

**ENCYCLOPEDIA
OF LIBRARY
AND
INFORMATION SCIENCE**

VOLUME 8



RNv 377

**ENCYCLOPEDIA
OF LIBRARY
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VOLUME 8

**El Salvador to
Ford Foundation**

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EL SALVADOR, NATIONAL LIBRARY IN

Library development in El Salvador has been slow and quiet, but it has progressed over the years. The library established in 1800 at the National University of El Salvador became the National Library by legislative decree of July 5, 1870. It occupied a building in the National University south of the National Palace in front of the Metropolitana Cathedral. The president of the Republic was Dr. Francesco Dueñas, and the Minister of Education was Don Gregorio Arbizú.

The first collection of the El Salvador National Library came from Rome and was purchased by the family of Cardinal Lambruschini, secretary and librarian of Pope Gregory XVI. It consisted of 6,000 volumes in Spanish, French, Italian, and Latin, published between 1500 and 1800. The university librarian was also the librarian of the National Library which started functioning in 1875.

On March 15, 1888, the president of the republic, General Francisco Menéndez, officially accompanied by the minister of state, inaugurated the National Library. Dr. Rafael U. Palacios, director of the institution, gave the inaugural address. The library remained in the National University building until 1938. It was then moved to the upper floor of the National Theater building. In 1939 it was transferred to 228 North 8th Avenue. Through official communication No. 289, dated April 9, 1931, the auditor general of the republic informed the director of the National Library of a 5¢ tax on each liter of liquor and alcohol purchased. The funds were to be used for the construction of the new National Library building. The new building, in which the National Library is now operating, was constructed at a cost of \$2,500,000 and was inaugurated January 15, 1964.

The General Bureau for Libraries and Archives was created by Decree No. 484, dated December 23, 1961. In January 1968 the name of the bureau was changed to the Administration of National Libraries and Archives. It consists of three units: (1) the National Library, (2) the bookmobiles, and (3) the National General Archives. The latter occupies a floor in the National Palace building. The administration is a part of the General Bureau of Culture.

The National Library with its collection of 90,000 volumes also functions as a public library. The organization and use of the collection has been completely modernized. The Dewey Decimal Classification is used for classification with the descriptive cataloging rules of the Library of Congress, the American Library Association, and the British Library Association. The 600 to 800 daily users of the library consult 900 to 1,000 volumes.

The library has a maximum capacity for accommodating 29,000 readers consulting 35,500 volumes in 1 day. The National Library acquires its materials through exchange, donations, purchase, and legal deposit. The latter was instituted in Salvadore with the Printing Office Law of 1886 and reformed by legislative decree of October 6, 1950. Printers are required to deposit three copies of each work published. Exchange is maintained with Europe and America.

During the last 3 years the National Library has initiated extension cultural programs such as exhibitions of paintings and books, and conferences and seminars on librarianship and libraries. Both national and foreign artists and writers have been included in these programs, especially during 1970, for the celebration of the library's 100th anniversary.

The following library directors, mainly important literary figures, have given much intellectual prestige to the institution by their leadership: Esteban J. Castro, 1872; Luis Gromeyer, 1873; Dr. Jorge L. Lainez, 1885; Dr. Rafael U. Palacios, 1886; León Lozano, 1887; Diego Meany, 1892; Francisco Gavidia, 1906; Arturo Ambrogi, 1919; Rafael Garcia Escobar, 1927; Juan Ulloa, 1931; Julio Cesar Esbobar, 1932; Jose Flores Figeac, May to October 1944; Neftali Girón Guevara, October 1944 to March 1945; Baudilio Flores, 1945 to 1961; Rolando Velásques, 1962; Guillermo Machón de Paz, 1964; Rosa Velásques de Doumakis, 1967; and David Escobar Galindo, 1971. The assistant director since 1962 has been Doña Gladys de Masey; secretary, Ricardo Contreras; head of bookmobiles, Valentín Amaya; head of National General Archives, Rodolfo Romero Choto.

The objectives of the National Library are to collect, administer, and facilitate the use and production of national bibliography; to provide the most representative works of world bibliography; and to promote culture and contribute to the development of national education. Branch libraries and bookmobiles participate in the educational function in all parts of the country, especially in rural areas. The National General Archive is responsible for the collection, preservation, and organization of the government documents issued by the central government, autonomous institutions, municipalities, and townships.

For economic reasons the library has only two publications: *El Boletín de publicaciones incorporadas* and the periodical *Anaqueles* the latter has been published under the title of *Signo* since 1971.

University libraries were formed individually as different schools were developed. With no planned program for library development based upon modern technical methods, the development very often depended upon the interest of the various school deans.

The libraries of the different schools will eventually become a part of the University City. In fact, several are already in the process of becoming a part of a projected centralized system. The university libraries have these basic divisions: (1) Selection and Acquisition, (2) Cataloging and Classification, (3) Public Services, and (4) Newspaper and Periodical Collection Services. At present, internal relations among these libraries are neither well defined nor well coordinated. This situation is aggravated by the reduced size of the staff assigned to libraries because of curtailed budgets and the diversion of funds for international scholarships. The library of the faculty of medicine has the best resources and is housed in a new building.

The administrative staff of the central library consists of the following: director, assistant director, secretary, head of acquisitions, head of periodicals, head of circulation, head of exchanges, head of technical processes, head of reference, sixteen auxiliary personnel, and seven service personnel.

The technical processes department, in its cataloging and classification of library materials, uses the Dewey Decimal Classification, the Anglo-American Descriptive Cataloging Rules, the subject heading list compiled by Carmen Rovira and Jorge Aguayo, and the Cutter Tables for book numbers. The faculty of economics library is the first to receive material centrally processed by this technical processes department. University extension centers in the central east and west regions are also receiving material centrally processed. Since 1971 the extension centers in the local communities have provided students with the first 2 years of university work.

The personnel for the technical processes department have received technical preparation by means of special courses imported from abroad.

An average of 2,000 students daily use the library of the Department of Public Services with its open stacks and reserve sections. The collection of 60,000 volumes assists in the development of the academic programs although it is in no way comprehensive. The lending system is in the process of being mechanized. An average of four books is consulted daily by each library patron.

The periodical and newspaper department, with a head and four assistants, is in the process of development. The collection consists of 800 titles divided into the following sections: El Salvador, general, and international organizations. Holdings enable the library to offer services that complement other areas in the library.

The amount allocated annually for the acquisition of books and periodicals is \$20,000. In 1970, 9,778 books were purchased. The selection committee consists of members from the various university disciplines and the head of the Selection and Acquisition Department. Other library department heads may also suggest titles for purchase.

A library exchange program is maintained with almost all countries of the world and especially with Hispanic-America. El Salvador University publications are used for exchange purposes.

The reference department is now being developed by the head of the department, a London graduate. Capable people head the library departments and most have a degree in librarianship.

The publication department of the National University has as its responsibility the publication of the national literature and especially the work of current and former university students. Material written by foreign authors is also published.

The University Bookstore offers an important service to students, making textbooks and reference books available at low prices and procuring books that are not easily available in other bookstores.

The Faculty of Medicine Library in the El Salvador University is one of the most complete medical libraries in Central America. It was begun in 1956 with the first subscriptions to scientific periodicals, cataloging and classification of the collection, and assignment of a budget. Great improvements were made in the physical condition of the library, in the personnel, and in service. These changes brought the library to the attention of the government and resulted in donation of funds from the government, the Kellogg Foundation, and other foreign foundations. The first build-

ing, located on Arce Street and 25th Avenue North, is almost in the middle of two large public charity hospitals: Rosales Hospital and Maternity Hospital.

Since the inception of the library there has been a Library Commission, consisting of four members of the teaching staff and the librarian who functions as the secretary. The commission is appointed by the dean of the faculty for an indefinite period and meets monthly. The function of the commission is to determine, in conjunction with the librarian, the policy of the library, and it assists the librarian in the selection of bibliographical materials. Donations and other forms of aid for the library are solicited from individuals and from foreign and national institutions.

Library commissions serve their most important function by stimulating the improvement of library services in general and not by involvement in technical and administrative library procedures.

The policy of selection and acquisition of bibliographical material established by the Library Commission has been oriented toward the development of a specific collection in medical and related subject areas, medical education, and the medical humanities. Bibliographical materials have been selected that serve the requirements of students and professors in accordance with plans and programs of study. To fulfill the needs of a science library, 75% of the collection has been devoted to science periodicals and 25% to books, pamphlets, and other materials. Most of the basic science periodicals have been acquired from the start of their publication. When this has not been possible, the last 20 years have been collected. Some are partially duplicated, and these are used for exchange and donations. The clinical science periodicals, with few exceptions, are complete from 1940 on. Those in greatest demand are partially duplicated. Among those duplicated are the *Journal of the American Medical Association*, *Lancet*, and *North American Medical Clinics*.

Comprehensive collections of the following have been acquired systematically: indexes, bibliographies, extracts, important medical annuals, such as *Index Medicus*, *Biological Abstracts*, *Chemical Abstracts*, and *Quarterly Cumulative Index Medicus*. Local and regional medical publications have also been collected comprehensively. To provide information on Latin American development in a particular subject area, subscriptions and other publications of a regional nature such as the following are maintained: *Acta Physiologica Latinoamericana* and *Archivos Latinoamericanos de Nutrición*.

The book collection includes current editions as well as retrospective material since 1940. The oldest editions of classic monographs and books that mention particular subjects for the first time are obtained.

A representative textbook collection has been developed as an aid to professors and students with the acquisition of one copy of a particular textbook for every ten students. The opinion is held that a library with single copies of ten different textbooks in various subject areas is superior to a library with ten copies of one textbook. The various textbooks are a research reference source for students.

For 13 years the library has offered a short course entitled "Introduction to the Use of the Library and Medical Bibliography" to students in their first semester after entering medical school. The objectives of the course are as follows: orient the

students to the rational use of the library; assist them to know and use information sources and the principal instruments of bibliographical control; develop the ability to build and enlarge upon the themes introduced in class by the professor; initiate them into the techniques of bibliographical research and the effective use of bibliographical citations.

Integration of local bibliographical resources has greatly contributed to strengthening the research collection. In 1964, by agreement between the Medical College of El Salvador and its faculty, the library of the medical college was donated to the faculty and a library policy was adopted to further the better use of local bibliographical resources.

The medical college and several related associations subscribe to various periodicals. From the medical college the library receives fifty-six periodicals which the college receives by exchange for its publication *Archivos del Colegio Medico de El Salvador*. In small countries where resources are limited, integration of local resources is especially beneficial. The faculty library offers its services nationally to the entire medical profession. In addition to the physical integration of these two libraries, there is a coordinated acquisition policy with the other university libraries.

Another means of integrating bibliographical resources has been achieved through the receipt of personal copies of periodicals and private subscriptions from doctors and faculty members. This type of integration has not been entirely welcome, however, because several periodicals are little used duplicates. In some instances donated subscriptions are not renewed and the library has to absorb the cost or discontinue the subscription.

A useful and highly recommended program for small medical libraries, especially at their inception, is that of the exchange of duplicate periodicals with member libraries of the Association of Medical Libraries. The faculty library has been a member of this association since 1960. Although the value of the material received on exchange is difficult to calculate, it is estimated that from 1960 to 1966 the library has received 1,268 volumes at an approximate value of \$12.50 a volume.

At present the library is located in the new faculty of medicine building. The University Superior Council, after studying the report of the University Library Advisors Commission under the direction of a UNESCO expert, recommended the organization of a physically decentralized library system with centralized administration and technical services. The council further recommended reducing the number of libraries and coordinating the location and services of those remaining to better serve the teaching and research requirements of the various faculties. The integrated medical library serving the medical sciences of the university will eventually include library services to all the faculties of medicine, dentistry, and the auxiliary health sciences. The library plans have been implemented by the university department for planning with the advice of the librarians and the UNESCO expert. The library has a space allocation of 1,281 square meters, and it services more than 1,000 regular patrons. The reading area provides seating space for 200 patrons with about 2.80 square meters per patron. The physical space has been utilized in accord with the most modern concepts of library planning in the following way:

1. Main floor. This floor has one door for entrance and exit, located near the circulation area where it can easily be checked and where the open stacks are. On this floor is located:
 - a. Selection and Acquisition Department, Cataloguing and Classification Department, and other technical services.
 - b. Circulation Department, catalogs, and ample space to permit easy access to large numbers of patrons.
 - c. Reference and Bibliography Department, with seating space for thirty-two patrons and space for 2,000 reference volumes.
 - d. Periodical Department with seating space for thirty-four patrons and 5,000 volumes of periodicals for the last 5 years.
 - e. Main reading room with seating space for forty-four patrons, twenty-four individual carrels, and 8,200 bibliographical volumes.
2. Lower floor:
 - a. General deposit for books and periodicals with a capacity for 50,000 volumes, connected directly with the circulation area on the main floor by means of a book lift.
 - b. Utility space, book repair, mail room, service door, with no admission to the public.
 - c. Storage area for equipment and materials for photocopy, microfilms, records, etc.
 - d. Individual carrels equipped with drawers, book shelves, and writing equipment for the use of professors and researchers.
 - e. Audiovisual centers for microfilms, records, tapes, etc.
 - f. Reading room with seating space for sixty-six patrons and 4,000 volumes.
 - g. Section for museum and history of medicine.
 - h. Seminar room for ten persons with audiovisual equipment.

Medical, Dental, and Medical Sciences Library

The hours of public service are listed in Table 1. The average number of hours for the three libraries is 55 hours weekly and 10 hours daily. The hours of service are ample, particularly in view of the limited number of personnel available. The hours of the new library will be 69 hours weekly and 13 hours daily.

The population served is summarized in Table 2. The number of students matriculated in 1969-1970 in the three faculties was 695; and the number of full-time

TABLE 1
Operating Hours

Library	Monday through Friday	Saturday	Daily hours	Weekly hours
Medical	8 A.M. to 9 P.M.	8 A.M. to noon	13	69
Dental	8-12 A.M. and 2-9 P.M.	No service	8	40
Medical Sciences	8-12 A.M. and 1-8:30 P.M.	No service	11½	57½

TABLE 2
Library Population Served

	Students	Professors
Medical	512	96
Dental	97	39
Medical Science	86	26
TOTAL	695	161

professors was 161. The number of students in the new faculty will be approximately 500 per course. In addition to the university students and professors, the libraries give medical bibliographic service to the rest of the community.

