10-1-1962

Special Libraries, October 1962

Special Libraries Association

SPECIAL LIBRARIES

OCTOBER 1962, VOL. 53, NO. 8

Space-Age Libraries . . . Perspectives on the Role of Automation . . . Data Processing in a University Library . . . A Company-wide Library Committee

SPECIAL LIBRARIES ASSOCIATION

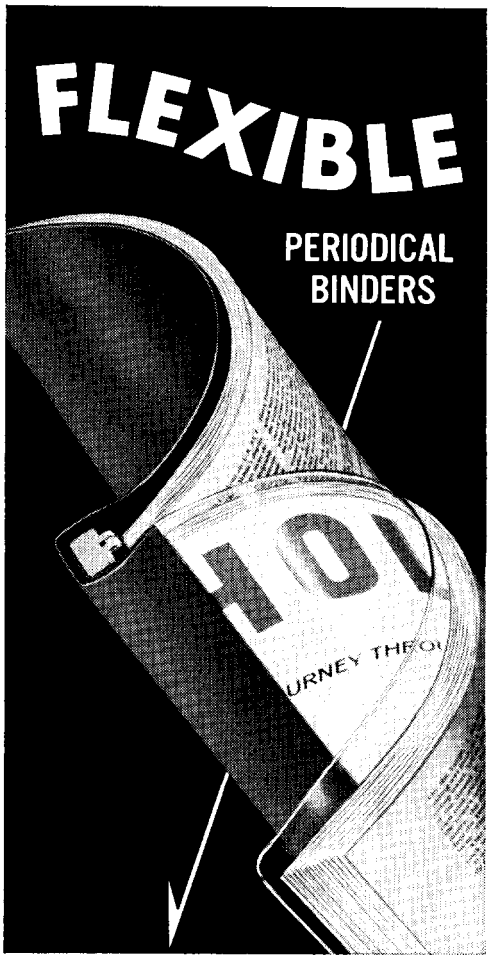
Putting Knowledge to Work

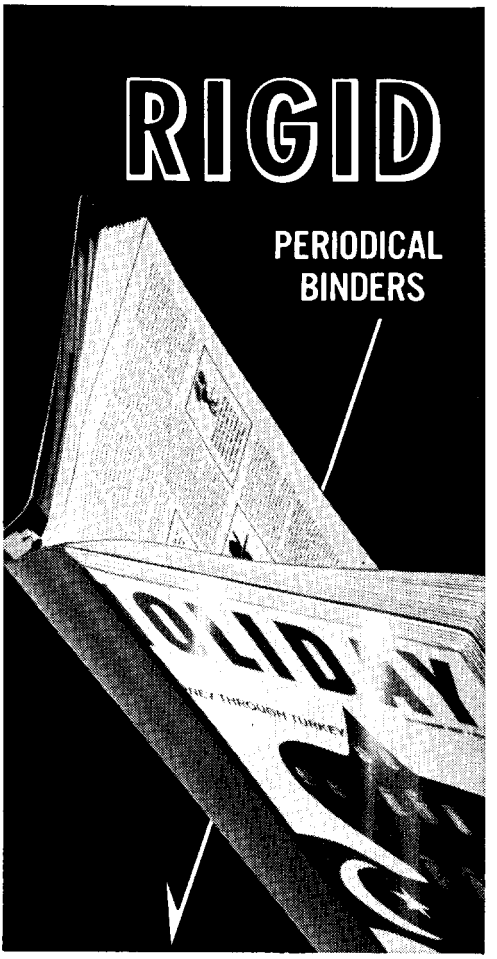
MEMBERSHIP

Dues: *Sustaining*—$100; *Active*—$15 (*Paid For Life*—$250); *Associate*—$10; *Affiliate*—$15; *Student*—$2; *Emeritus*—$5. For qualifications, privileges and further information, write Special Libraries Association.

THE 54TH CONVENTION WILL BE AT DENVER-HILTON HOTEL, DENVER, COLORADO, JUNE 9-13, 1963

SPECIAL LIBRARIES is published by Special Libraries Association, monthly September to April, bimonthly May to August, at 73 Main Street, Brattleboro, Vermont. Editorial Offices: 31 East 10th Street, New York 3, New York. Second class postage paid at Brattleboro, Vermont.



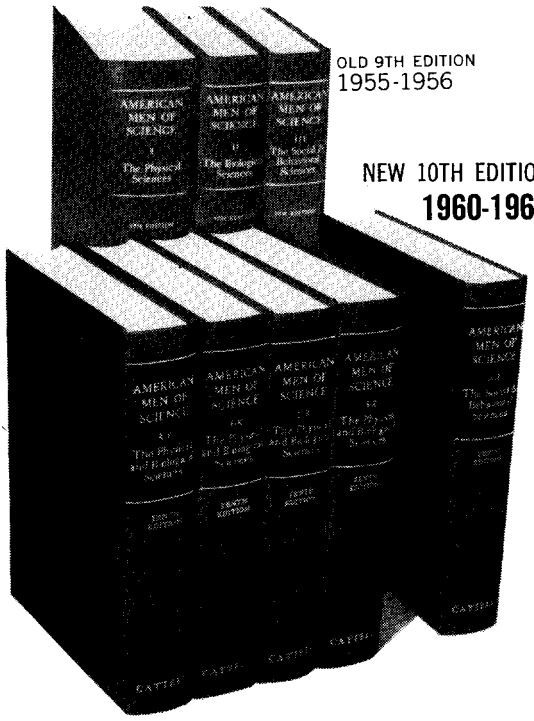


You have your choice . . .
with **GAYLORD**

FLEXIBLE (Series 680) . . . natural-bending, easy to handle. Both covers flexible vinyl. Front cover transparent; back cover and spine opaque chinese red or sable brown. Lasting protection with the look and feel of quality.
RIGID (Series 780) . . . handsome, rigid protection for attractive display. Front and back cover transparent vinyl; opaque spine in chinese red or sable brown.

Stainless steel compression springs adjust automatically to thickness of publication for positive positioning. Eight sizes to fit all popular magazines. Special key for lock and release mechanism. Prices from $2.85 to $4.50 each depending on size. Substantial savings on quantity orders. *Please write for full details.*

Gaylord Bros., Inc. Library Supplies, Syracuse, N. Y. Stockton, Calif.



Keep Pace with the startling growth in science with the new, expanded tenth edition of

American Men of Science

a distinguished biographical directory founded in 1906 . . . offering data on 114,000 leaders in the Physical, Biological, Social, and Behavioral Sciences

So great has been the expansion in the field of science since the 9th edition appeared six years ago, that what was then a three-volume set has now grown to five big volumes. The Physical and Biological Sciences now fill four volumes (divided into A-E, F-K, L-R, and S-Z) covering 90,000 people (22,000 more than in the last edition!). And, the Social and Behavioral Sciences, when ready in the Fall of 1962, will provide coverage of some 24,000 names (an increase of 6,000 over its predecessor!).

Here you'll find latest biographical data on living Americans (including Canadians) who are actively contributing to the advancement of science. Details given include: full name, position, address, field of specialization, birthplace, degrees, positions held, memberships, research specialties.

AMERICAN MEN OF SCIENCE is sponsored by the National Academy of Sciences, the National Research Council, and the American Association for the Advancement of Science and is published by the Jaques Cattell Press, a subsidiary of the R. R. Bowker Company.

The Physical and Biological Sciences—in four volumes—now available at $100 net pp. for the set.

The Social and Behavioral Sciences—ready now—priced at $25 net pp.

ORDER FROM:

The Jaques Cattell Press **Annex 15, Arizona State University, Tempe, Arizona**

Do you sometimes want all the information you can find on a given subject in chemistry?

That's almost what you'll get if you use the BIBLIOGRAPHY OF CHEMICAL REVIEWS. Volume 4 is a collection of 6,799 abstracts of review articles from CHEMICAL ABSTRACTS, Volume 55 (1961). It includes a keyword title index and an author index, which make searching easier and more effective. The only information it doesn't find for you is that which has come to light since a review was published.

You can (1) turn to the keyword index and seek out the subject you are most interested in, (2) use the reference there to find the review abstract in the front of the book, (3) then locate the original paper through your library or by writing publisher or author.

The keyword index lists permuted title words in context, with the keyword of each title in the center of the column. Each title appears several times so that you can look under *different* headings and this way make virtually certain of finding sources in the areas you wish to cover.

What You Get With the BIBLIOGRAPHY

About 6% of all abstracts in CA are review abstracts, and 1961 was the biggest abstract year in history, making the BIBLIOGRAPHY OF CHEMICAL REVIEWS, Volume 4 the most comprehensive to date. All abstracted reviews and published bibliographies are included, arranged by regular CA sections. There is an average of at least 40 bibliographic references with each review.

If you do not have Volumes 1 and 2 (11,848 CA abstracts between common covers for 1958 and 1959) and Volume 3 (6,506 abstracts from the 1960 CA), why not send for them along with this latest one?

The four volumes together contain more than 25,000 abstracts of reviews and give between 1 million and 1.7 million references to the literature. The BIBLIOGRAPHY OF CHEMICAL REVIEWS series provides information to speed your searching in a form unobtainable any other way.

Volume 4

332 columns • 113 index pages
paper bound • $6.50

Volume 3

320 columns • 106 index pages
paper bound • $6.00

Volumes 1 and 2
(bound together without index)

293 pages • paper bound • $5.00

Order from:

Special Issues Sales / American Chemical Society
1155 Sixteenth St., N. W. / Washington 6, D. C.

Now... from Thomas Register

THOMAS MICRO-CATALOGS

New system pre-files more than 60,000 pages of catalog data on microfilm...includes reader for rapid read-out

Here's a new service for you from the directory that industry has rated year-after-year as America's No. 1 directory . . . Thomas Register, and the price is surprisingly low . . . $250.00.

What is Thomas Micro-Catalogs?

SIMPLY THIS: thousands and thousands of pages of catalog data from America's leading firms *reduced* to 98 pages per 4" by 6" acetate card. The pages are filed by company name and cross-referenced with Thomas Register.

What does this mean to you? Faster search-out of catalog data required from new buying problems. No writing letters for catalogs. No time lag. No nuisance of obsolete or dog-eared copies. In short, the catalog you want *moments* after you want it.

The total price includes the complete Thomas Register (which you probably **now** *buy); the micro-catalog reader; the file drawer and one-year subscription to the Micro-Catalog cards. Send for full data now . . . distribution will be limited to 3,500 units in charter year.*

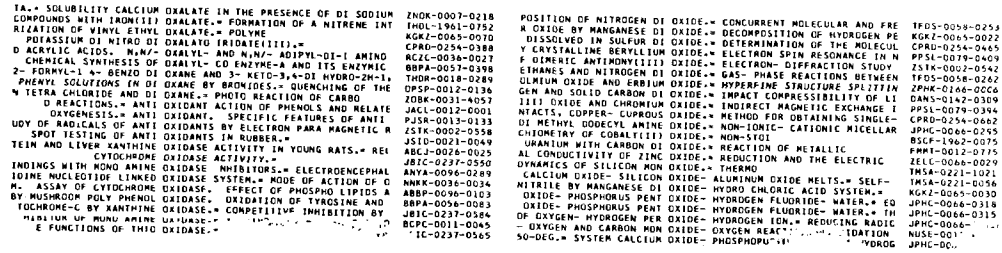
HOW IT WORKS

1. A NEW BUYING PROBLEM ARISES... Who makes "it."? You look in TR, find a group of logical sources. Now what?

2. GET MORE SPECIFIC INFORMATION ... once this meant write for catalog data. This costs about $1.50 a letter says one survey, and takes seven to ten days, says another. But now ... check Thomas Micro-Catalogs file, pull out the card, and slip it into the viewer and ...

3. READ THE "SPECS" IN SECONDS... simple, portable projector is easy to operate, easy to scan, provides no maintenance problem. It throws up a big 10" by 12" image on a tinted "eye saver" screen and is clear enough to be read by several persons at one time.

THOMAS PUBLISHING COMPANY 473 Eighth Ave., N.Y. 1, • Phone: OXford 5-0500



How to cover 60% of the new information in chemistry . . . almost as fast as it appears

• In 1962 CHEMICAL TITLES offers a more comprehensive, readily usable searching service than ever before. It has a new coding system, a new bibliography, a broader scope of coverage.

Twice each month, or 24 times a year, CHEMICAL TITLES presents up to 3000 titles taken from 643 journals of basic and applied chemistry—123 of them Russian.

These titles appear in CT within two weeks of the time they are received in the offices of the Chemical Abstracts Service. Many of them come from journals whose tables of contents are air mailed to the CT editors *in advance of publication*. No other index or alerting service provides such complete coverage so promptly.

Bibliography Reorganized by Tables of Contents

In the 1962 volume you find an improved feature: the arrangement of the bibliography *by journals*. Each journal is listed in bold type with its table of contents given beneath. Those who prefer to search by scanning their favorite journals now have this option.

CT can be used in many ways. It is divided into (1) the permuted keyword index, in which titles are given with an average of six points of entry, (2) the bibliography, and (3) the author index, with all authors' names listed alphabetically. You can use any one of these sections, or all three, to find what you are looking for.

CHEMICAL TITLES provides a speedy view of the *new* literature in chemistry. It closes the gap between original publication and the appearance of abstracts. It will increase the use of your library resources, broaden the base of your research, and save you hours of searching time.

Price Schedule:

	Rate per Volume		
	Base Rate	College and University	ACS Member
1st-10th subscriptions	$65 each	$50 each	$50*
Additional 11th-25th	45 each	45 each	—
26th and succeeding ones	30 each	30 each	—

* *Single subscription only*

ORDER FROM:

AMERICAN CHEMICAL SOCIETY

1155 SIXTEENTH STREET, N.W./WASHINGTON 6, D. C.

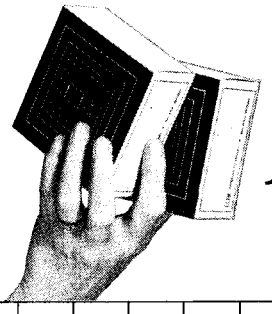
SPECIAL LIBRARIES

Official Journal
Special Libraries Association

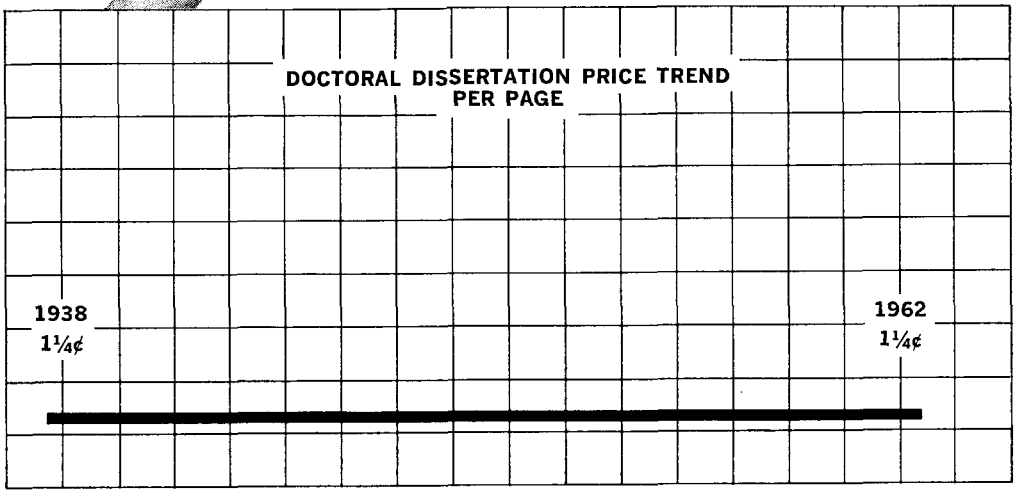
Volume 53, No. 8 **CONTENTS** *OCTOBER 1962*

Papers published in SPECIAL LIBRARIES express the views of the authors and do not represent the opinion or the policy of the editorial staff or the publisher. Manuscripts submitted for publication must be typed double space on only one side of paper and mailed to the editor. ● Reprints may be ordered immediately before or after publication. ● Subscriptions: U. S. $10; foreign, $11; single copies, $1.50. © by Special Libraries Association 1962.

INDEXED IN *Business Periodicals Index, Public Affairs Information Service, Library Literature, Business Methods Index* and *Library Science Abstracts.*



Accomplishment



The chart tells a story of accomplishment rarely seen today. Despite many increases in labor, film, materials, and equipment costs the price of microfilms of Doctoral Dissertations is still only 1¼c per page! It has been kept low through improved plant efficiency and increased volume. 132 leading universities now approve doctoral dissertation publication through University Microfilms.

The record for Dissertation Abstracts is equally amazing. Subscribers now get abstracts of dissertations from all those universities at a cost of only $.006 each.

All prices for scholarly research materials are kept low here. Write for free catalogues.

Xerox copies...

of doctoral dissertations in clear, easily readable 6″ x 8½″ page size are only 4½c per page—minimum order $3.00.

UNIVERSITY MICROFILMS, INC.
313 N. FIRST STREET, ANN ARBOR, MICHIGAN

Proposed Increase in Active and Associate Membership Dues

DURING THE PAST few years there have been indications that various Association activities have been curtailed, postponed or discontinued due to the lack of sufficient funds. This is noticeable in all areas of activity—Association, Chapter and Division. If the Association is to continue to be as active and effective as in the past, ready to accept the ever-increasing opportunities and challenges offered and if it is to continue as the leader in special librarianship, it must have available adequate funds. The Association has been operating for the past several years with a deficit and is likely to do so again in 1962-63.

The Executive Board on May 27 approved the Finance Committee's recommendation that dues for Active membership be increased from $15 to $20 and Associate member dues from $10 to $20 beginning January 1964.

Why an increase in dues? To support the increased programs of the Association, to meet increased costs of basic operations, to meet increased demands made on Association Headquarters, to provide increased allotments to Chapters, Divisions and Committees and to set up and maintain a retirement program for Association Headquarters personnel.

It has been suggested that it costs between $24 and, in some cases, up to $65 each year to service each member of an association. Only by initiative and good management of the Headquarters staff, the various Chapters, Divisions, Committees and the Board of Directors has SLA been able to operate under a limited income.

Before the proposed increase in dues is presented for approval by the membership at the 1963 Denver Convention, each SLA member will want to know more about the reasons for the proposed increase in dues and the necessity for increasing them at this time. Adequate plans have been made to inform the members of the reasons.

During the coming months, five one-page articles will be published in "Special Libraries." They will be written by SLA Officers and Committee Chairmen and will explain the reasons for the action of the Board of Directors in voting for an increase in dues and also what can be accomplished if the membership accepts the Board's proposal.

Chapters have been asked to study these articles and discuss them in relation to their own activities. Divisions have been asked to present the problem to their members in whatever ways seem appropriate and to weigh the advantages in relationship to their activities. The increase in dues will be discussed at the Advisory Council Meeting in Cleveland in February.

Each member is asked to cooperate in these studies of the present financial conditions of the Association, of the services the Association performs and of the advantages of increasing Active and Associate membership dues.

With a dues increase the Association will be taking a major step in insuring a dynamic future for Special Libraries Association, a future in which expanded services will be available to all members and in which individual members will derive increasing benefits.

ETHEL S. KLAHRE, President

Libraries in the Space Age

CONGRESSMAN JOSEPH E. KARTH, Minnesota
Member, House of Representatives Committee on Science and Astronautics


Moss Photo Service

RECENTLY I heard Dr. A. V. Astin, Director of the National Bureau of Standards, say that whereas the population of the country was doubling about every 50 years, the number of scientists in the major disciplines of science has been doubling about every ten years. Frontiers in science are continually expanding, and scientific break-throughs open the door for new exploration. Moreover, present-day economy has become so technologically oriented that it must depend more and more upon scientific and engineering efforts for its growth and advancement.

