its flexibility, perforce limits them.‡ The Library of Congress (LC) and Xerox Bibliographics have used the photocomposition process to produce catalog cards.

In the near future, particularly as long as on-line storage and transmission costs are still significant, it seems that the book catalog will be a valuable complement to the on-line data base.

Special note should be taken, before closing this section, of the experience of Hennepin County Library (Minnesota) and Denver Public Library. The "how to automate without doing it yourself" theme pertains to

* The New York Public Library has been fortunate because its printer, Multiprint, Inc., New York City, has been able to keep costs relatively constant and may even lower them because of the introduction of special printing equipment and processes which were not previously used in catalog production.

† The Hennepin County Library for its shelflist conversion project was particularly vexed in trying to keep up with the flow of printouts and corrections for 100,000 entries. Special stack space had been set aside and a whole system of batch control had to be developed.

‡ The Research Libraries of The New York Public Library have recently published a book catalog containing vernacular Hebrew characters. All of these characters were computer generated and created on the Videocomp, a state-of-the-art photocomposition device. This illustrates the difference between the line-printer with its single alphabet limitation, and the photocomposition device which in principle can handle a multiplicity of alphabets and type fonts.

the efforts of both of these libraries to transfer The New York Public Library's system to their respective computers. The research and development were done by NYPL and the software was freely given to these respective libraries. Libraries might well note that each network need not do an unique and massive research and development effort. Software sharing and transfer should have a special role in networking. The Hennepin County Library converted its 80,000-title shelflist to the MARC format by use of the University of California's MARC format recognition and MARC maintenance programs. It then had these records processed through NYPL's authority control and book catalog production programs to produce Hennepin's book catalog. Although Hennepin has successfully completed the software transfer, the Denver Public Library discontinued the project.

Software sharing and transfer is not only possible, but is a practical approach to automated networking on a modest basis; the book catalog, because of its ease of dissemination (one can print many copies and distribute them anywhere), offers great opportunities for cooperation in acquisitions and collection development, cataloging, and interlibrary loan.

Note should also be taken of the University of Chicago's total data management system currently in the research and development stage. Its basic design criteria should be mentioned: the system will be both upward *and* downward transferable on IBM equipment; it is predicated on being usable by any kind of library, and, in principle, any number of libraries.

COMPUTER-BASED MICROFORMS

During the 1970s, microforms have come into their own in library service. With the advent of computer-output-microfilm (COM), microfilm is playing a new and most vital role in library service and library automation. COM is available as an invaluable tool for networks.

Although COM either in microfiche or microfilm reel format was available well before 1970, it has become more heavily used in libraries, first in the area of acquisitions (e.g., the in-process file approach at Yale and Michigan Universities, and the on-order history files at Hennepin County and Los Angeles Public libraries) and ever more in the area of cataloging. The aforementioned Information Dynamics Corporation's Micrographic Catalog Retrieval Systems (MCRS) uses COM-generated indices and COM-generated card images for Cataloging-In-Publication data all on microfiche.

Information Design Incorporated's (IDI) CARDSET system is a wholly MARC-based system which uses indices to MARC, CIP, and full LC cataloging records which are displayed in full cardsets, ready for photocopying. Unlike other systems which photographed the LC card, an expensive and time-consuming process, the whole process is controlled by the computer. Actually IDI's reel microfilm is produced by a more sophisticated photocomposition device rather than the typical device used by the various COM service bureaus whose machines have limited character sets and

lower-quality displays. Many libraries around the country are using COM catalogs for their patrons. Tulsa City–County Public Library (Oklahoma), El Centro Junior College (Dallas, Texas), Federal City College (Washington, D.C.), Tulsa Junior College (Oklahoma), the Georgia Institute of Technology, the University of Texas at Permian Basin are all examples of libraries using COM catalogs either in total or in part.

COM is important because it is the quickest and most economical means of disseminating multiple copies of reports, be they acquisitions, cataloging, or any other. It is not unusual for a COM service bureau to turn around an extensive report with multiple copies in appreciably less than one eight-hour shift. For example, a typical COM device (they are usually called cameras) will take the computer-generated reel of magnetic tape with its digital information and "set type" at the rate of 300–500 pages of printout per minute. One service bureau charges $1.80 per 207-page (or frame) four-by-six-inch microfiche master and $.09 per duplicate fiche. Reel microfilm, although more expensive per frame, is also quite economical.

One of the most simple yet valuable applications of COM is the Louisiana Numerical Register.[11] The Register is in effect a union catalog of library holdings symbols affixed to the LC card number for a given title. It avoids a number of bibliographical problems by simply relying on the LC card number. Of course, if one does not know the LC card number, the Register is useless.

A last advantage is that the film itself is virtually indestructible, and can be cheaply and quickly replaced.

The disadvantages of COM center around the microfilm medium itself. The display image tends to discourage use by individuals for extensive periods of time. It would be wonderful if the microfilm industry could in some way improve the traditional quality of display. The typical COM reduction is 42X, and experimentation is underway at reductions of 80X and greater. Three particular COM readers are library oriented.

IDI has developed the ROM III reader which is especially valuable for library use. A single reel of COM microfilm locks inside the reader, and all of the adjustment and controls are on the outside of the reader, thus enabling the library patron to access the data contained on the film without having to handle the film, as required with traditional readers. Because of the low cost of producing COM microfilm from a machine-readable data base, the availability of a relatively low-cost high-speed reader, and the ease of preparing fully cumulative and frequent updates on a single reel, we may see some major changes in public and technical service orientation. Science Press is now marketing microfilm book catalogs with the ROM III reader.

Autographics Corporation has recently announced the Library Catalog Reader (LCR) 500, a reader similar to the ROM III. It is noteworthy that Science Press and Autographics, two major commercial book catalog houses, have both committed themselves to microform catalogs. As print-

ing and paper costs continue to increase, the shift to microform products from paper will also increase. These two suppliers are a further manifestation of a trend already established.

Northwest Microfilm, Minneapolis, Minnesota, has a microfiche reader which incorporates the best features of several microfiche readers presently on the market. Because of the many microfiche standards ranging in reduction from 16X to 48X, it is comforting to know that there is finally available a low-cost microfiche reader which permits the simple interchangeability of lenses. This solves the problem of needing several readers, one for each significantly different reduction.

Networks, the various micropublishers and those national distributors of data which have not availed themselves of COM's potential can all use COM in a variety of ways, many of which are just beginning to be explored.

In the balance, it would seem that the ROM III and the LCR 500 type of readers has more potential for use by the public at this time. Rather than having to deal with quantities of microfiche, the user can just push a button to scan an entire file on a single COM reel locked inside the machine. However, the ability of these machines to stand up to the daily wear and tear of public use must still be demonstrated. In the balance, though, it is a bright spot in what has become an increasingly dismal cost picture in the hard-copy book catalog world. Unfortunately, the initial capitalization of microform equipment is a problem. It is especially difficult because the equipment is not much beyond the prototype stage.

CONCLUSION

To close, a bright picture is before us. Shortcomings notwithstanding, there is a full range of products which networks can use to deliver needed services. From on-line CRTs to catalog cards to book catalogs to COM catalogs, there are enough tools available for networks to utilize in meeting the catalog and cataloging needs of participating libraries. The larger issue is: what is needed by libraries to get them to recognize that through networking, interlibrary cooperation and the sharing of resources, they will be able to serve their various publics better and cure themselves of some of the age-old problems that they in principle cannot solve by themselves? The economic picture of today underscores the urgency of this question.

REFERENCES

1. *OCLC Newsletter*, no.98 (April 30, 1976). As of this date 2,138,750 catalog records were in the OCLC data base.
2. SPIRES/BALLOTS Project Staff, *System Scope for Library Automation and Generalized Information Storage and Retrieval at Stanford University* (Stanford, Calif. 1970). 157p. Also, "Stanford's BALLOTS Look to Network Operation," *Advanced Technology/Libraries* 2:3–4 (Feb. 1973).
3. *BALLOTS Newsletter* (Oct. 1975).

4. Maurice J. Freedman, "Cataloging Systems: 1973 Applications Status," in *Library Automation: The State of Art II* (Chicago: American Library Assn., 1975), p.65.
5. International Business Machine Corp., Data Processing Div., *Massachusetts Central Library Processing Service* (White Plains, N.Y.: IBM, 1973), 14p.
6. *OCLC Newsletter*, no.57 (Jan. 24, 1973).
7. Association of Research Libraries, *The Future of Card Catalogs* (Washington, D.C.: ARL, 1975).
8. University of California, Berkeley. Institute of Library Research. "Largest Computer Produced Book Catalog Completed by University of California." 4p. press release dated 20 Sept. 1974.
9. John C. Rather, "Filing Arrangement in the Library of Congress Catalogs," *Library Resources & Technical Services* 16:240–61 (Spring 1972).
10. S. Michael Malinconico and James A. Rizzolo, "The New York Public Library Automated Book Catalog Subsystem," *Journal of Library Automation* 6:3–36 (March 1973).
11. William McGrath and Donald Simon, "Regional Numerical Union Catalog on Computer Output Microfiche," *Journal of Library Automation* 5:217–29 (Dec. 1972).

HIGHLIGHTS OF ISAD BOARD MEETINGS

1976 Midwinter Meeting
Chicago, Illinois

First Session
Monday, January 19, 1976
10:00 a.m. to noon

The meeting was called to order by President Henriette Avram. The following were present: BOARD—Lawrence W. S. Auld, Henriette Avram, Gerald R. Brong, Judith Hopkins, Susan K. Martin, Joseph A. Rosenthal, and Ruth L. Tighe. ABSENT—Frederick G. Kilgour and Helen F. Schmierer. GUESTS—George L. Abbott, Kandy Brandt, Ruth Frame, and Lois M. Kershner. STAFF—Donald P. Hammer, Executive Secretary.

The meeting opened with a discussion of items for the agenda.

Henriette Avram asked to place on the agenda a request for time from the ISAD Bylaws and Organization Committee.

The agenda was then approved.

The minutes of the San Francisco Conference meetings were then approved.

BYLAWS AND ORGANIZATION COMMITTEE. Lois Kershner, representing the ISAD Bylaws and Organization Committee, asked the board for guidance in the committee's revision of the ISAD bylaws regarding the matter of sexual stereotype terminology. She stated that the committee would like to know if the board felt that the term "chairman" was stereotype terminology and should be changed to "chairperson" in the ISAD bylaws. If the board felt that that change should not be made, then the committee would like guidance on what approach to the matter it should take. After a discussion, a vote was taken by show of hands approving the change to "chairperson." One board member was opposed.

DIVISIONAL INTERESTS SPECIAL COMMITTEE (DISC). Mr. Hammer brought up the matter of ISAD representation to the Divisional Interests Special Committee. The board had not had time at its last meeting to decide on which member should be the representative to DISC and which members should have the power to vote.

Mr. Rosenthal suggested that the representation to DISC be flexible and

that the person who last attended a meeting and cannot attend the next one should notify others of that fact so that ISAD is represented at all of the DISC meetings.

MOTION. After discussion, Judith Hopkins made the motion that the hierarchy of representation be as follows:

1. Vice-President/President-Elect (who should be primary representative)
2. President
3. Executive Secretary

The order of voting should follow the order of representatives. SECONDED. CARRIED.