Service statistics for 1969 are given in Table 3. The three libraries jointly gave a total of 148,824 units of service to 62,929 patrons. The library is frequented by more patrons than the statistics indicate because of the system of open stacks that allows patrons to assist themselves without consulting the staff.

TABLE 3
Service Statistics for 1969

	Periodicals	Books and other material	Total services	Patrons		Total patrons
				Men	Women	
Medical	23,829	51,379	75,208	26,069	7,694	33,753
Dental	11,846	26,636	38,482	4,012	2,689	6,701
Medical Sciences	—	32,134	32,134	12,355	10,120	22,475
TOTAL	35,675	110,149	145,824	42,436	20,503	62,929

Library services are as follows:

Medical:

- Circulation for both in and out of the library.
- Reference and bibliographical services.
- Photocopy service.
- Orientation service and bibliographical instruction for students writing doctoral dissertations and students in seminar courses.
- Special services:
 - Sale of medical textbooks.
 - Sale of publications.
 - Advisor of the Medical Education Society bookstore.
 - Advisor to the School of Social Service library,
 - General Bureau of Health and Medical College library, and others.
 - Reference service to other medical libraries in Central America.
 - Occasional assistance with translations.

Dental:

Circulation service both in and out of the library.
Service for audiovisual equipment and materials.

Medical Sciences:

Circulation service both in and out of the library.
Instruction on the preparation of bibliographies for doctoral dissertations.

There are lending and consulting services. Reference service is offered only by the Medical Library which has a collection and personnel that warrants this type of service.

The bibliographical resources are listed in Table 4. The total collection in the three libraries is 38,052 volumes, 624 periodical titles, and 1,373 theses titles.

An analysis of the bibliographical resources has not been made but it is estimated that 30% of the books are obsolete. Part of the collection is made up of duplicates, but this enhances the collection especially for items that are in demand. The libraries coordinate the contents of their collections with particular regard to basic items.

TABLE 4
Bibliographical Resources

	Books	Periodical titles	Periodical volumes	Thesis titles	Thesis volumes	Miscellaneous materials
Medical	5,887	550	12,324	1,075	5,375	1,000
Dental ^a	3,250	29	741	170	1,514	218
Medical Sciences ^b	4,000	45	1,000	128	743	—
TOTAL	13,137	624	14,065	1,373	7,632	1,218

^a The Dental Library also has 265 periodical titles that are discontinued or incomplete.

^b The Medical Sciences Library also has 265 periodical titles that are discontinued or incomplete.

The collection is housed in nine different locations, including one dental and five medical departments. The decentralization of the collection has made it difficult to use and control, and as a result bibliographical materials have been lost and misplaced. The collection as a whole should be evaluated in order to delete obsolete material and to relocate subject materials that would be better housed in other collections.

The Faculty of Medicine Library includes an excellent medical history section of some 10,000 French volumes.

The bibliographical materials acquired in 1969 are given in Table 5. The three libraries acquired a total of 2,632 volumes of bibliographical materials, 624 periodical titles, and 92 thesis titles.

TABLE 5

Bibliographical Materials Acquired in 1969

	Books	Periodical titles	Periodical volumes	Thesis titles	Thesis volumes	Miscellaneous materials
Medical	612	550	901	34	170	117
Dental	97	29	90	27	270	—
Medical Sciences	131	45	90	31	155	—
TOTAL	840	624	1,081	92	595	117

The reference collections are as follows:

Medical:

Comprehensive collection of the following publications: *Index Medicus*; *Cumulated Index Medicus*; *Chemical Abstracts*; *Biological Abstracts*; *Current List of Medical Literature*; *Quarterly Cumulative Index Medicus*; *Excerpta Medica*, in addition to the various specialized bibliographical tools such as dictionaries, biographies, manuals, directories, catalogs, and others.

Dental:

Approximately 100 reference volumes that include the following: *Index to Dental Literature, 1965/68*; *Index to the Periodical Dental Literature, 1921/27-*; dictionaries, catalogs, *Encyclopaedia Britannica*, annual statistical volumes, and memoirs.

Chemical Sciences:

Holdings include *Chemical Abstracts* from 1945 to 1963 when it was discontinued and the following encyclopedias: *Americana*; *Barsa*; *Tecnológica de Kir*; *Química Industrial*; *Espasa*; *Calpe*; *Biología Central y Americana*, in addition to tables, indexes, manuals, dictionaries, etc.

The reference collections in these three libraries complement each other with no duplications in the collections with the exception of *Chemical Abstracts* that is partially duplicated in the Chemical Sciences Library. In the acquisition plan for the new library, reference works will hold a high priority.

Cataloging and classification are described in Table 6. The Medical and Dental Libraries use the same classification system, but the Chemical Sciences Library uses the Dewey System. In the new library the plans include the reclassification of the material in the Chemical Sciences Library in accordance with the National Library of Medicine, Bethesda, System that is now used in the Medical and Dental libraries. This system is the most comprehensive one available for biomedical materials.

TABLE 6
Cataloging and Classification

Classification	Cataloging
Medical: System: National Library of Medicine, Bethesda	ALA and Library of Congress rules in addition to the latest Anglo-American Rules. Entire collection is cataloged. Dictionary Catalog.
Dental: System: National Library of Medicine, Bethesda	ALA and Library of Congress rules. Only 300 books have been cataloged; there is no catalog, only the cards for the 300 books.
Chemical Sciences: System: Dewey	ALA and Library of Congress rules. Entire collection is cataloged. Dictionary Catalog.

The periodical collection are as follows:

Medical:

There are 500 titles acquired by purchase, donation, and exchange, arranged alphabetically by title, with a classified subject index. In 1969, 1,000 periodical volumes were bound with about 3,000 unbound volumes.

Dental:

In 1969 the collection, arranged alphabetically by title, included subscriptions to 45 periodical titles with 94 titles discontinued or incomplete. There is a mimeographed list of periodicals held. No volumes were bound in 1969. The Prosthesis Department Library includes complete holdings of the *American Dental Association Journal*.

Chemical Sciences:

In 1969 the collection, arranged alphabetically by title, included subscriptions to 45 periodical titles with 265 periodical titles discontinued or incomplete. No periodical titles were bound in 1969.

An evaluation and analysis of the periodical holdings has not been made. There are approximately 10,000 volumes waiting to be bound. The Medical Library has started a program of binding 1,000 volumes a year, but this is not adequate because the number of volumes added each year exceeds the number bound.

The faculty of medicine library has obtained many periodical volumes through its program of exchange of duplicates with the Medical Library Association, of which it has been a member since 1960.

There should be at least one periodical librarian in the department in order to service it adequately.

The attempt to improve education through books in El Salvador has proceeded in a number of ways. The minister of education in collaboration with UNESCO and

the National Centers for Productivity sponsored a course for improving teaching methods under the title of "Organization of the School Library." Two hundred school directors participated in the 4-week course that met daily for 2 hours of classes. Since 1967 the Ciudad Normal Alberto Masferrer has offered teacher-librarian orientation programs for primary school teachers during the vacation period. At present, with the collaboration of the Agency for International Development, a 1-year intensive library orientation course is offered to 1,200 primary and middle school directors to prospective school supervisors with the objective of improving teaching programs for 1971. The most recent activity for the promotion of Central American school libraries was the UNESCO promoted meeting of experts on the development of Central American school libraries held in Antigua, Guatemala, from July 29 to August 2, 1968. The report issued as a result of this meeting has given El Salvador the foundation for its national library services plan. The first part of this plan is being implemented by the preparation of teacher-librarians in such programs as the one being offered at the Ciudad Normal Alberto Masferrer.

The Ciudad Normal Alberto Masferrer is located in the Valle de San Andrés, jurisdiction of San Juan Opico, Department of Library. It is 29 kilometers from San Salvador, the capitol, on the highway that leads to Santa Ana. It occupies twenty-nine buildings financed by a donation from the United States, and further supported by the government of El Salvador. The territory occupied is equivalent to forty-five city blocks, with the buildings occupying twenty of these blocks and the remainder devoted to agricultural programs.

The library was created in 1968 with the integration of all the collections of the various normal schools established in different areas in the country. There are 10,000 volumes in the integrated collection, with two professional librarians who staff the library, and have been under the guidance of Professor Rosa Valásquez de Doumakis who has studied librarianship in the United States.

Since 1962, when the new period of library activity began, the Ciudad Normal Alberto Masferrer library has extended its assistance in the following programs:

Eight library orientation courses:

1. Preparation of primary and middle school teachers.
2. Preparation and improvement of school administrators (supervisors and directors).
3. Training of teachers to utilize educational television courses.
4. Improvement of teaching methods for services in the primary and middle school.
5. Cooperation by means of special courses with institutions outside the field of education whose personnel require pedagogical training.
6. Training centers for primary and middle school.
7. Educational basic plan for practical secondary school.
8. All technical procedures utilized under the guidance of Miss Juliane M. Heyman, American Library Association consultant.

At present the library has the following sections: (1) Aquisition and Exchange, (2) Circulation, (3) Cataloging and Classification, and (4) Periodicals.

The library holdings now number more than 17,000 volumes, classified according to the Dewey Decimal Classification and 200 periodical titles.

The library personnel consists of five full-time and two part-time employees. The library hours from Monday through Thursday are from 7 A.M. to 9 P.M. and Fridays from 7 A.M. to 3 P.M.

The pedagogical methods utilized by the new professors of the Ciudad Normal incorporate the most modern concepts to such an extent that the library is now an important part of the development of teaching programs. The library is frequented by 200 patrons daily.

With the collaboration of the Regional Center for Technical Assistance, the Ciudad Normal has established a bookstore which makes textbooks available at low prices for students and professors.

The Ciudad Normal publishes a bulletin of new acquisitions and announcements of its different cultural programs.

The Organization of Central American States Library was founded on October 14, 1951, the same day that the San Salvador Charter was signed by the following Central American Ministers of External Affairs: Mario Echandi, Costa Rica; Roberto Edmundo Canesa, El Salvador; Manuel Galich, Guatemala; Edgardo Valenzuela, Honduras; and Oscar Sevilla Sacasa, Nicaragua.

At the start the library holdings included 500 books, 5 encyclopedias, and 3 periodical titles, purchased by the secretary general of the ODECA (Organización de Estados Centro Americanos), Dr. J. Guillermo Trabanino.

In the past the position of librarian was held by a scholar and not a professional librarian, with the result that the organization and utilization of the library was limited. However, this was changed in 1971 when a qualified librarian was appointed head librarian and archivist.

The library holdings now include 7,000 volumes classified according to the Dewey Decimal Classification and 200 periodical titles. There is a beautiful reading room, and the availability of a number of copying machines contributes to efficient library services.

The holdings are divided into the following subject areas: Integration, Education, International Politics, Labor Problems, and Statistical Materials on most of the countries of the world with a special emphasis on Central America and Panama. There are also valuable documents and studies in the collection. The library has the responsibility for the distribution of the organization's publications which concern Central American problems. There are many requests for these publications from libraries in Europe, and North, South, and Central America. The library publishes a semiannual bulletin, *Biblioteca Centroamericana*, which includes important announcements as well as recent library acquisitions.

The Private Library of Historian Miguel Angel Gallardo occupies his entire residence, a house of antique construction with four corridors and a garden in the center. One enters the library through a large vestibule after ringing the doorbell. Part of the residence houses an archeological museum and independent study rooms. The library staff consisting of two library trained employees assists visitors and

explain the organization of the library. The holdings include 49,000 volumes and are arranged according to Mr. Gallardo's own classification scheme. In the library office there is a catalog of holdings with an author, title, and subject approach, a copying machine, and a pre-Colombian history collection.

The reference section consists of eleven bookcases with nine shelves in each, stocked with a variety of international encyclopedias, dictionaries, annuals, and other reference works. These well-bound volumes are housed in a small room that limits the simultaneous use of the collection by more than one person. All the volumes have been selected for their quality and general research importance with an emphasis upon selection of works for their importance to historical research. There is a total of 900 encyclopedias and 17 volumes of the Spanish Royal Academy Dictionary.

The literature section is arranged according to areas in the following way: (1) North American, (2) English, (3) Spanish, (4) South American, (5) Latin American, (6) Portuguese, (7) French, (8) Italian, (9) Chinese, (10) Japanese, (11) Hebrew, (12) Israeli, etc.

The statistics and economic politics section includes materials primarily on Latin America, with an emphasis upon materials relating to El Salvador, with some material relating to North America.

The history of culture section includes materials from 1800 to the present, with in-depth collections on the history of world wars; North, South, and Central American revolutions; and revolutions in El Salvador.

The colonial history section is a collection that documents the conquest of America, with particular emphasis upon Central and South America from before colonization to the present day.

The fine arts section has a small collection on the history of the fine arts.

The periodical publications section consists of the following collection of official periodical publications of the republic of El Salvador: *Miscelanea*, September to December, 1827; *El Salvadoreño*, 1828-1829; *El Oris Salvadoreño*, 1837; *El Amigo del Pueblo*, 1843; *La Gaceta*, 1846-1862; *El Centinela de la Patria*, 1863; *El Constitucional o Periódico Oficial*, 1863-1865; *Boletín Oficial*, 1874-1875; *Diario Oficial*, 1876; *Gaceta Oficial*, 1877; and *Diario Oficial*, 1877 to date. This collection also includes periodicals of Central America since 1930, the laws and constitutions of El Salvador since 1886, and the legal codes of almost all the countries of Central America.

The small but important section on Socialism consists of books arranged by country and a periodical clipping file.

The agriculture section has an in-depth collection of books and periodicals on coffee in El Salvador since 1830.

There is a section devoted to racism, Nazism, military treatises, sports, sex, atlases, and world geography; a section that includes natural sciences, theology, psychology, and occult sciences; a section pertaining to the religions of the world; and another section on medicine and social service.

The following are the library's special collections: (1) A vertical file containing

800 documents in the official El Salvador archive. These are mainly Central American presidential and state archival manuscripts with particular emphasis on the material pertaining to El Salvador. (2) A collection of twenty-one Central American maps from 1500 to 1800 authored by Italian, French, and Spanish geographers. (3) A collection of rare paintings and reproductions.

The historical documents are reproduced in the publication, *Papeles Historicos*, by Mr. Gallardo.

The various collections in the library have been purchased by eminent Central American individuals. There is now a library staff member who devotes himself to acquiring special collections for the library.

Miguel Angel Gallardo, a trained statistician, whose primary interest is the history of America, is a librarian who knows his collection by heart.