As a Member of Congress, I would like to discuss the government's role in the general field of scientific information. Fortunately, both the legislative and the executive branches of the government have come to recognize that the effective dissemination of scientific information plays a key role in scientific achievement.

In its own operations the government has been principally involved in scientific information as *1)* an operator of information systems, and *2)* as a user of services and equipment.

Contributions to Information Field

As an operator of information systems the government contributes to a variety of non-federal needs for scientific information. Examples of some of these non-federal services are:

First, as a service to libraries and information centers throughout the world the Library of Congress supplies catalog cards on scientific and technological subjects. During the past five years its publication *New Serial Titles* has provided a list of approximately 16,500 new serial titles each year, of which at least one-third have been in the fields of science and technology, including agriculture and medicine.

Second, as a service to medicine the National Library of Medicine has available more than one million volumes on medical and related scientific subjects. It publishes and distributes an annual catalog of medical books, a monthly index to medical literature and current bibliographies on medical subjects. In addition, it also answers specific bibliographic inquiries on medical subjects.

Third, as a service to agriculture the National Agricultural Library, which recently marked its 100th anniversary, has now grown to over a million volumes. Next to the Library of Congress, it is today the largest U. S. government library.

Fourth, as a service to atomic energy research applications, the Atomic Energy Commission provides a coordinated system from production of reports on subjects related to atomic energy to direct service to users. In 1960 its *Nuclear Science Abstracts* covered over 26,000 articles, reports, monographs and other material.

Fifth, as a service to the business and scientific community, the Department of Commerce has, in addition to the Patent Office, the Office of Technical Services, which makes available generally the unrestricted scientific research reports of a number of government agencies, including the Department of Defense, the Atomic Energy Commission, the National Aeronautics and Space Administration and the contractors of these respective agencies.

Government Needs for Services and Equipment

The second phase of the government's interest in scientific information is as a user of services and equipment. In this area

Presented before the Chemistry Section, Science-Technology Division, May 30, 1962, at the 53rd Annual Convention of Special Libraries Association, Washington, D. C.

today the government has a profound influence upon the development of more effective dissemination of scientific information. The government, as the agent for all citizens, has public tasks to perform that dwarf any individual undertakings in the United States. The sheer enormity of these tasks necessitates the development of effective systems for handling them and the application of mechanization to these systems on as large a scale as can be made efficient and practicable. The by-products of this effort can have significant advantages for private applications in the scientific information field. For example, government needs for automatic data processing have resulted in its providing funds for developmental costs of equipment that is now available for other purposes.

This same process now appears to be taking place in the mechanical translation field, where the payoff is so far in the future that only very limited commercial funds are available for the extensive basic research that is necessary before practical machines for automatic translation can be developed. At the same time, the principles established as the basis for mechanized translation systems may have important applications in the mechanization of storage and retrieval of scientific information.

The House of Representatives Committee on Science and Astronautics, of which I am a member, has taken an active interest in this problem of the dissemination of scientific and technical information. Hearings were held before the Committee during the 86th Congress on this problem, and during the hearings the problem of translation of foreign documents was discussed and mechanical translation mentioned as an aid to the translation problems.

Glamour words these days are, of course, *mechanization* and *computers*. Unquestionably, the application of mechanized techniques involving computer-type devices offers the principal hope for the future for rapid and reliable storage and retrieval of technical information. The complex problems involved in their use in the information field are not primarily ones of computer technology. This science has advanced considerably beyond our current capabilities for adapting it to informational uses. The principal difficulties concern the general problem of conversion between natural and machine language. Current research efforts in this area are extensive and are requiring the combined talents of linguists, mathematicians, logicians, computer scientists, librarians and information specialists to make machine processing and servicing of technical information practicable.

Substantial progress is being made, and machine storage and retrieval already is proving successful in many limited applications. As might be expected, the problems are simplest when the information being handled is quantitative, precise and capable of sharp definition, i.e., conductivities, melting points, wave lengths, stress and strain characteristics and other numerical data. The difficulties are enormously greater when the material to be put into machine language and stored for subsequent retrieval concerns complex, interrelated concepts and ideas, which different people describe in different terms and for which they have varying needs and uses.

Mechanical Translation

Machine translation of one natural language into another is also an information application of mechanization to which substantial research effort is being devoted. Here many of the problems are very similar to those encountered in mechanizing storage and retrieval, and advances in either area are useful in both. The day of the untouched-by-human-hands translation —when, for example, one can feed a Russian scientific book into one end of the "machine" and have it disgorge an acceptable, correctly phrased English version at the other—is still some time in the future; exactly how far is subject to considerable difference of opinion.

However, the extent of the "touching by human hands" that is required grows

progressively less, and unquestionably mechanical translation of natural languages will have increasingly useful applications as time goes on. For example, a recent article in *Electronic News* by Charles Wendel* states that although interest in mechanical translation is expanding, it will be five to ten years at best before a satisfactory automatic machine translation system may be expected. Researchers in the United States in this field use general-purpose computers, but the Russians are putting heavy emphasis on theoretical research because they are short of computers. Mr. Wendel quotes Richard See, Chairman of the Federal Interagency Committee on Mechanical Translation Research, as stating that virtually all the Western European nations have mechanical translation programs under way, some of them using specially designed computers, and that most of these nations are cooperating with the United States in the field of mechanical translation and related research.

Mr. See reports that the National Science Foundation is spending about one-half million this year to support mechanical translation research and will increase this to about three-quarters of a million next year. A total of about $2 million is being spent for all mechanical translation in the United States this year, with the Air Force, the Central Intelligence Agency, the Army and the Navy providing funds through which universities, non-profit research organizations and industrial firms pursue mechanical translation research. Heaviest emphasis in the field has been toward translation from Russian to English, though other combinations are being tried both here and in Europe. The United States now spends over a million dollars yearly for human translation of Russian to English.

Before machines can process the texts of documents for either mechanized information-searching systems or mechanical translation systems, more precise knowledge of syntax, semantics and other aspects of language is needed. Consequently, a considerable portion of government-supported research in 1961 was directed toward extending knowledge of language.

In this field as a whole, the efforts of groups working on Russian-to-English mechanical translation have resulted in several sizeable automatic dictionary programs for such scientific fields as electronics, mathematics, physics, chemistry and biochemistry. Several approaches to the automatic parsing of Russian texts have met with partial success.

Research Projects Underway

Efforts directed toward methods that may ultimately contribute to complete and accurate translation by machine are being continued at Massachusetts Institute of Technology, where a research program on detailed knowledge of the grammars of several languages is gradually being built up. Theoretical work at MIT has produced certain important insights into the nature of language, the most recent being the "depth hypothesis," which offers a possible explanation of several characteristics of language, based on a limitation of the degree of complexity in sentence structure.

At Harvard University a project for research on automatic translation and mechanical linguistics is largely devoted to a program for research on automatic translation of Russian into English. A project at the University of California, Berkeley, which has been primarily devoted to Russian-to-English mechanical translation research, has undertaken a smaller but parallel study of Chinese.

A computer program for grammatical analysis of English sentences has been devised at the University of Pennsylvania, and work is well along on a more complex program for "transformational analysis," the reduction of sentences and their component clauses and phrases into simpler, more uniform constructions.

This work has proven so successful that it has served as the basis of a related research effort at the Radio Corporation of America. The ultimate aim of the University of Pennsylvania effort is the development of procedures for automatic in-

* March 28, 1962, vol. 7, no. 310, p. 44.

dexing, abstracting and searching of the analyzed texts.

During the year, *A Survey of Computer Programs for Chemical Information Searching* was published by the Research Information Center and Advisory Service on Information Processing at the Bureau of Standards. An extensive report on automatic character recognition was also prepared. The Center, supported jointly by the National Science Foundation, the National Bureau of Standards and the Council on Library Resources, Inc., assembles and studies publications and reports on information processing research, prepares state-of-the-art papers on various aspects of the research and furnishes advice on research problems to federal agencies and other cooperating organizations.

Projects concerned with mechanization of information handling are relatively costly, because they require highly trained staffs with a variety of skills, the rental of computer time (often at several hundred dollars per hour) and the experimental processing of large quantities of material. Examples of such projects supported by the National Science Foundation are the University of Pennsylvania work, previously cited; the Itek Corporation's research on means of systematizing and mechanizing the procedures of literature-searching systems; the Electrada Corporation's study of mechanized file organization; the Western Reserve University's test program to evaluate certain new, partially mechanized procedures for indexing and coding the contents of scientific literature; the comparative study of four classification and indexing systems by the Association of Special Libraries and Information Bureaux in Cranford, England; and studies by the Stanford Research Institute and Arthur Andersen and Company directed toward developing objective criteria for evaluating the performance of information systems.

A thorough analysis of the characteristic use of notation systems for structure of chemical compounds has been launched by the National Academy of Sciences-National Research Council, with support of the National Science Foundation. This study will consider similarities and differences among various chemical notation systems, the uses now being made of them, criteria that led to their adoption and development and the purposes that might be served by agreement among chemists on the use of one or more standardized systems.

Prospects for the Future

In the development of these special tools for information work, are there any of them in practical use as an aid to the special library? For some years now, new types of indexing and classification schemes have been tried out in various information systems. Usually the systems have been relatively small, and the feasibility of the application of such methods to larger systems or a variety of systems has not definitely been established. However, these systems, such as Uniterm, faceted classification, descriptor and others have seemed particularly adaptable to high-speed machine systems. Such developments are important in avoiding the real bottleneck to practical mechanical systems for organizing and searching large collections of information—the intellectual problems of organizing input into machines.

The complex technology of our age will manifest itself by more rapid methods of full utilization of the science of library techniques as we know it today.

It is my opinion that mechanical translation is the answer to give the scientist and engineer the widest range of technology in the shortest possible time. There is no doubt that time is an all-important factor to the research scientist. It is my opinion that the full utilization of abstracting procedures will be the solution to the time-saving problem of our scientists, and I am firmly convinced that in this complex, technologically oriented era, machine translation, computers, machine storage and retrieval devices will be so developed as to implement the working tools of the research scientists to the extent that a greater utilization of our scientific knowledge and manpower may be achieved.

Library Goals and the Role of Automation

DON R. SWANSON, Manager, Synthetic Intelligence Department
Thompson Ramo Wooldridge Inc., RW Division, Canoga Park, California


Ace Photo

BEFORE THE role of automation in libraries can be properly assessed, it is first necessary to understand the goals that are sought. Too often automation is regarded as an end in itself, and the question of what can be done is confused with what needs to be done. A push button library with a large high speed memory, electronic searching device and desk-side console with television display is frequently pictured for the future. Now if we were to begin not with equipment but with a *requirement* for remote library interrogation and desk-side service, we might then be led to consider at least the merits of providing a quick and simple fulfillment of purpose by means of a telephone at the user's desk, an extra reference librarian to answer the telephone and a fast messenger service to link user to library.

This example is neither unfair nor exceptional; it stands a ready generalization to any proposal for automation since the mechanized system has yet to be conceived whose end product or functional capability could not also be achieved more conventionally. This is not to say which is the better but only to argue that a comparison between the two ought to be made. We should want particularly to know the quickest and least costly way of achieving the desired end result, with or without automation. The benefits of sound planning based on well-conceived goals are not limited to automatic systems.

Thus, I shall emphasize concepts, problems and economics rather than equipment. There is no doubt that automation will play an important role in future libraries and that the role of librarians will change because of it. My purpose is to point out areas in which I think some of these changes ought to take place.

Paper presented at the Second General Session of the 53rd Annual Convention of Special Libraries Association, May 29, 1962, Washington, D. C.

A Perspective on the "Information Explosion"

Information, like population, is undergoing an explosive growth. This growth is the main force that shapes future requirements for libraries but not for immediately obvious reasons. The consequences of growth can be assessed only in the light of corresponding growth in our resources for coping with the situation. It may seem at first sight astonishing that the world's supply of recorded knowledge more than doubles every 15 years;[1] however, the number of scientists, engineers and scholars who are the producers and consumers of this information is increasing at about the same rate. Furthermore, this growth rate (about six to eight per cent per year) has been sustained for the past 250 years, so the problem is by no means peculiar to modern times.

If we apportion recorded information on a "scientist per capita" basis, then the terms "explosion" and "inundation" are inappropriate; to be sure increasing specialization sets in, but there is no reason to think that scholars in general must necessarily digest increasing amounts of information each day as time goes on.

There is evidence, furthermore, to indicate that, on a long-term basis, various information handling and communication facilities, such as publishing houses, libraries,[2] indexing and abstracting services, etc., are generally keeping pace in growth rate with the amount of information to be handled. It should be remarked too that this growth rate in science, technology and information must eventually

taper off, since limiting factors will set in before absurd limits are reached.

The fact that the growth of information handling facilities keeps up over relatively long time periods with information quantity does not, of course, preclude temporary, local or specialized crises of various kinds. Most of these problem areas are susceptible of straightforward solution, provided only that there is a willingness to invest a proportionate amount of resources.

I think, however, there is one exceedingly important area in which the consequences of information growth are disproportionately great and not at all temporary. This area concerns the patterns of communication and interrelationships among the various subdisciplines, sub-sub disciplines and other "units" or "pieces" of knowledge. It is probably impossible to formulate any kind of simple law that governs the increasing complexity of interrelationships among units of information, but we may at least observe that the number of *possible pairs* of units, which *might* be related to one another, increases as the square of the number of units. That is, during a period of time in which the number of units doubles, the number of *pairs* of units increases fourfold. (This rule is an approximation valid for large numbers; the exact rule can be arrived at either by theoretical combinatorial mathematics or by counting, depending on whether prestige or clarity is sought.) To illustrate with a simple example, consider ten men and ten women at a cocktail party. There are clearly 100 different (mixed) couples that can be formed. With 20 men and 20 women, however, the number of possible couples is 400; thus as the number of people doubles, the number of couples quadruples.

The way in which recorded knowledge is organized determines the extent to which interrelationships between units of information can be recognized and exploited. Thus as the units become increasingly specialized and more finely divided, various indexing and classification systems must become increasingly detailed, complex and finely structured. This is the crux of the "information problem," so let us consider some of the consequences.

Intellectual Access and Subject Cataloging

First of all, because of this increasing fineness of structure, any classification system suitable for describing the literature of today is not suitable for that of either five years ago or five years hence. Libraries span periods of time over which the structure of knowledge changes—hence a classification system for the entire collection is unsound in concept if this fact is not recognized and taken into account.

A second consequence involves more serious problems. As subject classification structures grow increasingly complex, the cataloging process becomes increasingly subject to error. The assignment of a piece of information to one or several categories is in general a subjective process—the cataloger brings his own viewpoint into the situation. It is at least plausible to suppose that the number of different categories to which a given piece of information can be assigned by different people with varying points of view is roughly proportional to the total number of categories in the subject classification scheme. That is, the difficulty of assigning something to the "right" pigeonhole is greater, the greater the number of pigeonholes. It is thinkable that for a sufficiently large and detailed subject list, a point of considerable doubt may be reached as to whether two people (for example, cataloger and user or reference librarian) would agree on a classification assignment often enough to permit the system to work at all. This problem may be one of the most important consequences of information growth.

The solution I suggest is to incorporate an increasing variety of viewpoints into cataloging processes to increase the likelihood of effective communication between cataloger and user. In principle, present systems permit this by means of added entries, but in practice it is often little more than a gesture. In some cases cross-filing even seems to be regarded as a symptom of defeat for a classification system rather than as a useful tool for providing multiple routes of intellectual access to information. The whole idea of a "main entry" or of deciding what a work is "mainly about" expresses a sort of "pigeon-

hole philosophy," in which it is attempted to enshrine each item of the collection in a unique niche. This philosophy, I think, deserves abandonment. The "main" subject of a work may not be of as much importance to the user of the information as some subjects regarded as peripheral or subordinate by the cataloger.

More extensive cross-filing by itself would, of course, tend to increase the amount of retrieval for any specified subject heading. Thus corresponding measures must be taken to permit narrower and more precise formulation of reference questions in the subject heading language of the library, largely through greater use of conjunctions or combinations of terms. It is this aim of greater retrieval precision that has motivated most of the research carried out by my group at Thompson Ramo Wooldridge during the past three years. I shall summarize here some of the main results and conclusions from three particular studies on automatic indexing and cataloging:

Study Number 1

Approximately 1,200 brief news items were classified into 20 nonhierarchical, subject categories, both by a human and a machine procedure. Each item was assigned on the average to about four categories. The results of the two processes were compared. With the human process as a standard, the machine missed only seven per cent of the correct subject assignments and made a number of irrelevant assignments equal to about 17 per cent of the total. Nearly 40 per cent of the automatic subject assignments judged finally to be correct were missed by the human catalogers. (The human cataloging was carried out essentially under conditions that prevailed in an actual operational situation; the relatively high error rate was ascribable to the fact that only "main" concepts tended to be cataloged.)

Study Number 2
(Sponsored by Council on Library Resources)

A series of information-retrieval experiments were performed on physics articles in which fully automatic retrieval techniques were evaluated by a process of expert human judgment applied in a direct study of the relevance of each document in the entire collection to the question that was asked. Similar evaluations were made of retrieval based on a human process in which subject cataloging was done in considerable depth, i.e., eight or so subject headings per article. Comparison of the two processes indicated that the machine retrieved about twice as much, for a comparable amount of irrelevant retrieval, as did the conventional method. (The details of this study are published elsewhere, *see* 3, 4, 5.)

Study Number 3
(Sponsored by Council on Library Resources)[6]

Several thousand entries in classified bibliographies were studied to determine the extent to which titles of reports and journal articles contained words identical or similar in meaning to those used in the subject heading under which they appeared. In the sample of technical literature studied, such a match was found for roughly 90 per cent of the entries. This means that substantially the same classified bibliography could have been produced by machine processing of article titles, provided that the machine was given an adequate synonym dictionary.

The foregoing results are all based on experiments performed with very small quantities of information compared with that contained in any real library. Generalizing to collections of realistic size is hazardous, but the conclusion that automatic indexing and cataloging is superior to human indexing and cataloging is both provocative and remarkable.

All three studies led to an interesting impression of subject cataloging as an intellectual exercise. Although it takes a fairly high level of intelligent human judgment and experience to decide what a work is "mainly" about, the comprehensive cataloging of *all* relevant subjects seems to place a higher premium on diligence and thoroughness than it does upon intellect. This explanation accounts for the fact that the machine rather consistently cataloged more effectively than did people. In no case, of course, is it to be inferred that a machine can

do *in principle* what people can't. Machine performance in these studies was superior only because human diligence and attitudes were limiting factors.

Computer and Human Processes

Let us consider very briefly how cataloging is performed by machine. I am not going to describe how computers work but will instead try to assist your intuition in understanding the distinction between a machine-like cataloging process and an intellectual process. To decide, for example, that a book about a primitive tribe of Indians should be classified under "cultural anthropology" is in general an intellectual task. Suppose though that the title, subtitle or perhaps one of the chapter headings in the book contained the phrase "cultural anthropology." We can, in this case, readily understand a mindless symbol-matching process by means of which a computer could properly classify this book. The computer would, of course, have to be given all of the words of the title, subtitle and chapter headings, as well as a list of all possible subject headings. It could then exhaustively compare the title and chapter words with each of the subject headings until a match was found and then perform the corresponding category assignment.