DIVISIONAL FINANCES–DUES SCHEDULE TRANSITIONAL GUIDELINES, COUNCIL DOCUMENT NO. 27. Ruth Frame, deputy executive director of ALA, was present to answer questions and provide information regarding the new structure of divisional finances.

DIVISIONAL INTERESTS SPECIAL COMMITTEE (DISC). The meeting then returned to the discussion of DISC, and Mr. Hammer reviewed the discussions that took place at the previous day's DISC meeting.

DISC asked the divisional boards to consider three questions:

1. Should seminars, institutes, and preconferences be considered a potential source for generating substantial surplus funds for the divisions?
2. Should institutes, etc., be self-supporting? and
3. Should the divisional boards approve the ALA indirect administrative charge of 2 percent that ALA will assess against those seminars, institutes, and preconferences which are sponsored, but not managed by ALA or any of its divisions?

A discussion followed on these points and culminated in agreement that Don Hammer would write a statement based on the discussion for later board consideration.

CONFERENCE PROGRAMS FUNDS. A discussion took place on the use of the $550 made available by ALA to each division for Annual Conference program costs. The funds are to be allocated to the various units within each division that have planned a program.

The matter of the Special Allocation Program Funds made available by ALA to the various units and administered by the ALA Conference Program Committee, Members at Large, was also discussed.

MOTION. Mr. Rosenthal moved that the Executive Secretary be charged with the ongoing task of informing the Program Planning Committee of ISAD about available funds from ALA for conference expenditures and that the Program Planning Committee be made the responsible coordinating body for recommending to the ISAD Board of Directors the disbursal of these funds. SECONDED. CARRIED.

Meeting adjourned.

Second Meeting
Tuesday, January 20, 1976
8:00 a.m. to Noon

The following were present: BOARD—Henriette Avram (President), Lawrence W. S. Auld, Gerald R. Brong, Roberto S. Esteves, Judith Hopkins, Susan K. Martin, Joseph A. Rosenthal, Helen F. Schmierer, and Ruth L. Tighe. ABSENT—Frederick Kilgour. GUESTS—George L. Abbott, Kandy Brandt, Mitch Freedman, Howard Harris, Stephen Silberstein, Charles Stevens, and Alphonse Trezza. STAFF—Donald P. Hammer, Executive Secretary.

REPORT OF THE REPRESENTATIVE TO THE LEGISLATIVE ASSEMBLY—Charles Stevens. Mr. Stevens reported that among other things, the ALA Legislative Assembly has discussed the Library Services and Construction Act. Shall there be funding? What should be in the Copyright Act and how will we handle the problems of systematic photocopying? What shall we do about the urban libraries' proposal to have the distribution of funds made largely to the urban libraries and not so much through other libraries? These are some of the key issues.

An issue on which the ISAD board should vote is the endorsement of the Legislative Committee's efforts, working with other organizations, to get before Congress a bill that says that communities smaller than a town or city that do not have certain kinds of social services involving information should be able to put together a three-to-five-year demonstration project to fill in education and information blanks in that community, and be able to apply for funds.

MOTION. Larry Auld moved that the ISAD Board support the activities of the ALA Legislative Committee in principle. SECONDED. CARRIED.

MEMBERSHIP RECRUITMENT TASK FORCE—Ruth Tighe.

Report previously distributed.

Discussion hinged about the feeling that the reason we are trying to build up our membership is not clear and that recruitment and membership efforts, on the one hand, scarcely touch services and programs on the other.

It was agreed that becoming a member of ALA and ISAD should be facilitated. Discussion followed on the failure of *American Libraries* to carry a membership application. Mention was made of possible problems and additional costs involved with postal regulations if a tear-out sheet were included in *AL*.

The suggestion was made by George Abbott to advertise in A-V and video publications. AECT's publications and *Booklist* were mentioned.

Lengthy discussion followed, including a brief report from the A-V Section and VCCS representatives on their plans for recruitment.

MOTION. The motion was made that Susan Martin be authorized to spend up to $750 on various activities such as inserting flyers in *JOLA*,

trading space or placing ads in appropriate journals, or whatever other efforts toward publicizing ISAD and recruiting members she may think appropriate and that she do this in consultation with the board as she feels necessary, and that she work with the two sections, VCCS and the A-V Section. SECONDED. CARRIED.

The discussion on recruitment continued in regard to an advertising brochure, and Ms. Avram asked Mr. Hammer to send a copy of the presently used brochure to each board member for their perusal, with comments to be sent by the end of February to Ms. Tighe.

BUDGET 1976–77. General discussion took place about the budget with primary interest in the ANSI X-3 and X-4 representatives. Funds for travel have been provided for the X-3 representative, but, since the X-4 representation is rather new, no provision had been made for travel in the 1975–76 budget.

MOTION. It was moved by Mr. Rosenthal that the Board authorize an expenditure of up to $300 per ANSI Committee for the 1975–76 budget year. SECONDED. CARRIED.

MOTION. Mr. Rosenthal then moved that the Board insert as a line item in the next fiscal year's budget the amount of $300 to pay the travel costs of the X-4 representative. SECONDED. CARRIED.

Roberto Esteves reported that VCCS was requesting for the 1976–77 budget the following amounts:

Postage	$130.00
Photocopy	25.00
Telephone	120.00
Publicity Materials	75.00
	$350.00

George Abbott requested for the A-V Section $400 for the 1976–77 budget.

MOTION. Mr. Rosenthal moved that $400 be provided in the next year's budget for the A-V Section. SECONDED. CARRIED.

Ms. Avram suggested that a general item be added to the 1976–77 budget of $300 for the use of the various ISAD representatives to cover their expenses.

MOTION. Mr. Rosenthal made a motion accordingly, but raised the amount to $600.* SECONDED. CARRIED.

INDUSTRY-LIBRARY RELATIONS COMMITTEE REPORT—James Dodson. James Dodson, chairperson of the Industry-Library Relations Committee, reported on his efforts to appoint committee members.

* In a later action by telephone and mail vote, the board agreed to eliminate the amount of $600 from the 1976–77 budget because of budgeting difficulties. The approval of the concept of a fund to pay ISAD representatives' expenses was retained for future use.

He would like to have some industry representatives on the committee, but has found that not many industry people are members of ISAD.

The committee is preparing a news release on the nature of the committee.

The committee is also interested in having a forum-type meeting at the Annual Conference in July to discuss some of the problems that could be identified between industry and the library. Since the deadline is past for scheduling meetings at the July conference, Mr. Dodson stated that they have not been able to schedule the meeting. The board recommended that the committee work with the ISAD Program Planning Committee in an attempt to schedule the meeting.

The committee proposed that a clearinghouse be set up to make material from vendors available. The committee expressed concern that the ISAD office may not be able to handle the work involved. A discussion followed on the value and use of such a collection and whether or not the information was already available in various directories.

MOTION. Mr. Auld moved that the clearinghouse be approved and that the Board reexamine the activity after a year's operation. SECONDED. CARRIED.

Mr. Dodson then discussed the committee's interest in functioning as a liaison group between libraries and industry when there are problems involving advertising or misrepresentation of products, etc., and to make sure that communications exist so that the correct information is transmitted.

The board recommended that the news release be written with the liaison function included. Mr. Hammer should seek advice from ALA legal counsel and then return to the board for review either in July or by mail.

BYLAWS AND ORGANIZATION COMMITTEE REPORT—Helen Schmierer. The major activity of the committee has been to go through the divisional bylaws and the sectional bylaws to remove all terminology that perpetuates sexual stereotypes. This work was completed and the committee was now seeking approval of the Board.

MOTION. Helen Schmierer moved the acceptance of pages one through four of a document called the "ISAD Bylaws, Changes to Remove Terminology Perpetuating Sexual Stereotypes." CARRIED.

Ms. Schmierer discussed the publication of the Audio-Visual Section's bylaws that have now been approved by the A-V Section Executive Committee.

MOTION. She moved approval of the document called, "A-V Section Bylaws, Redraft Pages 1 to 3, Changes to Remove Terminology Perpetuating Sexual Stereotypes." CARRIED.

All of the sexual stereotype terms have also been removed from the Video and Cable Communications Section bylaws. A long discussion took place on the problem of publishing all of these bylaws in *JOLA* and es-

pecially on the matter of previous approval of the VCCS bylaws by its membership with the stipulation that the stereotype terminology be removed later. The discussion centered on the problem of whether or not the VCCS membership had to reapprove the revised bylaws now that the stereotype terminology had been eliminated. The Bylaws Committee felt that a new vote should be held in case they failed to remove all of the stereotype language or in case they made some other error while making the changes. Mr. Rosenthal commented that if that had happened, it would only require the publication in *JOLA* and balloting on that item. Therefore, he felt that in view of the fact that the VCCS membership passed the bylaws with the stipulation that the sexist terminology be removed later, there was no need to have them vote again.

Kandy Brandt stated that at the VCCS membership meeting it was understood that the situation was unusual in that bylaws were being passed for the first time and now that both sections have bylaws, any future changes will have to follow the usual route of bylaws committees, etc.

Ms. Schmierer then discussed the new function statement for the Technical Standards Committee. One of the points raised by TESLA was whether or not its function should now be broadened to include standards for audiovisual and video. The ISAD Bylaws Committee recommended that TESLA's charge remain that of standards of library automation only on the grounds that probably the A-V Section and VCCS will later establish a standards committee in their respective sections.

Ms. Avram suggested that a review should be made of the whole division in terms of the existing new sections, but also of other existing groups like the Telecommunications Committee. She also suggested that the board should discuss this matter of the organizational impact of all units in ISAD at the coming Annual Conference in Chicago. Mr. Rosenthal asked Ms. Schmierer if the Bylaws and Organization Committee could study this whole area and report back to the board in about a year. Ms. Schmierer stated that the committee had already discussed these problems at great length, and she felt she could report back by the Annual Conference.

Henriette Avram then summarized by saying that the board should take no action now on the TESLA function statement but that the board should review TESLA in terms of the Sections and the Telecommunications Committee and that the Bylaws and Organization Committee should report on the organizational problems in July. Ruth Tighe suggested that since Mr. Rosenthal called for a year for the review the report in July could be a preliminary one.

Taken by consensus.

The discussion then moved on to the matter of including one representative from each section on the Bylaws Committee.

MOTION. Ms. Schmierer made the motion that the Bylaws and Organization Committee be composed of five members including at least one representative from each ISAD Section. SECONDED. CARRIED.

Ms. Schmierer asked that section representatives be appointed immediately. Mr. Rosenthal, as ISAD vice-president–president-elect, agreed.

The chairperson of the Bylaws Committee then stated that the committee has noted that there are a number of groups in other divisions and sections of ALA concerned with some phase of audiovisual activities. The committee will begin the work of identifying these committees and their functions and see if the functions of these committees are appropriate for the A-V Section of ISAD, or if they are concerned with things that only relate to their own divisions. If units are found that are carrying out activities appropriate to ISAD, the board should then make recommendations to ALA/COO.

On behalf of the board, Ms. Avram gave Helen Schmierer a vote of thanks.