The library, located on Gallardo Avenue, 1-67 St. Tecla, El Salvador, Central America, is frequented by national and international researchers, journalists, and students with an interest in history.

The José Simeón Cañas Library, Catholic University, is located in the university city where there are four modern buildings for offices and classrooms for the following faculties: industrial engineering, economic sciences, natural sciences, and the sciences of man. The second phase of the construction program (1970-1974) includes plans for the construction of seven new buildings. One of these will be a new library building.

The library holdings consist of 14,000 volumes and 500 periodical titles. A staff of four assists 700 users a month.

The collection is in the process of being classified according to the Dewey Decimal Classification. There is a much used electric copying machine for the many students who have to study volumes that are in short supply. The library is open from 8 A.M. to 8 P.M. on Friday and Saturday. When the projected plans are implemented, the university library will be the best in El Salvador.

The Dr. Gustavo Guerrero Library of the El Salvador Ministry of External Affairs, inaugurated in its new building in September 1971, has holdings consisting of 3,000 volumes of international law and international politics and a small number of documents of the past century. A library trained staff member is in the process of cataloging the collection.

The El Salvador Hipotecario Bank Library collection is notable in the area of bank laws, economic sciences, and studies relating to the economics of Central America. The holdings include a cataloged collection of 5,000 volumes, 238 periodical titles, and a vertical file of bulletins. The personnel has had library training and offers private and public reference service.

ROSA VELÁSQUEZ DE DOUMAKIS
(Translated by Savina A. Roxas)

ELECTRONIC COMPOSITION

The term "electronic composition" as used in this article encompasses all of the following:

1. Composing systems producing proportionately spaced characters in multiple fonts.
2. Output of graphic arts quality with a line resolution of not less than 650 lines per inch for final copy.
3. Systems employing digital computers to perform the functions of line justification, hyphenation, and page makeup.
4. Systems achieving output speeds greater than 300 8-point characters per second to film or plate material.
5. Systems employing cathode ray tubes as write-out devices.

As the definition given above indicates, electronic composing systems are variants of computer peripheral devices such as line printers or computer-output microfilm devices.

It should be noted also that the term "electronic composition" does not encompass all forms of computerized typesetting. Computerized typesetting had its genesis in attempts to automate the input to conventional typesetting machines. Newspaper composition is perhaps the earliest and best illustration of this. Electronic composition, on the other hand, had its genesis in attempts to obtain the "blessings" of typography while maintaining the output speeds of digital computers.

In the case of computerized typesetting printers were getting into the business of data processing, while in the case of electronic composition data processing people were getting into the business of printing. [For an excellent description of the whole field of the computer and typesetting see *Computer Peripherals and Typesetting* by A. H. Phillips (1).]

This article will discuss only the field of electronic composition since it is more directly related to the field of the information science.

The computer first became an effective composing device in 1955. While it is generally known that the first business-type computer, Univac I, was installed in the Bureau of the Census, U.S. Department of Commerce, in 1951, it is not generally known that it did not have a high-speed line printer associated with it until 1955. During the first 4 years of its use, Univac I had as an output device an off-line 12-character per second typewriter (known as Unityper) driven by the output tape of the computer. The first line printer installed had the then fantastic speed of 600 lines of up to 120 print positions per minute. The number of print positions available per line imposed serious limitations on the Bureau of the Census, given the nature of its publications. To overcome this limitation for the publication of the economic censuses of 1958, the bureau programmed the computer to format partial lines for one printing pass and then backed up the page for a second pass with the balance of the line. Lines of up to 150 characters in length were achieved by this simple ex-

pedient. Speed of composition did, however, suffer and the line rate dropped to 200 lines per minute. Considering, however, that character rate was a respectable 500 characters per second, it was obvious that a quantum jump from the 12-character per second Unityper had been achieved.

Speeds of impact line printers increased in lines per minute as well as in the number of print positions available per line. In 1971 the most widely used impact line printers produced 1,100 lines per minute of alphanumeric data with up to 132 print positions available. Available commercially are line printers producing up to 3,000 lines per minute of numeric data with up to 160 print positions available. (See a current issue of *KEYDATA, Computer Characteristics Review*, Keydata Corp., Watertown, Massachusetts, for the most recent data on the characteristics of line printers.)

Output speeds of up to 4,000 alphanumeric characters per second for the production of either camera copy or short run offset plates are attainable from the impact line printers of today's computers. It appears quite clear, however, that today's impact line printers are pressing the speed potential of their technology. While internal computing speeds have increased from 0.8 of a bit per microsecond (Univac I) to 2181.8 bits per microsecond (Control Data 7600) in the span of 20 years for a change rate of 2727.2, impact line printer speeds, in terms of alphanumeric characters per second, speeds have only increased from 1,200 to 4,000 characters per second for a change rate of 3.3. This comparison indicates fairly vividly the limits of electromechanical changes in speed versus changes in electronic speeds.

If the computer is thought of as a form of assembly line, obviously it is a line badly out of balance. Compensation by increasing the number of output devices that are channeled to a central processor assists in achieving a better balance; however, there are effective limits to the use of this approach, not only with respect to cost but also with respect to optimum use of the central processor.

In a composing context the difference in speed between the impact line printer and the central processor is overshadowed by the more serious typographic limitations of the line printer. The monospaced output of an impact line printer is not easy to read. Even if a simple change is introduced, such as upper and lower case characters (which incidentally generally decreases output speed by 50%), the end product is still not aesthetically pleasing. Since the primary purpose of printing is to convey information, the process is hindered by impediments to the desire to read.

From an economic standpoint the use of monospaced characters increases the size of a publication on an average of 40%. This is because in a monospaced system all characters are assigned the lateral width of the letter "M" even though only two of the 26 characters require this much space. The frequently recurring letters "i" and "l," for example, require approximately two-thirds of the space of the letter "M." Accordingly, the typical monospaced line of 132 characters will consume approximately the same space as 172 proportionally spaced characters.

Because of the less economic use of a sheet of paper, of necessity there will be more sheets stemming from camera copy produced on a line printer than from a

device with true typographic capability. Data of the U.S. Government Printing Office indicate that bulk output of a line printer will exceed the bulk produced by a typographic device by close to 40%. This means also that 40% more film, printing plates, paper, and printing and binding labor will be associated with line printer output. Storage requirements in terms of cubic footage are also higher and distribution costs, which are closely correlated to weight, are again higher. All this increase in cost goes, one must keep in mind, for a product that is aesthetically and functionally inferior to a typographically produced publication.

Notwithstanding the aesthetic and economic limitations of the computer line printer in 1961, it was reliably estimated that 20% of all federal publications were then being produced on line printers or similar devices such as tabulating machines. Considering that there were only 730 digital computers in use in the federal government in 1961 and 4,277 such systems in use in 1970, it is evident that the line printer is a most pervasive composing device. As the technology of input changes, permitting the translation of text into machine language, e.g., optical character recognition devices, at relatively low cost, the digital computer will become even more ubiquitous.

The first output system that began to bridge the gap between digital computers and typographic quality output was that of the MEDLARS (*Medical Literature Analysis and Retrieval System*) project. In 1960 the National Library of Medicine, Public Health Service, U.S. Department of Health, Education, and Welfare, set in motion a process which has had a most significant impact on the technology of composition. The major publication of the National Library of Medicine is *Index Medicus* which with its predecessors has a unique place in the annals of information science.

Index Medicus has been composed in a variety of ways but here will be reviewed only the most recent methods, i.e., typewriter composition onto cards that were "shingled" to make up a page; Justewriter composition onto punched cards for processing on a sequential card camera (Listomatic); composition onto camera copy by impact line printer; and composition by means of a computer-produced magnetic tape driving a high-speed filmsetter.

The first three methods referred to were pre-MEDLARS methods since there was no inherent retrieval capability in any of them. The latter two methods produced retrieval capability as well as composing capability since the machine language created could be applied to multiple purposes.

Like the characters in the tale "The Three Princes of Serendip," the National Library of Medicine found something it was not looking for. Indeed the systems design parameters laid down in 1961 in the initial contract with the Defense Information Systems Division of the General Electric Company specified that only state-of-the-art equipment was to be used for MEDLARS and the initial costing assumed that two filmsetters would meet the needs.

By October of 1961 it became obvious that even the legendary speeds of an impact line printer (when throughput time to plate-ready film was included in the production cycle) could not meet the library's time parameter. In addition, the speed limit set would have required in excess of twenty-eight filmsetters rather than



FIGURE 1. *View of Photon 900 series machine.*

the two originally costed. At that time a decision was made to advance the state of the art by developing an output device to be driven by the tape output of the computer.

The particular device developed was the Photon 900 which was given the acronym GRACE (*Graphic Arts Composing Equipment*) (see Figure 1). GRACE went into service in June of 1964 when it produced the July 1964 issue of *Index Medicus*. In 1969 GRACE was donated to the Smithsonian Institution, having served honorably, if not always reliably, for almost 5 years. GRACE never attained speed specifications, i.e., 440 characters per second, but did advance typographic output speeds by a factor of 30. In addition, the issuance of a request for proposals for a computer-related high-speed typographic output system gave rise to promising research and development efforts.

While MEDLARS constituted a classic example of serendipity as far as the technology of composition was concerned, the next major development was a deliberate effort on the part of the Joint Committee on Printing of the U.S. Congress to advance the state of the art. In 1962 a committee named the Federal Electronic Printing Committee, composed of representatives of the major publishing agencies of the U.S. Government, was established. This committee was charged with the responsibility of developing a "better way" to compose the publications of the U.S. Government which were then being produced by means of computers. In August of 1963 the specifications for a high-speed system were issued and bids were received in October. Six firms submitted bids, all but one of which was responsive in major part to the specifications.

The specifications issued in 1963 by the U.S. Government Printing Office were of major significance in the field of electronic composition. While high-speed systems inevitably would have been developed, they would not have developed as soon.

In addition, it is probable that a sequential process would have been followed since the U.S. Government Printing Office's requirements for speed and capacity are unique.

The Federal Electronic Printing Committee had been careful to place considerable emphasis on the computer interface and need for complex software in its specifications. It is well that they did, because the basic problems with electronic composition have been far more related to the computer than to the output device itself.

Award was made by the U.S. Government Printing Office on March 19, 1964 to the Mergenthaler Linotype Company for the design and fabrication of a system to be delivered in 1966. The delivery schedule slipped quite seriously when it became apparent that the technological problems were more severe than anticipated. In addition, the most serious underestimate was in relation to the computer side of the system. Throughput speeds had been seriously overestimated and core memory requirements were seriously underestimated.

Production problems were overcome, however, and delivery of the first of two Linotron 1010s was made to the U.S. Government Printing Office in August of 1967. By January of 1971 the electronic composing systems of the U.S. Government Printing Office had composed 575,128 pages of material that formerly would have been composed by impact line printer. Costs to the government were estimated to have been reduced by \$5,234,000, and approximately 5,100 tons of paper were eliminated from the distribution system (see Figures 2 and 3).

During the period of development of the Linotron 1010, other systems employing cathode ray tube techniques were also developed. Chief among these were the following:

1. The Digiset, developed in Germany by Dr. Rudolf Hell, became operational in 1967 in Denmark.
2. The Harris Fototronic CRT, designed in 1964, became operational in January of 1968 in the United States (see Figure 4).
3. The Linotron 505, which was originally designed in the United Kingdom in 1966 by Purdy and McKintosh, began field trials in 1967 and became operational in both the United States and the United Kingdom in 1968 (see Figure 5).
4. The RCA Videocomp 830, which is a derivative of the Hell Digiset, became operational in 1968 in the United States and the Videocomp 70/800, a more advanced machine, became operational in 1970 (see Figure 6).

Table 1 illustrates the number of electronic composing machines operational as of May 1, 1971.

Average system costs for these systems (inclusive of computer programs but exclusive of computer costs) as of May 1, 1971, as given by their manufacturers, are listed in Table 2.

The operating principles of the systems mentioned above break into two groups. The Linotron 505 and 1010 store their graphic images on photographic grids. The Fototronic CRT and the various Videocomp machines store their graphic images in digital form. Accordingly, the two Linotron machines have fewer characters on

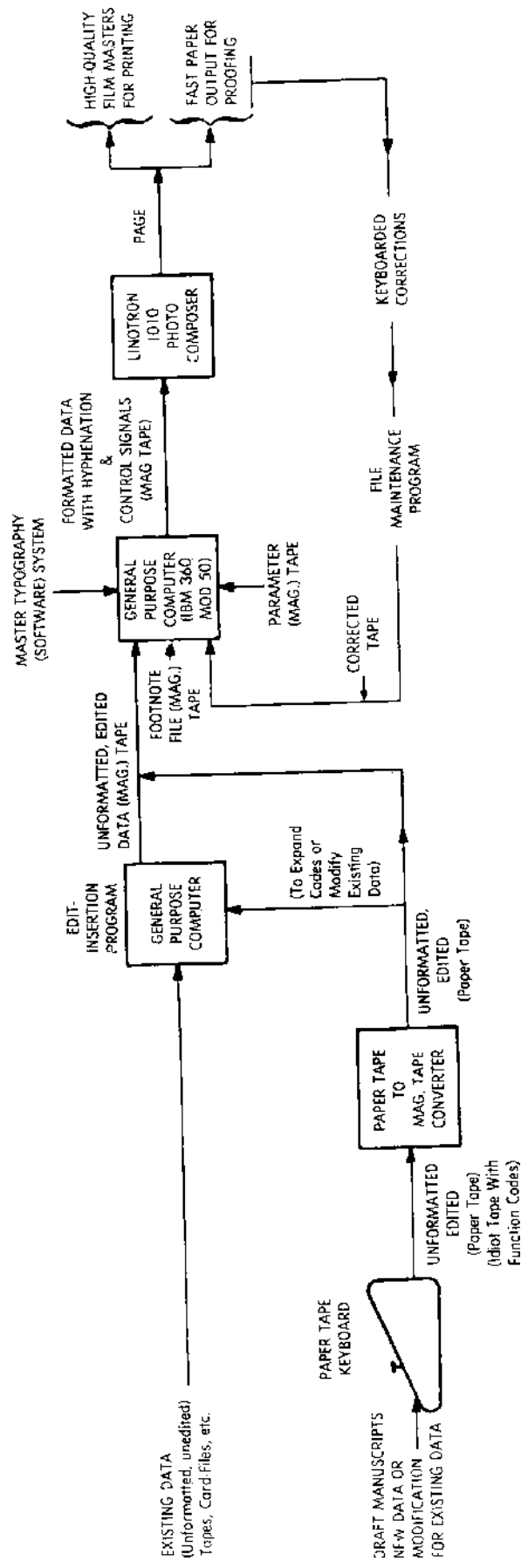


FIGURE 2. Block Diagram for Linotron 1010 Electronic Composing System at the U.S. Government Printing Office.