This machine-like process can be extended in sophistication by providing the machine with a list of words for each subject heading that are synonymous with or characteristic of that subject heading. Again, with no more than an elementary capability to match and compare strings of symbols, it could achieve a considerably more polished and even impressive end result. The significance of the accomplishment, however, would be credited to the human beings who performed a highly intellectual task of organizing groups of words into the structure of the subject heading list, and to those who wrote the sequence of elementary instructions (called the "program") which the machine followed. These intellectual tasks though are done once and for all. The high volume, repetitive matching process applied to each article is then the job of the machine.

In all of these studies I have outlined, the essence of the research task consisted in achieving sufficient understanding of human cataloging activities to be able to recognize those aspects that were clerical in nature and hence mechanizable. At the same time, non-clerical aspects of cataloging can also be identified that I think are, and will continue to be, of very great importance in libraries. These aspects exploit peculiarly human and somewhat mysterious abilities in the areas of associative recall and pattern recognition.

If a librarian, or any other human being, has examined a book or document in a collection he mentally catalogs it in many ways that in general defy systematic description. Such things as shape, color, type of binding, quality of printing, illustrations, the circumstances of acquisition, degree of popularity, the type of people who request the work and, no doubt, many other attributes which do not fall within the established pattern of either descriptive or subject cataloging are noted, either consciously or subconsciously. Those mental cataloging processes become invaluable when the same person acts in the capacity of a reference librarian to assist a user whose description of what he wants may be vague, partly wrong or completely at right angles to anything that has been or ever will be invented in the area of descriptive and subject cataloging.

Furthermore, there may be considerable variance between what the requester wants and what he really needs. In communicating with the user and in helping him to resolve this hiatus, the reference librarian performs a highly valuable non-machinelike function. The value of this sort of process clearly depends on the degree to which the libarian is acquainted with his collection. Such acquaintance is likely to be enhanced if the reference librarian in question also engages in or closely supervises the cataloging processes.

Thus, I envision future subject cataloging as incorporating *two distinct processes* that serve to complement one another. The first of these is a machine process in which highly detailed cataloging and indexing in great depth, based on the language of the document being indexed, is carried out. The second is a subtle process performed by a librarian intimately familiar with the collection, whose function is to provide an intel-

lectual merging of cataloging and reference. Since human capacity for intimate knowledge of a collection is limited, this ability can be best exploited only in relatively small collections. Thus, subject cataloging is, I am convinced, not an area in which one must eventually decide between people and machines but rather one in which there is a valuable role to be played by both. Clear distinctions will have to be drawn between the clerical, or machinelike, processes and the intellectual processes, in order that man and machine may eventually assume their proper roles.

Descriptive cataloging is usually regarded as requiring less intellectual skill than subject cataloging. From the point of view of mechanization, however, the reverse is true. Descriptive cataloging requires skills of pattern recognition which, though highly developed in any two-year-old child (who can, for example, recognize pictures of people or animals) are still beyond the capability of today's most expensive computing machinery. Once information is identified and recorded by a human being, however, it is susceptible to machine handling.

Economics and the Cost of Automation

I have pointed out earlier that no mechanized system applicable to libraries is conceivable whose functional capability could not also be achieved in more conventional ways. This remark applies even to questions of speed and response time, since, within reasonable limits, any required speed could be achieved—from either a man or machine system—*if* expense were no consideration. The basic criterion for evaluating an automatic system is comparative cost with other automatic or non-automatic systems doing the same job, provided one is careful to calculate the true cost per unit of output or unit of useful work accomplished. Questions of speed, error frequency and even absenteeism, illness and vacations are in the last analysis reducible to economics.

In considering the economics of library automation, an important distinction must be drawn initially between the *text* of the collection and the *"handles"* (in the form of catalog information) that provide access to the collection. The volume of information in the two cases differs by factors of hundreds or more, and they present two distinct classes of mechanization problems. Recognition of this fact provides a sound perspective for evaluating the various storage and search devices now being developed or marketed. These devices handle, in one way or another, both index and text. Now the index and catalog-type data can be processed with essentially unlimited versatility by existing general purpose digital computers, in contrast to the more limited searching machines. Thus for this kind of machine-coded data, the special purpose searching devices can be directly compared (on a cost-speed ratio basis, and putting aside the question of versatility) with computers; for the most part they do not show up exceptionally well under such comparison. Most of the search machines also handle text, however (some with a single unit record—photographically reduced—for both text and digitally coded index information), and for this purpose can be evaluated by comparing their costs and speeds for both searching and file maintenance (or "updating") with conventional printed document and filing cabinet methods. These conventional techniques lead to systems with sometimes surprisingly large capacities, low access times and low costs. For example, a complete set of *The Reader's Guide* in conventional form provides 30-second access to one and one-half billion[2] bits of information stored in less than one-half cubic yard of space. It is not my purpose here to pursue the question of evaluation but only to suggest the foregoing approach and perspective.

If we are to consider a system in which automatic indexing plays a part, then we must necessarily begin with the text of the collection, and wholly new problems present themselves. A computing machine can operate only on words and, accordingly, the words have to be made available in machine language. One way of doing this is to record words on punch cards by means of keypunch machines. The cost is roughly one or two cents per word which, by standards of what is normally spent even for the most thorough indexing and cataloging, is exorbitant.

What alternatives exist? Costs come much

more into line if we make available to the machine something on the order of one per cent of the full text. Then, of course, the problem of selecting that one per cent presents itself. An alternative is to develop machines that can scan printed pages and sense characters in order to translate them to digital codes. A considerable amount of research and development in this area has been going on for the past decade. A versatile print-reading machine with a capability to scan and recognize a variety of type fonts perhaps mixed together on the same page is still many years in the future. It will eventually come into being, though, and all indications based on factors of speed and cost point toward effectively overcoming this economic hurdle of converting natural language text to machine-readable form.

Suppose that we have somehow arrived at a machine record of either the full input text or else we have invested in human effort to select critical fragments (such as titles, chapter headings, abstracts or possible key paragraphs) of such input texts for keypunching. If we next calculate the speed of automatic indexing and the cost per hour to run the computer, then we arrive at a cost of something like one dollar per article for automatic indexing. (This figure is based on the results of Studies 1 and 2 mentioned earlier.) Comparable costs would be generated by a human being if he were to spend perhaps 15 or 20 minutes per article, which is probably somewhat longer than the time presently spent with conventional systems.

It is apparent in any case that the issue of man versus machine is here an economic toss-up. Interestingly enough, nearly all research involving natural language text with which I have been acquainted has led to similar results so far as economics is concerned. For example, both machine and human translation of Russian to English costs in the neighborhood of one to several cents per word exclusive of the cost of machine input, and with the quality of the machine product leaving much to be desired. At the present time the state of the art of all natural language text processing seems to be at the break-even point so far as the cost of an operating system is concerned. Automatic systems carry an additional handicap, though, in that many months or even years of costly preparation are necessary before the system can become operational, and these costs must be amortized. The relatively heavy cost of automation and the extensive preparatory work required explain and justify the rather deliberate pace with which the library field seems to be moving toward use of computing machinery.

If, indeed, we are now at the economic break-even stage, the *trend* from this point onward becomes of particular interest. There is no question that machines are improving a good deal faster than people are, and the eventual shift of economic balance in favor of automation seems inevitable. Gross breakthroughs, however, will be hard to come by, and the shift may not occur with any great suddenness. Much is heard nowadays about new large-capacity high-speed memories. These will help in some applications, but where a great deal of natural language processing must occur, over-all costs and speeds are not presently dominated by the requirements of access time to large storage. Computing speed itself is more often the governing factor. Print readers and third generation computers (operating in billionths instead of millionths of a second) may constitute the long-range equipment base for economically revolutionary approaches to library automation.

CITATIONS

1. VLEDUTS, G. E. et al. Scientific and Technical Information as One of the Problems of Cybernetics. *Soviet Physics Uspekhi,* vol. 2, no. 5, September-October 1959, p. 637.

2. Resource Data Developed for the G. E. Contract with the University of Illinois. Unpublished report, June 16, 1961.

3. SWANSON, Don R. Searching Natural Language Text by Computer. *Science,* vol. 132, 1960, p. 1099.

4. ———. Research Procedures for Automatic Indexing. Machine Indexing; Progress and Problems, Third Institute on Information Storage and Retrieval, February 1961, American University.

5. ———. Interrogating a Computer in Natural Language. Congress of the IFIP, August 27, 1962, Munich, Germany.

6. MONTGOMERY, Christine A. and SWANSON, Don R. Machine-Like Indexing, by People. To be published in *American Documentation.*

Application of Advanced Data Processing Techniques to University Library Procedures

EDWARD HEILIGER, Librarian
University of Illinois Library, Chicago Division, Chicago, Illinios

THE UNIVERSITY of Illinois is planning a new campus in Chicago, which will accommodate 20,000 students by 1969-70. This will expand the present operation at Navy Pier some five-fold and calls for expanding the library collection to a large size as rapidly as possible. It was decided to investigate what data processing could do to assist in this growth. Dake Gull, formerly of the Library of Congress and now with General Electric Company, offered his help and guided us through the first year of our work.

Initial Analysis of Library's Work

The first job was to flow chart the library's present work in computer terms. This meant analyzing every step of every job in the library in yes-no terms. This proved to be an exciting task, and the library staff completed the job by volunteering for many hours of night and week-end work. It soon became evident that many of the present procedures needed changing. Savings resulting from changes more than justified the effort. One by-product was that the charts provided excellent manuals for explaining the work of each department. Three years later, these charts are still being revised. A complete set of the charts is available in the report on our work entitled *Advanced Data Processing in the University Library,* just published by Scarecrow Press (*see* review in this issue).

During the first year and since, a definite effort has been made by the library staff to orient itself in this new field. Frequent meetings, without agenda, were held to discuss computers, data processing and related matters. Literature on the subject was circulated, and meetings attended. American Documentation Institute meetings were particularly helpful. This effort will pay off in the years ahead when the work in all departments will have to adjust to the new system.

Various ideas were discussed at some length during the first period. One of these was microstorage and retrieval therefrom of large journal files, using microwave to carry the articles to the print-out (life-size hard copy) at the service point. This was dropped because the AVCO Corporation, which was developing the machinery, was having optical problems. Another possibility was a mechanical shelf-reader, which could read a miniaturized LC card on the spine of each book (on thermo-plastic tape) and kick out any book not in its proper place on the shelf. This was not pursued further because the machine had not yet been invented. In the same category, exit-control machinery was worried through. One promising lead was the use of odors. With its distinctive wavelength, an unoffensive odor could be applied to a certain spot on the spine of each book and removed as the book was charged out. Books not so treated would activate a signal at the exit. All of this was a far cry from what we finally worked into.

Because of the flow charting, the Council on Library Resources encouraged our interest in computer applications and a systems approach by awarding us a grant to develop this further. The University of Illinois Research Board also contributed. Money was needed to staff a project and to hire outside technical help. Two of our own staff had

Paper presented at the Second General Session of the 53rd Annual Convention of Special Libraries Association, May 29, 1962, Washington, D. C.

developed particular competence and were released for full-time work on the project. A contract was negotiated with General Electric's Defense Electronics Division to provide a certain number of man-hours of technical assistance and to deliver a report on its work, with the stipulation that the best machine for each job should be recommended, regardless of manufacturer.

Our two men spent much of their time in Bethesda, Maryland, with the G.E. information specialists and the rest of the time in Chicago digging out the facts needed to further the study. These two were constantly learning a great deal, as were the G.E. men. The latter were eager to understand the library situation and asked for certain information. The members of the library staff were asked to write essays on what they expected the project to do. They were also asked to debate pro and con such topics as: "RESOLVED: We should stop binding secondary periodicals; each faculty department should have a catalog; we should check in secondary journals; we should buy our cataloging and processing; it is more important to serve the faculty well than it is to serve the students well; the library should buy extra copies of journals to put in departmental offices and discard them after use." Also, an analysis of reference questions was made, including a play-by-play, word-by-word account of the reaction between reference librarian and the students when certain questions were being asked.

Decisions had to be made about the scope of the project and method of approach. It was decided to use a computer in the system, to use the systems approach relating all work in the library to the system, to think constantly in terms of other libraries as well as our own, to make cost studies, not to emphasize information retrieval and to consider cataloging first because of its relative complexity. With reference to the systems approach, it was considered important to devise a flexible system that would not be destroyed by obsolescence of types of machinery adopted by the system. The decision on information retrieval was dictated by the fact that much research is being done on this elsewhere and belief that the state of the art still favors the reference librarian and his tools. Cost studies were considered necessary because of the need to appraise the financial feasibility of the new system. The most important decision, that to base the system on a computer, was made because it was soon evident that herein lay the secret to a new era in librarianship.

Use of Computer with Book Record

Perhaps the best way of explaining the system developed is to describe the work flow.

Any type of order card, holding all the information needed for machine use, can be used. The card is searched. Machine search is not yet feasible. When it becomes feasible, there will still have to be a human verifier who can prepare the IBM card for searching. An attempt will be made at this point to provide LC cataloging information. If this is not available, the Catalog Department will have to alter or add to the information on the order card when it receives the book.

After searching, the order card information is transferred to an IBM card (or set of cards) by a keypunch operator. This is the point at which errors in the system are most likely to occur. A professional person is not needed to revise the keypunch operator's work—it can be done by a clerical person.

This IBM card will be used to create a magnetic tape record that can be read by a computer. Once a week a new set of cards will be put onto tape. Rush orders can be scheduled twice a week and handled manually.

Once the bibliographic and order data are on the tape, the computer can produce a printed copy of the order to be sent to the jobber or publisher. In the process it will automatically deduct the amount from the proper book funds indicated on the tape. The order forms will be so printed that the address of the jobber or publisher will fit correctly into a window envelope.

At this stage the first of the control documents will be created on a separate tape, which will be automatically up-dated at the time of each ordering and at the time of each step in processing. This control document will be called the Processing Information List (PIL) and will be printed out once

a week and be available at various service points in the library. The program will instruct the machine which items are to be taken from the main tape to create the PIL. New orders will be added regularly.

At this point the computer punches the fund information onto an IBM card, which is then collected with previous fund cards, and a printed fund list is prepared on an accounting machine.

When the books come from the jobber or publisher, they are sent to the cataloging department. The invoice is then manually checked against the up-dated PIL. Added information and/or changes will be indicated to instruct the keypunch operator in making a new IBM card, which will automatically replace the old one on the tape. One kind of information included will be the amount of discount. This up-dating of the main tape will be done at the same time the new orders are added. Also any revisions of the tape caused by cataloging changes, including discards or lost books, can be made.

The computer will now be able to up-date the entry in the Processing Information List. It will also be able to begin creation of the second control document, the catalog.

Once each month all completed entries in the PIL will be removed and placed in the monthly cumulative edition of the catalog. Each month the cumulated edition will supersede the previous monthly edition. After a certain number of cumulations, varying between nine and 28 depending on the size of the collection, a total holdings edition of the catalog will be printed out. The computer can print out only five copies plus the original. It can also produce a Multilith mat, which can be used to produce additional copies. The library planning for the new campus calls for all library facilities to be in one building with library catalogs in each faculty department and frequent delivery service from the library.

In preparation of the book for use, the computer will produce IBM cards that can be used by an accounting machine to print book pockets and labels. These IBM cards can then be reproduced by a reproducing punch to provide a permanent book card (IBM, plastic rather than paper).

The circulation process envisaged at the time of the circulation of the book includes creation of two new IBM card documents, which will take information from the IBM book card, from the reader's identification card, and static information set into the charging machine (such as date). The book card will always be in the book except during the charging process. These two new IBM card documents include a charge card and a return card. The charge card is kept at the circulation desk until the library closes at night. It will then join other charge cards and will be fed into the computer to create another control document, the Daily Circulation List. The return card, which will appear to the borrower to be a date-due card, will serve a vital function in the discharging process. The Daily Circulation List, automatically compiled each night, will include the following information: classification number, date due and borrower's identification number. Multiple copies will be produced so that they can be posted in the stacks and at service points. The list also tells whether a book is on reserve, at the bindery, or otherwise located.

In the discharging process, the return cards are removed from the pockets of the books and used by the computer to delete this entry from the Daily Circulation List. In the case of overdue books, all but the very largest libraries would have the computer produce IBM cards that would be fed into an accounting machine to produce overdue notices. In very large libraries, the computer could produce a new tape from which overdue cards could be printed out.

The Daily Circulation List can be printed out in many orders: by class number, by ID number and by due date. It would also be possible to have printed a list of books on loan to faculty or any other group programmed for. It is also possible, and somewhat expensive, to print out a list of all books borrowed by any certain person during any certain period of time. This interests the University counselling service.

Use of Computer with Serial Records

The serials problem is somewhat separate and less dependent on other parts of the

system. Each serial title and information about that title are punched out on IBM cards and transferred to tape. At the time of this transfer, a card is punched out for every issue of that serial that will be received that year; one card will be punched for every bound volume that will appear for that serial for that year; and one card will be punched for each title page and for each index that will be received for binding. At the same time the total serials holdings of the library will be printed out by the computer in list form.

This list, another control document, is called the Annual Serials List. Information for each item will have the complete title, complete holdings by year and volume number, frequency of issue, average data of arrival and binding information. When a serials piece is received in the library, the correct card, which has been previously punched by the computer, will be manually removed from the file and placed in a hopper. At the end of day these will be put on tape and will help create the final control document, the Weekly Serial List. The list contains an abbreviated title, a current volume number, number of issues per year, average date of arrival and whether or not the serial is at bindery. If a card for a given serial does not reach the computer by a certain predetermined date, then a claim notice is automatically printed by the computer. The pre-punched bindery card can be dropped out in such a fashion that the bindery load can be spread evenly throughout the year, if this is desired. Financial records and orders for new subscriptions and renewals will be printed out once a year.

Other Uses and Plans

Although the system does not deal with information retrieval as such, the type of bibliography the computer can produce does make greater use of LC card information than do present card catalogs. With the computer programmed with a set of library filing rules and a set of symbols that describes for the computer the various parts of the bibliographic unit, it can print out, for instance, a list of books published in a given country, between certain years, on a certain subject (or combination of subjects), that are illustrated and have bibliographies. It will also be possible to permute on individual items in LC subject headings in the same fashion that *Chemical Titles* does on titles. This index has been dubbed POSH (permuted on subject headings).

Faculty reading interests are going to be put on a tape that will be matched with the tape of incoming materials to produce notices for individual faculty members telling them that a particular book has arrived that may be of interest to them.

The results of the cost and time analysis (not too thorough an analysis) showed present cataloging cost to be $8.05 and the rest of the processing $4.35 more. The cost of circulating a book was 41¢. The time to process a trade book averaged three months. This encouraged us to experiment with Bro-Dart's Alanar Book Processing Service during the past year. By using this service we have cut costs. We find ourselves accepting more LC cataloging because of it.

A complete mathematical model was developed for the system and is included in the published report. One of the jobs to be done is to test the formulae in this model. We are faced with the necessity of programming and more programming and need to hire a professional programmer who will train some librarians on our staff and, in the process, produce many much needed programs.

Metals Division Fall Meeting

SLA's Metals Division will hold its 13th Annual Fall Meeting in conjunction with the 1962 World Metal Show and 44th National Congress at the New York Coliseum, October 31-November 2, in New York City. A symposium, "The Diffusion of Technological Change," will be moderated by Dr. Luther H. Evans, Director, International Law Library, Columbia University. Louis Vaczek, scientist, author and teacher; Dr. Charles Moore, Director, International Copper Research Association; and Ernest W. Horvick, Director of Technical Services, American Zinc Institute, will be guest speakers at other meetings. A metals library will be set up in a booth where librarians will handle inquiries.