ALA PLANNING COMMITTEE PROJECT—Don Hammer. Mr. Hammer presented the minutes of the ALA Planning Committee document and chart that the Planning Committee is asking all the divisions to complete by May 15, 1976. Briefly, it includes a chart on which all of the plans of the division are to be correlated with the ALA objectives. The purpose is to enable the divisions and the Planning Committee to study the activities of the various ALA units in relation to ALA objectives. Some of the board members objected to the project and stated that they felt it was an unwarranted intrusion on the staff of ISAD and on the people that participate in ISAD activities. It was pointed out that the executive secretary is trying to handle two divisions and the board and others are giving their services voluntarily. Mr. Hammer then stated that independent of the previously discussed ALA planning project, he felt that ISAD should establish a planning and budget committee that would be concerned with long-range planning of divisional activities. He stated that this was particularly important now that the divisions are more or less autonomous and now that ISAD has established two new sections.

Ms. Avram stated that some of these ideas would be considered by Helen Schmierer's committee.

MOTION. Mr. Rosenthal then moved that the board refer the question of establishing a planning committee to the Bylaws and Organization Committee and, in the interim, the president, the past-president, and the vice-president–president-elect work with the executive secretary as a planning and budgeting committee. SECONDED. CARRIED.

CONFERENCE ON ISAD'S ROLE IN THE NATIONAL PLAN FOR LIBRARIES—A. Trezza. Alphonse Trezza then spoke on ISAD's role in NCLIS. Joseph Becker, during his speech in San Francisco at the ISAD program, stated that the National Commission would fund a meeting of ISAD representatives to discuss ISAD's role in the national plan.

Mr. Trezza said that the commission had in mind a meeting of eight or nine people and the discussions should reflect the interests of the field and should end in specific action-oriented recommendations. The commission is now finishing a study on the place of LC in the national program and

how its role can be implemented. The proposed meeting should determine where ISAD's expertise can be brought to bear in the national program. Henriette Avram asked the board to decide if this is a viable project, to discuss the concepts, and to determine the best approach to it. It was suggested that in some areas of interest, the National Bureau of Standards and the American National Standards Institute could be involved.

MOTION. Ruth Tighe then made a motion to endorse the principle that ISAD work with NCLIS in needed areas. SECONDED. CARRIED.

PROGRAM PLANNING COMMITTEE REPORT—Mitch Freedman. The committee met with VCCS representatives in order to discuss a preconference institute on video. The committee wants all aspects of ISAD to be represented in the process of planning programs and institutes, and they intend to meet with the A-V Section later. Mr. Freedman stated that the Bylaws and Organization Committee should examine the matter of expanding the Program Planning Committee by inclusion of one member from each of the two sections.

In the hope of providing a program on automation for the younger members of the profession who cannot get to the ISAD institutes, the committee and the Junior Members Round Table will cosponsor a program at the Annual Conference in July. The program will be an introduction to automation, and the committee is hoping that the ISAD A-V Section will help with visuals.

Another program will be with RASD and will be on information retrieval data base services and automation and the reference function.

George Abbott then spoke about the A-V Section's program plans for the Chicago Annual Conference. Two programs are scheduled: one, intended for the general attendee, will be "A-V Past, Present and Future," on A-V in libraries and what the future is; the second session will be on "Data Bases in the Non-print Media Field."

Mr. Freedman then announced that the proceedings of the ISAD institute on "The Catalog" will be published by ISAD. ALA Publishing Services will definitely not do it, as an agreement has been made that ISAD will handle it.

Mr. Hammer announced that in a DISC meeting at headquarters, at which the ALA administration was present, it was established that the divisions have the right, since they determine the registration fees for institutes and preconferences, to set multilevel registration fees, i.e., a fee for the members of the sponsoring division, a higher fee for ALA members who are not members of the division, and a third fee for nonmembers of ALA. He asked the board for permission to implement this policy, but no action was taken.

Kandy Brandt asked about funds for VCCS conference programs and was told to submit VCCS' needs in writing. She also asked when requests for 1977 preconference had to be turned in and was told the decision would be made by an ALA committee during the Chicago Annual Conference on which units would be allowed to have a preconference in 1977.

DISCUSSION GROUP MERGER.—Sue Martin stated that there had been little discussion and no opposition to the proposal to combine the Library Automation Discussion Group and the MARC Users Discussion Group. She then recommended that the board approve the merger.

Ms. Avram suggested that the board hold action on this item until Mrs. Martin and Brett Butler, the other discussion group chairperson, have considered the possible problem of communication between MARBI and MUDG. MARBI requests opinions on proposed MARC changes from MUDG and disseminates information through MUDG. A problem may be created if they are merged. Mrs. Martin will discuss the matter with others and return at the Chicago Annual Conference.

JOLA ADVERTISING.—Sue Martin then discussed the low quantity of advertising in *JOLA*. She described an editorial that will appear in the March issue of *JOLA* that discusses the problem of advertising and also ISAD's relationship to ALA. The budget figures show that ALA Advertising Services anticipated a gross in advertising in 1975–76 of $3,300 which is by far the lowest of any of the journals. Out of that is taken such things as advertising commissions, publishing services charges, discounts, etc. Almost $2,300 is taken out, and so ISAD ends up with about $1,000. The income from advertising then is very low and the low-key approach ALA takes to acquiring advertising is one of the reasons for it. The idea of taking *JOLA* advertising out of headquarters' hands is being considered as one solution.

Mr. Hammer suggested that the situation might improve when *JOLA* begins to publish material in the areas of A-V and video. Ms. Martin stated that she has informed Advertising Services of the change within ISAD. She gives them lists of possible advertisers, and frequently talks to advertisers, but the leads are very rarely followed up.

Mr. Abbott commented that the new sections are just getting geared up, and a year from now there probably will be articles forthcoming and then the advertising may pick up.

Mr. Hammer asked who would handle the advertising if it were removed from ALA. Sue Martin responded that she would try to find a member who would serve as the "advertising editor," just as she has a book review editor.

No action was required of the board, but the board suggested that she continue to explore the area.

ISAD MEMBERSHIP SURVEY REPORT.—Don Hammer reported on the board mail vote regarding the publication of a summary of the 1973 Membership Survey Report. The board voted four yes, three no, and one conditional vote which could be considered a vote either way. He wanted guidance on the matter from the board. The board decided that Mr. Hammer should inform Sue Martin that if someone would write a brief summary, it could be published.

DISC STATEMENTS FOR ACTION.—Don Hammer brought up the

matter of the three points DISC asked each of the divisional boards to discuss and vote on during their meetings. He brought the matter to the board before at this conference and now was submitting a written statement based on their previous discussions for final consideration. The board then approved a revised statement as attached to these minutes.

The meeting adjourned after agreement was reached to meet in a special session to discuss the National Commission proposal for a meeting of ISAD representatives.

Meeting adjourned.

Third Meeting
Wednesday, January 21, 1976
2:00-4:00 p.m.

The following were present: BOARD—Henriette Avram, Judith Hopkins, Susan Martin, Joseph Rosenthal, Helen Schmierer, and Ruth Tighe. GUESTS—John Aubry, RTSD Representative to ISAD. STAFF—Donald P. Hammer.

The board discussed the possible representation of various interested organizations at the NCLIS-sponsored meeting to determine the role of these organizations in the national plan for libraries. In addition to ISAD, the possibility of Z-39, ASIS, and the NBS being included was discussed.

Additionally, areas in which it was believed ISAD could be most effective were discussed. The board favored a limited number of areas, probably primarily technical aspects, with a strong interest in standards.

As an additional item briefly discussed, Ms. Martin expressed the concern of the ISAD Editorial Board in the matter of a name change for *JOLA*. The Editorial Board was not against such a change, but felt it should be done at the same time the division's name is changed.

No objection was made by any board members.

Meeting adjourned.

EXHIBIT 1

ISAD EDITORIAL BOARD REPORT

1. Problem of the increasing quantity of manuscripts was discussed. Suggestion was that reviewers be reminded of criteria for acceptance, and encouraged to be somewhat more stringent in application of criteria.

2. Role of two new ISAD sections. Concern was voiced that *JOLA* does not publish material on AV or VC and is too difficult to get into. Editor's response was that Technical Communications has included items on AV and VC for quite a while, and that last year there was verbal communication with VCCS encouraging submission of manuscripts. No manuscripts have been received. Editor will communicate formally with the sections to invite papers.

3. New format of Technical Communications was discussed and approved.

4. Problem of low level of advertising was discussed. Editorial Board supported the editor's recommendation that we explore the removal of *JOLA* advertising from ALA

management, replacing it with a volunteer "advertising editor." Preliminary conversations indicate that this may be possible.

5. Cover color for 1976 volume will be pastel yellow.

6. Editorial Board endorsed the policy of including a brief summary (3–4 pages) of all ISAD institutes in Technical Communications, and recommended that some priority be given to the full papers presented at these institutes.

Susan Martin
Chairperson

EXHIBIT 2

INDUSTRY/LIBRARY RELATIONS COMMITTEE REPORT

1. Passed a motion requesting that the chairperson prepare a news release that would be distributed widely announcing the formation of the committee, indicating its purpose, and requesting suggestions for specific areas of action or concern.

2. Passed a motion requesting that the chairperson select one more representative from industry as a committee member since there was only one industry representative currently.

3. Passed a motion to have a forum at the Annual Conference to discuss general or specific activities of the committee suggested by industry and libraries as the result of the news release.

4. Passed a motion to set up a clearinghouse in the office of the ISAD executive secretary to (a) provide information from literature provided by vendors on products, services, and supplies of interest to ISAD members; (b) provide the unsolicited reactions of librarians to similar products, services, and supplies.

James T. Dodson
Chairperson

EXHIBIT 3

STATEMENT OF THE ISAD BOARD OF DIRECTORS REGARDING ALA COUNCIL DOCUMENT 27

(Section on Seminars, Institutes and Preconferences)

In accordance with the request of the Divisional Interests Special Committee (DISC), the ISAD Board of Directors is submitting the following statements regarding ALA Council Document 27, concerning the section on Seminars, Institutes and Preconferences.

1. The ISAD Board of Directors strongly recommends that seminars, institutes and preconferences *should be* considered potential sources for generating substantial surplus funds for the divisions. The ISAD Board believes that the divisions should be entitled to determine what activities should be considered as revenue raising events since the divisions are now considered responsible for their own financial affairs.

2. The ISAD Board of Directors approves the concept that a division's total program of seminars, institutes, preconferences and like activities be self-supporting within the context of the overall division budget.

3. The ISAD Board of Directors has no objections to the ALA indirect administrative charge of 2% of total costs, excluding meal functions, that ALA will assess against those seminars, institutes, and preconferences which are sponsored, but not managed, by ALA or any of its divisions.

Technical Communications

Protocol for Computer-to-Computer Communication

The ALA/ISAD Telecommunications Committee has deliberated for several sessions on means to facilitate communication of library information to and from users of interactive terminals that connect one computer system with another computer system without requiring the use of multiple terminals and/or user protocols. This may be achieved most economically in an on-line environment in which the computers serving groups of users are themselves connected via telecommunication links. One step toward fulfilling the overall requirement is the establishment of a protocol for interaction among several such main computers for bidirectional data transmission. Since common carriers provide only the means of transmitting bits from one machine to another and not data processing of messages relating to the internal requirements of a user community, this burden falls on the users themselves.