TABLE 1
Electronic Composing Machines Operational as of May 1, 1971

System	In United States	Outside United States
Linotron 505	51	55
Linotron 1010	5	0
Fototronic CRT	12	1
Videocomp 820	5	—
Videocomp 830	10	1
Videocomp 70/800	15	1
Digiset	0	13 "

" From Composition Information Service, *1970-1971 Survey of Computerized Typesetting*.

line but also have faster access to any character that is stored on the grid that is already in position. The digital machines not only have a larger number of fonts available on line, but can change fonts at electronic speeds compared to the electromechanical speeds of the grid machines when a basic change in type is required.

While there are many differences between electronic composing systems and conventional filmsetters and hot metal compositors, the major difference is in output speeds. Table 3 compares maximum typographic quality speeds of electronic composing systems with some widely used nonelectronic processes.

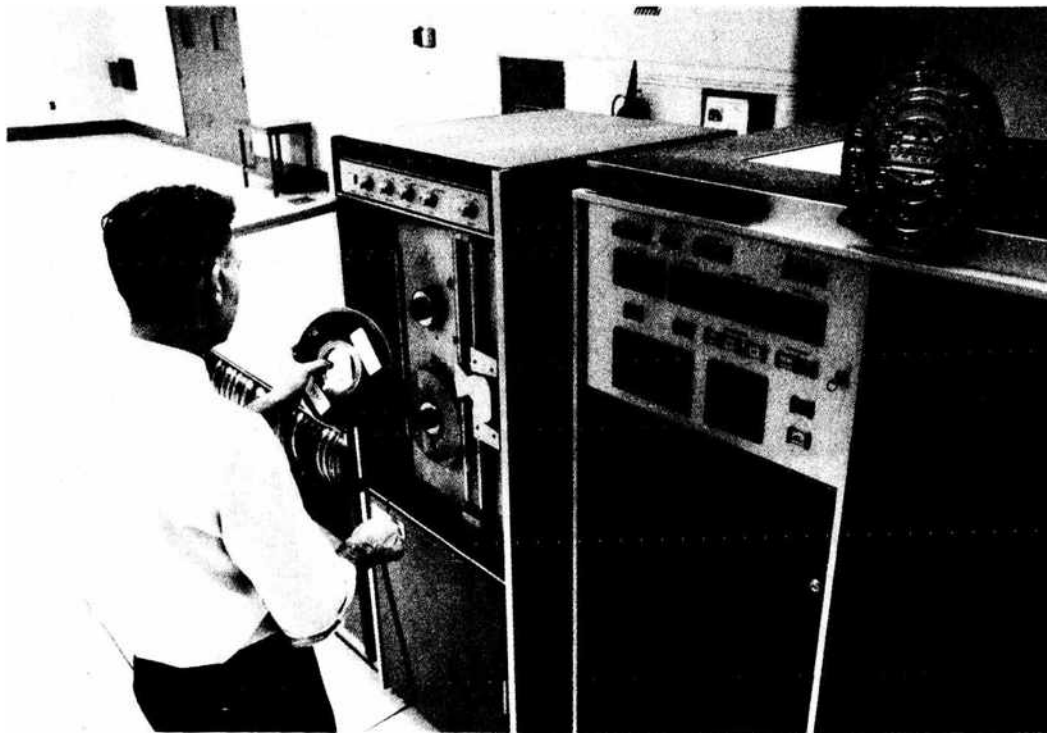


FIGURE 3. *View of Linotron 1010. (Courtesy Mergenthaler Linotype Co.)*

TABLE 2
Average System Costs as of May 1, 1971

System	\$
Linotron 505	140,000
Linotron 1010	1,500,000
Fototronic CRT	400,000
Videocomp 820	230,000
Videocomp 830	340,000
Videocomp 70/800	390,000

Speed is obtained at a sizeable investment and, accordingly, the issue of economic use of such systems must be faced. The economics of electronic composing systems had been carefully considered by the U.S. Government prior to the decision to acquire the Linotron 1010. As early as 1965 the U.S. Government Printing Office had stated that electronic composition was an economic substitute for line printer produced work but not necessarily economic for work that was of a one-time nature (2).

Accordingly, most of the 575,128 pages produced by the U.S. Government Printing Office between October 2, 1967 and January 1, 1971 represented repetitive

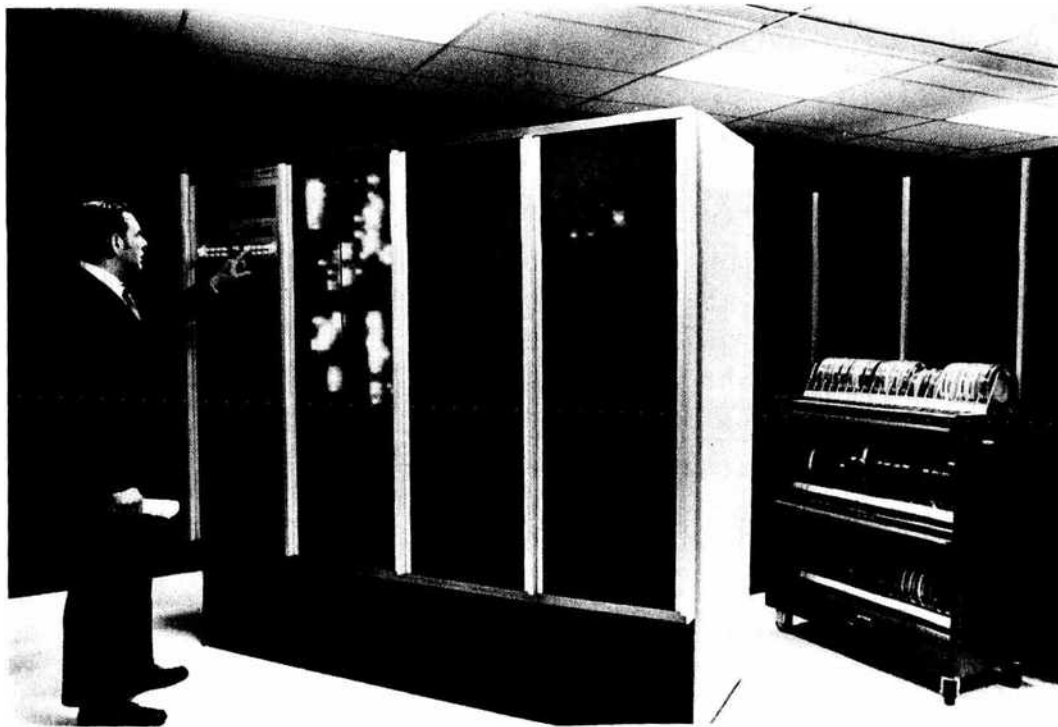


FIGURE 4. View of Harris Fototronic CRT. (Courtesy Intertype, a division of Harris Intertype Corp.)

TABLE 3
Speeds of Composing Systems

System	Characters set per second
Videocomp 70/800	6000
Linotron 1010	1100
Fototronic CRT	1000
Linotron 505	180
IBM MTSC (impact composer)	12
Harris Intertype Fotomatic (filmsetter)	10
Linotype Elektron (hot metal)	7.8
Monophoto Mk 4 (filmsetter)	3.3
Monotype Caster (hot metal)	3.0

publications which used the same formats for successive issues, e.g., parts lists, catalogs, by-products of information storage and retrieval systems, and telephone directories. In the commercial area, telephone directory composition has been the major application, followed by such applications as airline schedules, library and other catalogs, and price lists. All of these applications minimize input costs by salvaging data from one issue to the next in a very economic form such as magnetic tape.

For one-time work such as popular novels, the electronic composing systems do not as yet have much to offer in the way of economy. A study of the costs of conventional composition processes compared to electronic composition was published by the Joint Committee on Printing of the U.S. Congress (3). This study compared the costs of producing eight representative pages by Linotype, Monotype, and two versions of a photocomposing system with all of the then operational



FIGURE 5. View of Linotron 505. (Courtesy Mergenthaler Linotype Co.)

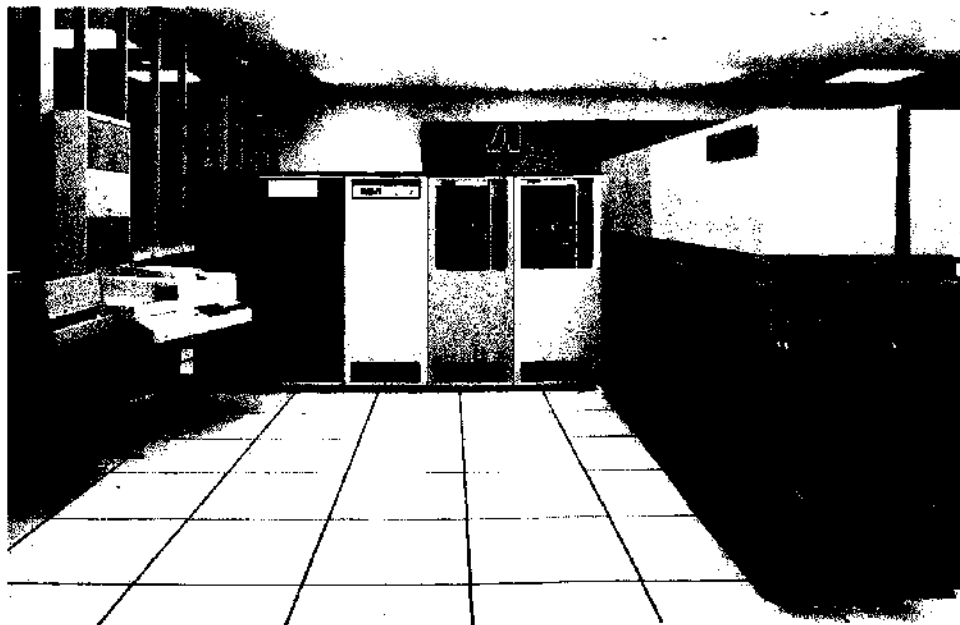


FIGURE 6. View of RCA Videocomp 70/800. (Courtesy Radio Corporation of America.)

electronic composing systems. The study found that for one-time work the volume required to break-even on a cost basis with conventional processes was far higher than that encountered by the typical firm.

One of the principal reasons for the high volumes of work required to attain a break-even situation with conventional typesetting processes is the costs of computer processing. Each of the electronic composing systems referred to requires that a digital computer prepare the input tape to the composer. Table 4 shows the typical computing system and monthly equipment rental cost supporting each of the electronic composing devices.

In addition to equipment costs, it is necessary to develop computer programs to perform such typographic functions as line justification, hyphenation of words at the end of lines, and page make-up. While each of the equipment manufacturers provide generalized computer programs to go with their equipment, it is most

TABLE 4
Costs of Electronic Composition

Electronic composing system	Typical supporting computer	Typical monthly computer lease costs (\$)
Linotron 505	IBM 1130	1,200
Linotron 1010	IBM 360-50	22,000
Fototronic CRT	IBM 360-30	9,200
Videocomp 70/800	RCA 70/45	13,900

common to develop specific programs for frequently recurring work, such as composition of telephone directories, because of the difference in execution times.

Thus we have an expensive operation to contend with. Nonetheless, one of the conclusions of the cost study referred to is worth repeating here. It was, "Say what we will about the human and organizational problems surrounding this technology, it is a fact. It will not go away. A rational and economic man must anticipate it making itself felt in the composition industry."

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E. R. LANNON

ELECTROSTATIC PRINTING PROCESS

See Copying and Duplicating Processes and Equipments

ELEMENTARY SCHOOL LIBRARIES AND COLLECTIONS

See School Libraries and Collections

ELEMENTARY AND SECONDARY EDUCATION ACT, 1965

See Legislation Affecting Libraries and Information Centers

ELIZARENKOVA, TATIANA PETROVNA

Tatiana Petrovna Elizarenkova (1900–1968) was a prominent library scientist, especially interested in library terminology and education. From 1934 to 1941 she was on the staff of the Saltykov-shchedrin Library in Leningrad. She was assistant

professor and, later, head of the Foreign Language Department of the Institute of Culture in Moscow. She was the author of the *English-Russian Dictionary of Library-Science Terms* (1962) and *Russian-English Dictionary of Library-Science Terms* (1968), which is still in print. She took an active part in the translation into Russian of Ranganathan's *Colon Classification* and in the compilation of the pentalingual dictionary of library terms under the auspices of UNESCO.

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OLGA AKHMANOVA

ELSEVIER FAMILY

Elsevier, *Helschevier*, or *Elschevier* is the name of a family of booksellers, book binders, printers, and publishers in the northern Netherlands who played an important national and international part, particularly as publishers, in the seventeenth century.

Their editions and activities have been the subject of much study in the French and Dutch language, not just because their editions reflect a good picture of the knowledge of the antique world in the seventeenth century, but also because other printers, especially in France, issued editions under the colophon of the Elseviers. The Elseviers also published books under fictitious publishers names for political or other considerations. Even today unsolved riddles exist in this field.

Originally the Elseviers came from Leuven; *Lodewijk* Elsevier (Louys d'Elsevier, Leuven 1540–Leiden 1617) received his training as a printer at Plantijn in Antwerp but, for considerations of a religious nature, left the Roman-Catholic southern Netherlands to establish himself as a bookbinder and bookseller in Protestant Leiden in 1580. His contacts with the University of Leiden, founded in 1575, enabled him to proceed to publishing books. His first colophon was an angel with a book in one hand and a torch in the other; later on he altered the mark into an eagle on a column with the proverb *Concordia res parvae crescunt* and later still an alder with below it the proverb *Non Solus*. When he died in 1617, he had published some hundred books. His sons *Matthias* (1564–1640) and *Bonaventura* (1583–1652) succeeded him. Other members of the Elsevier family, uncles and cousins, were also active in the book trade, mainly as dealers.