Coordination Through Cooperation—The Boeing Approach

GERALD J. OPPENHEIMER, Library Supervisor
Boeing Scientific Research Laboratories, Seattle, Washington

THIS ARTICLE WILL describe an attempt to achieve library coordination within a divisional company structure by the creation of a permanent committee whose sole members are the library supervisors.[1]

Background and Problems

During the 1950's a number of developments combined in producing a deteriorating library situation for which remedies had to be found. Among these elements was, first of all, the rapid growth of the Boeing Company from about 48,000 employees in 1951 to a peak of about 100,000 in 1957-58. The fact that this phenomenon not only constituted a gain of 52,000 employees but represented an ever greater proportion of scientific, technical and engineering manpower aggravated the problem for Boeing libraries. In addition, there was the increasingly prominent general predicament still facing libraries—the "raging" book and the no less violently "raging" report. Another factor, divisional operation, while improving over-all efficiency tended to inhibit effective communication between library units. It is this problem that became the major concern of those interested in improving the library situation.

How could an avenue be created for individual libraries to make recommendations on a company-wide policy? How could uniformity be achieved in the establishment of work standards, professional standards and professional job classifications? What steps should be taken to set up regular channels of communication that might prevent unnecessary duplication of material and would act as a high-speed interlibrary loan system? How could library procurement be improved in a system in which each library went through its divisional purchasing and accounts-payable departments whose practices varied from division to division? What might be done to facilitate borrowing from local libraries?

Towards the end of 1958 top management at Boeing began to stress the need for the development of a company library policy and service objectives. During the early part of 1959 discussions in corporate engineering meetings indicated the desirability of achieving these ends by committee action in lieu of a single library system for all divisions of the company. In March of that year the Library Supervisor of what is now the Boeing Scientific Research Laboratories Library in the organization of the Vice-President-Research and Development was designated as the permanent Library Committee Chairman in a memo by the Senior Vice-President. Each division was requested to designate a qualified representative. The Committee functions were primarily to review the current library organization, to establish areas in need of improvement and to make recommendations concerning general matters of library administration and service consistent with company and division requirements.

In April 1959 the Library Committee submitted its report entitled "Libraries for Research at Boeing." In reviewing the current library organization, it stated that due to the autonomous character of each divisional library, widely diversified policies in almost all aspects of library service had been followed, which in spite of considerable individual attempts at cooperation prevented effective utilization of resources. Further limitations hampering realization of library potential were the lack of professional personnel, of space and of materials. In general, it was felt that libraries had served primarily as record keeping and issuing agencies to the detriment of their task of providing a true

1. Problems caused by decentralization of a company may find their solution in committee action even on a management level, e.g., *see* DAWSON, D. H. Management by Executive Committee. *Management Review,* March 1962, p. 44-6.

information service in support of the research, engineering and other functions of the company.

The Committee saw the need for improvement in a great number of areas: services, circulation systems, interlibrary loans, cataloging and indexing, union catalogs, branch libraries, types of library materials, acquisitions, budgets, professional and work standards. Recommendations were submitted to the Senior Vice-President and approved. The implementation of these recommendations was begun immediately.

Committee Organization

At present the Boeing Company is organized in the following divisions: Headquarters, Aero-Space, Industrial Products, all in Seattle; Transport, in Renton, Washington; Military Aircraft Systems, in Seattle and Wichita; and Vertol, in Morton, Pennsylvania. The libraries represented on the Committee are the Boeing Scientific Research Laboratories Library (Headquarters Division) with one branch library, Aero-Space Division Library with four branches, Transport Division Library, Industrial Products Division Library, Medical Library (Aero-Space Division) and the Library of the Wichita Branch, Military Aircraft Systems Division, whose needs in the Seattle area are administered to by the Aero-Space Division Library. Not directly represented at this time are the Vertol Division Library and the various libraries and collections attached to individual offices and departments.

The Chairman of the Committee speaks as the single voice of all Boeing libraries to upper management at Boeing or to other companies when conducting Committee business. Structurally, his position in the Headquarters Division gives line contact with upper management, which strengthens his Committee function. Meetings are called for specific purposes at the discretion of the Chairman who may invite, in addition to the designated representatives (library supervisors), other professional librarians or staff members whose contributions can be expected to be of value to the Committee's task. Information is exchanged, procedures for handling common problems are suggested, and cooperation is extended to all areas. The Committee's decisions are in the form of recommendations, advisory and coordinating in nature, not policy-making. With appropriate management approval, however, these recommendations achieve policy status.

Committee Achievements

The results of Committee actions to date justify, I believe, management's decision to establish it. One of the initial objectives of the Library Committee was accomplished when administrative and most lead positions in Boeing libraries were filled by graduate professional librarians. Management recognized their professional status by including these positions in the supervisory and special payrolls.

Concern with the professional character of the service to be rendered also led to the removal of non-library material, such as specifications, drawings and technical orders, from the library units to more appropriate areas.

The Committee has placed a professional librarian on the University of Washington campus to act, under the immediate supervision of the Chairman, as liaison person between the University and Boeing libraries. This action has resulted in advantages for all local library systems. The University Library no longer needs to perform interlibrary loan services for Boeing but has a single point of contact, who is well briefed in his responsibilities. As a result the University is guaranteed proper handling of material, including prompt return. Boeing personnel are able to obtain, in most cases, material from either the Seattle Public Library or the University of Washington Library within a day. This sort of interlibrary cooperation anticipates in some respects the remarks made recently by Eugene Jackson.[2]

Through the Library Committee the Boeing Company has become a Sustaining member of Special Libraries Association and an institutional member of the American Documentation Institute, thus deriving the benefits that are a part of belonging to a national service organization and in this way acknowl-

2. JACKSON, E. B. Special Libraries. *Library Trends,* vol. 10, October 1961, p. 219-22.

edging its interest in and concern with library problems in all their ramifications.

The Library Committee in January 1962 distributed the first edition of its *Union List of Serial Publications in Boeing Libraries (Seattle Area)*. This list was prepared on an IBM 1401 data processing system. Frequent updating is planned to have at all times current holdings information available for all Boeing library units. One of the next projects will be the creation of a union catalog of books.

On January 1, 1962, a direct purchasing procedure for all library items went into effect for the Boeing Scientific Research Laboratories Library as a pilot operation to be adopted, if successful, by all Boeing libraries in the Seattle area. The improvement in service noticeable after several months, particularly in delivery time and avoidance of red tape, leaves little doubt that this step is of immense benefit to the library and its clientele and to the company from a cost standpoint.

In recognition of the need for material in foreign languages, a translation service is attached to the Boeing Scientific Research Laboratories Library. Its staff consists of two full-time foreign literature analysts who translate material and prepare bibliographic tools for the control of commercial translations and original foreign language articles. Other divisional libraries, after determining their needs, may wish to establish a similar service.

In an attempt to determine the feasibility and desirability of mechanized information retrieval systems for Boeing libraries, a subcommittee on information retrieval has been appointed whose primary function will be to advise the libraries when need, utility and cost of such a system are optimum.

The Committee, as the Boeing representative, addresses itself to outside organizations, such as the Aerospace Industries Association, ASTIA and others, in affairs affecting the operation of the Boeing library system as a whole.

It should be stressed that the Library Committee at all times strives to achieve rational uniformity within divisional autonomy. Hence, there is no central acquisitions department, there are no uniform circulation or cataloging policies. The Aero-Space Division Library routes periodicals; the Boeing Scientific Research Laboratories Library distributes, on a daily basis, copies of tables of contents. Instances of such differences could easily be multiplied.

D. T. Bedsole recently pointed out some difficulties that might prevent the successful development of such cooperative arrangements.[3] Among others he mentions lack of participation on the part of some libraries, lack of true reciprocity, lack of authority as a group, opposition to some course of action tending to standardization or centralization. Yet, the actual working together of our Committee and the results of its activities indicate that these shortcomings are not necessary concomitants of such a system. It remains to be seen whether future developments in the library area will allow us to subscribe to Bedsole's statement that "In spite of the possible limitations listed above, the cooperative arrangement may be the most desirable plan for many corporations."

Each of us, as professional librarians, is well aware that a committee, such as this Library Committee, that recommends action cannot be a panacea of itself. The successful operation of such a program as has been described here can only be a composite of many elements. Professional librarians are needed to properly assess the shortcomings of any library system and to effectively provide the required remedies. Active management support of the Committee's recommendations is an absolute requirement for success of such a venture, since policies originate with them. There must be effective communication between the library and its clientele and an accurate determination of its need. For this the Committee must rely upon the individual library unit. Finally, it is necessary for the members and the libraries they represent to adopt and carry out the plans and objectives of the Committee with a united spirit of cooperation.

3. BEDSOLE, D. T. Library Systems in Large Industrial Corporations. Ph.D. Dissertation, University of Michigan, 1961, p. 284-8.

A Suggested Orientation Program for Special Libraries in the Field of Science-Technology

SUSAN ARTANDI, Research Associate
Graduate School of Library Service, Rutgers University, New Brunswick, New Jersey

IN A SPECIAL library that serves the scientific and technical research department of a corporation, orientation in the use of the library should be given on several levels according to the educational backgrounds and work assignments of the people involved. The following three categories may be the most useful:

1. Scientists and engineers with the Ph.D. or M.S. degrees
2. Scientists and engineers with the B.S. or B.A. degrees
3. Technicians

Broadly speaking, these groups are comprised of persons who have similar levels and types of library needs and use. It should be remembered, however, that any general statement or assumption about these groups will not always hold true. There will often by atypical cases in each category. Such cases should be handled at the level required.

Scientists on the Ph.D. and M.S. level should tour the library along with other areas of the plant on their first day of employment. During this tour they should have an opportunity to meet the library staff briefly but casually. A descriptive booklet about the library should be given to them on this occasion. The first days in a new job are very exhausting; there is a lot to see, innumerable faces and names to remember, and the inevitable strain of adjusting to new surroundings. After a week or two the scientist is usually ready to start work on his first research project. It is at this time that a meeting with the librarian should be scheduled.

During this interview the librarian should describe the arrangement of the library, indicate the nature of the available materials and services, show how and where particular items can be found, point out materials likely to be specifically useful in the narrower field of research in which the scientist is going to work, and explain the organization of existing internal indexes. It is at this time that routing arrangements may be made and explained and the researcher introduced to the use of such services as internal abstract bulletins, table of contents service and so on.

Scientists on the doctoral or master's level know the current literature of their specialty and usually are exceptionally well informed of new developments in their particular fields of interest. They will be able to point out areas in the collection that need to be strengthened or to make useful suggestions concerning future purchases. This means that the meeting should be an active discussion and exchange of views in which the librarian should seek awareness of the scientist's information needs and knowledge and the scientist should get a complete picture of the resources of the library.

The orientation program for the Ph.D. and M.S. groups is based on the assumption that this group is not in need of basic instruction in the use of library materials. A recent study* indicates, for example,

Based on a lecture given at the Graduate School of Library Service, Rutgers University, by the author, who was formerly Assistant Librarian, Union Carbide Plastics Company, Bound Brook, New Jersey.

* Survey made by Joint Committee of the ACS Division of Chemical Literature and Chemical Education. *Chemical & Engineering News,* May 15, 1961, p. 118.

that 96 per cent of all schools teaching chemistry and chemical engineering teach the use of chemical literature, 40 per cent in formal course work and 56 per cent through the use of course projects and related methods. Men in this group have all had to work on at least one major research project to qualify for their degrees, and should have used a library and applied their library training extensively during that project.

The group with undergraduate degrees is quite different in this respect. Their use of library materials during the undergraduate years was probably rather limited. Their library and literature backgrounds will vary widely in accordance with the philosophy of instruction of the school they attended, and they lack the reinforcement of instruction that comes from using the library in connection with research of personal and immediate importance to them. The group's familiarity with the use of a library will also vary with their previous employment experience and the previous availability and accessibility of a library.

The orientation of this group should also begin with the same casual tour of the library on their first day. An interview with the librarian should also follow at a later date, after the employee has become accustomed to his new surroundings and has a clear idea of the nature of his work.

However, this meeting will be conducted along somewhat different lines from that described for the first group. In this instance, there will probably be less of an exchange of ideas and information and more direct explanation by the librarian. In addition to the description of services and resources, he should thoroughly describe the use of various reference tools. Particular emphasis should probably be given to the use of indexes to the periodical and patent literature and the organization of available internal indexes. Direct instruction in the true sense of the word is needed here. It is probable that as the scientist progresses with his work, several follow-up sessions will become necessary.

The technician is a high school graduate and knows very little about the use of a specialized collection. Theoretically, he would need the most in the way of instruction. However, his work demands very little use of the literature, and he is expected to spend most of his time in the laboratory. His use of the literature will be largely limited to basic monographs and standard handbooks. This group also should be included in the first day general orientation tour and later should be given individual guidance and assistance as the need may arise. Any instructional program is, of course, most successful when it directly meets current needs of which the user is aware.

The objective of this program is to ensure efficient use of the library's resources by research personnel. The program should be strengthened through day-to-day assistance and constant and good communication between librarian and user. In the special library, with its limited number of users and close cooperation between user and librarian, a subjective approach to the evaluation of an orientation program is far more likely to be valid than in other library situations. Analysis may be based on the judgment of the staff, on the appraisal of important incidents and on samples of users' opinions. It should, however, be both conscious and continuing if it is to be most fruitful.

Library Technology Project Report

GLADYS T. PIEZ, Senior Editorial Assistant
Library Technology Project, American Library Association, Chicago, Illinois

Good progress is being made on Phase II of the binding project, which is sponsored jointly by SLA and ALA and was described in *Special Libraries* in April 1962, p. 208.

Guide to Library Record Players

The most recent in the Library Technology Project's series of major publications is Number 5, *The Testing and Evaluation of Record Players for Libraries.* Consumers' Research, Inc. of Washington, N. J. evaluated 14 record players, eight of the monophonic type and six stereophonic. Because the record players tested are equipped with earphones, they are well suited for library installations where it is impractical to provide separate listening rooms. With players of the earphone type, library users may listen to records in the reading room without disturbing other patrons.

Part One of the book discusses the components of record-playing equipment and how they function. Part Two is composed of 14 sections, each presenting the results of tests on a particular player. Each player is assigned Consumers' Research quality ratings of "recommended," "intermediate," or "not recommended," on the basis of the tests.

The project was financed by the Council on Library Resources. LTP plans a continuing series of test programs on listening equipment for library use. The present report is sold by ALA for $2.00.

Microfilm Print-out Devices

A project to determine the basic principles of the whole problem of print-out and to evaluate present processes, methods and equipment for producing full-size, hard-paper copies from microtext is nearing completion. Made possible by a grant from the Council on Library Resources, the project is being conducted by William R. Hawken. Early publication of the results is planned.

Electric Eraser Tested

A new type of electric erasing machine was tested by Consumers' Research for the Library Technology Project. The February 1962 *Consumer Bulletin* reports the results under the title, "A New Electric Eraser for Draftsmen, Artists, Library Workers." *Presto Model 80,* manufactured by Metal Specialties Manufacturing Company of Melrose Park, Illinois, was the eraser tested. Four samples of the *Presto* eraser, differing in various details of components and construction, were tested. The manufacturer indicated that perhaps none of the samples was a regular production model, and for this reason the rating given is a tentative one. *Consumer Bulletin* places the *Presto* in the "intermediate" class. It was found convenient for occasional small erasures, but for frequent use or for fairly large areas, the small-diameter eraser has a disadvantage because it wears away rapidly.

LTP Charging System

Development of the Library Technology Project self-charging system for circulation control, announced in the April 1962 issue of *Special Libraries,* has been completed successfully by George Fry & Associates.

Three prototypes have been built, two of them hand and one of them electrically operated. An installation and operation manual has been prepared and the necessary forms designed. Cost data and ideas for further improvements were obtained from a test installation of the system in a large branch library. Cost data show that the system is more economical for certain types of libraries than the self-charging transaction system described in *Study of Circulation Control Systems* (LTP Publication Number 1). Steps are now being taken to market this new system.

An information sheet describing the LTP charging system will be sent on request (see item 3 below).

Information Sheets

As a way to disseminate information on its own projects and on subjects it is frequently asked about, the Library Technology Project has prepared information sheets which it is distributing on request. Those of interest to special librarians are listed here: *1)* the use of carpeting in libraries; *2)* a model insurance policy for libraries, together with a list of companies that are prepared to underwrite the policy's provisions; *3)* LTP charging system; *4)* LTP pamphlet boxes; *5)* LTP book labeling system; *6)* small catalog card duplicators; *7)* selection of a microfilm reader for the library; and *8)* selection of a reader for micro-opaque materials.

New Special and Other Library Programs of the U.S. Office of Education

FRANK L. SCHICK, Assistant Director, and HERBERT HOLZBAUER, Research Library Specialist, Library Services Branch, U. S. Office of Education, Department of Health, Education & Welfare

LIBRARIANS READILY agree that the primary function of libraries is educational, and special librarians will want to have it understood that their responsibility extends to the support of research and development programs of the organizations they serve.

At first glance it seems contradictory that with this stress on research our knowledge of special libraries is so fragmentary. In a recent survey of library science research studies[1] conducted during the last three years it was found that among 200 statistical surveys, which are undertaken on a recurring basis, the least well-represented type was that of special libraries. Similarly among 230 significant nonstatistical studies, the coverage of special libraries ranked second from the bottom.

Among the reasons for this limited coverage it should be mentioned that two of the three largest sponsors of statistical library surveys, the State Departments of Education and the U. S. Office of Education, have not dealt with this topic at all, and the third—State Library Agencies—cover it, if at all, only on a statewide basis. In addition, the infinite variety of special libraries contributes to the difficulty of dealing with them comprehensively.

However, isolated studies sponsored by a variety of organizations for particular purposes have been made over the years. Some of these have given valuable aid to particular segments of the special library area. In some instances directories and lists of special information activities have been released. In others, surveys conducted for a single organization were made available only to the sponsoring agency.

For many years this lack of nationwide special library information has been of concern to the Library Services Branch which, according to the annual appropriations bill,[2] has the delegated responsibility for ". . . surveys, studies, investigations and reports regarding libraries; [the] coordination of library service on the national level with other forms of adult education; [and] the development of library service throughout the country. . . ." Until now the frequent requests about all U. S. libraries from government agencies, professional and trade associations and organizations, administrators, educators, librarians, UNESCO and many others could not be fully answered because no nationwide special library data could be included. In addition, management, which depends frequently on statistics as an essential tool, should find special library data useful in the assessment of this service. For these reasons, bridging this information gap holds a high priority in the development of the research and statistics program of the Library Services Branch of the Office of Education.

Federal Educational Responsibilities

The concern of the federal government in education goes back to 1785 when the Second Continental Congress enacted basic ordinances, which saw to it that lands be reserved for public schools. In 1867 Congress passed the enabling act of the Office that provided that this agency "collect statistics and facts showing the condition and progress of education in the several States . . . and to diffuse such information . . . as shall aid the people . . . in the establishment and maintenance of an efficient school system, and otherwise promote the cause of education throughout the country."[3] Operating under several names and federal agencies until 1953, the Office of Education became one of

the constituent agencies of the Department of Health, Education and Welfare. During its 95-year history the two basic functions of the Office of Education remained to administer federal legislation and to conduct statistical survey and research studies relating to education. Both of these responsibilities are now reflected in the program of the Library Services Branch of the Office of Education.