Several protocols exist or have been proposed for controlling transmission facilities (data links) for the express purpose of delivering an arbitrary stream of bits from one computer to another. Each such protocol provides a framework into which one may place any data bit pattern (up to a maximum length) of one's choice. The committee envisions the placement of control and data information of use to library "networks of networks" in this location within such a data link control protocol.

The data section is to contain information requested by a user or to cause a computer system to perform some action for a user, e.g., a bibliographic record, a purchase order, an interlibrary loan request, etc. The format for such information and the code by which characters (or other data) are represented are to be provided *in toto* by standards or conventions by user communities; hence, the committee will not compile formats or codes for the data section. One instance envisioned is transmission of bibliographic information in the ANSI format for the interchange of Bibliographic Data on Magnetic Tape (ANSI Z39.2-1971) as implemented in Library of Congress MARC distribution format.

Preceding the data will be a section devoted to system control functions. The Telecommunications Committee has identified three groups of control elements as necessary for interaction of library-related computer systems. The groups are: (1) routing control, (2) target facility action control, and (3) billing control.

Within each of these groups the committee has identified several elements, some of which interact with each other to specify a particular action or condition.

It is envisioned that the various computers involved in such an overall system shall be so connected that a message which originates at a terminal connected to any facility may be forwarded to any other for delivery to another terminal, for interaction with a data base, or to initiate some other action. The minimum-cost topology with redundancy which achieves this end is a "ring" network among the facilities. Networks of higher connectivity may, of course, be employed.

It is envisioned that the parties involved in such an arrangement shall establish conventions by contractual arrangement, such as charge rates for services performed, message routing algorithms, network supervision, and the like. It is also recognized that the parties to such a system will necessarily support and maintain a registry system for the identification of types of formats, codes, etc. In such a registry system, for example, a type of record data designation of "4"

might be assigned to Library of Congress MARC records.

The committee believes that it has identified sufficient control elements to accommodate foreseeable requirements in computer-to-computer transmission of library-related data, be it textual or not, and has described a framework within which such transmission may be undertaken. It has yet to undertake detailed specifications of the content, encoding schemes or formats for these elements. These tasks will be addressed in future meetings. At this point the committee solicits commentary on the identified control elements described below and suggestions for additional control elements and the motivation for their inclusion.

Please direct such comments in writing to: Philip L. Long, Chairman, ISAD Telecommunications Committee, Philip Long Associates, Inc., 3861 Havenwood Place, Alexandria, VA 22309.

Persons who wish to present comments directly to the committee are requested to attend the first meeting of the ISAD Telecommunications Committee at the ALA Annual Conference in Chicago and to bring twelve copies of their comments for distribution at that time to committee members.

The control elements, their contemplated use, and hypothetical examples of usage, organized by group, follow:

Group I—Routing Control

1. Source Computer Facility Identification—It is contemplated that this item shall be used to identify the host facility from which a message originates. In the event that a reply to such a message is in order *and* no Reply Delivery Address is included in the message, these data shall form all or part of the function of that item. Note that this item is associated with an entire facility.

This item may be used in conjunction with Originating Terminal/Device Identification to provide specific identification within a system of interconnected computers of a particular user terminal.

2. Originating Terminal/Device Identification—It is contemplated that this item shall be used to uniquely identify the user terminal or other device which caused a message to be transmitted from the host facility to which it is connected onward to another facility.

This item, if present, is subordinated to Source Computer Facility Identification. One instance in which this item would not be present is that which would arise should a facility be transmitting a batch of purchase orders to a vendor's facility.

3. Destination Computer Facility Identification—It is contemplated that this item shall be used to identify the host facility to which a message is ultimately destined. Note that the message may be passed through a number of facilities located (with reference to data links) between the source and destination facilities. In such cases, intermediate facilities make note of the passage of the message (see Station Signature), and then simply forward the message to the next nearest facility.

This item may be used in conjunction with Target Terminal or Terminal/Device Group Identification to provide specific identification of a terminal or of any of a group of terminals within the target facility. The capability provided by this item permits, for example, transmission of an interlibrary loan request from a terminal connected to one computer system to the first available interlibrary loan terminal (say there are three) located in an institution whose terminals are connected to another computer.

4. Target Terminal or Terminal/Device Group Identification—It is contemplated that this item shall be used to identify either a specific terminal device or to indicate that any of a prespecified group of terminal devices (or all terminal devices in such a group) within a target facility is to be the recipient of a message.

This item, if present, is subordinated to Destination Computer Facility Identification. Its use permits the originator of the message pinpoint control of the destination, broadcasting of messages, or any required shade of accuracy between these two extremes.

5. Reply Delivery Address—It is contemplated that this item shall be used to

specify the location to which reply data resulting from a message are to be directed in cases where such reply data are not to be sent to the point of message origination.

Examples of use of this control element include (but are certainly not limited to) providing drop shipping addresses for book ordering, specifying an off-line printing facility and subsequent mailing address for use in data base search systems which employ slow (thirty characters per second or less) terminals or terminals which have no hard-copy capability or attachment.

6. Station Signature—It is contemplated that this item shall be used in order to permit a computer facility to indicate that a given message or message segment has been processed by that facility and then forwarded to another such facility.

The information contained by this item is intended to preclude the possibility of redundant message processing.

Such processing might, for example, entail search for a particular record or document in a data base, followed by forwarding of the query to another facility should the requested data not be present at the given processing facility. This capability permits construction of auto-forward broadcast multidata base search systems. A more frequent use of this item would be to indicate that a message ultimately destined for another facility has been passed along by a given facility.

Aside from efficiencies to be realized through nonredundant processing of the messages being placed "on a network," such a capability is seen to be necessary to preclude the possibility of a message looping forever on a network, never being delivered to the destination facility. This possibility arises any time a network of data paths is configured such that it is possible for a message (always proceeding in a "forward" direction) to pass more than once through a given point on the way to its destination. Such network configurations will undoubtedly be eventually employed around high density traffic facilities to alleviate transmission delays due to "bottlenecking."

Group II—Target Facility Action Control

1. Message Type—It is contemplated that this item shall be used to indicate to the receiver(s) of a message the general nature of the message.

The content of this control element would specify whether:

a. the message is directed to a single receiving device (direct transmission)
b. the message is directed to all receiving devices, perhaps as a class of devices, within a target facility (broadcast transmission)
c. the message function is network control, query, reply, etc.
d. the message transaction is bidirectional or unidirectional

Within a message, (a) and (b) are mutually exclusive, while (c) and (d) are independent of each other and of (a)/(b).

By the term "bidirectional" the committee means to indicate that a message is logically half of a "conversation," consisting of a request message and a reply message. Both the request or query message and the reply message are considered to be classed as bidirectional in nature.

By the term "unidirectional" the committee means to indicate that a message is transmitted to another target facility without specific solicitation, and that no reply message (at the application program level) is expected. Unidirectional transmission would occur, for example, in case of transmission of a file of purchase order records or a file of bibliographic records.

2. Transaction Type—It is contemplated that this item shall be used to indicate the purpose for which a message was originated, e.g. search, interlibrary loan request, posting, record update, etc.

Transaction Type is envisioned to be used in conjunction with Message Type to completely specify the nature and purpose of a message, one such case being to indicate that a given message is the reply to a search query that was broadcast by the originator.

3. Type of Data Format—It is contemplated that this item shall be used to specify the format of the data information

contained in the Data Section of the message. Formats for the Data Section are those agreed upon by a user interest community and on file at the network-of-networks registry office, where designators for each such format are assigned and where supporting documentation for each format is placed on file for access (to be used for example by network systems programmers), and where updates on such format support documentation are sent from time to time by the parties in each user community responsible for format/content/code standardization.

It is expected that such formats, when not already in existence, shall be developed as need arises by groups recognized as experts by the profession. One widely recognized format which the committee expects to be adopted (as is) for use in this context is the Library of Congress MARC implementation for transmission of bibliographic data; this implementation is not only widely used but is also in conformance with ANSI Standard Z39.2-1971.

4. Type of Data Code—It is contemplated that this item shall be used to specify the code in which data information contained in the Data Section of the message is represented.

This item is subject to the same registry system alluded to in the immediately previous item. One such widely recognized code is that for binary representation of character data used by the Library of Congress MARC Distribution Service; this code is a superset of the ANSI ASCII code set.

5. Target Data File Identification—It is contemplated that this item shall be used to identify to the target facility computer system what file the user wishes to be accessed.

Examples of different files that might be selected via this item are on-line order file, technical processing in process file, cataloged works file, etc. It is expected that designators for such file which are universally recognized, at minimum within a group of interconnected computer systems, will be developed; each host facility can then relate the universal file designators by tables to its internal designation or name for the specified file.

6. Password—It is contemplated that this item shall be used to accommodate data access security restrictions of individual host computer facilities.

This would permit those facilities to offer differing services to a diverse set of users, depending on various contractual and/or statutory restrictions.

Password may be used in conjunction with Message Type, Transaction Type, and Target Data File Identification to provide the capability at the target computer facility to maintain restrictive security and privacy of data as required.

Group III—Billing Control

1. Date and Time of Transmission Stamp—It is contemplated that this item shall be used to identify a particular message or cluster of transmissions of message segments in chronological sequence with other messages.

This item may be used in conjunction with Priority of Message and/or with Interactive Session Number to provide means to evaluate the value of cost elements which are deemed by a host computer facility to be time- and/or precedence-of-service sensitive.

2. Segment Identification—It is contemplated that this item shall be used to provide the capability to transmit messages in part.

Such a capability would be mandatory in a network configuration in which the size of a message could exceed the maximum permitted for a message as defined by the bit-oriented lower-level data link control protocol being employed. Long abstracts or bibliographic records with copious content notes are likely candidates to cause such a situation.

3. Account Number—It is contemplated that this element shall be used to designate the entity to which invoices for services rendered are to be directed.

It is envisioned that this item, as subsequently described in additional deliberations of the committee, must be hierarchic in nature.

4. Interactive Session Number—It is contemplated that this item shall be used to identify a cluster of messages which,

when taken as a whole, constitute a single entity for billing purposes.

The source facility shall be responsible for assigning a value to this item, to be held constant over the span of messages which constitute the cluster. This responsibility devolves to the source facility, since it may be impossible to derive such information by context at the target facility. The source facility programs must be designed to provide this item based on information supplied by each target facility at the time an agreement to provide service is reached; the definition of what constitutes a billable cluster will vary from time to time.

5. *Priority of Message*—It is contemplated that this item shall be used to instruct the target computer facility that action taken as a consequence of receipt of a message is to be initiated faster or slower than other transactions.

Conceptually this item represents the user's level of willingness to pay additional amounts for preferential treatment of a request. This item may be used in conjunction with Account Number, Date and Time of Transmission Stamp, and with the actual time of day at the target facility, both to determine the billing rate for services performed and to schedule the initiation of processing called for by receipt of a message.

ISAD/LC Institute on Processing and Automation

A capacity audience crowded into the Old Town Holiday Inn, Alexandria, Virginia, March 11, 1976, as Henriette D. Avram, in her dual role as president of ISAD/ALA and special assistant to the Librarian of Congress for Network Planning welcomed attendees to the joint ISAD/LC Institute on Processing and Automation at the Library of Congress. By conference end, it was clear that the attendees, as well as the 200 applicants turned away from the popular institute, want more such meetings.