In 1637 a bookshop and publishing office was established in Amsterdam by *Lodewijk*, (1604–1670), grandson of the founder of the Leiden publishing business. Both *Bonaventura* and *Abraham* Elsevier, who ran the business in Leiden, and *Lodewijk* and *Daniël* Elsevier in Amsterdam, were first-class book dealers. Their publishing houses were able to develop, mainly owing to the cooperation of scholar

Daniël Heinsius, professor in Latin, Greek, Statesmanship and History in Leiden. He was the intellect behind the Leiden Elseviers, whereas his son Nicholaas Heinsius, also a great scholar, became the intellectual adviser of the Amsterdam Elseviers. The Elseviers owe their renown principally to a series of duodecimo format classics (hardbound, pocket size Latin works) started by Bonaventura and Abraham Elsevier in 1629. Nearly all classic authors were published in this edition and the appellation "in 12° Elzevirien" became a well-known bibliographical expression. In America this format also became known under the same name (69 by 127 millimeters, type page 50 by 105 millimeters). It is worth mentioning that the Elseviers bought cut type and had it recast; that the paper on which they printed was of indifferent quality; but that their ink was excellent.

The Elseviers did not restrict themselves to the duodecimo editions, but published many important works in folio size, including an excellent Arabic-Latin dictionary by Golius in 1653. Furthermore, the big Flemish Bible was printed at Leiden in 1663. The most beautiful small editions (e.g. *De Republieken*) were issued between 1620 and 1640. The eighteen known catalogs of the works issued by Elsevier mention between 1,000 and 1,100 titles.

The first book published by Lodewijk Elsevier bore the title *J. Drusii, Ebraicarum questionum libri duo* (Leiden 1583). Other well-known editions by the Elseviers are *De Imitatione Christi* and *Psalterium* (Leiden, 1653), *Nederlandse Historien* by P. C. Hooft (Amsterdam, 1642), and works by Hugo de Groot and Descartes. The Amsterdam Elseviers also issued *Corpus Juris Civiles* (2 Vols., 1663) and *La Sainte Bible* (2 Vols., 1669).

After Abraham Elsevier's death in 1712 the Leiden firm was sold for only 2,000 guilders; it had no further part in the publishing world. The Amsterdam Elseviers ended their business shortly after Daniël Elsevier's death in 1681. The heirs carried on the business for another few years and in 1683 the last Elsevier edition was published, after which the short period of Elsevier prosperity belonged to the past. Toward the close of the seventeenth century, shortly after Daniël Elsevier's death, French collectors were seeking after the little Elseviers issued in duodecimo. The Elsevier editions became so famous and sought after that many forged editions were circulated under the Elsevier colophon. Famed collections came into existence, beautifully bound, including the collection of the Duchess of Orleans in France, numbering over a thousand volumes.

Many bibliographical studies on the Elseviers and their editions have been issued: Bérard (1822), Nodier (1829), de la Faye (1842 and 1854), Pieters (1843, 1851, and 1858), Moppeley (1848), Brunet (1866), Centenari (1879), Willems (1880), Berghman (1885 and 1897), Goldsmid (1888), and Rahir (1896). The libraries at Petersburg (1862 and 1864), Winterthur (1864), and Warschau (1874) issued catalogs of their Elsevier collections. In addition, documentations on the Elseviers were collected and published in the Netherlands by Dodt van Flensburg (1841), Jacob (1839-1843), Rammelman Elsevier (1845), and de Reum (1874). In all these works the Elseviers have been dealt with genealogically and bibliographically, but not from a social, economic, and typographical point of view.

The name of Elsevier proved to have such an excellent ring in bookdealers' circles that in 1880 a company was founded by J. G. Robbers in Amsterdam under the name of Uitgeversmaatschappij Elsevier (Publishing Company Elsevier). After World War II this company, under the management of J. P. Klautz (1930–1954), gained an international aspect by founding Elsevier establishments in Brussels, London, New York, and for a short time also in Houston (Texas), while in 1945 the principal Dutch weekly, *Elseviers Weekblad*, was set up by the same company. In France and England the name Elsevier was given to a series of books and a type of book. All this had nothing more to do, however, with the seventeenth century Elseviers.

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JOHAN P. KLAUTZ :

EMORY UNIVERSITY DIVISION OF LIBRARIANSHIP

The beginning of education for librarianship in the South immediately followed the initiation of free public library service in the area, both having their genesis in the Carnegie Library of Atlanta. What was eventually to become the Emory University Division of Librarianship began in 1899 as a 6-month apprentice class designed primarily to prepare librarians for the newly organized library.

The formation of the library resulted from a group of civic leaders successfully negotiating with Andrew Carnegie for a \$100,000 grant to the city for a new library building. The grant was contingent upon the Young Men's Library Association, a private Atlanta library formed in 1867, providing a suitable site and merging its resources with the projected new library. The city of Atlanta also had to agree to provide \$5,000 a year for the library's support. Through this action Atlanta became the first city in the South to provide free municipally supported library service.

With new financial support and the accompanying extension of collections and services, and in anticipation of a new building, the need for additional qualified library personnel was obvious. Anne Wallace, who had followed her sister as librarian for the Young Men's Library Association in 1892, initiated the apprenticeship class to meet this need. The class was modeled after the program developed at the Dayton (Ohio) Public Library. Applicants were required to take a competitive examination and of the fourteen examined in 1899, four were accepted to begin training in October of that year.

The development of both public library service and education for librarianship in the South was greatly influenced by the efforts, capability, and foresight of librarians associated with the founding and development of the Atlanta Carnegie Library. Miss Wallace possessed an understanding of the role of public library service and had the personality and determination to seek expansion of that role. Not only did she provide leadership to the Atlanta library, she was also effective in persuading Mr. Carnegie to give an additional \$45,000 for the library building. Other examples of her leadership included the direction of a Congress for Women Librarians during the Cotton States and International Exposition held in Atlanta in 1895, and inviting Georgia librarians to a meeting of the Young Men's Library Association in 1897 that resulted in the formation of the Georgia Library Association. She also played an important role in securing legislative approval for the establishment of the Georgia Library Commission in the same year.

After the beginning of public library service in the region other southern cities followed Atlanta's example and soon began to organize free public libraries. Officials from these libraries visited the Atlanta library to learn from its experience and often recruited employees. Four of the first nine apprentices trained by the library had accepted positions in other cities by 1904. Miss Wallace, convinced that a formal educational program should supplant the apprentice classes, again sought assistance from Mr. Carnegie. He agreed to provide \$4,000 a year for 3 years for the development of a school for librarians at the Carnegie Library.

Julia Toombs Rankin, a graduate of the Pratt Institute School of Library Science who had been associated with the Atlanta apprenticeship program from its beginning, assisted Miss Wallace in the development of the curriculum. It was modeled much after the Pratt program and opened as the Southern Library School in September 1905. The school was officially incorporated in Fulton County, Georgia, on April 9, 1907, and the name was changed at that time to the Carnegie Library Training School in Atlanta. The term "Training" was soon dropped, and the school was generally referred to as the Atlanta Library School to distinguish it

from the Carnegie Library School at Pittsburgh, Pennsylvania, which had identified itself earlier with the more generic name.

Mr. Carnegie agreed to provide continuing assistance to the school in 1907 when his original series of gifts expired, and he raised his annual support to \$4,500. The next year Miss Wallace resigned to be married, but this was not the end of her career in library service. After her husband's death she accepted the position as librarian of the Drexel Institute in Philadelphia in 1922, re-established the Institute's Library School, and served as dean until her retirement in 1937.

Miss Rankin succeeded Miss Wallace as director of the library and the library school program in Atlanta, but in 1911 she too resigned her position to be married. Her successor, Katherine H. Wooten, had been a member of the first apprentice class. Due to the increased pressures of the dual assignment she requested that the school be placed under the direction of another. The trustees accepted this request and Delia Foreacre Sneed was made principal of the school. Mrs. Sneed had attended the Pratt Library School at Miss Wallace's request, and since 1906 had been the one full-time instructor in the Atlanta school.

Upon Miss Wooten's resignation in 1914, Mrs. Sneed accepted the additional administrative responsibility of directing the library, but the next year she too resigned. At this time Tommie Dora Barker assumed leadership in both the school and the library. Miss Barker had completed her studies in the school in 1909, and after serving in the Alabama library extension service had returned to the Atlanta Library as reference librarian and instructor, and later as assistant director of the library, before accepting the dual directorship of both the school and the library. She held these responsibilities for the next 15 years. Miss Barker delegated major responsibility for the academic program to Susie Lee Crumley, who had completed the program in 1912 and had been associated full-time with the school thereafter. Miss Crumley resigned from this assignment at the time of her marriage in 1925, and Winifred Lemon Davis was recruited from the faculty of the Library School of the University of Wisconsin to be principal. Mrs. Davis resigned in 1929 and Ethel M. Fair was made acting principal for the last year the school was located in the Carnegie Library.

Of the eleven schools examined by the ALA Committee on Library Training in 1906, the Atlanta school was one of five to meet all of the standards. Through its participation in the Round Table of Library School Faculties, the school became an original member of the Association of American Library Schools in 1915.

An alliance between the Library School and Emory University had been possible since 1915 when the university was chartered and established in the Druid Hills section of Atlanta. Official negotiations took place in 1924, and the affiliation became official in October 1925. Emory began awarding certificates that year to students meeting approved standards. In 1928 Emory began conferring the Bachelor of Arts in Library Science degree on graduates of the program. The school and its administration were physically moved to the Emory campus in 1930, being quartered on the fourth floor of the newly constructed Asa Griggs Candler Library. In the 24 years that the Library School had been a part of the Carnegie Library, 319 students had completed the program.

Having provided leadership to the school during its formative years and through the transitional period prior to the move to Emory, Miss Barker remained as Director of the Atlanta Library for a short time before accepting the position as regional field agent for the American Library Association. In recognition of her leadership role in the development of public library service and library education in the South, Emory University in 1930 awarded her its first honorary doctorate given to a woman.

Clara E. Howard was attracted from the Library School at the New Jersey College for Women to be Dean of the Library School when it moved to the Emory campus. The Carnegie Corporation and the Rosenwald Fund each provided \$50,000 for the support of the school for 5 years. In 1940 the Carnegie Corporation established a permanent endowment of \$100,000. Miss Howard served as dean until 1936, and upon her resignation Miss Barker was asked again to provide leadership to the educational program. She accepted the deanship and served until her retirement in 1954.

Emory was not only fortunate in obtaining the leadership of Miss Howard and Miss Barker, but also an outstanding faculty whose loyalty to the school extended in several cases over many years. Included among these were Miss Clyde Pettus who, after experience with the Brooklyn public and Knoxville public libraries, joined the Atlanta Carnegie Library and the school in 1921. Following the school to Emory, she remained as teacher until her retirement in 1957. Evalene Parsons Jackson moved from the position of readers' adviser at the Atlanta Library to join the faculty of the school in 1936. She served until her retirement in 1969, assuming the directorship upon Miss Barker's retirement in 1954 until reasons of health made this additional responsibility inadvisable after 1965. Agnes Reagan, having received her master's in history and a fifth year's bachelor's in library science from Emory, returned from the library at Wellesley College in 1947 to join the faculty and served until 1967 during which time she earned a Ph.D. at the University of Illinois Graduate Library School. Dr. Reagan resigned to assume the responsibilities as executive secretary of the ALA Library Education Division and the assistant directorship of the newly formed ALA Office for Library Education.

In the late 1940s the faculty completely revised the curriculum and beginning in 1949-1950 the fifth year bachelor's degree was replaced with the master's degree. The program was extended two quarters for the new degree, requiring five quarters or 15 months' residence. One of the five quarters was in courses prerequisite to full graduate status and students having fulfilled these in undergraduate study or in other schools were exempt from the first quarter's work.

The new curriculum required at least fifteen quarter hours work in a subject field for which the student had the necessary prerequisites for graduate study. A closer alliance between the Library School and the Graduate School of Arts and Sciences therefore became more advisable. To facilitate this alliance, independent status of the Library School was relinquished, and beginning with the academic year 1948-1949 it became a division of the Graduate School and known as the Division of Librarianship.

Certain influences became apparent in the 1960s which contributed to an in-

creasing number of students enrolling in library school programs. Included among these influences were the general trend for college graduates to pursue graduate studies, the upsurge in the development of library service in the years following World War II and the accompanying publicized need for trained librarians, and the provision of federal support for library education. As a result enrollment in the division, as in other library schools, accelerated dramatically during the decade. Between the initiation of the master's program in 1949 and 1960 a total of 175 students were awarded master's degrees, between 1960 and 1970 this figure more than doubled with a total of 466 master's degrees being awarded, 305 of these in the latter 4 years. During these 4 years, through grants under Titles 11-B and V(C) of the Higher Education Act of 1965, the division awarded forty-nine federally funded fellowships.

When Miss Jackson requested to be relieved of the directorship in 1964, Charles T. Lester, dean of the Graduate School of Arts and Sciences, assumed the responsibility as acting director until the appointment of Venable Lawson in 1965. Lawson had received his library training in the division after which he worked for the Harvard College libraries and the Atlanta Public Library. He also had taught part-time in the division and the Atlanta University School of Library Service, and prior to accepting the directorship of the division was serving on the faculty of the Florida State University Library School.

Emory University has maintained a reputation for providing a high ratio of faculty to students and for many years the library school provided such an advantage with a relatively small full-time faculty, drawing on the strength of practicing librarians in the Atlanta area for part-time instruction to provide the necessary breadth of courses. With the increasing enrollment it was essential that the full-time faculty be enlarged to provide the type of counseling and instruction the University attempted to offer. Jean Gilbert Moister, who had served with the Atlanta public school system, and John E. Clemons, who had been associated with Lawson at the Florida library school, joined the division in 1966. Mrs. Moister gave her full attention to the development of the training program for school librarians; Mr. Clemons assumed the responsibility of assistant director of the division in 1968 in addition to his instructional duties.

With Dr. Reagan's departure from the division in 1967 and Miss Jackson's retirement in 1969, only Marion Ruth Taylor remained as a member of the faculty who had served prior to the new administration. Miss Taylor had been appointed in 1963 to assume the responsibility for the technical services area in the curriculum. To provide the type of leadership Miss Jackson and Dr. Reagan had provided, experienced librarians and teachers were recruited to the faculty on temporary appointments. Virginia Satterfield, who had retired from her position as librarian and professor of library science at the Woman's College of Georgia, became a major strength during this period; Winifred B. Linderman accepted an appointment for 1967-1968 upon her retirement as professor from the Columbia University School of Library Service; and Mary Ann Boyd, formerly in charge of the Southeastern Materials Center at the University of South Florida, provided guidance in 1969-1970 in the development of the program in special librarianship.