The Evolution of Library Services

The Office's interest in libraries goes back to 1870 when the first survey on libraries was conducted and was published as *Statistics of Public, Society and School Libraries.*

In 1880 Melvil Dewey, the initiator of so many basic concepts of American librarianship, discussed with Commissioner Eaton of the Bureau of Education the appointment of a library officer "to give his entire time to looking after general library interests."[4] While library studies were conducted intermittently and on a part-time basis, only in 1938 was a separate library unit created, which remained until 1958 under the direction of Ralph Dunbar. Until 1956 the staff of this office never exceeded four professional and three statistical and clerical workers. Following the passage of the Library Services Act in July of 1956, the only federal grant program in the library field, the staff of the Library Services Branch was increased to 23 and consisted of 10 professional and 13 administrative, statistical and clerical employees. The librarians include the director and assistant director, the school, college and university and public library specialists, three extension specialists engaged in the administration of the Library Services Act and two research librarians.

In 1960 the Library Services Act, which provides annually $7.5 million for rural public library development, was extended for a five-year period. The following year Congress authorized a staff increase of one clerical and two professional positions. They are responsible for school and special libraries.

Special Library Plans

In June of 1962 Herbert Holzbauer joined the Branch as Research Library Specialist to conduct studies, research and statistics in the area of special libraries with the added responsibility for maintaining state-of-the-art information in the areas of advanced documentation techniques, retrieval and new pattern recognition systems.

Since 1957 he has been Chief, Library Branch, Foreign Technology Division, USAF, Wright-Patterson Air Force Base, Ohio. His previous experience includes positions as Technical Assistant, New York Public Library; Film Service Director, Library of Hawaii; Head, Technical Ordnance Library, U. S. Naval Quality Evaluation Laboratory, Oahu, Hawaii. He received his M.A. degree in library science from Columbia University.

In order to develop a statistics program in the special libraries field, John G. Lorenz, Director of the Library Services Branch, contacted the Special Libraries Association in 1959 and established a liaison which contributed to the creation of the SLA Statistics Committee. The cooperation with SLA was maintained by Frank L. Schick, Assistant Director, who is in charge of the Branch's research and statistics program. During the 1962 SLA Washington, D. C. Convention, the members of the SLA Statistics Committee, Ruth Fine, Katherine Dodge, Frances Poremba, Gordon Randall and Florence Turnbull, attended the first Branch meeting on special libraries and were joined on this occasion by Nettie Taylor, Frank Jones and the members of the Federal Library Survey Statistics Committee: Paul Howard, Marion Bonniwell, Louise Clickner and John Cronin.

First Special Library Surveys

Due to the diversity of special libraries and the limitations of staff and resources it is planned to undertake annually one survey to cover a different segment of the special library universe. The initial study to be undertaken is a survey of special libraries serving state governments. It is anticipated that this survey will complement and further substantiate the findings of Dr. Phillip Monypenny's survey of state libraries. Data from diverse libraries such as state health and highway departments, departmental libraries in agriculture, finance and taxation and con-

servation will be collected. Of primary interest will be information concerning the number and kind of personnel, the broad and specific subject areas covered, collections of these libraries, their expenditures and the scope of their services. It is hoped that data collection can start in the beginning of 1963.

A survey of libraries serving the federal government is to start in the fall of 1963. This study would use as a point of departure, the yet unpublished "Survey of Federal Departmental Libraries," which Dr. Luther Evans conducted for the Brookings Institution. Further studies will deal with special libraries serving commerce, industry and various organizations and associations throughout the country.

Through interlibrary cooperation special libraries have been a part of the nation's library resource. In embarking now on this new research and statistics program, the Library Services Branch looks forward to providing, with the cooperation of special librarians, information about their libraries' functions, missions and contributions to the economic, governmental, industrial and research activities of the country.

CITATIONS

1. SCHICK, FRANK L. Library Science Research. *Journal of Education for Librarianship,* Fall 1962.
2. Public Law 87-582. 87th Congress. H.R. 10904, August 14, 1962, p. 8.
3. Title 20. U.S. Code S1, p. 3649.
4. Papers and Proceedings of the 14th General Session of the American Library Association, 7th Session. *Library Journal,* vol. 17, August 1892, p. 66-7.

Photographs, courtesy U.S. Office of Education

Librarians Rate LC Classification

ANNETTE L. HOAGE, Head of Special Services
Trevor Arnett Library, Atlanta University, Atlanta, Georgia

A SURVEY by the author of use of the LC Classification in libraries in the United States was completed in May 1961.* Its two purposes were to describe the development and structure of the Classification in relation to its use and to obtain librarians' views and determine the extent to which they use the Classification.

Sources of the data were questionnaires, interviews and available related material. A sample of 117 institutions was chosen from a list of special, college, university and public libraries compiled by the Library of Congress staff in 1954. A total of 459 questionnaires were returned by librarians in 72 per cent, or 89, of the libraries. Separate questionnaires were constructed for *1)* administrative officers, *2)* chief catalogers, *3)* classifiers and *4)* circulation, reference and divisional reading room librarians. Questions were asked concerning characteristics of the classification and procedures for making policies, applying the schedules, training employees, and evaluating the system. The results are summarized below:

Critical Evaluations

GOOD FEATURES OF THE LC CLASSIFICATION

Comprehensive
Reasonably logical
Practical
Up-to-date
Expandable
Provides a variety of subject relationships

Geographic subdivisions
Special subject subdivisions
Alphabetic subdivisions
Integration of biography

* HOAGE, Annette L. The Library of Congress Classification in the United States. Unpublished D.L.S. dissertation, School of Library Service, Columbia University.

QUESTIONABLE OR CRITICIZED FEATURES OF THE LC CLASSIFICATION

Lack of flexibility
Notation

Tables
Directions for use
Lack of a combined index

Date subdivisions
Title subdivisions
Parenthetic numbers
"General special" category

Most of the schedules were accepted with practically no criticism. However, religion, psychology, bibliography, music and philosophy were considered in need of improvement by some librarians. Critics usually were those who classify materials in very large or highly specialized collections, and in some instances they found that it was possible to expand undeveloped sections of the schedules to accommodate their special needs. More difficulties arise from insufficient interpretation of the schedules than from structural deficiencies.

Operative Practices in Libraries

MOST LIBRARIANS

Accept 90-99 per cent of the numbers on LC cards and proof-sheets.
Record modifications of the classification.
Classify a title in 10-15 minutes. Ten of 45 classify one in five minutes or less.
Use the classification mainly as a location device. Forty-five per cent use it as a reference tool.
Do not follow the order of classes in the stacks.
Need training and experience to classify competently.
Take a month or more to train non-professional employees to use the classification.
Use informal, unwritten employee training methods.

FEW LIBRARIANS

Keep copies of the schedules near the shelves.
Make the LC subject heading list available to the public.
Maintain public shelf lists or classified catalogs.
Have an active staff committee concerned with classification policy.

Few records of use of the classification were kept in the libraries in the sample; most decisions were evidently made on the basis of experience and informal observations. These are valid sources of information, but objective studies might be more reliable and permanent bases for developing policies and procedures. The evidence suggests that the training of non-professional employees could be improved by introducing systematic programs.

Conclusions

The results of this study indicate that the characteristics of the LC Classification that facilitate its use outnumber those that hinder its application in libraries in the United States. It was considered suitable for their libraries by 91 per cent of the respondents; the reasons most often cited were: *1)* the subject approach is acceptable to users, *2)* it reduces administrative effort and production costs, and *3)* it is up-to-date. It is used for all types of materials in 60 per cent of the libraries without significant modifications.

On the basis of experience with this survey, it appears that individual-directed interviews applied to single or homogeneous groups of libraries may be an effective method for follow-up research. A logical point at which to begin may be the M (music) class or the B-BJ (philosophy) subclass since librarians have criticized them, and they have not been revised by the Library of Congress staff. Other phases of this topic that deserve more consideration are: *1)* the reasons why librarians do not accept numbers in the schedules and on the proof-sheets and cards, *2)* use of the Classification as an aid in reference work, including ways that the schedules are used as bibliographies, and *3)* the administration of classification such as organization of the work, nature of records and in-service training methods.

CURRENT CONCENTRATES Of The Library World

The Outlook for Special Librarians

THE TRENDS looking toward 1980 that will affect special libraries include the following: a doubling of the gross national product; a geometric increase in research and development; an increase in the proportion of special librarians to research workers; the entrance of more technical persons into special librarianship; a broader and deeper spectrum of education for the field; an increasing tendency of the population, governmental units, and industry toward accumulation into metropolitan aggregates; major increases in college and university enrollments; the inauguration of university library service to nearby "research parks"; the differentiation of public library service to individuals from that rendered to organizations; continued growth of government-related informational agencies with pioneering responsibilities.

Looking still further ahead, J. P. Pickard has predicted that by the year 2000, 85 per cent of the country's 320 million people will live in urban areas. This is the most important phenomenon for special libraries, both because of their identification with companies . . . and because of the high correlation between metropolitan areas and Special Libraries Association membership addresses.

If the 30,000 special librarians of 1970 have swollen to 60,000 by 1980, that total would equal the number of scientists and engineers in research and development in colleges and universities in 1958. It does give one pause. Even if this figure is rejected as unrealistic, it does dramatize the urgent need for the quantum step forward in library education.

Critically important in the next decade is the expansion of effort in the application of computers to information retrieval problems. This increase will result in the need for a greater number of special librarians rather than fewer. Widespread experience with data processing installations is that, as the complexity of the equipment secured increases, more and more highly skilled persons are required to effectively utilize the capacity. In view of the preceding, the assertion is made that there will not be fewer than 40,000 special librarians in 1980 and not more than 60,000.

Special librarianship can expect that the next two decades will see the rise of many distinguished special librarians in the college and university field. Of necessity there will be more departmental libraries and those of higher caliber because of the enrollments mentioned elsewhere and the introduction of research earlier in the academic life and its continuation past the doctoral level.

In 1980 there will be university-managed and industry-sponsored special libraries that are arising and will arise in the vicinity of the principal universities. Their advanced use of new methods of bibliographic control, information retrieval, and data exchange will make their operations indistinguishable from those of special libraries of outstanding profit-making organizations in the same subject fields.

By 1980, special librarianship will be in its 71st year as a profession (or 82nd if based upon the founding of the Medical Library Association). It will have absorbed many elements from documentation. A merger will have taken place, but the surviving member will not need a broader charter than the SLA objective of "Putting Knowledge to Work." It can look back proudly on a past filled with accomplishment, innovations, and leadership and forward to a full partnership on the team conquering ignorance and misunderstanding.

Extracted from "Special Libraries" by Eugene B. Jackson, *Library Trends,* vol. 10, no. 2, October 1961.

Bylaws
Special Libraries Association

Article I: Name and Objectives

SECTION 1. The **name** of this Association, a membership corporation organized and existing under the laws of the State of New York, shall be Special Libraries Association.

SECTION 2. The **objectives** of this Association shall be to encourage and promote the utilization of knowledge through the collection, organization and dissemination of information; to develop the usefulness and efficiency of special libraries or information centers; to stimulate research in the field of information services; to promote high professional standards; to facilitate communications among its members; and to cooperate with organizations that have similar or allied interests.

SECTION 3. Should **dissolution** of this Association become necessary, its property shall be distributed to an organization or organizations having similar objectives.

Article II: Membership

SECTION 1. The membership shall consist of Active, Associate, Affiliate, Student, Sustaining, Emeritus and Honorary members. Eligibility for and privileges of each class of membership shall be within the provisions of these Bylaws. The Association committee concerned with admissions shall be the authority on the eligibility of membership applicants.

SECTION 2. An **Active** member shall be an individual who, at the time of application, holds a professional position in a special library or information center and who fulfills one of the requirements set forth in a, b, c or d below:

a. Holds a degree from a library school of recognized standing and has had three years professional experience in a special library or information center;

b. Holds a degree with a major in library science from a university, college or technical school of recognized standing other than a library school, and has had at least four years experience in a special library or information center, including three years of professional experience;

c. Holds a degree from a university, college or technical school of recognized standing other than a library school, and has had at least five years experience in a special library or information center, including three years of professional experience;

d. Has had at least ten years experience in information service work of which at least five years has been professional experience in a special library or information center.

Active membership shall also be accorded to an individual who holds an academic position in a university, college or technical school of recognized standing and who is engaged in educating students in disciplines related to the professional aspects of information service work.

An Active member shall have the right to vote, to hold Association, Chapter and Division office, to affiliate with one Chapter and one Division without further payment, and to receive the official journal free.

SECTION 3. An **Associate** member shall be an individual who, at the time of application, holds a position in a special library or information center and who fulfills one of the requirements set forth in a or b below:

a. Holds a degree from a university, college or technical school of recognized standing;

b. Has had at least seven years experience in information service work of which at least two years have been professional experience in a special library or information center. One year of higher education shall equal one year of nonprofessional experience.

An Associate member shall have the right to vote, to hold any Chapter or Division office except that of Chapter President or Division Chairman, to affiliate with one Chapter and one Division without further payment, and to receive the official journal free. Upon qualification for Active membership, an Associate member shall become an Active member.

SECTION 4. An **Affiliate** member shall be an individual who holds a professional position in an organization other than a special library or information center and who has knowledge and experience that qualify him to cooperate in furthering the objectives of the Association. He shall have the right to affiliate with one Chapter and one Division without further payment, to hold any Chapter or Division office except that of Chapter President or Division Chairman, and to receive the official journal free. An Affiliate member may become an Associate or

Active member upon qualification for Associate or Active membership.

SECTION 5. A **Student** member shall be an individual who is enrolled in a library school of recognized standing either as a full-time or as a part-time student. A part-time student may not hold this class of membership for more than two years. A Student member shall have the right to affiliate with one Chapter.

SECTION 6. A **Sustaining** member shall be a firm, an organization or individual desiring to support the objectives and programs of the Association. A Sustaining member shall not have the right to vote or to hold office. With these exceptions, the privileges and benefits of this class of membership shall be determined by the Board of Directors.

SECTION 7. Status as an **Emeritus** member may be requested by an Active member who has held Association membership for 20 years, including any years as an Associate member, and who has reached age 60. An Emeritus member shall have all the rights and privileges of an Active member except the right to hold elective office in the Association or to be a Chapter President or Division Chairman.

SECTION 8. An **Honorary** member shall be an individual elected to this honor by the Association membership. At the time of his election, a candidate shall not be a member of the Special Libraries Association. Nominations shall be presented in writing to the Board of Directors and may be proposed by one or more Association members. Upon endorsement by a two-thirds vote of the Board, the nomination shall be submitted by the Board to the membership for election at an annual meeting. The total number of Honorary members shall not exceed 15 at any one time and not more than two may be elected in any one year. An Honorary member shall enjoy all the rights and privileges of an Active member except the right to vote and to hold office.

Article III: Board of Directors

SECTION 1. There shall be a Board of Directors that shall have power and authority to manage the Association's property and to regulate and govern its affairs. The Board shall determine policies and changes therein within the limits of the Certificate of Incorporation and the By-laws of the Association, shall take such actions as it considers necessary to carry out the objectives of the Association, and shall perform such other functions as the membership may direct.

SECTION 2. The Board shall consist of 12 directors elected by the membership: the President and President-Elect of the Association, the Chairman and Chairman-Elect of the Advisory Council, the Treasurer, six Directors and the most recent Past-President. At its first meeting the Board shall elect one of its members to serve as Secretary for one year.

SECTION 3. The chairmen of the committees responsible for Chapter and Division liaison with the Board of Directors shall be entitled to attend and participate, without the right to vote, in meetings of the Board except executive sessions. They shall represent Chapter and Division interests in relationships with the Board and shall inform Chapters and Divisions of decisions and policies affecting their interests.

SECTION 4. The Board shall hold at least four **meetings** annually and may hold additional meetings upon call of the President or upon written request of any three members of the Board. Meetings of the Board, except executive sessions, shall be open to members of the Association and by invitation of the President to nonmembers. Seven members of the Board shall constitute a **quorum.**

SECTION 5. A **vacancy** in the membership of the Board of Directors by reason of resignation, death or otherwise shall be filled by a majority vote of the remaining members of the Board. This appointee shall serve until the vacancy is filled at the earliest annual election permitting orderly nominations.

SECTION 6. The **term of office** of President, President-Elect and Past-President of the Association, Chairman and Chairman-Elect of the Advisory Council shall be one year. The term of office of Treasurer and Director shall be three years. All members of the Board of Directors shall serve until their successors are elected and assume their duties. The term of office shall commence at the adjournment of the annual meeting or if there is no annual meeting on July 1 following the election.

Article IV: Officers

SECTION 1. The **President** shall be the chief executive officer of the Association and, subject to the Board of Directors, shall have general supervision and control over its affairs. He shall serve as Chairman of the Board of Directors and shall preside at all meetings of the Association and the Board. He shall recommend to the Board such measures as he considers desirable to further the objectives and broaden the effectiveness of the Association. At the annual meeting he shall report for the Board on the general state of the Association and shall present for information or consideration any matters of policy or program that he or the Board desire to bring to the attention of the members.

He shall be a member ex-officio, without vote, of all Association committees except the Nominating Committee.

SECTION 2. The **President-Elect** shall perform such duties as the President may assign. In the event of temporary disability, absence or withdrawal of the President, all his duties and obligations shall be assumed by the President-Elect.

SECTION 3. The **Chairman of the Advisory Council** shall preside at all meetings of the Council and shall direct and coordinate its activities. He shall communicate to the Board of Directors and to the Council such matters and suggestions as may, in his opinion, increase the usefulness of the Council.

SECTION 4. The **Chairman-Elect of the Advisory Council** shall perform such duties as the Chairman may assign. In the event of temporary disability, absence or withdrawal of the Chairman, all his duties and obligations shall be assumed by the Chairman-Elect.

SECTION 5. The **Treasurer** shall perform the usual duties of the office and those assigned by the Board of Directors. At the annual meeting he shall report to the membership on the financial status of the Association.

SECTION 6. The **Secretary** shall perform the usual duties of the office and those assigned by the Board of Directors.

Article V: Advisory Council

SECTION 1. There shall be an Advisory Council that shall advise the Board of Directors on matters pertaining to the general policies and programs of the Association and that may initiate proposals for consideration by the Board. The Council shall receive and may request reports from its members and shall consider matters referred to it by the Board of Directors, the President or the administrator of Association Headquarters.

SECTION 2. The Advisory Council shall consist of each Association Committee Chairman, Chapter President and Division Chairman. If unable to attend a meeting of the Council, he shall designate a member of his respective Committee, Chapter or Division to represent him. Members of the Advisory Council shall be Active members of the Association.

SECTION 3. The Advisory Council shall hold at least two **meetings** annually, one of which shall be held during the annual convention. Additional meetings may be held upon call of the Chairman or upon written request of 20 members of the Council. Meetings of the Advisory Council shall be open to all Association members.

Article VI: Association Meetings

SECTION 1. An **annual meeting** shall be held at such time and place as the Board of Directors determines.

SECTION 2. **Special meetings** may be called by the Board of Directors. Notice of a special meeting shall specify the business to be transacted, and no business other than that stated in the notice shall be considered.

SECTION 3. **Notice** of meetings in writing or printed in the official journal shall be sent to each voting member at least 30 days before a meeting.

SECTION 4. A **quorum** for the transaction of business shall be 100 voting members in good standing.

SECTION 5. When not in conflict with these Bylaws *Robert's Rules of Order Revised* shall govern all deliberations.

SECTION 6. Whenever, in the judgment of the Board of Directors, a question arises that should be put to a vote of the entire membership or cannot await the annual meeting, the Board may submit the question for vote by proxy or by mail unless otherwise required in these Bylaws. The closing date for the return of proxies and mail votes shall be established by the Board. The question presented shall be resolved by a two-thirds vote, provided at least 40 per cent of the voting members have voted.

Article VII: Chapters

SECTION 1. Chapters may be established by the Board of Directors upon written petition of 25 or more voting members of the Association who reside or work in the geographic area defined in the petition.