William J. Welsh, newly appointed Deputy Librarian of Congress, formerly director of the Processing Department, highlighted what were to become the institute themes: (1) LC is "going to play a role in the development of networks; we want to reach each and every library in the U.S. through networks"; (2) the LC card catalogs will be closed; (3) the concept of decentralized input and the concomitant concept of standardization will be pushed; (4) LC is taking seriously its "prime responsibility to inform" and plans to expand its educational efforts.

Welsh was followed by an impressive lineup of Processing Department speakers who built up a definite impression of size and complexity, of change and development, within LC. The value of the well-executed preconference tours in visually confirming LC's enormous scale must be noted.

Edmund L. Applebaum, now director of the Administrative Department, formerly associate director of the Processing Department, began with an overview of the Processing Department.

Following the departmental overview, Applebaum discussed acquisitions and overseas operations, the magnitude of whose operation was made immediately clear by the statement that the 7.8 million items received annually are equal to one item each second of each working day. His overview of the various means by which LC acquires material was essential groundwork for later discussion of the Process Information File.

In summary, Applebaum stated that LC cannot be *the* acquisition and cataloging institution for the country; it is physically impossible and logically should not be necessary. The first step is the establishment of standards and their acceptance and use by libraries; the second step is decentralization of responsibility.

Joseph H. Howard, formerly assistant director for cataloging, now director of the Processing Department, followed with "An Overview of Cataloging—Cooperative Cataloging in an On-line Environment." Howard began by defining descriptive and subject cataloging, and carefully spelling out three elements of descriptive cataloging: choice of entry, form of entry, and description. He then sketched the history of cooperative cataloging.

In the Cooperative Cataloging Project,

which ended in 1967, libraries in the "real world" sent cataloging to LC; LC revised heavily and communicated changes. The cost of the project was so great that LC agreed to expand its cataloging coverage and dropped the "cooperative" effort. In contrast, the present Shared Cataloging Program, under which LC accepts *description* from certain other national bibliographies, is a major step in genuine cooperation.

In looking to the future, Howard stated the important thing about *form of entry*, and central to the quality control issue, is access to the name authority file. The key step is, therefore, development of a machine-readable data base for name authority. If such is available, it then becomes possible to accept the *form of entry* from other users of the file.

Worth noting for the public libraries: in response to a question, Howard commented that shared cataloging need not be restricted to research libraries. The significant factors are the size of a library's collection and the standards followed in cataloging.

Robert R. Holmes, assistant director for processing services, gave "An Overview of Processing Projects and Services—The Problems of Automation." Holmes' description of catalog management was, in his view, obvious justification for closing the catalogs: there are two major catalogs (official and public), plus special catalogs. The catalogs contained 45 million cards in 1975. In 1976, 3.5 million cards were filed. One hundred employees are required. If a 1980 catalog closing is assumed *(no date was officially announced)*, between March 11, 1976, and 1980, 13.2 million cards will be prepared and filed.

Other items can be singled out, illustrating the tremendous movement at LC: (1) Outside reports for the NUC and RAL are being searched on-line in Catalog Publication. (2) Preparation of the RAL has been automated and publication is catching up. A new edition of *Symbols of American Libraries* is due, produced from a machine-readable data base. (3) From a peak 78 million cards sold in 1968, card production has declined steadily and now represents less than 50 percent of the income of Catalog Distribution Service. Distribution of MARC tapes and book catalogs has risen. (4) The Librarian of Congress has authorized distribution of the LC shelflist, but no details were available.

Lucia J. Rather, assistant chief, MARC Development Office, gave a brief "Overview of the Core Bibliographic System (CBS) and the National Bibliographic Service (NBS)," providing a conceptual base for later speakers. CBS, an integrated system for the control of bibliographic information, and NBS, a system for making data from CBS and outside sources available to all libraries, are both well under way and represent strong LC goals.

Barbara Roland, chief, MARC Editorial Division, spoke on "Expansion of MARC —Current Capabilities, Future Plans." Unedited bibliographic records are keyed, and content designators are then assigned by AFR routines and a proof diagnostic produced. It is particularly noteworthy that the division began keying corrections *on-line* the day before the institute—a move that will reduce the correction cycle time from a week to a day.

In commenting on the scope of MARC, Roland noted that when a language is added, *related* languages are included. By 1977, LC hopes to include all roman alphabet languages. Addition of nonroman alphabets is projected.

Lucia Rather returned to discuss "MARC Off-Line Users—MARC Retreiver, Sort Programs, Print Programs, Book Catalog Programs." The MARC retriever is a sophisticated search algorithm which is applied to the MARC file to produce current awareness lists, catalog management information, and one-time lists. It is primarily used for reference, in contrast to the on-line search service which supports processing. In addition to the MARC Retriever, LC is now also using MARC data to produce photocomposed book catalogs (the *Motion Pictures and Filmstrips* catalog) and is developing a flexible publication system.

Mary Kay Daniels Ganning, library information systems specialist, Catalog Distribution Services, reviewed the products and publication problems of the division

in some detail. Several items can be particularly singled out: (1) card production is now coming from MARC tapes and has been automated to improve handling and inventory control. Photocomposition programs, including floating diacriticals, were developed in 1971; (2) sale of overprint format cards is projected; (3) proof-service customers may select a MARC-English, MARC-non-English, or non-MARC service; (4) while the NUC is still produced by "shingling" presorted catalog cards, other LC catalogs are photocomposed, with variable page composition, using twenty-one parameters; (5) CDS will distribute shared cataloging tapes, starting with CANMARC; (6) through the MARC Accumulation and Distribution Service (MADS), CDS does its own MARC editorial quality control.

"MARC On-Line Search Services—Present Capabilities; Current Uses in LC; Future Plans" were reviewed by Josephine Pulsifer, group leader, MARC Development Office. MARC Search Service (MSS), now under development, is a control system accessing on-line MDS and other files, including records in process (unverified), by LCCN and several search keys. Currently, 4,000 searches per day, on 250 terminals, are made. The Four-Phase terminals being used were displayed and demonstrated throughout the institute.

Justin Kniemeyer, project leader (LOIS) closed the first day's program with a talk on the Library Order Information System (LOIS), now under development. As of March 11, 1976, there were 5,584 monograph orders and 30,169 subscription orders on the file. Approximately 100 invoices are processed daily. Management statistics will be produced: country/format; fund/format; country/format/fund; cancellations; canceled and reinstated. Records are "order-level." LOIS is a *batch* system, and data will be used to update status information in the automated process information file.

"Automated Process Information File (APIF) Project—Beginnings of On-Line Cataloging at LC and the Monitoring System to Track Books as They Flow through the Cataloging Process" was presented by James Godwin, project leader (APIF). APIF is designed to control materials in process at the earliest possible moment and to provide management information. A bar-code/wand system will be used to "charge" items to various processing stations. Title changes and LC classification will be input at time of shelflisting, as they affect access. LC is planning to distribute APIF records, and a format for *Titles in Process* records is now being printed.

Pamela Andre, project leader (Subject Headings), reviewed "Authority Files: Progress in Automated Authority Systems —History; Present Processing of Subjects; Future Systems for Names; and the Integration of Automated Authorities for Subjects and Names." Several points stood out: (1) In the past, publication of the subject authority list has been hampered by a cumbersome, GPO-developed line-number control system using search keys to get back into the file. (2) The system has now been substantially streamlined, including Reciprocal Generation Processing to complete the cross-reference circle. The final printed list can be produced in half the time previously required. (3) MARC has had a major impact here too. Historically there have been two subject files: print and nonprint, the nonprint including not only personal and corporate names but such things as chemical terms. Subject terms appeared on MARC tapes that did not appear in the printed list. The printed list is now being expanded to include all subject terms *except* personal and corporate names. (4) LC will distribute subject headings in a machine-readable format compatible with the MARC communications format in the near future. (5) The projected microform distribution of LCSH is awaiting authorization from the Joint Committee on Printing. Each quarterly edition will be a total cumulation. (6) Automation of the name authority system is a difficult goal. A name authority format is being developed and will be distributed to the library community for study. In addition to magneform distribution, two other products are planned: a printed list and a microform list, although there is already doubt about

the viability of a printed list. (7) In discussing integration of the files, it seems probable that at least compatible distribution formats will be used.

Lucia Rather spoke briefly on "National Standards—Development of Formats, Character Sets, and Codes." Following a historical review, Rather noted that a chronological coverage code is presently being developed.

Continuing, Rather outlined "CONSER/NSDP—History and Current Status of the Projects." Both National Serials Data Program and CONSER have been well described in other publications, notably the *LC Information Bulletin* and earlier issues of *JOLA*.

Lenore S. Maruyama, group leader, MARC Development Office, guided attendees through "Cooperative Programs: COMARC/RAL/NUC—The COMARC (Cooperative MARC), RAL (Register of Additional Locations and NUC (National Union Catalog). Projects are discussed in relation to cooperative input for a national data base and the resulting products." Under COMARC, a CLR-funded project, LC source records are being transcribed by participating research libraries for distribution through MARC. It is hoped that records will be ready for distribution later this spring.

Quality control with decentralized input was the major issue in discussing the NUC. Overall, two questions were posed: How do you handle record validation? and What do libraries do with the data base? Henriette Avram's concept of format relating to function was implied.

Henriette Avram discussed International MARC and MARC networks, as well as the status of the CBS and NBS.

The proposed Research Libraries Group project to transmit bibliographic records computer to computer, storing in an institution *only* those records relating to that institution's holdings, was discussed. Avram also reviewed the current LC/CLR-funded study being performed by Inforonics to determine the character of ongoing network services, review work in progress at LC, and identify components presently missing in the National network(s).

Current efforts on standardization were reviewed, noting particularly the Ad Hoc Association of National Libraries, which has received IFLA funding for a British proposal to study (1) the near term requirements for an international network, and (2) the impact of nonstandardization of names and subjects. LC, with CLR financial support, will be a member of the steering committee.

John Rather, chief, Technical Processes Research Office, spoke on "The Future of Catalog Control in the Library of Congress: A Description of the New System of Catalog Control Being Developed at LC and a Consideration of its Implications for Cataloging Both Inside and Outside the Library of Congress." Rather indicated that LC would continue to produce a variety of products, including cards, "as long as there is a demand." He also noted that the closing of the catalogs, the development of on-line cataloging, and the extreme scope, therefore unlikelihood, of a complete retrospective conversion, imply a future change in the historical background against which works are cataloged.

Michael S. Malinconico, chairperson, ISAD Program Planning Committee, closed the institute by thanking all ISAD and LC participants and in particular William J. Welsh for his commitment to communication, Lucinda Leonard for her successful efforts as program coordinator and moderator, and Henriette D. Avram for making automation in libraries "a viable reality in less than a decade."—*Mary L. Fischer, Los Angeles County Public Library System.*

On-Line Searching and Full-Text Access: Challenge for the Information Community

Results from two recently completed NSF studies point to deteriorating prospects for full-text accessibility. One study, by Judy Wanger, Mary Fishburn, and Carlos Cuadra of SDC, studied on-line users. The other, by Bernard Fry and Herbert S. White of the Graduate Library School, Indiana University, analyzed, among other things, trends in purchases of journals among libraries. The 300-page

SDC report is available from SDC at $15 per copy, while the Indiana University report is available from NTIS as PB 249108, hard copy $11; microfiche $2.25.