A policy of employing young professionals to faculty positions for a year or longer also was used to temporarily expand the faculty. This policy provided an experience in library education for the individuals and their perspective was valuable for the other members of the faculty. Among the young professionals so employed were Patricia A. McKenzie, Caroline Coughlin, Dale F. Luchsinger, and George G. Stewart.

James D. Ramer, former director of the University of North Carolina Library at Charlotte, was attracted to the faculty in 1968; Marvin P. Harm in 1970, from the position as head of the library for the Albany (Georgia) Junior College; and Lee W. Finks in 1971, former head of the library of Episcopal High School and doctoral candidate at Rutgers University. Dr. Ramer accepted primary responsibility for the history of the book and libraries, Harm for the specialization in media, and Finks in reference and bibliography.

The division was successful in attracting federal funds available in the 1960s to support library education. Through such assistance not only were fellowships obtained for student support, but institutional assistance grants were received to support development of faculty and library resources, and for providing continuing educational opportunities for practicing librarians through institutes. Between 1968 and 1970 six of the latter type institutes were offered.

The school has always accepted a responsibility for providing continuing educational opportunities for the practicing librarians. A 2-week course was offered in 1921 to upgrade untrained library employees in the Southeast. In 1927 and 1928 a similar program was offered in cooperation with the American Library Association for librarians, assistants, and trustees, and beginning in 1929 a special summer program was offered for school librarians. The division cooperated with the Library Education Committee of the Southeastern Library Association in 1964 in presenting an institute for teachers of library science on teaching the selection of library materials. An institute on public library service to the disadvantaged was cooperatively sponsored in 1967 with the Atlanta University School of Library Service, as was the institute for library school librarians offered in 1971. The Archives Institute was first given in August 1967 in cooperation with the Georgia Department of Archives and History and is a continuing summer offering in the division.

Under the leadership of Mildred Jordan, librarian for the Calhoun Library of the Emory Medical School, a course in medical librarianship was first offered in 1951 and continued as a regular summer offering under Miss Jordan's direction until her death in 1965. This program has continued under the direction of Miriam Hawkins Libbey, who in 1966 succeeded Miss Jordan in the medical library.

During the academic year 1956-1957 a sixth year program was established for those professional librarians desiring an educational program beyond the master's, but not wishing to pursue the doctorate. This program was formally recognized in 1967 with the awarding of the Diploma for Advanced Study in Librarianship.

The division remained physically located on the fourth floor of the Candler Library occupying relatively the same space allocated to the school when it moved to the Emory campus in 1930. The growth of the student body and faculty and the

increase in the division's library holdings made additional space a critical need. This need was met when the Woodruff Library for Advanced Studies was opened in 1969 and all space on the fourth floor of the Candler Library previously used by the university library was released to the division. With some renovations this provided two additional classrooms and two new faculty offices, and the Division Library expanded into more ample quarters permitting proper housing of materials and space for readers and the development of relevant services. Diane W. Butzin was employed as division librarian and as instructor for special librarianship in 1970. She had previously been in charge of Special Services and Projects for the Bowman Gray School of Medicine Library in Winston Salem, North Carolina.

In 1970 the faculty redefined the role of the division as accelerating the improvement of library service through teaching and research, and acknowledged the division's concern for the students' knowledge, skills, and attitudes, and for the faculty's direct contribution to the library profession. To fulfill this role and recognize these concerns the following objectives were identified to provide guidance for future planning:

1. To attract a student body that has an educational background to support a successful career in library service, and has displayed a potential for both a high motivation toward library service and for professional motivation.
2. To provide for the student a learning environment conducive to his discovery of empathy with and creative involvement in library service.
3. To effect the transfer of appropriate skills and knowledge requisite to successful performance as librarians in a changing society.
4. To foster continuing study, research, and innovation directed toward the progressive improvement of library education and library service.

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VENABLE LAWSON

EMORY UNIVERSITY LIBRARY

Emory College, founded by the Methodist Church in 1836, was situated in the village of Oxford, Georgia, 40 miles southeast of Atlanta. A small college with an exclusively classical curriculum, in its early years it had a hard struggle for survival,

only beginning to achieve stability at the outbreak of the Civil War, which closed its doors from 1862 to 1866. Instruction was of the textbook and recitation type, and although a college library of sorts was established, it was of little use to either faculty or students. At the suspension of classes in 1862, the library contained less than 2,000 volumes, of which a large proportion was mere lumber. Meanwhile, however, with the foundation of the literary societies, Phi Gamma and Few, libraries were provided that made general reading material available to their members. The college catalog of 1860 boasted of a stock of 6,000 volumes; of these more than 4,000 were in the halls of the literary societies.

A large number of the books were lost during the military occupation of the campus in the war years. For the following three decades the library played no significant role in the academic life. It was not until the 1890s that a determined effort was made to achieve some system in collection and administration. At this time some valuable gifts of books and, in 1908, a small endowment fund for the Department of English—the John W. Akin Endowment, which by gradual accretion has become a valuable asset—were received. In 1901 the Few and Phi Gamma Societies placed their books in the keeping of the college library. Through the years the college collections had been moved from building to building, with professors as part-time custodians, keeping the rooms open few hours in the week. Finally, in 1897, a separate library building, Candler Hall, was erected, and in new quarters with improved service a marked increase of use by both faculty and students was noted. In 1915 the librarian reported 40,000 volumes on the shelves of Candler Hall.

Emory University was founded in 1915. Even before a charter was obtained, a School of Theology was organized, and in 1916 it and the newly established School of Law were housed on the campus in the Druid Hills section of Atlanta. The Atlanta Medical College, the resultant of a chain of foundations going back to 1854, brought its classrooms and laboratories to the new site in 1917. From the beginning it was planned to bring Emory College from Oxford as the liberal arts center, but war conditions delayed the move until 1919, at which time the School of Business Administration and the Graduate School were also organized. The Carnegie Library Training School of Atlanta, incorporated in 1907, affiliated with the university in 1925; in 1948 it became the Division of Librarianship of the Graduate School. The Southern Dental College, founded in 1887 as a department of the Southern Medical College, achieved a connection with Emory in 1944. The School of Nursing, originating in 1905 as a training school in the city, continuing in Wesley Memorial Hospital on the Emory campus, was raised to collegiate level in 1944. These are the eight divisions of the University in Atlanta. For a time the facilities of the Oxford campus were used as an academy offering a standard college preparatory course, but in 1929 the academy began to be phased out and was succeeded by a junior college, now known as Oxford College. Students successfully passing their courses at Oxford are automatically admitted to the junior year in Atlanta.

The university's enrollment in fall 1969 was 5,494: 2,356 in Emory College, 812 in the Graduate School, and 465 in Oxford College. The faculty numbered 1,798,

with 850 full-time. On August 31, 1969, endowments and trust funds totaled \$130,193,278, and operating expenses for 1968-1969 were \$57,239,711.

In addition to the two central libraries, the Asa Griggs Candler Library (undergraduate) and the Robert W. Woodruff Library for Advanced Studies, the Emory University Library system includes six divisional facilities and one departmental library: Theology, Law, Medicine, Librarianship, Dentistry, Oxford College, and Department of Chemistry.

The Library of the Candler School of Theology, 87,237 volumes, occupies two floors of the Theology Building on the Quadrangle, with reading rooms on the first floor and stacks on the ground floor. Also on the first floor is a handsome memorial room in which are exhibited the Thursfield Smith and other Wesley and Methodist collections of books, pamphlets, and memorabilia. From its beginnings the Theology Library, besides general collections to support instruction and research in the wide field of divinity, has specialized in gathering the printed materials of American Methodism. It currently receives 339 periodicals.

The Library of the Lamar School of Law, 71,170 volumes, occupies a large room on the first floor of its building on the Quadrangle, with additional stacks on the ground floor. Besides the indispensable statutes, reports, digests, etc. for every part of the United States, a representative collection of Canadian and English materials has been gathered. It subscribes for 628 periodicals.

The A. W. Calhoun Medical Library, 79,542 volumes, was liberally endowed by members of the Calhoun family in 1923, and it continues to receive their support. At present it occupies space in the Woodruff Memorial Building (medical research), but it is planned to furnish it with more commodious quarters in the near future. There is a memorial room to Dr. Abner Wellborn Calhoun (1845-1910), the distinguished ophthalmologist, and a small collection of medical classics, among them a fine copy of Vesalius's *De Humani Corporis Fabrica*, 1543. The Medical Library currently receives 1,464 periodicals. The Medical Library also serves the School of Nursing. A branch of the Medical Library is situated in the Thomas K. Glenn Memorial Building, which is across from Grady Hospital in downtown Atlanta.

The Division of Librarianship occupies the top floor of the Asa Griggs Candler Library, and its library, 25,755 volumes, is placed adjacent to classrooms and offices. Besides the general collection, two small gatherings of professional interest are present: the Clyde Pettus Collection on the History of the Book, and the Hilda P. Holme Collection, the latter comprising some 1,500 titles—children's literature, history of the book, and fine arts. The Division of Librarianship receives 242 periodicals.

The Sheppard W. Foster Dental Library, 16,248 volumes, organized in 1926, for nearly half a century occupied straitened quarters in the old Southern Dental School building in downtown Atlanta. With the erection of the School of Dentistry Building on the university campus in 1969, it was installed in a handsome suite conveniently located. It has 313 periodicals on current subscription.

Candler Hall continued to be the library of Oxford College until the erection of a new building in 1969. In its design attention was given to every phase of convenience

and comfort, making it a model of a small junior college facility. Stacks and study areas are intermingled, and the best in modern furnishings have been installed. The book stock, 23,102 volumes, has been carefully selected to supply both curricular needs and recreational reading for the students. The periodical list of 269 titles also takes particular account of the special requirements of a junior college.

The only departmental library on the campus is that of the Department of Chemistry. It occupies space on the second floor of the Chemistry Building which it is rapidly outgrowing. A new building for the department, now in the planning stage, will eventually solve all problems of storage and use. Besides bound files of journals and monographic materials, 127 current periodicals are available for consultation.

The catalog in Woodruff Library is a union catalog with cards for all libraries on the Emory campus showing locations of books.

When the college came to Atlanta in 1919, perhaps 2,500 books were brought from Oxford. Temporary quarters were set up in the basement of the Theology Building, which served the college for 7 years. This time, nevertheless, progress was achieved. In the first place, all books were recataloged according to the Library of Congress system. Second, the budget was increased and a start was made toward bringing the collections up to university standards of reference and research. A remarkable work of organization under unfavorable conditions was carried out by the librarian, Miss Margaret Jemison, continuing even when the great recession at the end of the 1920s reduced the book budget to a shadow.

Table 1 shows the growth of collections. The figures are, unfortunately, not quite consistent because of the different methods of counting prescribed from time to time. They do, however, show clearly enough the rate of growth from the organization of the University Library to the present time.

The annual report of the University Library for June 30, 1970, in addition to 927,542 books, noted 134,029 manuscripts, 14,218 reels of microfilm, and 303,462 cards of microtext. There were 5,677 periodicals received in this year.

TABLE 1
Growth of Emory University Library Collections

Year	Volumes
1920	69,000
1925	93,000
1930	146,300
1935	160,986
1940	179,251
1945	249,973
1950	332,901
1955	444,493
1960	526,753
1965	823,609
1970	927,542
1971	966,459

In 1924 Mr. Asa Griggs Candler (1851–1929), Emory's first great benefactor, made a gift of \$400,000 to provide a library building. Dr. James Hinton, professor of English, was sent on a tour to gather ideas, and in accordance with his recommendation, Edward L. Tilton of New York, a specialist in the field, was chosen as architect. Construction proceeded without delay, and the building was dedicated on February 26, 1926.

Set at the head of the Quadrangle, the Asa Griggs Candler Library was constructed of reinforced concrete faced with Georgia marble. Of four stories, it was built around a stack core of three levels, estimated to accommodate 350,000 volumes. From an exhibition foyer a double stairway led to the second floor, where there were the circulation desk, the catalog, offices and work areas, and a two-story reading room extending the width of the building. Study cubicles were provided on each of the stack levels.

The library at first did not require all the space available, and administrative offices at once occupied the ground and first floors, from which they could not be removed until the erection of the Administration Building at the other end of the Quadrangle was completed in 1955. In a short time the Library School moved into the third floor. Within twenty years, overcrowding had severely affected all library services. It is true that in 1942 space on the first floor was released, where a separate Department of Special Collections was placed, but this afforded little relief.

In 1954 Miss Jemison resigned and Guy R. Lyle was brought from Louisiana State University as director of libraries. He immediately began making plans for remodeling the library's interior, utilizing the entire building after the removal of administrative offices. The outstanding alteration was cutting down the two-story circulation area and reading room to a single story to permit the addition to a science library on the third floor. At this time also a Candler Memorial Room, adjoining the exhibits foyer on the left, was set apart to display memorabilia of a notable family of patrons of the university.

Even though the Candler Library had been considerably expanded in both book and reader capacity, the most that was hoped for was that it would meet the needs of the predictable development of 5 years or so. Actually it was 15 years before the opening of the Woodruff Library finally solved problems of space and services. It was not long until several thousand books and periodicals not in active demand had to be put in storage to relieve the overcrowded stacks. Moreover, storage space was in short supply, and stored items were inconvenient to service in the locations available. A growing problem was the general employment of the library as an undergraduate study hall, which to an unfortunate extent interfered with and discouraged its use for reference and research. In the early 1960s the director began to make plans for a new building, emphasizing in his annual reports that it should have high priority in the developing building program.

The appointment of a faculty-trustee committee to make definite plans, followed by a contribution of \$25,000 from the Division of Higher Education of the United Methodist Church Board of Education, got the project under way. The choice of architects was the New York firm of Warner, Burns, Toan, and Lunde. A massive

campaign for endowment and building funds marked the semicentennial year of the university, 1965. An advance payment of \$1,500,000 of the pledge by the Ford Foundation made it possible to begin construction in October 1966. Substantial gifts from numerous foundations and individuals and a grant from the federal government completed the underwriting, and on October 31, 1969, the Robert W. Woodruff Library for Advanced Studies was dedicated with appropriate exercises.

The future role of Candler Library will be as an undergraduate reading library. It is already in use for that purpose, and plans have been drawn for a complete renovation.