SECTION 2. **Membership** eligibility in Chapters shall be in accordance with Bylaw II. An eligible member may affiliate with more than one Chapter upon payment of a fee determined by the Board of Directors and approved at an annual meeting.

SECTION 3. **Bylaws** for its own government shall be adopted by each Chapter. These bylaws shall not be in conflict with those of the Association and shall be submitted to the Association Bylaws Committee for review.

SECTION 4. **Groups** within a Chapter may be established by the Chapter. Groups shall request needed operating funds from the Chapter and shall submit to the Chapter an annual report including a financial statement. Upon dissolution of a Group its assets shall revert to the Chapter.

SECTION 5. Each Chapter shall submit an **annual report** on its activities and a **financial statement** to the chairman of the committee on Chapter liaison.

SECTION 6. **Funds** for the operating expenses of a Chapter shall be provided by allotment of a share of the annual Association dues paid by its members. Each year eligibility to receive an allotment shall be determined by the Board of Directors on the basis of the Chapter's financial statement for the previous year. Requests for additional funds or loans may be submitted to the Board of Directors and may be granted by the Board at its discretion. All funds received by a Chapter shall be used for purposes incident to fulfillment of the Association's objectives.

SECTION 7. **Dissolution** of a Chapter, when its usefulness has ceased, may be authorized by the Board of Directors. All assets of the Chapter shall revert to the Association.

Article VIII: Divisions

SECTION 1. Divisions relating to areas of interest actively represented among the members may be established by the Board of Directors upon written petition of 100 voting members of the Association who desire to participate in the activities of the proposed Division.

SECTION 2. **Membership** eligibility in the Divisions shall be in accordance with Bylaw II. An eligible member may affiliate with more than one Division upon payment of a fee determined by the Board of Directors and approved at an annual meeting.

SECTION 3. **Bylaws** for its own government shall be adopted by each Division. These bylaws shall not be in conflict with those of the Association and shall be submitted to the Association Bylaws Committee for review.

SECTION 4. **Sections** relating to definite areas of interest within a Division may be established by the Division. Sections shall request needed operating funds from the Division and shall submit to the Division an annual report including a financial statement. Upon dissolution of a Section its assets shall revert to the Division.

SECTION 5. Each Division shall submit an **annual report** on its activities and a **financial statement** to the chairman of the committee on Division liaison.

SECTION 6. **Funds** for the operating expenses of a Division shall be provided by allotment of a share of the annual Association dues paid by its members. Each year eligibility to receive an allotment shall be determined by the Board of Directors on the basis of the Division's financial statement for the previous year. Requests for additional funds or loans may be submitted to the Board of Directors and may be granted by the Board at its discretion. All funds received by a Division shall be used for purposes incident to fulfillment of the Association's objectives.

SECTION 7. **Dissolution** of a Division, when its usefulness has ceased, may be authorized by the Board of Directors. All assets of the Division shall revert to the Association.

Article IX: Committees

SECTION 1. Standing and special committees of the Association and special committees of the Board of Directors shall be established by the Board for the purpose of delegating such powers and functions as the Board finds desirable for the conduct of its business and for carrying out the objectives of the Association. *These committees shall be responsible to the* Board.

SECTION 2. The President shall appoint the members and designate the chairman of all committees except the Nominating Committee. Appointments to standing committees shall be made to provide continuity of membership. No member may serve in excess of six consecutive years.

SECTION 3. Each committee shall submit to the Board of Directors a written **report** of its activities throughout the Association year, together with any recommendations considered necessary or advisable. Additional reports may be submitted by a committee or requested by the Board or the President.

SECTION 4. **Funds** for committee expenses are authorized by the Board of Directors upon submission of an estimated budget.

SECTION 5. Standing and special committees may establish **subcommittees** to assist in their work. Subcommittees may include nonmembers of the Association.

Article X: Nominations and Elections

SECTION 1. **A Nominating Committee** for each election of members to the Board of Directors shall be elected by the Board at least one year before the closing date established for the committee's report. This committee shall be composed of five Active members, no one of whom shall be a member of the Board. The senior two of the six Directors shall present the names of candidates for election to the Nominating Committee and shall designate the chairman.

SECTION 2. **Nominations** for membership on the Board of Directors shall be presented as follows: The Nominating Committee shall present each year two candidates for President-Elect

of the Association, Chairman-Elect of the Advisory Council and two Directors, and every three years two candidates for Treasurer. The names of nominees and their written acceptances shall be presented to the Board of Directors not later than November 15 and subsequently printed in the official journal. Further nominations, accompanied by written acceptance of the nominee, may be entered by petition of 25 voting members and shall be filed with the administrator of Association Headquarters at least three months prior to the annual meeting.

SECTION 3. **Election** shall be by secret ballot mailed to each voting member at least six weeks prior to the annual meeting. The candidate who receives the largest number of votes for an office shall be elected. In event of a tie, election shall be by a majority vote at the annual meeting.

SECTION 4. **Tellers** shall be appointed annually by the President to count the ballots and report the election results. These tellers shall also count and report the results of other mail votes of the membership.

Article XI: Publications

SECTION 1. The Association shall publish an official journal and such other publications as the Board of Directors may authorize. Control of all Association publications shall be vested in the Board.

SECTION 2. The Association shall not be responsible for statements or opinions advanced in its publications or in papers or discussions at meetings of the Association or at meetings of Chapters and Divisions and their subunits, or for statements by any of its members, officers or staff, except those authorized by the Board of Directors or those reflecting duly established policies of the Association.

Article XII: Dues and Fees

SECTION 1. Dues shall be payable in advance and annually, except that an Active member may elect to pay at one time the sum prescribed for life dues. An Honorary member shall be exempt from payment of dues.

SECTION 2. Dues for Association membership and fees for additional Chapter and Division affiliation shall be determined by the Board of Directors subject to approval by two-thirds of the voting members present at an annual meeting, provided that written notice shall be given to all voting members at least 60 days in advance of the meeting. Initial dues may be prorated as determined by the Board of Directors.

SECTION 3. Membership shall cease when dues are three months in arrears. Reinstatement is possible only within the following nine months and upon payment of dues for the entire year. After one year, reapplication for membership is required.

Article XIII: Association Headquarters

SECTION 1. The location of Association Headquarters shall be determined by the Board of Directors.

SECTION 2. The administration and management of Association Headquarters shall be the responsibility of a salaried staff administrator who shall direct the functions and activities of the headquarters and shall perform such other duties as the President or the Board may assign. He shall be appointed by the Board of Directors and shall have such title as the Board determines.

Article XIV: Association Affiliation and Representation

SECTION 1. The Association may have as an affiliate or become an affiliate of any society having objectives allied to those of Special Libraries Association. If affiliation becomes undesirable it may be cancelled. Affiliation or disaffiliation may be authorized by the Board of Directors.

SECTION 2. Association representatives to joint boards, joint committees and meetings of other societies shall be appointed by the President and are responsible to the Board of Directors. At least once during the Association year, each representative shall submit to the Board a written report which may include recommendations.

Article XV: Amendments

SECTION 1. These Bylaws may be amended by a two-thirds vote of the returned mail ballots sent to the entire voting membership.

SECTION 2. Amendments may be proposed by the Board of Directors, the Bylaws Committee or 25 voting members of the Association. Proposals originating in the Board of Directors or in the Bylaws Committee shall be approved by a two-thirds vote of the Board before submission to the members. Proposals originating by petition shall be submitted in writing to the Board of Directors and shall be presented to the members with the recommendations of the Board.

SECTION 3. Notice containing the text of any proposal shall be sent to each voting member at least 30 days before the annual meeting at which it is to be discussed. If approved by a majority of the voting members present, the proposal shall be submitted to the entire voting membership for mail ballot and final decision. A proposal not approved at the annual meeting may be referred to the Bylaws Committee for review.

This Works For Us . . .

Document Processing and Bibliography

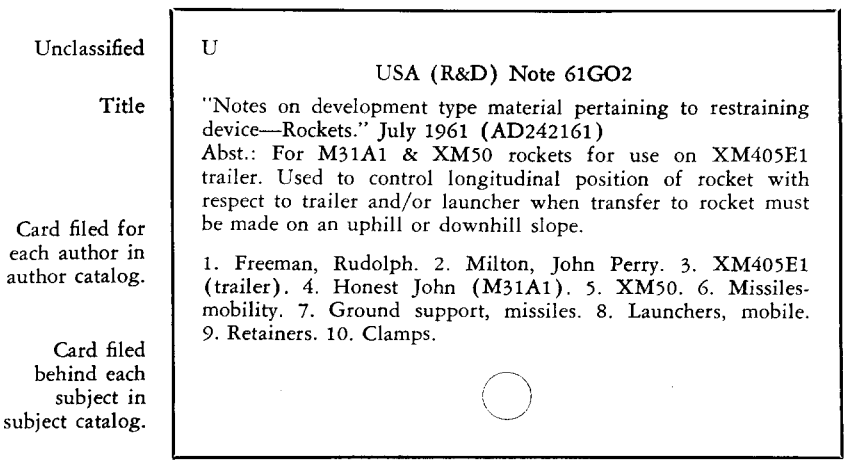
The McDonnell Aircraft Corporation Engineering Library services 1,200 drawers of classified and unclassified documents. Often 1,600 documents are issued in a week. Because of the urgency and exactness of the work, the following "not-too-conventional" system of processing documents has evolved:

Access to documents is provided through a shelf list and three card catalogs (author, subject and model). A card is prepared for each document, and it contains the following:

1. A brief "call word" or "call number" based on the issuing agency. Many have joint issuing agencies or are issued by two separate agencies. The "call word" (agency) is decided upon, and a cross reference to the other agency is placed in the shelf list. If no adequate number is found on the document, one is created using *a)* the year for the first number of the "call," *b)* a letter of the alphabet to represent the month of the year, and *c)* an agency accession. For example: USA (RD) Note 61G02 means: U.S. Army Research and Development Note; issued in 1961 in the month of July; the second document received from the Army source of that date. (If the document were issued in January, the letter notation would be A, February B, March C, and so on.)
2. The title of the document.
3. An abstract.
4. Added entries for *a)* authors, *b)* models by name and/or number. (Example: XM405E1 (trailer), Honest John (M31A1), XM50), and *c)* subject headings.

In order to reveal the complete contents of a document, numerous subject headings are assigned. When too many cards accumulate for a heading, the cards are removed, photographed on standard size paper, stapled together and assigned a MAC (McDonnell Aircraft Corporation) Biblio number. Copies of this bibliography are available for distribution. A reference copy is always kept in the library. This method of removing cards from the subject catalog has the added advantage of being able to circulate the same information that is found within the card catalog. A single card indicating the call number of the MAC Biblio then replaces all of the cards that were removed. Cards representing new documents on the particular subject are placed in the catalog behind the MAC Biblio card. If the section again becomes too full, the cards are photographed and added to the MAC Biblio to form a revised bibliography on the subject. All cards are arranged chronologically behind each subject, so filing is relatively simple.

JAMIE R. GRAHAM, Librarian
McDonnell Aircraft Corporation
St. Louis, Missouri



Sample card—used for shelf list, author, subject and model catalogs.

Follow-up on Interlibrary Loan Analysis

CONFIRMATION AND A PROPOSAL

I was very interested in the article by Eugene E. Graziano on interlibrary loan analysis in the May-June 1962 issue of *Special Libraries,* because, although I am sure that use of such records for the purpose of backfile acquisitions must be practiced commonly, this was the first occasion upon which I had seen anything in print. It also prompted me to dig out some records I kept while I was librarian of a research organization in the field of reactor technology (the Nuclear Research Centre, C. A. Parsons and Co., Ltd., Newcastle upon Tyne).

The investigation I undertook may well be of interest, because the organization was so entirely different from that in which Mr. Graziano worked. It was formed only in 1958, a librarian was appointed in 1959, and the library served the information needs of only about 100 scientists and technologists with a periodicals list of 160 titles.

Initially I thought that in such a young library backfile acquisition was something that had to be attended to with all speed, and in 1960 I set about the analysis of the previous year's interlibrary loan records. Bearing in mind the vast difference beween the two organizations, my Table I shows a remarkable similarity to Table II in Graziano's article, the difference being caused, in my opinion, by the difference in ages of the two organizations—obviously a younger library will have a flatter curve. It would appear therefore that this Table supports Graziano's idea that such a curve offers a mathematical means for evaluating the effectiveness of a library.

Further analysis of the records produced Table II, which revealed conclusively that at that stage of development possibly in both the library and the technology served, the acquisition of backfiles of periodicals was a relatively unimportant matter. Closer examination showed that there were certain periodicals it would be advisable to purchase retrospectively, e.g., 71 requests were made for material published between 1945 and 1950, inclusive. These were for 40 different titles, only four of which were asked for more than three times. These were: *Journal of the American Chemical Society, A.S.M.E. Transactions* and *Applied Physics,* all of which were on our current list, and one "wild" one, *American Mineralogist,* which appears because the only issues ever requested (all to satisfy one subject enquiry) were published between 1945 and 1947.

This lack of need for backfiles is important also in deciding the binding programme, and the conclusion reached here was that there was in fact little need for binding because the greatest demand for back issues was only over a period of four years.

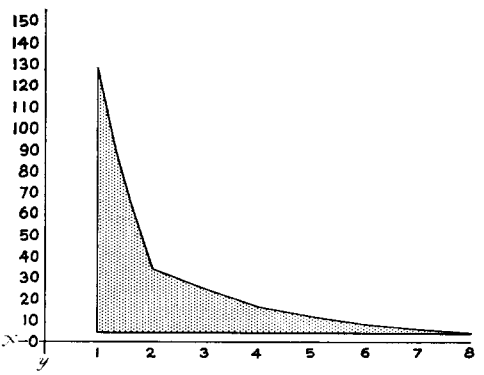


Table I: Frequency of titles requested. y equals number of periodicals requested (different titles); x equals number of times requested.

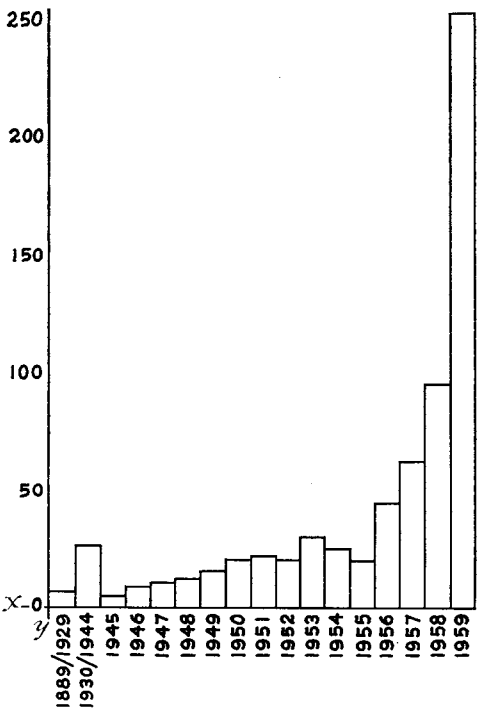


Table II: Years of publication of requested titles. x equals years of publication; y equals number of requests.

Analysis of the interlibrary loans records, in conjunction with the general loans records, revealed a further point of interest; 235 different titles were requested, and 92 of these were titles on our current list for which we had limited backfiles. There were no loans from our own current files in the case of eight of these titles, and they were among those titles for which interlibrary loans had been requested only once or twice. In a larger library this aspect of the interlibrary loans record could well be of considerable value in cutting out poorly used periodicals.

The results of my survey led me to the same conclusions as Mr. Graziano:

1. The interlibrary loans record is of limited value in choosing periodicals for backfile purchase;
2. The chance that any particular title will be requested more than once seems to be largely accidental;
3. Purchase of abstracts, bibliographies and union lists makes the best use of money; and
4. Current subscriptions are likely to be of greater value than backfiles.

As Mr. Graziano so rightly says: "A quantified library science will be the only hope for the librarian of 2100 A.D." The analysis of interlibrary loan records is therefore a step in the right direction and one which, for preference, should be the subject of co-operation, both national and international. I would be very pleased to hear from any librarians who have carried out similar surveys in this country and perhaps Mr. Graziano could do the same for the United States. We might then at some future date be able to offer a joint assessment of the information sent to us. Might I suggest that as a first step a detailed account of the records to be kept and the form they should take be published in *Special Libraries?*

T. D. WILSON, Assistant Lecturer
Municipal College of Commerce
Newcastle upon Tyne, England

REMARKS AND FURTHER SUGGESTIONS

Mr. Wilson's findings are exciting because his situation was so entirely different from mine and his conclusions the same. The fact that he was able to apply my formula validly as a means of measuring the relative effectiveness of his library in support of its program leads to the cautious conclusion that quantified descriptions of library experience can be *generally valid for any library.* This would mean that library science is capable of a truly scientific, or mathematical, basis. One need not be concerned at this point that as yet only very limited aspects of library experience are generally quantifiable because although mathematics is abstract (not qualitative), it is a powerful analytical and synthetic tool.

I should like to touch upon three points. Mr. Wilson spoke of the flatness of his curve, and it is important to note that I considered the integral of the curve to be significant rather than the derivative. *This is an essential point.* Secondly, I did not wish to say that backfiles are unnecessary; it is my opinion that some backfiles basic to the discipline served are essential. Thirdly, I feel that it should be stated that our conclusions apply only to scientific backfiles and probably are invalid in areas of the humanities.

Mr. Wilson is absolutely correct in his assertion that interlibrary loan record analysis should be the subject of national and international cooperation. Not only do interlibrary loan records constitute a plot of the parameters of individual libraries, but they contain the raw materials for study of regional, national and international trafficking in the graphic records of civilization. Analysis of such traffic would undoubtedly lead to effective regulation, which is obviously necessary, and such a project might certainly be worthily undertaken by UNESCO.

I agree with Mr. Wilson that it will be necessary to normalize in detail the type of records to be kept. In my study I used my carbon copy of the standard interlibrary loan request form, and probably the best solution would be a revision of the form and international adoption of it. Prior to revision, it would be necessary to make some good guesses as to the type of information that could be gleaned from interlibrary loan records. This would mean an international committee that would first survey analytical techniques that have been utilized, with or without success, in applying numbers to descriptions of library experience; and this would require the cooperation of a great many librarians.

Science is tedious; ultimately it will be the library scientists among the practitioners of the librarian's art who will attempt to count whatever is countable, and then look to see if any meaning is to be found in this tedium. Questions such as the following might be resolved by study of interlibrary loan records: *1)* Where are citations first found? *2)* Why are attempts to borrow from other libraries sometimes unsuccessful? *3)* What are the channels and volumes of traffic? *4)* Is geographical distance significant? *5)* Why are some libraries borrowers and other lenders? *6)* Do libraries generally have similar interlibrary loan historical patterns? *7)* Are interlibrary loans received on requested formats? *8)* Do interlibrary loans stimulate interlibrary loans?

Mr. Wilson's proposition for a preliminary survey is a good one, and I would be pleased to know of any studies that have been made, both successful and not. (Remember that Einstein's Theory of Relativity rests pretty squarely on the failure of the Michelson-Morley experiment.)

EUGENE E. GRAZIANO
Research Information Specialist
Lockheed Aircraft Corporation
Palo Alto, California

Have You Heard . . .

NSF Grant to Translations Center

The SLA Translations Center, located at the John Crerar Library in Chicago, recently obtained a $45,678 grant from the National Science Foundation for the "collateral support of the operation of the Translations Center." The grant will be made in three installments. The first NSF grant was awarded to the Translations Center in 1956.

1963 National Library Week Campaign

Reading—the Fifth Freedom . . . Enjoy It! is the theme of the sixth observance of National Library Week to be held April 21-27, 1963. The NLW program, geared to stimulate reading and a wider use of and support for libraries of all kinds, is sponsored by the National Book Committee, Inc. in cooperation with the American Library Association.