Increasing On-Line Searching

The SDC team surveyed on-line use in 472 organizations. With on-line services, managers in these organizations reported a reduction in search time, ability to serve more users, increased staff productivity, access to information not previously available, and increased user satisfaction. Over half (52 percent) of the organizations reported that introduction of on-line services resulted in serving a larger number of users. In one organization, the number of searches requested increased tenfold a year following introduction of on-line services. Also, users predominately favored on-line over batch searching.

Other data from Martha Williams indicate that on-line usage in 1975 reached 1 million searches, up 300,000 from an estimated 700,000 in 1974.

So much for the good news. Users can more easily learn about a much larger number of potentially useful articles. On-line services turn us on. What about obtaining the full text of these articles? Now, for the bad news.

Deteriorating Full-Text Access

Drs. Fry and White collected subscription and loaning data from 401 or 33 percent of the 1,225 academic, public, and special libraries included in their carefully designed sample. Some data also were obtained from 254 or 20 percent of the sample of 1,235 publishers. In both cases, trends were established from 1969 to 1973.

In the four-year period, individual subscriptions declined by an estimated 3 percent, but library subscriptions increased by only 1 percent. Libraries have tried unsuccessfully to maintain serial coverage by shifting funds from the purchase of books to maintenance of serial subscriptions. The largest of the academic libraries, for example, increased the percentage of the budgets for serials from 12 percent in 1969 to 16 percent in 1973. Special libraries showed a similar trend. Serial purchases consumed 20 percent of their budgets in 1969 and 23 percent in 1973. However, increases in subscription prices apparently more than wiped out the increased expenditures for serials. This was reflected in increased cancellation rates and reductions in subscriptions to new periodicals. For all academic libraries, subscriptions to new periodicals as a percentage of total subscriptions in 1973 was less than half of the 1969 level. Meanwhile, the number of new scholarly and research periodicals increased by an estimated 8 percent over the four-year period. These data suggest that significant gaps in serial acquisitions are occurring in an increasing number of libraries. Libraries are attempting to meet requestors' needs by increasing loaning and borrowing of materials. Among academic libraries, for example, increases of more than 30 percent were found in the borrowing of periodicals between 1969 and 1973. To reduce costs many of the loaning libraries have instituted fees.

Though useful, interlibrary loans generally impose time delays and sometimes add to user frustrations in locating desired materials.

Nexus

So, here we are today. On-line services are at the takeoff point. As their use increases further and this trend is well established, there will be greater demand for the full text of articles. At the same time, all indications point to further impediments in obtaining information now made identifiable by on-line services.

Improvements

Efforts are under way to ameliorate this situation. Users of certain on-line services can place orders for documents from the Institute for Scientific Information and the National Technical Information Service directly from their terminals. Documents are supplied by mail. Many libraries are conducting interlibrary loans by teletype services. NCLIS, with considerable NSF support, has requested proposals for collecting data about interlibrary loans based on photocopying. This study will also develop and test the feasi-

bility of a clearinghouse operation. IIA and several other organizations are also examining how a clearinghouse mechanism linking copying stations and copyright owners could work.

Their efforts promise to increase access to documents, but at an added cost to libraries and probably to users as well. There may be no alternative to increased costs. But at least cost-saving alternatives that might benefit publishers, libraries, and users should be fully explored. Alternatives might include conversion of libraries to dispensing instead of circulating operations. New developments in micrographics storage, retrieval and reproduction technologies, combined with point-of-sales accounting methods, might permit immediate local access—a prime value to users—at costs below reproduction based on retrieval of printed material.

By expanding our definition of the problem, we may be able to conduct experiments that could lead to innovations in bibliographic and full-text retrieval that will rebound to the benefit of all parties in the information transmission chain. Anyone interested?

Notes from the Division of Science Information, National Science Foundation.

News and Announcements

CLR to Assess Potential of Computer-Output-Microfilm for Library Use

The potential of computer-output-microfilm (COM) for library applications is the subject of an investigation recently undertaken by the Council on Library Resources, Inc. (CLR). As a first step, a panel of micrographics and computer experts gathered on January 26–27, 1976, to establish the specifics of an inquiry into the degree to which existing or soon-to-be-available COM hardware, software, and services can be effectively applied to library services and operations.

Principal investigator for the COM study is Brett Butler of Butler Associates. His report will answer a series of questions principally concerned with bibliographic applications that were developed by the advisory panel. Points to be covered include the current and prospective cost ranges for generating COM output of bibliographic data, the availability of character fonts and formats, suitability of the readers and reader/printers presently available, limitations of COM formatting, user reactions, and the identification of existing bibliographic products that are good candidates for conversion to COM.

Members of the advisory panel are Henriette Avram, Library of Congress; David Burnett, Eastman Kodak Co.; Mary Fischer, Los Angeles County Public Library; S. Michael Malinconico, New York Public Library; Bruno Prochaska, Information International, Inc.; and Carl Spaulding, CLR.

Ceefax, A New Electronic Newspaper

Developed by the British Broadcasting Company, a news service transmits on the BBC1 channel in the gaps which occur every hundredth of a second between the pictures seen on the television screen.

The ultimate use of such a system would mean a myriad of additional uses for the home television set at a relatively small cost. Possibilities include home connection to libraries or a computer.

ISAD Industry/Library Relations Committee

An Industry/Library Relations Committee has been created by the Information Science and Automation Division of ALA to stimulate and improve communications between representatives of industries and libraries on topics relevant to the activities of ISAD. ISAD is primarily concerned with three areas of information dissemination: library automation and information science, educational technology including audiovisual materials and equipment, and video and cable communications. This new committee with members from industry and libraries had its first meeting at the ALA Midwinter Meeting to discuss the charge to the committee and future activities. The committee believes that current and potential suppliers of equipment, software, and services to libraries and library representatives in the areas of interest to ISAD too frequently talk past rather than to each other. It was therefore proposed that communications between these groups be improved by offering opportunities for dialogue on specific topics of interest. An open forum will be held at the ALA Annual Conference in Chicago in July to give industry and library representatives a chance to propose subjects and activities for the committee to support. In the interim, anyone with suggestions or comments should direct them to the Committee Chairman, James T. Dodson, Industry/Library Relations Committee, The University of Texas at Dallas, P.O. Box 643, Richardson, TX 75080.

BIOSIS Receives National Science Foundation Grant for Educational Media Study

The National Science Foundation has awarded a grant to BioSciences Information Service of Biological Abstracts (BIOSIS) for a joint study by BIOSIS, Chemical Abstracts Service, and Engineering Index, Inc., of the suitability and effectiveness of various instructional media in educating several types of audiences in the value and use of scientific and technical information. The study is the first phase of a program to develop, produce, and test innovative instructional media to increase user awareness of available scientific and technical information resources and enhance user ability to acquire and apply these resources.

Four types of audiences will be studied under the grant: end users of scientific and technical information, educators, managers, and "information intermediaries" such as reference librarians and information scientists. These audience groups will be represented in the study by a user media panel, whose members will review and evaluate various printed, audio, and visual instructional materials developed by the three participating services and other organizations.

Arthur W. Elias, director for professional services at BIOSIS, is principal investigator for the study. Media specialists from the Ohio State University Research Foundation, under the leadership of George W. Tressel, are serving as media consultants. Dr. Carol Ganz of the Office of Science Information Service User Requirements Program is the National Science Foundation's project officer for the study.

Library Automation Bibliography Available

A bibliography on library automation covering the latter half of 1971 through the first half of 1973 has been published by ISAD through the ALA Publishing Services Department. The bibliography was compiled by Martha W. West, San Jose State University, as a part of the *State of the Art II* proceedings of an ISAD institute held in 1973 in Las Vegas and is now available as a separate reprint from the ALA Order Department at $.50 prepaid.

The thirty-five-page bibliography is arranged by subject under headings such as "Bibliographies and Information Sources," "MARC Cataloging," "Serials," "Circulation," "Automated Retrieval and Data Bases," "Networks and Cooperation," "College and University Libraries," etc.

Send order with payment to ALA Order Department, American Library Association, 50 E. Huron St., Chicago, IL 60611.

INSPEC Awarded EEC Contract

INSPEC, the Information Services Division of the Institution of Electrical Engineers, has been awarded a study contract to investigate the feasibility of a standard command language for the projected EEC on-line information network, EURONET.

The contract has been placed by the EEC's Directorate-General for Scientific and Technical Information and Information Management.

In its first phase EURONET will create a communitywide telecommunications network giving on-line access to a number of major scientific and technical data bases, including INSPEC's own files covering published literature in physics, electrical and electronics engineering, computer science, and control engineering.

Through EURONET, users will be able to access a variety of data bases and retrieval systems on widely differing host computers. The adoption of a common command language for the network could make it easier for users to move freely between different systems and data bases.

The INSPEC investigation will analyze the technical problems resulting from the present diversity of file structures and retrieval procedures. It will attempt to determine the practicability of adopting a common command language in the short and long term and will include the preparation of detailed specifications for a proposed language.

New COM Systems

Two new computer-output-microfilm (COM) systems have been announced by 3M Company's Microfilm Products Division. The systems, products of the newly added Beta COM line, include improvements to increase throughput speeds provide superior image quality, and allow for greater flexibility. Many options are available for custom systems.

The 3M Beta System 700S has a higher-speed tape transport (nine-track, forty-five inches per second, 1,600 bits per inch); additional 8K memory (doubling the previous standard); a movable camera mount, and a viewer lens with variable aspect ratio as standard features.

3M's Beta System 700H has the same memory, camera, and lens features as the 700S; a seven- and nine-track, seventy-five inches-per-second tape transport, and a stroke-mode character generator which produces higher quality and a speed increase of approximately 35 percent. This makes it one of the fastest COM devices available today. Both systems have as options 35mm and 16mm capability, and a 1.6 million-word disc system for job-parameter and similar storage.

Eleventh Annual Educational Media and Technology Conference to be Hosted by UW-Stout July 26–28, 1976.

The Register of Copyright of the Library of Congress, Barbara Ringer, Washington, D.C., and the president of the Association of Educational Communications and Technology, Harold Hill, professor of communications, University of Colorado, Boulder, will keynote the University of Wisconsin-Stout's Eleventh Annual Educational Media and Technology Conference to be held in Menomonie, July 26–28, 1976.

Ringer's topic "The New Copyright Law" is aimed at informing media specialists of the very latest information on the revision of the U.S. Copyright Law.

Hill's topic "How to Survive in the Media Business" is directed at media professionals who have been feeling the pressures of constricted budgets and personnel cutbacks in schools and colleges.

The program includes five concurrent workshops: "Designing Learning Packages through the Instructional Development Process"; "Automated Circulation Control Systems for Media Applications"; "Copyright Revision"; "Visual Literacy"; and "Censorship." Additional presentations will cover information about the work of international film organizations, six case studies of exemplary media programs at the public school, vocational-technical, and college levels, while industrial instructors and other related matters will be explored by the faculty.

In addition to the keynote speakers, a host of outstanding professionals are participating in the presentations.

Further information may be obtained by contacting Dr. David P. Barnard, Dean of Learning Resources, UW-Stout, Menomonie, WI 54751.