The drive for capital funds secured \$35,000,000 for the university, of which one-fifth was devoted to the new library. The Robert W. Woodruff Library for Advanced Studies, named for the generous donor who carried the campaign to victory, is a magnificent facility that will serve the institution for many years. Located on a hillside across a ravine bridged to connect with the Candler Library, it is a ten-story building in the modern style, yet so designed as to blend with the architecture of the older buildings. With a usable floor area of 180,315 square feet, it has a seating capacity of 1,456 users, 60% of whom are provided with private studies and carrels. There is stack space for more than 1 million volumes.

On the ground floor are located the documents center, microtext reading, and science library. On the main floor are periodicals, reference collections, card catalog, circulation desk, book order department, and department of serials and binding. Both these levels extend out under the wide plaza surrounding the book tower. The entrance level contains the lobby, administrative offices, lockers, and lounges. Above are the seven stories of the book tower.

The main book collections are shelved on floors one through six. On each floor there is a seminar room, conference room, eleven faculty studies, twenty dissertation studies, and fifty-six carrels. Stacks are open to students who must, however, register to obtain card keys that will pass them through the turnstile that admits to the elevators.

The seventh floor is devoted to special collections, a handsome suite which is paneled in walnut, carpeted, and ceiling-lighted. The open portion of the floor is furnished with wall and floor exhibit, manuscript, and map cases. A special room is set apart for the extensive Joel Chandler Harris Collection. A glassed office for the archivist commands the whole, and adjoining are the offices of the special collections librarian. At the east end is the Thornton Research Suite of four small study rooms, each equipped with a microfilm reader. There are two closed stack areas, the smaller one containing the university archives and the larger one shelves the greater portion of rare books and manuscripts of the department. Adjoining the latter is the receiving and cataloging area. Surrounding the entire floor is an open balcony from which are obtained fine views of Atlanta and its surroundings.

At the top of the book tower is a penthouse which, besides housing mechanical equipment, affords generous storage space for Special Collections.

While the Woodruff Library is especially designed to fill the study and research needs of graduate students and faculty, its facilities are fully at the service of all

students of the university. The Candler Library is being transformed into an undergraduate reading library, the main part of the function for which it was originally intended. On the second floor are placed course reserves, and in the long reading room is an open-shelf collection of approximately 8,000 volumes, chosen with the assistance of the undergraduate faculty, together with selected reference works and current periodicals. Every attempt has been made to provide both convenience and comfort for study and recreational reading in uncrowded surroundings.

There is a special Black Studies reading and conference room on the first floor, with a small but significant collection of current literature dealing with Negro history, sociology, and the fine arts. The Department of Teaching Aids is on the ground floor, where audiovisual materials of a wide variety are stocked and serviced. Here also is the Union Catalogue of the Atlanta-Athens Area, to be briefly described below.

The senior staff of Woodruff Library consists of the director of libraries, two associate university librarians, and six departmental assistant librarians—Book Order, Catalog, Circulation, Reference, Serials and Binding, Special Collections. Together with the librarian of Asa Griggs Candler they form the Library Council, which holds weekly meetings to discuss problems and unify activities. Documents, science, and microtexts are administered by reference assistants. A Library Policy Committee, appointed by the University Senate, is made up of representatives of the various divisions with the dean of the graduate school and the director of libraries. This body has the power to make decisions on problems affecting relations of library, faculty, and student body, and public relations generally. The first fall meeting is devoted to making allocations from the budget to departments of the college and graduate school. It also has the responsibility of passing on requisitions from the faculty for items too expensive to be purchased from departmental allocations.

Book purchases and periodical subscriptions are in large part made on requisition by departmental representatives from their budget allocations and from earmarked endowments and gift funds. Reference has its own account, and a special committee is responsible for interdisciplinary materials and recreational reading. Current cataloged accessions are listed in a fortnightly publication, *Books and Libraries at Emory University*.

Instruction in the use of the library is furnished undergraduates in the fall quarter. Entering freshmen attend two lectures on "Introduction to Library Resources." Two 1-hour bibliographical seminars, entitled "Library Resources and Bibliographical Techniques," are provided for juniors. There are three series of these—Humanities, Natural Sciences and Mathematics, Social Sciences—which students attend in accordance with the field of their concentration.

Listed below are the chief book funds, in addition to the allocation from the university's annual budget, at the disposal of the Library. The three oldest endowments—Akin, MacDonald, and McCandless—built collections solidly if slowly in low income years. It was not until the first annual grant from the Lewis W. Beck Foundation of Atlanta was received that systematic purchases for advanced graduate

research could be undertaken. Since 1933 expendable funds from this source in the neighborhood of \$350,000 have laid the bibliographical foundation of a notably developing research facility.

Endowed Book Funds

John W. Akin Fund (1908), English literature
 Eva MacDonald Fund (1923), sociology and psychology
 Fanny A. McCandless Fund (1927), education
 William E. & Augusta E. Barnes Fund (1947), general
 William D. Thomson Fund (1953), general
 Cullen B. Gosnell Fund (1963), state and municipal government
 Ruth Candler Lovett Memorial (1964), English literature before 1900
 C. F. Hamff Memorial (1965), German literature
 Randolph L. Fort Memorial (1968), communications
 Dorothy Lunsford Giles Memorial (1968), taxonomy and flowering plants
 William Powell Jones Book Fund (1968), twentieth century English literature
 George Howell Mew Endowment for Business Administration (1968)
 William Edward Storey Memorial (1968), poverty
 Hansard-MacDougald Memorial (1969), general

Periodic Gifts

D V S Senior Society (1902), general
 Lewis W. Beck Foundation annual grants since 1933 for research
 Emory Woman's Club (1943), general
 Kappa Delta Epsilon Educational Sorority (1946), education
 David Chewning (1958), presidents of the United States
 J. Scott Houston, Sr. Memorial (1962), exploration and travel
 June Ellen Schwartz Memorial (1967), Jewish literature
 William Albert Haygood Memorial (1968), gemmology

Through the years, exceptional care in the selection of materials purchased in strict accordance with current and anticipated offerings of the curriculum has given the library a strength beyond that indicated by the extent of its holdings. An expanding doctoral program, however, has required both diversification and enlargement of collections in many fields. In several departments the library can claim distinction for its holdings. Among areas of special strength may be noted British national archives, French departmental archives to 1790, the Southern Confederacy, Methodist Church materials, and comprehensive bibliographical and reference works.

The Department of Special Collections, in addition to general holdings comprising several thousand rare and valuable volumes—first editions, association books, and the like—and a large variety of individual manuscripts and small gatherings, contains some two-score large unitary collections. Some representative groups will be noted here.

The manuscripts of the Thursfield Smith Wesleyana—letters of the Wesleys and early Methodist leaders, with items from other sources—are placed in Special Collections. The Joel Chandler Harris Memorial Collection was in large part as-

sembled by the author's family. Besides virtually all editions of his books and a wide range of ana, more than 6,000 sheets of literary manuscript, correspondence with his family, and letters of his publishers, friends, and admirers are given a special room. Here also are the library and papers of his eldest son, Julian LaRose, and his wife, Julia Collier Harris, her father-in-law's biographer. Among other literary holdings are books and manuscripts of John Hill Hewitt, contemporary and rival of Poe, Maurice Thompson, and Mary Noailles Murfree ("Charles Egbert Craddock"). Emory has secured every known edition of *Gone With the Wind* together with related materials.

Several hundred items of rare Americana comprise the Tracy W. McGregor Collection. Of Southern historical items, the Judge Samuel Cole Williams Tennesseeana and the Keith M. Read Confederate Collection are of first importance. The Charles Howard Candler Library is rich in first and early editions of English authors from the fifteenth to the nineteenth century in addition to prime rarities of Georgiana.

The extensive business records of the Americus firm of Harrold Brothers present a century-long conspectus of Georgia economy. The papers of Charles H. Herty, industrial chemist, reveal the part science has played in the state's developing economy. The immense correspondence of Bishop Warren A. Candler (1857-1941) furnishes a virtually complete account of the role of the Methodist Church, South, in his era.

Among the most recent acquisitions are the housing library and personal papers of Charles F. Palmer, Atlanta realtor, President Franklin D. Roosevelt's Defense Housing Coordinator, and the library and personal papers of Atlanta journalist Ralph E. McGill.

While Special Collections is especially rich in Southern Americana, every attempt is made to gather research materials in every relevant field. The collection of nineteenth century English fiction deserves further mention here. A recent accession has been an assemblage of approximately 500 "yellow-backs," one of the most complete in an American library.

Microfilm, microprint, and microcards now take their place with more conventional forms of the printed word as part of the research resources of the library. Among major materials held are the *London Times* (1765-date); the *New York Times* (1851-date); the Adams Family papers; the Draper manuscripts; documents of the United Nations; the British Sessional Papers, eighteenth, nineteenth, and twentieth centuries; *Landmarks of Science*; and Early English Books 1475-1700. In addition to collections in the two central libraries, various specialized materials are held by the divisional libraries.

A pamphlet series, *Emory Sources & Reprints*, reproducing unique and extremely rare items from the library collections, was published from 1943 to 1958. In all twenty-eight numbers were issued in limited editions.

The following bibliographies and volumes on library administration have been published by present and recent members of the staff: Guy R. Lyle, *The Librarian Speaking: Interviews with University Librarians* (Univ. Georgia Press, Athens,

Georgia, 1970); Thomas H. English, *Roads to Research: Distinguished Library Collections in the Southeast* (Univ. Georgia Press, Athens, Georgia, 1968); Guy R. Lyle, *The President, the Professor, and the College Library* (Wilson, New York, 1963); Guy R. Lyle (with Paul H. Bixler, Marjorie Hood, and Arnold H. Trotier), *The Administration of the College Library*, 3rd ed. (Wilson, New York, 1961); Evan Ira Farber, *Classified List of Periodicals for the College Library*, 4th ed. (Faxon, Boston, 1957); Richard B. Harwell, in collaboration with Marjorie Lyle Crandall, *Confederate Imprints: A Check List Based Principally on the Collections of the Boston Athenaeum*, 2 Vols. (Boston Athenaeum, Boston, 1955); Richard B. Harwell, *Cornerstones of Confederate Collecting*, 2nd ed. (Univ. Virginia Press, Charlottesville, Virginia, 1950); Richard B. Harwell, *Confederate Music* (Univ. North Carolina Press, Chapel Hill, North Carolina, 1950); Richard B. Harwell, *Confederate Belles-Lettres: A Bibliography and Finding List* (The Book Farm, Hattiesburg, Mississippi, 1941).

A grant from the General Education Board in 1939 made provision for a union catalog of books in libraries of the Atlanta–Athens area. It is presently located on the ground floor of Candler Library. Books of thirty libraries are represented by author or main-entry cards; in July 1970 there were approximately 1,200,000 cards locating between 3 and 4 million volumes. Libraries regularly reporting their holdings include Emory, the University of Georgia, Georgia Institute of Technology, Georgia State University, Atlanta University, and twenty-five college, public, and other collections of the general area. The Union Catalogue is in active consultation for research and reference needs by scholars of the University Center and investigators of the region and from outside.

THOMAS H. ENGLISH

ENCYCLOPAEDIA BRITANNICA SCHOOL LIBRARY AWARDS

National cash awards are given annually in both the United States and Canada to three selected school systems which, with due consideration of resources, show the greatest measure of growth and progress toward the goal of good school library service in the elementary schools of the system as a whole. Established in the United States in 1963 by Encyclopaedia Britannica, Inc., and in Canada by Encyclopaedia Britannica of Canada Limited in 1966, the awards focus attention on the need for school libraries at the elementary school level and the importance of these resources to quality education.

Applications for the awards are available every September from the Chicago-based publisher or from the school library supervisor in nearly all state and provincial departments of education. Any school system — public, private, or parochial — is eligible to apply.

The purposes of the awards are fourfold: (1) to stimulate public interest in school libraries; (2) to point up the importance of good elementary libraries to quality education; (3) to encourage citizen planning for their development; and (4) to commend those school systems whose foresight and planning is an inspiration to others.

The awards, presented in the United States during National Library Week, are given with the advisory assistance of the American Association of School Librarians, a division of the American Library Association, and a department of the National Education Association. The AASL appointed committee screens all applications (each state is limited to a maximum of four entries per year) and nominates as many as ten school systems from which the Encyclopaedia Britannica jury selects three final cash winners. The cash winners share \$5,000 in cash gifts to enlarge library materials collections.

In the United States seventy-nine school systems, ranging from the nation's largest in New York City to one of the smallest in Ganado, Texas, have received national recognition for improvement of elementary library services. In the past 9 years more than 721 school systems in every state have been nominated for the award by the various state departments of education administering the program at AASL's request.

In 1966 Britannica's School Library Awards was cited as the most outstanding educational relations program in the United States by the Public Relations Society of America. The program is a leading force in the continuing national efforts to improve the number and the standards of elementary school libraries.

Mary V. Gaver, professor in the Graduate School of Library Service at Rutgers — The State University and 1966–1967 president of the American Library Association, has reported on the awards program applications at various intervals. Dr. Gaver's *Patterns of Development in Elementary School Libraries Today* has been published in three editions. The third edition, subtitled *Emerging Media Centers*, was published in 1969 and appraises library services at the elementary school level and surveys the use of federal funds in developing centralized educational media centers.

Library-Learning Centers: WHAT'S HAPPENING, a 20-minute, 16mm sound color film featuring examples of ways progress has been made in providing total media services to elementary students, was produced in 1970 to help stimulate professional and public interest in the important and essential role which the elementary school library plays in a program of quality education. The film is available from the publisher for preview with intent to purchase or on a rental basis to all types of organizations and agencies whose activities or programs are pertinent to school library media development.

FRED A. KRUEGER

ENCYCLOPEDIAS

The term encyclopedia is derived from the Greek *enkloi* (circle) and *paideia* (of learning). It has been used since the seventeenth century to describe a publication that attempts to summarize the whole body of human knowledge, usually in multivolumed form, arranged alphabetically by subjects, or, less often, classified under broad subjects. Both arrangements are usually augmented by a detailed subject index. In the twentieth century encyclopedias have been compiled by a large staff of editors, consultants, and contributors, and in the case of those published in the United States, are subject to continuous revision. The term is also applied increasingly to comprehensive summaries in specific subject fields, such as the sciences, the arts, and the social sciences.

From its beginnings the encyclopedia has reflected the era in which it was produced and has drawn on the collected knowledge of the past. This can be seen in Collison's *Encyclopaedias: Their History Throughout the Ages* (1), a readable account of general works from 350 B.C. to the present. Also useful is Walsh's *Anglo-American General Encyclopedias* (2) which gives publishing histories and brief biographical notes on outstanding editors of 419 works.