Members in the News

MILDRED BENTON, former Consultant in Research Information, U. S. Naval Research Laboratory, is now Chief, Biological Serial Record Center, Biological Sciences Communication Project, American Institute of Biological Sciences, Washington 6, D. C. MRS. RUBY W. MOATS, former Chief, Division of Bibliography, National Agricultural Library, is Assistant Chief.

WILLIAM J. CONDON, former Librarian, Nuclear Materials & Propulsion Operation, General Electric Company, Cincinnati, Ohio, has accepted a position as Head, Library Services, System Development Corporation, Santa Monica, California.

ROBERT T. DIVETT, Librarian, University of Utah Library of Medical Sciences, received the Medical Library Association's 1962 Murray Gottlieb Prize for his essay, "Medicine and the Mormons."

J. HESTON HEALD, former Deputy for Science and Technology, ASTIA, has been assigned to the position of Technical Advisor, ASTIA Air Force Systems Command, United States Air Force, Arlington, Virginia.

DR. GRACE M. SHERWOOD, State Librarian of Rhode Island, Providence, retired recently. She is succeeded by ELLIOT E. ANDREWS, former Librarian, News Library, Providence Journal Company.

Advertising and Marketing Research Library

The Advertising and Marketing Research Library has been established as a specialized research information center for businesses and individuals on a membership subscription basis. AMRL collections cover ten major classifications within the field and are maintained by a professional library staff. The library, located at 1145 West 6th Street, Los Angeles 17, California, offers to its subscribers full use of the library's research, compilation and abstracting services.

ADI Reprints Available

Reprints of papers given at the "State of the Art" symposium at the American Documentation Institute's November 1961 Convention and published in the January 1962 issue of *American Documentation* are available as a 57-page separate. For $2 the separate may be ordered from the ADI Secretariat, 1728 N Street, N.W., Washington 6, D. C.

SLA Sustaining Members

The following organizations are supporting the activities and objectives of the Special Libraries Association by becoming Sustaining Members for 1962. These are additions to the Sustaining Members listed in News and Notes, July-August, 1962.

ALLIED RESEARCH ASSOCIATES, INC.
F. W. FAXON COMPANY, INC.
IBM, THOMAS J. WATSON RESEARCH CENTER
MARATHON OIL COMPANY
RADIO CORPORATION OF AMERICA LABORATORIES
SUFFOLK COOPERATIVE LIBRARY SYSTEM
UNIVERSITY BINDERY

Letters to the Editor

FUNCTIONS OF SPECIAL LIBRARIANS EMPHASIZED

In the "Age of the Machine" we are in danger of allowing ourselves to lose sight of what exactly it is we do as special librarians. One person may also function as librarian, a records manager, a technical processes director and even as a special services coordinator if the company is so organized. But each of these are separate hats and should not be confused with the one designating the role of the special librarian.

To fully understand this role and to better fulfill its expression is our reason for SLA membership. Confusion of other functions with that of supplying specialized information to a selected clientele has resulted in an attempt by some of us to be "all things to all men." As librarians we must use the new techniques and devices that enable us to keep an orderly flow of pertinent information to the people we serve.

Our public is hard pressed to keep up in the changing industrial climate. They look to us to produce quality answers when they have the need to know. The rugged individualist of yesterday's industry must add a mass of related information to his store of knowledge, and rapidly. Even the intensively educated man of more-than-ten-years-out-of-college experience finds challenge in the very language of recent technology. The recent graduate, still digesting his formal education, finds himself struggling with the "real" thing.

As special librarians our prime purpose is to provide those who use our services with the information they need regardless of the complexity of subjects and the proliferation of sources. To do this we must learn to rapidly evaluate and use new equipment, services and techniques. We must also continue to study our special subject field.

My premise in this letter is that we need to reemphasize our reason for organizing and joining SLA. We must select our activities to closely coincide with our purpose as special librarians as distinguished from documentalists, records managers and technical processes managers. We should know about cybernetics as well as knowing about mechanized library equipment; but we should emphasize the comparative value of these devices in our operation rather than their development. In our enthusiasm for machine retrieval we must not neglect our immediate problems. We should be working on the services and techniques we can use now. We should be working out difficulties with publishers who make ill-advised changes in major publications. We need to promote cooperation and collaboration in accessions and loans among our membership. We should not forget that our prime purpose as SLA members is to assist each other as Special Librarians.

We could well let the machine manufacturers continue to talk to each other about the intricacies of input and output and concentrate on our "world with people." The senior engineer that came up the ladder from helper to administrator needs the help of the special librarian, as does the young college graduate who hasn't learned the industry jargon. Let's get on with being special librarians.

First, let's clarify what it is we do as special librarians. Then let us work hard on using all our cooperative strength to do that well. If we have time left over some of us might be free to invent a language that machines understand or a camera that eliminates the need for the printed word. Until then let us get on with the business of providing optimum information in a specific field to specified persons.

This may sound like the "voice of dissent," but it is being raised against the "sound of confusion." I'm plugging for emphasis on the improvement of library service to specialists in future meetings of our Association.

HESTER L. DALE, Chemist Librarian
Richfield Oil Corporation, Wilmington, California

MORE ON GUIDES TO SCIENTIFIC LITERATURE

The comments made by Miss Schutze in her "Letter to the Editor" in the July-August issue were interesting. However, there are some misstatements which need correcting. To these I would like to add my own comments on her bibliography. Miss Schutze may have compiled the most comprehensive bibliography of guides but certainly not the first. A. C. Townsend published a bibliography of guides in the June 1955 issue of the *Journal of Documentation*, which also includes a delightful essay. I recommend it to your readers. This article is entitled "Guides to Scientific Literature."

One of the most compelling reasons for publishing a new bibliography of guides was to correct errors made in the compilation by Miss Schutze. There are numerous spelling errors as well as bibliographic mistakes scattered through her bibliography. The reader should check items 93, 321 and 276. Her bibliographic entries are not consistent and she uses the same entry twice. The reader should check items 234, 316, 276 and 651. In addition, the Schutze bibliography fails to show important combinations and revisions of guides. Items 311 and 320 were revised, combined and issued as NBS Circular 567 which the Schutze bibliography lists separately as item 321.

This criticism is not intended to minimize the value of Miss Schutze's bibliography. I felt it was important enough to be listed in my own compilation and I still feel this way. However, it should be used with care.

The Moore and Spencer bibliographic guide on electronics was not included because my Library's copy had not yet arrived. The Baker and Foskett bibliography was omitted through my oversight.

ROBERT W. BURNS JR., Head
Science-Technology Library
University of Idaho, Moscow

MISS SCHUTZE REPLIES

First, I will repeat that the Schutze bibliography is the first and most comprehensive of its kind. The Townsend article mentioned by Mr. Burns is not a

bibliography of guides but rather a long critical book review of 22 guides to special subjects. Like all good authors, Mr. Townsend has appended these references to his article.

The errors in spelling and bibliographical style to which Mr. Burns alludes are grossly exaggerated and unfair. An errata sheet was issued at the time of the publication and corrected the misspelling in items 93 and 321, the listing of a British journal as *Engineering* in item 234 and *Engineering* (London) in item 316, as well as the only double entry, items 276 and 651. Is there a work so rare that it can boast no errors? Certainly not Mr. Burns' compilation! He omitted the most important guides (book length) published since the Schutze bibliography. This is indicative of poor research or—no research!

Burns' next statement is entirely misleading. I have listed the combination of items 311 and 320 as item 321, but also have listed them separately since the Smith guide (item 320) contained 34 pages of useful text not incorporated in the revision (item 321).

Mr. Burns cannot minimize the value of the Schutze bibliography. It can be used with confidence and is being so used in courses in scientific literature in library schools throughout the United States. Library consultants have ordered the bibliography as an aid in setting up new collections. Colleges and universities and public libraries, large and small, have ordered copies for the various divisions and departments of their institutions. The bibliography has been purchased by libraries and book sellers in 14 foreign countries. At this time, four years after its publication, I have filled 134 requests in the past three-and-one-half months.

Only when Mr. Burns has done an original piece of work, will he appreciate the painstaking research and scholarship that went into the Bibliography in question. He will not then quibble over a few minor errors nor will he feel compelled to publish a new bibliography to correct these few minor errors but at the same time compile a list two-thirds of whose items appear in my work.

GERTRUDE SCHUTZE
801 Crotona Park North, New York 60

EDITOR'S NOTE: The above will end the Burns-Schutze debate unless some other reader wishes to make further relevant comments.

CONTROLLED SUBSCRIPTIONS CREATE ROUTING PROBLEM

As you know, a number of technical periodicals limit circulation to "qualified" recipients and will not even sell a subscription to those considered "unqualified," though ordinarily the cost is paid by advertising and thus there is no charge to the recipient. Naturally, in order to get an adequate advertising income, the publishers must assure that only a given group of persons read the publication. We have recently had difficulty in this connection with two publishers because the request was that the periodical be sent to the company library for routing not to the specific attention of a key executive of the prescribed rank. At the request of the executives I wrote to the publishers stating that their periodicals would indeed reach executives of the intended rank, but that our routing system required that incoming periodicals come first to the library for processing and marking. Apparently the clerical personnel who handle such inquiries are instructed to grant free distribution—indeed, even paid distribution—only if the item is specifically addressed to a certain type of title. I feel there ought to be some way to reach the publishers directly, informing them that a request from a librarian of a technical organization is in fact equivalent to a request from the persons who will eventually read and use the periodical.

RINEHART S. POTTS, Librarian
Aero Service Corporation, Philadelphia

NEW PAPERS FOR THERMOFAX COPYING EQUIPMENT

The March 1962 issue of *Special Libraries* carries an article by Chester M. Lewis, "Interrelationship of Microfilm Copying Devices and Information Retrieval." In this article various reproduction processes are mentioned, among others thermography, and specifically equipment manufactured by Minnesota Mining and Manufacturing Company under its trade name, Thermofax. The statement is made that copies made by Thermofax process remain sensitive to heat and become blackened if kept in a hot place, or in sunlight, and that many colors, in regular ball point pens, will not reproduce unless they have carbon or metallic inks. While this was true until recently, your readers may be interested in knowing that now there are several papers for use on Thermofax machines which are more or less permanent. These papers have been accepted for archival use by some governmental organizations, for example, the Internal Revenue Service. Thermofax itself manufactures and markets several papers which are quite long lived. The Savin Co., I believe, manufactures papers under the trade name, Perfax. These papers are marketed, at least, by the International Office Machines Company of Los Angeles. I'm sure there must be other companies throughout the country carrying these papers. Thermofax has also just announced a companion piece of equipment which will produce copies by a dry process of anything, such as diazo print or ball point inks which are not especially produced for Thermofax use.

I realize that Mr. Lewis' article was presented first as a paper in June 1961, and no derogatory connotations should be attached to my remarks.

International Office Machines Co. in Los Angeles also markets a new paper for use on Thermofax equipment which will produce a spirit duplicator master. Thus, for about $.10 one can make a spirit duplicator master, good for 200 copies, from any original.

DONALD V. BLACK, Physics Librarian
University of California Library, Los Angeles

Off the Press . . .

Book Review

ADVANCED DATA PROCESSING IN THE UNIVERSITY LIBRARY. *Louis A. Schultheiss et al.* New York: Scarecrow Press, 1962, xiv, 388 p. $10.00. (L.C. 62-10128)

Librarians interested in the application of data processing techniques for the improvement of library technical services will welcome the appearance of this book. It is timely, well edited and loaded with facts—not just theories.

The book is a report on the Information Systems Project at the University of Illinois, Congress Circle, Chicago. Support for the project came from the Council on Library Resources and the University, which should be credited for encouraging the study. Possibilities for a total system of mechanization of university library routines were investigated. Emphasis was on technical services and reference. The study of reference service did not produce definite conclusions and was therefore not included in the book.

It is interesting to note the successful team approach made in this study. Systems engineers from General Electric Company, computer experts and library staff members at all levels contributed to the success of the project. Much care was taken to inform and seek the participation and suggestions of all library staff members.

A history of the Project and a concise review of machine methods that have been used elsewhere in libraries are followed by a chapter "Machine Age Library Philosophy." Here the authors define parameters for their investigation based on library purposes: "to support functions of the University." Functions are discussed, and library relationships shown. Many factors lessen the library's ability to provide satisfactory support and must be challenged by the use of better methods in the library. These factors include increased volume of publication, more users, subject fragmentation, shortage of professional librarians and increased costs.

Many problems that have been solved in business and industry by data processing techniques are similar to library problems. Advantages, restrictions and limitations of machine systems are summarized. The necessity for precise planning and definition of policies imposed by machine systems often results in improvements that could (and should) have been made in former manual systems. An excellent discussion of flow charting of library operations is alone well worth the cost of the book. Reproductions of many flow charts are included.

While it was decided that information retrieval would not be investigated, some experiments with a permuted index POSH (Permutation On Subject Headings) are described. The authors' purpose was to see whether greater use of cataloging depth already available via L.C. cards would be obtained. It was concluded that such techniques could be used for bibliographies in special areas but not as a complete subject index to a total collection.

Cost analysis of present methods revealed that a new $5 book costs $18.51 at UIC by the time it has been ordered, cataloged and processed for the shelf! Cataloging alone costs $8.67 per title. If special librarians were to calculate costs on the same basis they might be equally astounded by the amount. The use of a cataloging service, such as Alanar, was investigated during a one-year trial period. A preliminary evaluation reveals several real problems that such a service presents, such as re-Cuttering and remarking.

In addition to flow charts already mentioned the appendix contains other interesting items such as essays by library staff members on the subject "What I expect the ULIS Project to accomplish," a list of typical reference questions and mathematical models for calculating costs and sizes of computer-prepared lists and indexes. An excellent bibliography of references from business and library literature and an index complete the volume. Reproduction from a typed manuscript has produced copy that is easy to read. The title is a little misleading in that this is not an advanced discussion nor is the book solely of interest to university librarians.

WILLIAM A. WILKINSON
Technical Librarian
Monsanto Chemical Company, St. Louis, Missouri

New Serial

BIORHEOLOGY is an international quarterly research journal first published in July 1962. Articles and papers appear in English, French or German, and the interrelationship of rheological properties of biological systems and their structural aspects are stressed. Subscriptions may be ordered from Pergamon Press, Inc. at $30 a year to libraries, universities, the government and industry and $15 to individuals.

Maryland Union List of Serials

Union List of Serials in Maryland has recently been completed by the Maryland Chapter of the Reference Services Division of the American Library Association. The listing contains the holdings of 120 libraries, and it is estimated that at least 50 per cent of the holdings are listed for the first time. Letter A will be available this fall for $31 on a prepaid subscription basis. A standard binder and punching service cost $6.50, and a 2½-inch binder and punching service cost $8.25 extra. Checks payable to the Literature Service

Associates should be sent to Wilbur McGill, Govans Branch, Enoch Pratt Free Library, 5714 Bellona Avenue, Baltimore 12.

Metals Booklist

The SLA Metals Division has published *Recent Books on Metals, an Annotated Booklist,* which also contains a directory of publishers. Copies are available, gratis, from SLA Headquarters, 31 East 10th Street, New York City 3.

Science and Technology Commission Reports

Two government publications, *Hearing Before the Committee on Government Operations, United States Senate, Eighty-Seventh Congress, Second Session, on S.2771,* part 2, July 24, 1962, and *Report of the Committee on Government Operations, United States Senate on S.2771,* August 6, 1962, have recently been issued by the U. S. Government Printing Office. The reports deal with the bill to provide for the creation of a Commission on Science and Technology. Section 2 of the bill proposes the establishment of systems for an efficient scientific information program.

New Micro-Catalogs

A new unitized microfilming technique for publishing industrial catalogs, which speeds data retrieval and cuts space requirements by 95 per cent, has been developed for the Thomas Publishing Company by the Microcard Corporation. Known as Thomas Micro-Catalogs, it is to be used in conjunction with the Thomas Register, a five-volume index trade directory. When the user determines, after examing the advertising of a manufacturer of a given product in the Register, that additional information is wanted, he can then turn to the Thomas Micro-Catalogs to obtain product specifications, parts numbers and other data reproduced directly from the manufacturer's own catalog. Selected catalogs from approximately 14,000 leading companies are represented on the Micro-Catalog cards, which are similar to the European Microfiche and contain 60 catalog pages each. The data can be easily and quickly located by using a new magnifying viewer, which serves as a "reader" for the filmed catalog pages. Both the Register and the accompanying projector-viewer lease for $250 per year. Write the Thomas Publishing Company, 461 Eighth Avenue, New York 11, for further information.

SLA 1962-63 Roster Available

The Official Directory of Personnel, a listing of the names and addresses of the Board of Directors, Advisory Council, Association Committees, Special Representatives, principal Chapter and Division officers and Headquarters staff has been issued to all Board and Advisory Council members. Others who are interested may order a copy for $1.50 from Association Headquarters.

SLA Authors

FOCKE, Helen M. Library Association Recruiting. *Library Journal,* vol. 87, no. 14, August 1962, p. 2667-71.

LORENZ, John G. The Role of Libraries in Economic and Social Development. *Unesco Bulletin for Libraries,* vol. XVI, no. 5, September-October 1962, p. 226-33.

RISTOW, Walter W. The Juan de la Cruz Map of South America, 1775. *Festschrift: Clarence F. Jones.* Evanston, Illinois: Northwestern University Studies in Geography, no. 6, 1962.

SHARP, Harold S. A Plan for Interoffice Donations. *Office,* vol. 56, no. 2, August 1962, p. 18; 21-2; 176-7.

SHERA, Jesse H. The Book Catalog and the Scholar—a Reexamination of an Old Partnership. *Library Resources and Technical Services,* vol. 6, no. 3, Summer 1962, p. 210-16.

YONGE, Ena L. Regional Atlases: A Summary Survey. *The Geographical Review,* vol. LII, no. 3, 1962, p. 407-32.

Hall Catalog Price Correction

The Catalog of the Hispanic Society of America, published by G. K. Hall & Company, costs $675, not $6.75 as reported in the September *Special Libraries,* page 445.

RECENT REFERENCES

Librarianship

Guide to Use of Dewey Decimal Classification: Based on the Practice of the Decimal Classification Office at The Library of Congress. Essex County, New York: Forest Press of Lake Placid Education Foundation, 1962. 133 p. (L.C. 61-16797) Apply.

RATHER, John C. and HOLLADAY, Doris C. *Library Statistics of Colleges and Universities, 1960-61: Institutional Data* (OE-15023-61). Washington, D. C.: Office of Education, U.S. Department of Health, Education and Welfare, 1962. iii, 89 p. tables. pap. $.50. (Sold by Government Printing Office)

Collections, staff, expenditures and related institutional data for 1960-61 and salaries of specified positions as of September 1, 1961. Second in series of annual surveys.

BACK ISSUES NEEDED

The January and February 1962 issues of "Special Libraries" are in very short supply.

It will be appreciated if anyone having copies he does not need or want will return them to SLA Headquarters, 31 East 10th St., New York 3.

Bibliographic Tools

BRITTAIN, Dr. Robert P. *Bibliography of Medico-Legal Works in English.* South Hackensack, New Jersey: Fred B. Rothman and Company, 57 Leuning Street, 1962. 270 p. $8.75.

All publications, and various editions of each, including translations and foreign-language publications written in English-speaking countries.

CLAPP, Jane. *Museum Publications:* Part I Anthropology, Archeology and Art. New York: Scarecrow Press, 1962. xlvi, 434 p. $10. (L.C. 62-10120)

Publications available from 276 museums in the United States and Canada. Addenda. Index.