Input

To the Editor:

The December 1975 editorial in *JOLA*, "The IS in ISAD," succinctly described the advantages of computer-based reference services. However, the argument that because these services are charged by the vendor, the library must charge the user directly is not only invalid, but personifies an alarming retreat among librarians from the concept of free library service. Of course no library service is free. Libraries find that even the receipt of free gift books is a costly process. The purchase, processing and circulation of books costs many thousands of dollars.

Providing reference service demands funding for the collection and the personnel to interface it with the user. Why must computer-based information service, simply because it is new, be singled out as the one service the library charges directly to the user? Budget constraints act on book purchasing, journal subscriptions, and conventional reference service. They also influence on-line reference. We should devote our energies not to calculating the best way to make the user pay but rather to calculating the best way to persuade the funding source that supports all other library services to absorb the cost.

It is obvious that these services need to be operated under stringent supervision. At the University of Louisville we perform on-line searches only for graduate students and faculty. A screening process has been established so that the computer is resorted to only when conventional methods for the search are too time consuming or the computer's capability to search abstracts and non-print tags is needed.

We charge the users a small fee, approximately 16 percent of the total bill. Even though we have not been entirely successful in obtaining sufficient administrative support to provide the level of service needed, we can look forward to better funding next year. We can also look inward and know that we are not turning our backs on the tradition of free library service that has been so hardly won by predecessors.

Ruth Atwood, Director
Information Referral Center
University of Louisville
Louisville, Kentucky

Response

The rationale for user charges for on-line reference service is not that the vendor charges the library, but that these are extra-ordinary services which will not be utilized by the majority of users. Indeed, such services are inappropriate for many users—e.g., the undergraduate student writing a term paper. While we all pay lip service to the concept of free library service, there are a number of services in libraries which are not free—photocopying, equipment rental (typewriter or film projector), placing of reserves, interlibrary loan, etc. In each of these instances, the service provided is not one used equally by all patrons but a special one which extends the traditional circulation and reference function. Is the use of on-line reference services conceptually any different?

Martha W. West
Department of Librarianship
San Jose State University
San Jose, California

Book Reviews

CATV and Its Implications for Libraries, ed. by Cora E. Thomassen. Allerton Park Institute Number 19. Urbana-Champaign, Ill.: University of Illinois, Graduate School of Library Science, 1974. 91p.

"The Communication Technology [community antenna television cable distribution systems] being developed now is limited only by our imagination," says James S. Keller in the second paper offered in the book. The set of conference papers and the reported discussions examine the implications of CATV. The title of the book indicates the implications are targeted at libraries—the information presented is broader than libraries.

The excellent paper by Donald P. Mullally on "Libraries and CATV: Some Hopes and Fears," reviews CATV-related issues that have appeared in professional library literature for the past decade, and describes the failure of radio and television, the broadcast media, to reach their anticipated goals. He does not criticize the broadcast medium but does explain why broadcast has not had the impact that cable will have. Mullally's paper gives a number of good examples of how CATV might be used in a total community communications system.

An interesting point developed by Mullally is that "Broadcast television has become the equivalent of the mass circulation, general audience magazine. It is possible that CATV can become the electronic equivalent of the special interest magazine."

Brigitte L. Kenney, in one of the two outstanding papers in the book, describes the contemporary sociological issues faced as libraries consider whether they should or should not start to use the communications potential offered by CATV systems. Drawing upon experiences she gained in a recently completed Council on Library Resources fellowship, Kenney describes programs that libraries are providing through the innovative use of CATV capabilities.

The overall set of papers could have been helped, this reviewer feels, if Kenney's paper preceded the entire set of papers, since it is a springboard from which an analysis of CATV might take place.

Ken Dowlin announces in the opening paragraph of his paper that "Public libraries are going through a great change," as he explores in his paper, "Cable Television as an Information Tool." Dowlin's paper raises questions about the role of public libraries as they are going through this period of supposed change, but he does not indicate the relationship of this change to the new communications technologies. Nor does he consider whether cable television, or any of the new technologies, will have significant impact on the provision of basic library/information-service.

Roberto Esteves presents an excellent review of policy issues that must be faced by libraries as they start making use of CATV capability. He stresses the kinds of problems that are faced as libraries start working with technology. Suggestions offered are on various policies that need to be developed related to the development and operation of a library capability on the CATV system.

The collection of papers closes with an outstanding piece by Russell Shank, who explores "CATV and Libraries: Issues and Challenges." The approach that Shank takes is to express the concept that "The rise of cable television is only one of the technical manifestations of several major social changes taking place that involve the manner, content, and the intensity of communication among people." He stresses that "society's needs and information technology are quickly exceeding tradi-

tional librarianship's ability to serve as an agency for providing access to information. The library's mission must be redefined in terms relevant to today's world, and librarianship must begin to operate with a wholly new fundamental philosophy." Shank analyzes the various issues related to reform of the library services system as well as administrative modifications to allow for full use of the new communications technology. Shank's paper is based on the assumption that the library has a prime role to play in the provision of society's library/information-service utilizing CATV, although he fails to consider alternative agencies that might provide the information service necessary to society as it undergoes this self-renewal.

Because of the strength in specific papers in *CATV and Its Implications for Libraries,* this book should probably be a basic work available to library groups as they explore the development of CATV utilization. It can not be described as a reference piece, but it can be described as an "idea starter" type of publication. It is short, easy to read, and the information is presented in a very manageable way.

Gerald R. Brong
Information Futures

Basic Statistics for Librarians, by I. S. Simpson. Hamden, Conn.: Linnett Books, 1975. 113p.

This book is a first attempt to provide librarians with instruction in statistics on an elementary level. Among the topics covered are descriptive statistics (presentation of data in chart form), probability, some basic hypotheses tests, correlation, and regression. The emphasis is on how to use the techniques discussed, mostly by way of example, with relatively little interpretation or discussion of their limitations.

The need for a good library-oriented statistics book is critical. Libraries generate large quantities of data of various kinds, and automation provides the capability of generating much more. Basically, statistics is the art of separating out what is meaningful and useful from a body of data. Though many statistics texts do exist, librarians often feel they are written for someone else and, especially at the student level, have difficulty perceiving the relevance of these quantitative methods for their own work. This book treats the subject conventionally, but attempts to make the subject more relevant for librarians by using illustrations from the library. Only two sets of data are used, successfully providing a sense of continuity, but they offer only a hint of the great variety of potential applications.

The book is rather uneven in quality. The opening chapter, on descriptive statistics, is well written and should be very useful for people not familiar with these methods. Other parts often read less easily than they should. In part, this is because of the poor quality of the typography, which makes the mathematical expressions difficult to read. But much of the book gives the impression of being hastily written. There are awkward sentences. Similarly, assumptions underlying the methods presented, such as normality, are often not stated, nor is it always clear when approximations that are made are valid.

The chapter on the analyses of variance exemplifies the weaknesses of this book. Nowhere is there a clear statement of why these tests are as important as they are; the initial example confuses the comparison of the variance of variables with the comparison of their means; and the assumption of normality on which the F-test depends is nowhere mentioned. The actual description of the procedure is too succinctly stated and doesn't give the reader any insight into why the calculations are carried out.

Simpson deserves credit for recognizing a need of the profession and for his effort to meet that need. The topics were chosen judiciously and a considerable range of material is touched on in a small space. The book's value, however, probably will be greater for readers familiar with the techniques and interested in library-oriented examples than for librarians seeking an introduction to the subject.

Abraham Bookstein
University of Chicago

Computers and Early Printed Books: Report of the LOC Project Investigating Means of Compiling a Machine-Readable Union Catalogue of pre-1801 Books in Oxford, Cambridge and the British Museum. London: Mansell, 1974. vii, 131p. $12.00.

The problems of assembling all information on the identity and location of early printed books have exercised the minds of bibliographers since at least the middle of the nineteenth century. Now the computer offers a capability never before envisaged of handling thousands of records, each of which might need a dozen different index entries, and of producing acceptable bibliographical listings.

Project LOC was a feasibility study in the identification, transcription, and handling of bibliographical records of pre-1801 books, using a computer. It considered the collections in Oxford and Cambridge as typical of the world (assisted by data from the British Museum) and took the collections in Peterhouse Cambridge and Hertford College Oxford as typical of the college and university collections; with these two colleges as control, it looked at all the entries in the universities' collections under the letter *O*. The project team encountered severe physical and organizational problems in locating the material at all, due mainly to the variations in accessibility and even inventory of some college collections.

There were even more severe data processing problems, with an inappropriate and unique computer (the Cambridge Titan), scattered data collection, three incompatible data preparation devices (Dura using Duracode, non-parity on eight-hole tape; Vonomatic using ISO code, even parity on eight-hole tape; Flexowriter using Ferranti Atlas code, using odd parity on seven-hole tape), and different character sets.

The team established internal standard methods and figures for accessing the material, identifying and transcribing the data, and coding and handling it. They developed, almost as a by-product, possibly the most valuable concept of the project: an automatically derived, text-based, unique identifier to "fingerprint" the book. They even projected the time and costs for the production of a complete union list for Oxford, Cambridge, and the British Museum. Unfortunately, with the possible exception of the "fingerprint," few of their data or conclusions can ever be relevant to other situations.

The data base is so unreliably small and the difficulties encountered so curious and unique that the authors themselves admit the impossibility of extrapolating from their experience. The methods were affected so much by a variety of obsolescent machinery that they could have little significance for anyone using more sophisticated equipment (indeed any other equipment) and a standard format approach. The observations and conclusions presented in this book have already been worked over by a group of specially invited experts brought sometimes thousands of miles to read the draft report and make what the report itself calls "silent emendations" (p.81).

The project's scholarly relish in recognizing and overcoming the difficulties of the physical location and transcription of titles, difficulties common to all bibliography, whether it uses three-by-five-inch cards or computers, seems to have turned it aside from what might have been its unique contribution: to propose a hospitable format for the description of the material, and a standard program to handle the data, together with recommended standards for the practice and equipment necessary to transcribe and encode the information for the system, no matter what the point of origin. At the time of the project, there were other institutions concerned with the retrospective conversion of catalogs and many other universities in England with available computers of standard design and at least adequate collections of early printed books.

The indexer for information retrieval seeks similarities and relationships in the contents of ever bigger files; the bibliographer enjoys the detection of difference and variation, reducing his universe towards the unique identifiable phenomenon. Project LOC quite properly displayed all the characteristics of good bibliographical philosophy. It was laudable

in its ambition, but unfortunate in its execution; it took pains to experience and solve diverse problems of collecting and handling bibliographic data—but the very diversity of that experience inhibits its applicability to other situations.

C. D. Batty
McGill University

Library Automation; The State of the Art II. Papers presented at the Preconference Institute on Library Automation held at Las Vegas, Nevada, June 22–23, 1973. Edited by Susan K. Martin and Brett Butler, with a bibliography compiled by Martha W. West. Chicago: American Library Assn., 1975. 191p. $7.50. ISBN: 0-8389-3152-9.

The reaction to the citation above is predictable: It's just another conference proceedings. Well, it certainly is a volume of conference proceedings, but the "just" is undeserved. For those who routinely read proceedings, this volume provides a refreshing change; for those who rarely even glance at them, here are some papers worthy of careful reading, and exceptionally readable.

This conference was a review of the accomplishments of the field from 1967 to 1973, and an attempt to look ahead to the next five years—a period which, thanks to the delay in publication of these proceedings, is mostly behind us. The major differences between these proceedings and others are not only those of content (for there are few conferences devoted completely to summarizing what has gone before in such a way that it becomes comprehensible even to those currently involved in the field) but also of flavor. Here we get the formal presentations of such speakers as Allen Veaner, Diana Delanoy, Lois Kershner, Maurice Freedman, David Weisbrod, Pauline Atherton, Walter Curley, and Ralph Shoffner, and also questions and a variety of remarks from members of the audience and from the other speakers. The commentaries include the inevitable uninformed questions ("I know nothing about the computer or the automation of libraries; we are looking for some guidance" p.134), and the more common informed questions (. . . in line with your use of software developed by other libraries, what changes in cataloging procedures were required . . . ?" p.71). But they also include more detailed information ("Ohio State University's circulations system automatically erases borrower identification . . . after the material has been returned. It's impossible for anyone, after a certain period of time, to find out what particular human being took what book out. . . . You can in other words build [security] into a system." p.52), and alternative points of view (". . . You are far too kind to academic libraries. I haven't been in hundreds, but I have probably been in fifty of them on business of one kind or another, and there are a lot of disasters out there and some extremely dumb things that have been done" p.135). These various comments add spice to the volume that takes it completely out of the class of publications that simply reprint formal papers.

Although the papers presented are of a uniformly high standard, one seems to stand out for its comprehensive coverage of a subject about which so much is being written. Maurice Freedman's paper on cataloging systems does an excellent job of gathering and organizing facts on a variety of projects and systems, and is followed by a lengthy and informed discussion, and an unusually comprehensive and up-to-date bibliography. If there are, as some suggest, conference papers that should also appear as journal articles, this is surely one that most deserves to be updated and reprinted as a companion piece to Bierman's cataloging survey (*JOLA*, 8:277–98 [Dec. 1975]).

In sum, this volume is far more than simply a repetition of the proceedings of the 1967 institute; it is a valuable and highly readable summary of library automation as of 1973. ALA is to be congratulated on the high quality of the entire production, including fault-free editing, good paper, attractive typography, and low price. What a pity we had to wait so long for it.

Peter Simmons
School of Librarianship
University of British Columbia

Library Networks '74–'75, ed. by Martin R. Miller. White Plains, New York: Knowledge Industry Publications Inc., 1974. 110p. $24.50. ISBN: 0-914236-01-6.

This plastic-ring-bound volume has eight short (the typing is double-spaced) chapters followed by a directory of eighteen networks, a bibliography of twenty-two items, and three supporting appendixes. The chapter headings are (1) "Library Networks: The Reason Why"; (2) "The State of Automation"; (3) "Will They Work?"; (4) "MARC"; (5) "Ohio College Library Center"; (6) "Regional Developments"; (7) "Suppliers to the Market"; and (8) "Overview: A National Network and some Conclusions."

The scope of the volume turns out on inspection to be limited to North American computer-aided library networks, and provides a useful, readable, brief overview of this rapidly changing field in 1974. Library networks are here defined (p.3) as "any coalition formed by a group of similar or dissimilar libraries to share resources and centralized processing with one another."

The directory and the general discussion portions of the review are of the most lasting interest. The most outdated and therefore least satisfactory portion is chapter 7 which deals with hardware. Xerox Ltd's announcement of the phasing out of its computer business and IBM's discontinuation of support for its Library Access Systems (LAS) have substantially changed the picture presented in this chapter. The chapter would have been better balanced if it had also dealt with the prospects for minicomputers rather than concentrating exclusively on Xerox and IBM mainframe equipment.

The field of library networks is so wide, so fast moving, and so difficult to see in perspective that there is a need for some form of regularly updated review and directory specifically devoted to it. Review chapters in the *Annual Review of Information Science & Technology* and review articles in journals such as the *Journal of Library Automation* have their part to play, in addition. Ideally there would be two parallel review publications, one concerned with library networks and one concerned with information networks; the latter would include services such as those of MEDLINE, SDC, and ESRO-RECON. Desirably, the review concerned with library networks would cover computer-aided networking and major cooperatives and consortia operating on a manual basis. Network organizations would be listed in a directory, and additional sections would treat topics such as hardware, software, communications facilities, data bases, standards, regional developments, and national and international developments.

The result would be a broader and deeper review than that presently offered by Knowledge Industry Publications, and could probably only be produced on a co-operative basis with sections written by specialists. Greater accuracy would also be obtained by checking directory entries with organizations listed. A particularly poor entry in the present directory is the listing of the Ontario Universities' Library Co-operative System (OULCS) which employs two University of Toronto Library Xerox computers: a Sigma 6 for on-line operations and a Sigma 7 for output products. The present entry spells out the acronym OULCS incorrectly and describes the hardware inaccurately. These, however, are minor negative points. The major positive point is that we need a broader, deeper annual review which develops and extends the conception of the present volume. I look forward to seeing the next issue which is scheduled to appear around the middle of 1976.

Roderick M. Duchesne
Assistant Director (Networks)
National Library of Canada

INSTRUCTIONS TO AUTHORS

Scope. The *Journal of Library Automation* publishes scholarly papers and technical reports containing findings not published previously in the following fields: research and development in library automation, including inter-library communications; research in information science and educational technology directly related to library activities; and the history and teaching of these subjects. Each paper is accepted with the understanding that it is to be published exclusively in the *Journal of Library Automation,* unless some other specific arrangement is made in advance.

Mailing address. Manuscripts should be mailed to Susan K. Martin, *Journal of Library Automation,* General Library, University of California, Berkeley, CA 94720.

Organization of papers. Reference to earlier issues of the *Journal of Library Automation* will be helpful in preparation. Whenever possible, material should be presented in classical form: 1) introduction, which should set the scene by referring to pertinent related literature and showing how findings in the paper differ from those already in the literature; 2) methods and materials, presented in sufficient detail that others can adapt or adopt them, but omitting information which is generally known or which can be covered by citation of another paper; 3) results, or new data produced; 4) discussion, containing an examination of results with respect to previous findings, or quality, or suggested further investigation, etc.; 5) conclusion, containing evaluation of the significance of the findings or development.

If the paper is a technical report, section 2) is often a detailed description of equipment and procedures of a new system; section 3) reports operation of the system in terms of time to install, cost to install and operate, quality of product, performance, compatibility, flexibility, simplicity, etc.

Papers are edited to improve the effectiveness of communication between author and readers, particularly to remove ambiguities. When extensive editing is necessary, a paper will be returned to the author for correction and approval before type is set.

An indicative abstract of 100 words or less must accompany the manuscript on a separate sheet. It should include purpose, method, results and conclusions, and any specialized information. It should be intelligible without reference to the article, while assuming that the reader has a general knowledge of the subject. Clarity is essential, but complete sentences are not necessary.

Preparation of copy. Manuscripts should be prepared as neatly as possible in the form used by *Journal of Library Automation.* Papers should be submitted in two copies and typed in double space.

The title page shall carry authors' names in full and their affiliations.

References should be typed in double space on a separate sheet. They should be listed in order of citation in the text and numbered consecutively. Citations should be made in the following form:

1. Lois L. McCune and Stephen R. Salmon, "Bibliography of Library Automation," *ALA Bulletin* 61:674-94 (June 1967).
2. ALA Library Administration Division, comp., *Library Statistics of Colleges and Universities, 1965-66 Institutional Data* (Chicago: ALA, 1967), p. 3.
3. Robert R. Freeman and Pauline Atherton, *AUDACIOUS; An Experiment with an On-Line, Interactive Reference Retrieval System Using the Universal Decimal Classification as the Index Language in the Field of Nuclear Science* (New York: American Institute of Physics, UDC Project, 25 April 1968), p. 36. AIP/UDC-7; PB-178 374.

Financial support, and credit for materials, technical assistance and advice, may be cited in a section headed "Acknowledgments," which should appear at the end of the text.

Illustrations. Illustrations must not be larger than 8½ by 11 inches; a larger illustration should be photographically reduced on a glossy print. Line cuts will usually be reduced for printing to 5 inches or less in width, or 7½ inches or less in length. The artist should be informed of the anticipated reduction before a drawing is made. Illustrations should be done in india ink or black typewriter ribbon on white paper. Illustrations should be numbered lightly with soft pencil on the back, and numbered legends typed on a separate sheet.

Tables. Each table should be typed on a separate sheet, numbered, given a title, and cited in the text. Each column should have a heading. Vertical rules may not be used. Tables wider than 76 characters when set must be run endways.

Chargeable costs. Charges will be made whenever special typography (e.g., tables and formulas), corrections in galley proof, etc., cause composition costs to exceed standard text-page composition costs by more than 10%. In the event that an author makes any changes from copy after galley proof has been submitted to the printer, the entire cost of changes will be charged to the author.

Page proof will not ordinarily be sent to an author.

Can You Afford Today's Cost of Maintaining a Card Catalog?

At less expense, you can have a microfilm catalog that offers far more convenience to your patrons!

An inexpensive replacement for the conventional card catalog is a computer produced microfilm catalog. It's easy to arrange the change-over from your present system. Write or phone the pioneer in library automation . . . Science Press. Return this coupon today.

science press

P.O. Box 342-M
Herndon, Virginia 22070
Phone 703/450-4477

Please send me the following information:

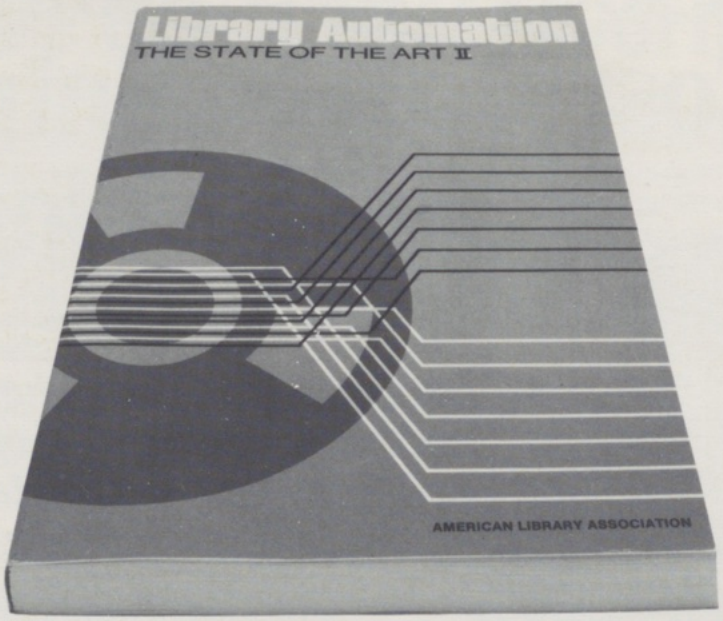
- ☐ Science Press Microfilm Information System
- ☐ O.C.L.C. Conversion to Printed or Microfilm Catalogs
- ☐ I need particular information on_____

NAME _____ TITLE _____

LIBRARY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____



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.

200 pages Paper LC 75-20168 ISBN 0-8389-3152-9 (1975) $7.50

Order Department
AMERICAN LIBRARY ASSOCIATION
50 East Huron Street, Chicago, IL 60611