CALLOWAY, Doris Howes, and DAVID, Lore Rose. *Nutrition and Radiation Injury: An Annotated Bibliography* (Library Bulletin No. 6). Chicago: Quartermaster Food and Container Institute for the Armed Forces Quartermaster Research and Engineering Command, U.S. Army, 1961. 120 p. pap. (on exchange; apply)

Author index.

CLARKE, R. W., comp. *Selected Abstracts of Atomic Energy Project Unclassified Report Literature in the Field of Radiation Chemistry and Bibliography of the Published Literature 5th Annual Supplement (Papers noted up to December 1960).* Berkshire, England: Chemistry Division, United Kingdom Atomic Energy Authority, 1961. iv, 587 p. pap. $14.40. (Available from Her Majesty's Stationery Office.)

1961 supplement to A.E.R.E. C/R 1575, Parts 1-6; sectionals correspond to separate parts of parent document. Subject and author indices.

CLEGG, H. A., ed. *World Medical Periodicals,* 3rd ed. London: World Medical Association, 1961. xli, 407 p. $7.

130 titles removed from previous edition and 1,130 added. Journals dealing with hospital administration, buildings and equipment included.

GOTTLIEB, David and ROSSI, Peter H. *Bibliography and Bibliographic Review of Food and Food Habit Research* (Library Bulletin No. 4). Chicago: Quartermaster Food and Container Institute for the Armed Forces Quartermaster Research and Engineering Command, U.S. Army, 1961. 112 p. pap. (on exchange; apply)

Originally published as "Study of the Bases for Changing Food Attitudes," research contract DA19-129-qm-1117. Addenda.

HAMDY, Mokhtar M. *Compression of Dehydrated Foods: Review of Literature* (Library Bulletin No. 5). Chicago: Quartermaster Food and Container Institute for the Armed Forces Quartermaster Research and Engineering Command, U.S. Army, 1961. 27 p. pap. (on exchange; apply)

Originally published as "Compression of Dehydrated Food Products," research contract DA19-129-qm-1630. Bibliography.

HARVARD MEDICAL SCHOOL AND PSYCHIATRIC SERVICE MASSACHUSETTS GENERAL HOSPITAL. *Community Mental Health and Social Psychiatry: A Reference Guide.* Cambridge: Harvard University Press, 1962. xx, 161 p. pap. $3.50. (L.C. 62-9425)

1158 items primarily in United States literature from January 1953 to April 1961. Author-title-subject index.

HOLLOD, Helen L. *Personnel Management and Training* (PACAF Basic Bibliographies). San Francisco: Commander-in-Chief, Pacific Air Forces, ATTN: PFPPS-P, Command Librarian, APO 953, 1961. v, 75 p. Gratis.

Supersedes June 21, 1960 bibliography. Index.

Information Storage and Retrieval (OTS Selective Bibliography SB-475). Washington, D. C.: Office of Technical Services, U.S. Department of Commerce, 1961. 13 p. pap. $.10.

Data storage systems, information storage and retrieval and government-owned patents.

LINDA HALL LIBRARY. *A List of Serial Titles Currently Received by the Linda Hall Library* (Bulletin No. 8). Kansas City: 5109 Cherry Street, 1961. 132 p. varied paging. pap. $1.

Supersedes 1958 list (Bulletin No. 7). Appendix lists U.S., state and foreign documents.

List of Selective Bibliographies. Washington, D. C.: Office of Technical Services, U.S. Department of Commerce, 1961. 5 p. pap. Apply.

Reports and translations available from OTS.

Military Aspects of the Civil War (Special Bibliography Series No. 17). Colorado: U.S. Air Force Academy Library, 1961. iii, 29 p. pap. (Available from Director of the Library.)

Reference works, documents and collections, pictorial works, recordings, general works, military biography and special areas represented in the holdings of the Air Force Academy Library.

MOORE, C. K., and SPENCER, K. J. *Electronics: a Bibliographical Guide.* New York: Macmillan, 1961. xvii, 411 p. $15.

Describes and evaluates over 2,000 books and periodicals in 68 separate subject areas in the field of electronics. Arranged according to Universal Decimal Classification system. Addenda. Author and subject indices.

MOSTECKY, Vaclav, ed. *Annual Legal Bibliography:* A selected list of books and articles received by the Harvard Law School Library from July 1, 1960 through June 30, 1961 including all items which have appeared in Volume One of *Current Legal Bibliography,* vol. 1. Cambridge: Harvard Law School Library, 1961. xi, 215 p. (L.C. 61-18217)

Classified list of subjects. French and German subject, alphabetical subject and geographic indices.

PINCOCK, Rulon D. *Arms and Armaments* (PACAF Basic Bibliographies). San Francisco: Commander-in-Chief, Pacific Air Forces, ATTN: PFPPS-P, Command Librarian, APO 953, 1961. iv, 36 p. Gratis.

Supersedes June 1, 1960 bibliography.

Plastics in Homebuilding: A Selected List of References Available at the National Housing Center Library and Including a Separate List on Plastic Pipes (Reference List #44, File #967). Washington, D. C.: National Housing Center Library, 1962. 9 p. pap. Apply.

RAPPAPORT, Ruth. *Psychology* (PACAF Basic Bibliographies). San Francisco: Commander-in-Chief, Pacific Air Forces, ATTN: PFPPS-P, Command Librarian, APO 953, 1961. v, 88 p. Gratis.

Includes related fields: biographies, hypnotism, mental hygiene, parapsychology, psychiatry and psychoanalysis. Index.

REEVES, Dorothea D., comp. *Resources for the Study of Economic History: A Preliminary Guide to Pre-Twentieth Century Printed Material in Collections Located in Certain American and British Libraries.* Boston: Baker Library, Harvard Graduate School of Business Administration, 1961. viii, 62 p. pap. $2.

SEVERSMITH, Dr. H. F. and STRYKER-RODDA, Dr. K. *Long Island Genealogical Source Material: A Bibliography* (Publication No. 24). Washington, D. C.: National Genealogical Society, 1962. iv, 121 p. pap. $4; members, $3.

First regional bibliography in genealogical field. Part 1: bibliography of sources arranged by author; Part 2: alphabetical listing of places with reference to sources in part 1; Part 3: alphabetic list of library symbols; and Part 4: alphabetic list of libraries.

SPANIER, Lela M., comp. *Biomedical Serials 1950-1960: A Selective List of Serials in the National Library of Medicine* (Public Health Service Publication No. 910). Washington, D. C.: U.S. Department of Health Education and Welfare, 1962. vii, 503 p. pap. $3 (Sold by Government Printing Office).

Serials begun after 1960 are not included among 8,939 titles.

STROUD, Gene S. and DONAHUE, Gilbert E., comps. *Labor History in the United States:* A General Bibliography (Bibliographic Contributions No. 6). Urbana: Institute of Labor and Industrial Relations, University of Illinois, 1961. 167 p. pap. $2. (L.C. A61-9096)

Successor to *History of Labor and Unionism in the United States: A Selected Bibliography,* by Ralph E. McCoy. Expanded to include statistical summaries and studies relating to wages and hours, living costs, productivity, employment and unemployment, work stoppage, social security and health and welfare activity. Subject index.

TEW, E. S., comp. *The First Ten Years of International Associations* (Publication No. 175). Brussels: Union of International Associations, Palais d'Egmont, 1962. 40 p. pap. $1.

Index of articles and surveys that appeared in first ten volumes (1949-1958) of *International Associations.*

THORNTON, John L. et al., comps. *A Select Bibliography of Medical Biography.* London: The Library Association, 1962. 112 p. illus. £1.7s.6d.; £1.0.6d., members.

English works published during the 19th and 20th centuries.

Union List of English Translations of Russian Journals, April 15, 1961. Philadelphia: Union Library Catalogue of the Philadelphia Metropolitan Area, 219 Logan Hall, 36th & Woodland Avenue, 1961. varied paging. $3.

Updates and expands January 31, 1959 publication.

WELLISCH, H., comp. *A Selected Bibliography on Fluid Mechanics, Hydrology and Hydraulic Engineering 1950-1960.* Tel Aviv: Water Planning for Israel, Ltd., 54, Ibn Gvirol Street, 1961. v, 70 p. pap. Apply.

Part I: books and monographs; Part II: periodical publications; Part III: abstracting and indexing services. Author and subject indices.

WILD, J. E., comp. *The European Common Market* (Special Subject Lists No. 35). London: The Library Association, 1961. 30 p. pap. 2s 6d.

Lists 355 books, articles and bibliographies. Newspaper material omitted. Name index.

YUAN, Tung-Li. *Russian Works on China, 1918-1960 in American Libraries.* New Haven: Far Eastern Publications, Yale University, 1961. xiv, 162 p. pap. (L.C. 61-16699)

Available translations are noted under authors, and Russian translations from other languages cited. Material arranged in six geographical areas; China Proper, Northeastern Provinces, Mongolia, Sinkiang, Tibet and Taiwan.

Dictionaries and Directories

CZERNI, S. and SKRZYNSKA, M., eds. *English/-Polish and Polish/English Technological Dictionary,* 2 vols. New York: Pergamon Press, 1962. 445 p. $15 set; $10 vol. (L.C. 62-8850)

34,000 entries. Appendix of 1,000 most common technical terms.

Directory of Business, Trade and Professional Associations in Canada, 1961-62, 2nd ed. Montreal: Canadian Business, 300 St. Sacrament Street, 1961. vi, 193 p. pap. $8.

Expanded edition includes national and provincial labor federations, metropolitan labor councils, major civil service associations, important sports organizations, research councils, marketing boards and a greater number of cultural associations.

Directory of Library Photoduplication Services in the United States, Canada, and Mexico, 2nd rev.

ed. Chicago: Photoduplication Services, University of Chicago Library, 1962. $1.50; $1.80 if billed.

Encyclopedia of Associations, 3rd ed. Detroit: Gale Research Company, 1961. 1010 p. $25.

Lists 2,590 more groups than previous edition, 11,482 in all. Subject index.

Volume 2, *Geographic-Executive Index* (304 p., $15) lists associations by headquarters locations and names executives alphabetically.

International Initialese: Guide to Initials in Current International Use (Publication No. 174). Brussels: Union of International Associations, Palais d'Egmont, 1962. 40 p. pap. $1.

1800 sets of initials used by international governmental or non-governmental organizations.

JACOBS, Dr. Horace and WHITNEY, Eunice E. *Missile and Space Projects Guide.* New York: Plenum Press, 1962. 220 p. $9.50.

National and international listing of aerospace project names, designations and acronyms, with data on related equipment.

NATIONAL INSTITUTES OF HEALTH. *Scientific Directory 1961 and Annual Bibliography 1960,* 3rd ed. (Public Health Service Publication No. 831; Public Health Bibliography Series No. 34). Washington, D. C.: U.S. Department of Health, Education and Welfare [1961]. v, 144 p. pap. 45¢. (Sold by Government Printing Office).

The broad outlines of NIH structure, names professional staff and lists scientific and technical publications deriving from NIH research program. Author and subject indices.

Repertoire of the Associations of Librarians Members of the International Federation, 6th ed. The Hague, Netherlands: Martinus Nijhoff, 1961. Varied paging, loose-leaf.

In French and English. IFLA membership list.

SHERMAN, Morton. *Industrial Data Guide.* New York: Scarecrow Press, Inc., 1962. 368 p. $8.25. (L.C. 62-10117)

Manufacturers and technical and scientific books and articles listed for various fields of technology.

WRITERS' AND ARTISTS' YEAR BOOK 1961: A Directory for Writers, Artists, Playwrights, Writers for Film, Radio and Television, Photographers and Composers, 54th ed. New York: Bowker; London: Adam & Charles Black. 558 p. $4.

Journals, publishers, agencies and societies, prizes and awards, markets, reference. Indexes.

Miscellaneous

Annual International Congress Calendar; 1962 ed. (Publication No. 173). Brussels: Union of International Associations, Palais d'Egmont, 1962. 96 p. pap. $4.

Chronological listing of announced international congresses, conferences, meetings and symposia for 1962-67. Supplementary lists appear monthly in *International Associations.* Subject and geographical indices.

Federal Funds for Science X, Fiscal Years 1960, 1961 and 1962 (Surveys of Science Resources Series; NSF 61-82). Washington, D. C.: National Science Foundation, 1962. vii, 145 p. charts. pap. $.75. (Sold by Government Printing Office.)

Expanded to include funds for dissemination of scientific and technical information. Part I deals with research and development and R&D plants; Part II deals with dissemination of scientific information. Four appendices: Technical Notes, federal contract research centers and statistical tables of Parts I and II.

KRONICK, David A. *A History of Scientific and Technical Periodicals:* The Origins and Development of the Scientific and Technological Press 1665-1790. New York: The Scarecrow Press, Inc., 1962. 274 p. tables. $6.50. (L.C. 62-10118)

Bibliography. Name and subject index.

REITZ, J. Wayne, et al. *Report on Science and Engineering Center Study,* vol. I and appendices II-XII. Gainesville: University of Florida, 1961. xvii, 132 p. illus. pap. Apply.

CLASSIFIED ADVERTISING

Positions open and wanted—50 cents per line; minimum charge $1.50. Copy must be received by tenth of month preceding month of publication.

POSITIONS OPEN

FIRST ASSISTANT, BUSINESS AND INDUSTRY DEPARTMENT. Beginning salary up to $6,923 depending on experience. Annual increments to $7,792. Credit for military experience. Library Science degree, two years experience required. 4 weeks vacation. 5 day week. Sick leave, social security and good retirement plan. Apply: Flint Public Library, Personnel Office, 1026 E. Kearsley St., Flint, Michigan.

REFERENCE LIBRARIAN at Racine, Wisconsin. Requires B.S.L.S. or M.S.L.S. Academic courses and experience with scientific and technical literature most desirable. Salary range $5,000-$7,720 depending upon degree. Prefer 4-5 years experience with starting salary in $5,300-$5,700 range. 40-hour, five-day week. Four weeks vacation. 12 days sick leave annually, cumulative to 120 days. Six paid holidays. Three per cent longevity pay on 10th anniversary of employment. Medical and hospital insurance, Social Security and municipal retirement plan. For further information or application form write: City Librarian, Racine Public Library, Racine, Wisconsin.

TECHNICAL LIBRARIAN. Los Alamos Scientific Laboratory has an opening for a Technical Librarian who would be responsible for work in the technical processes section of our library. The position requires a degree in library science plus a scientific or technical background. Experience in a

technical library is necessary. The ability to read German, Russian or French would be desirable as would training or experience in the use of machine methods in library work. Delightful year-round climate. 24 days annual vacation. Please send resume to: Recruiting Office, Los Alamos Scientific Laboratory, University of California, Los Alamos, New Mexico.

FOR SALE

OFFERS INVITED. Unbroken run, *Review of Applied Mycology*, volume 14 (1935)-volume 41 (1962 to date), volumes 14-38 well-bound, red buckram. Apply: Dr. A. R. Wilson, Templehall, Lonforgan, Dundee, Scotland.

Museum Librarian

LIBRARIAN for The Corning Museum of Glass, a demanding position in a busy museum, located in the renowned Corning Glass Center. The library contains one of the world's most comprehensive collections on the art and history of glass, a small reference collection on the fine and applied arts and a distinguished collection of manuscripts and incunabula. Corning is situated on the southern edge of the Finger Lakes region and is a cultural center which includes the recently formed Corning Community College and College Center of the Finger Lakes. Degree required, some experience and knowledge of art history desirable but not indispensable. Liberal salary and personnel benefits. Write: Paul N. Perrot, Director, The Corning Museum of Glass, Corning Glass Center, Corning, New York.

Cataloger Needed!

Cataloger needed for library serving Research and Development Department of Union Carbide Chemicals Company, South Charleston, West Virginia. Adequate clerical personnel and equipment available. First duty will be recataloging collection of over 7,000 books. Future duties will depend on personal preferences and abilities. Could include supervision of ordering, responsibility for special files and indexing or reference work.

Contact: Miss Idair Smookler (Bldg. 701), Union Carbide Chemicals Company, P. O. Box 8361, South Charleston, West Virginia.

Research Librarian

Excellent opportunity for woman to assume responsibility for selection, organization and administration of reference material of Research Department of a leading investment banking firm. Duties would include general supervision of related files and personnel. Degree in library science desirable. Knowledge of source material in the fields of economics and finance required. Compensation commensurate with experience and qualifications. Liberal benefit program.

Send complete resume to Mr. R. J. Kirkpatrick, Secretary

THE FIRST BOSTON CORPORATION
20 Exchange Place
New York 5, New York

TECHNICAL LIBRARIAN . . .

To establish acquisition, indexing, and dissemination procedures leading to an effective Information Retrieval system. Literature searches, special bibliographies, general reference questions in field of aerospace sciences.

QUALIFICATIONS: B.S. or B.A. with courses in physics and mathematics plus fifth year degree in Library Science.

SALARY: Open depending upon applicant's qualifications. Liberal benefit program.

Please airmail your resume, in confidence, to:

Mr. J. C. Byrd, Manager
Personnel Branch
ARO, Inc.*
Arnold Air Force Station, Tennessee

(* Contract operator of the Arnold Engineering Development Center for the Air Force Systems Command, USAF.)

An Equal Opportunity Employer

TECHNICAL LIBRARIANS

ASSISTANT LIBRARIAN

Position: Assistant Librarian on staff of 34. Responsible for all public services, including circulation, reference, & acquisitions. Shares responsibility in personnel matters as well as budget & space allocations.

Salary: $7200 a year up, depending on qualifications.

Qualifications: Library school degree or equivalent in education; three years' experience in technical libraries, including some supervisory experience. Scientific and foreign language background desirable.

CATALOGER-ABSTRACTER

Position: Catalog & classify a wide range of Russian book & pamphlet materials in scientific, technical, political, & economic areas.

Salary: $5400 a year up, depending on qualifications.

Qualifications: Library school degree and good knowledge of Russian required; cataloging experience desirable.

The RAND *Corporation*

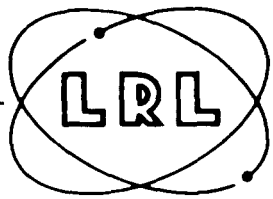
A SCIENTIFIC RESEARCH ORGANIZATION

Outstanding Company Benefits — United States citizenship required

an equal opportunity employer

Please send resume to:

Mrs. Dorothy Wilson — 1700 Main Street — Santa Monica, California



LAWRENCE RADIATION LABORATORY

IN THE SAN FRANCISCO BAY AREA

is operated by the University of California
for the United States Atomic Energy Commission.

Technical Information Department

REFERENCE LIBRARIAN

Assist scientific and engineering personnel in compiling bibliographies, performing literature searches, and seeking factual information in technical literature. Some cataloging involved. Requires undergraduate degree in one of the physical sciences and degree in librarianship or equivalent training and work experience.

CATALOGER

Will catalog technical reports and books, assign subject categories, and participate in AEC cooperative cataloging. Some reference work will be involved. Requires undergraduate degree in one of the physical sciences and degree in librarianship or equivalent training and work experience.

TECHNICAL INFORMATION SPECIALIST

To do research in the field of science information and to apply existing knowledge and techniques to new problems. To investigate the dissemination, storage, and retrieval of science information with emphasis on systems development and mechanization. Requires a degree or evidence of strong interest in science, mathematics, or engineering. Experience in some phase of technical information activities, or in automatic data processing is desirable.

Please address inquiries to:

Mr. Peter Kneedler
Personnel Department
Lawrence Radiation Laboratory
University of California
P.O. Box 808 M-47
Livermore, California

U.S. Citizenship Required ***An Equal Opportunity Employer***

OCTOBER 1962