In the latter half of the twentieth century the major general encyclopedias have been purchased in great numbers due to the rise in income, the increase in population, and the increased number of schools and libraries (3). These sales have helped to support encyclopedia publishers' efforts to keep up with man's accumulated knowledge through a policy of continuous revision.

The success of their efforts depends on the judgment of the editors and their consultants, not only in the wise selection of the contents of their works, but also in their organization. The typical multivolumed general encyclopedia is one whose contents are arranged alphabetically under both general and specific topics, with the longer articles signed by contributors selected because of their knowledge of the subject. The articles are edited to conform to a style considered suitable for the intended audience, and in many instances are supplied with illustrations selected by the staff responsible for this important feature in an age devoted to pictorial representation. They are analytically indexed and supplied with cross references for ease of use. They usually contain appended bibliographies intended to supply further information on topics treated briefly of necessity in a work which must be kept within bounds.

Keeping within the limits in the number of volumes, pages, illustrations, maps, and index entries is one of the more serious problems faced by encyclopedia editors and publishers who are responsible for balanced coverage. Science and technology must be adequately represented because of widespread interest and its rapid expansion. Geographical areas must be treated adequately in terms of their history and socioeconomic development. Biographies of persons who have come into prominence must be added, and those of persons already included must be reassessed.

Literature and the arts must be included, to name only a few of the areas covered in a general encyclopedia. And in those works intended for home and school use, certain aspects must be added to the more traditional concept of its contents: emphasis on the school curriculum, information on careers, and how-to-do-it information.

All of this is quite familiar to librarians, some of whom have served as consultants and contributors to encyclopedias (4), as well as reviewers on the Reference and Subscription Books Review Committee of the American Library Association.

George Sarton has observed that "It is wise to refer to encyclopedias for first guidance; it is priggish to disregard them; it is foolish to depend too much on them" (5). It was wise of him to refer to them in the plural, for in spite of their many similarities they differ in their contents and treatment, as comparison will reveal. Thus librarians will consult more than one of them in seeking general syntheses or answers to specific questions.

They also attempt to select them wisely, using not only general guides to reference materials but, especially in the United States, the thorough analyses of new British and American encyclopedias and new editions of older works found in *Booklist and Subscription Books Bulletin* (6), though these reviews often appear some months after their publication. They also use *Purchasing a General Encyclopedia* (7) in providing information to prospective purchasers. They consult Walsh's *General Encyclopedias in Print* (8) which is less critical but still useful for British and American works, giving for each its publishing history, suitable audience, subject coverage, arrangement, and price, with citations to reviews and informative articles. Reviews of other national encyclopedias are less easily located and must be sought in a variety of sources, though they are included in general guides to reference materials.

Recognizing their limitations as well as their strong features, librarians resort to other types of reference sources for more complete or more up-to-date information. These include such well-known sources as catalogs, bibliographies, and indexes; biographical dictionaries; narrative and statistical yearbooks; atlases, and encyclopedias in special fields. For example, those seeking information on libraries and related subjects may not find it in general encyclopedias, though they do include biographies of famous librarians, histories of famous libraries, professional library associations, as well as articles on the history and characteristics of reference books such as encyclopedias, dictionaries, bibliographies, and atlases. Much more information will be found in the *Encyclopedia of Library and Information Science*, which augments the general encyclopedia with its long articles on types of libraries, such as *Art Libraries and Collections*; on library service in individual countries; on various activities, such as *Abstracts and Abstracting*; on associations, such as the *Bibliographical Society of America*; on recent areas of research, such as *Bibliopsychology*; on no longer living distinguished persons in library and related fields, such as *Sir Thomas Bodley*; and on the literature of various subject fields, such as *Biological Literature*. Information science is represented by articles on various systems, such as the *Batten System*; on methods, such as *Batch Processing*; and on

applications, such as *Automatic Data Processing, Library and Information Center Applications*. Most of the articles have long, appended bibliographies. In some cases cross references are supplied, e.g., *Automatic Analysis* (see also *Abstracts and Abstracting and Analysis of Information*). The final volume contains an index to the contents of the multivolume set.

In spite of its full treatment of both theory and practice of library and information science, and its international approach with contributors from all over the world, it must be supplemented by other more recent sources, such as periodical articles indexed in *Library Literature* and abstracted in *Library and Information Science Abstracts*. Its statistical and directory information must be updated by consulting such sources as the *Bowker Annual of Library and Book Trade Information*. But it is still wise to refer to it for first guidance.

This is only one example of the increasing number of encyclopedias in special subject fields that have been published in recent years. Outstanding among them are the *McGraw-Hill Encyclopedia of Science and Technology*, *Encyclopedia of Philosophy*, *International Encyclopedia of the Social Sciences*, and *Encyclopedia of World Art*. These will continue to appear in great number.

The future of the general encyclopedia is not easy to predict, but it is unlikely that there will be any drastic change in its underlying purpose to synthesize existing knowledge in a form that can be retrieved easily. Increasingly, newer methods of production will be employed, confirming Lowell Martin's earlier prediction (9). Efforts to produce a truly universal encyclopedia will continue, though UNESCO and similar bodies concerned with this problem have reached no agreement thus far (10). Meanwhile, encyclopedia publishers will attempt to give more worldwide coverage while emphasizing the interests of prospective customers, most of whom will be citizens of the country in which the encyclopedias are published. It is also safe to assume that encyclopedias intended for a specific audience, such as school children, and for special subject fields will continue to engage the attention of publishers.

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FRANCES NEEL CHENEY

ENGINEERING DIVISION, SLA

The Engineering Division, like many of the science-oriented divisions of the Special Libraries Association (SLA), was originally a section of the Science-Technology Division. It was formed in 1942 as the Engineering-Aeronautics Section. Among the accomplishments of the Engineering-Aeronautics Section was its contribution to the establishment of the SLA's Translations Center housed at the John Crerar Library in Chicago. The members of the Engineering-Aeronautics Section compiled an index of translations which was later combined with the Union Card Index of Technical Translations, a project of the Science-Technology Division started in 1947. The Union Card Index was the forerunner of the SLA Translations Center, now the National Translations Center. Another accomplishment of this section was the publication in 1949 of *Subject Headings for Aeronautical-Engineering Libraries*.

By 1953 it became evident, as a result of a survey of the section's members, that the membership really represented engineering libraries. At their business meeting in Toronto in that year, the members voted in favor of changing the section's name to the Engineering Section. This group continued as a section of the Science-Technology Division until 1965. At that time, the members of the Engineering Section expressed the need for a stronger sense of identity and more freedom, and funds, to develop projects and programs designed specifically for the benefit of engineering libraries

and the engineering profession as a whole. Consequently, an application for division status was made in 1965. The application was approved and, at the SLA Conference in Minneapolis in 1966, the Engineering Division was launched. The bylaws of the Division state that

The objectives of this Division shall be those of Special Libraries Association: 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. Specifically this Division should encourage communication between librarians and information specialists in all fields of engineering.

One of the first undertakings of the new division was to bring to completion a project started by the Engineering Section—the publication of a book list for technical institute libraries. Many division members cooperated in this project by supplying bibliographic information and annotations. The South Atlantic Chapter's Project Committee coordinated the work, with Theodore Kopkin and Effie Lunsford providing editorial direction. Initial funds for the project provided by the Engineering Division were supplemented by funds from the SLA's Non-Serial Publications Fund. The book list, which is entitled *A Basic Collection for Scientific and Technical Libraries*, was published in 1971 and is available from SLA Headquarters in New York. Another division project undertaken with the cooperation of the Science-Technology Division was a survey of the members of these two divisions to develop a list of most wanted 16mm format engineering journals. The results of this survey were reported in the Fall 1970 issue of *Sci-Tech News*, the official bulletin of the science and technology oriented divisions of SLA.

A current activity of the Engineering Division is the compilation of a comprehensive membership directory which will include information on the libraries and information centers represented by the division's 250 members. It is hoped that this will form the nucleus for a directory of sources of engineering information. The directory, when completed, will indeed aid "communication between librarians and information specialists in all fields of engineering."

CARMELA CARBONE

ENGINEERING INDEX, INC. (Ei)

Engineering Index, Inc. (Ei), a private, nonprofit abstracting and indexing service located in New York City, has maintained a transdisciplinary data base for all fields of engineering and certain fields of science and management since 1884.

This article will describe the history, purpose, and scope of the organization as well as specific abstracting and indexing services and projected new concepts in information systems.

The Engineering Index was founded in October 1884 by a man obsessed with an idea. The man was J. B. Johnson, then professor of Civil Engineering, Washington University, St. Louis, Missouri. The idea, in Dr. Johnson's words, follows:

When I was elected professor in 1883, I felt my greatest lack lay in my ignorance of engineering literature. I at once began to reinforce myself in these directions by going to the libraries and indexing the chief sources of such literature. . . . At this time I was a member of the Board of Managers of the Association of Engineering Societies,* representing the Engineers Club of St. Louis. At a Board meeting of this association in 1883, I described the work that I was doing for myself and offered to do it, somewhat more elaborately and free of charge, for the journal of the association, if the Board would agree to publish it. This the Board consented to do and the Index was begun . . . [see Figure 1]. All indexing was done by professional engineers of more or less practical experience. The theory of this Index from the start has been:

1. To index only articles of permanent value.
2. To give such a short, concise, but adequate description of the article as would enable one seeking information on the given subject to determine whether or not it would be worth his while to obtain or consult the article (1).

Publication of Dr. Johnson's "Index Notes" in the October 1884 issue of the *Journal of Association of Engineering Societies*, marked the official founding of *The Engineering Index* (2).

The foregoing principles of the founder have been followed essentially by Ei from then until the present (1971). They are applied to annual and monthly publications, cards, microfilm, computer tapes, and bibliographic services (see Figure 2). Thus the product originally designed to provide current awareness and to facilitate retrospective search of the technological literature for one engineer, today does the same for hundreds of thousands of engineers and scientists in industry, business, education, and government all over the world.

Meeting this stated objective required that the products and services of Ei be adapted and developed to keep pace with the unparalleled expansion of industry, government, education, the engineering community, and, most important, of technological literature published since 1884.

In addition to this growth problem and with its almost constant internal growing pains, Ei had to endure financial crises, wars, and changes of ownership. As a result, its life was several times held in the balance.

From 1884 until 1895, the forerunner of *The Engineering Index* was owned and published by the Association of Engineering Societies. At that time, *The Engineering*

* The Association of Engineering Societies, composed of local and regional engineering societies or clubs, was founded in 1881 and disbanded in 1915. It was dissolved before the organization of national and international engineering societies, known today as the Council of Engineering and Scientific Society Secretaries (CESSS), was born.

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LIGHTHOUSE - LIGHTSHIP.

Lighthouse, continued.

Report of the U. S. Lighthouse Board, 1885. Contains three appendices of value. 1. Report on experiments made at the South Foreland, near Dover, Eng., to determine the comparative power of oil, gas and electricity as lighthouse illuminants, by French E. Chadwick, Commander U. S. N. Illustrated by seven plates. 2. Report on the Hell Gate electric light, Hallett's Point, N. Y., and on progress of experiments on electricity as an illuminant for lighthouses, by John Mills, Lieut. of Engineers, U. S. A. Thirteen plates. 3. Report on the construction of the Detroit River Light Station, in Lake Erie, in twenty feet of water. Five plates.

Rothersund. By O. Offergeld, before the Association of Architects and Engineers, at Hamburg. Gives details of the construction of the Rothersund lighthouse in the North Sea, with two-page plates showing plans and sections of the pneumatic caisson. Valuable. *Lon. Eng.*, Dec. 2 and 16, 1887.

Lighting.

By Compressed Oil Gas. An illustrated article reprinted from *Le Genie Civil. Sci. Am. Sup.*, No. 760, July 26, 1890, p. 12140.

Cost of Lighting by Gas and by Electricity. Address by W. H. Preece, F. R. S., giving results of practical experience. *Mech. World*, July 18, 1891, *et seq.*

Incandescent Gas Lighting. A paper by W. Mackean, F. C. S., describing several systems, and the nature of various illuminating oxides. Discusses also the difficulties encountered in the practical application. *Jour. Soc. Chem. Indus.* Reprinted in *E. & M. Jour.*, May 16, 1891, pp. 585-6.

On the Measure and Distribution of Light. By Dr. H. Kruss. Mathematical treatment of the subject, with applications to the illumination of closed spaces. *Journal fur Gasbeleuchtung und Wasserversorgung*, 1886, pp. 66-80.

Of Streets. Tables showing the cost of lighting streets by gas, gasoline and electricity, in different cities in the U. S. *Eng. News*, June 28, 1890, p. 607.

See *Electric Lighting*.

Lightning.

And Lightning Conductors. By W. H. Preece, before the Soc. of Tel. Engrs. Treats of atmospheric electricity, its effects and methods of protection. *Van. Nos. Eng. Mag.*, Vol. VIII., p. 117.

Arresters and the Photographic Study of Self-Induction. A paper read before the American Institute of Electrical Engineers, New York, Jan. 8, 1889, by E. G. Acheson. Illustrated. Describes a series of experiments undertaken to determine the cause of the occasional "grounding" and failure of telegraph and telephone cables by electrical discharges, and some conclusions as to lightning arresters. *Elec. Eng.*, February, 1889; *Elec. World*, Jan. 19, 1889.

Arrester. See *Electric Lightning Arrester*.

Conductors. Gives some of the most important directions for the erection of lightning conductors, drawn from the joint report of the English Lightning Rod Conference. *Building*, April 2, 1887.

Guards for telegraphic purposes and the protection of cables from lightning, with observations on the effect of Conducting enclosures. Paper by Dr. Oliver Lodge read at the meeting of the Institution of E. E. Illus. *Elec. Rev.*, May 16, 23, 30, 1890, pp. 567, 592, 621.

Protection of Buildings from. By Capt. J. S. Bucknell. Treats of the present practice and advocates the use of wire ropes instead of rods, etc. *Van. Nos. Eng. Mag.* Vol. XXVII., p. 151.

Protection of Buildings from. A lecture by Prof. Oliver J. Lodge before the Society of Arts. *Jour. Soc. Arts*, June 15, 1888.

Lightship, with Electric Lights. Illustrated description of ship and equipment. *R. R. & Eng. Jour.*, Aug. 1891, pp. 361-4.

FIGURE 1. An early (1884-1891) sample of indexing from The Engineering Index.

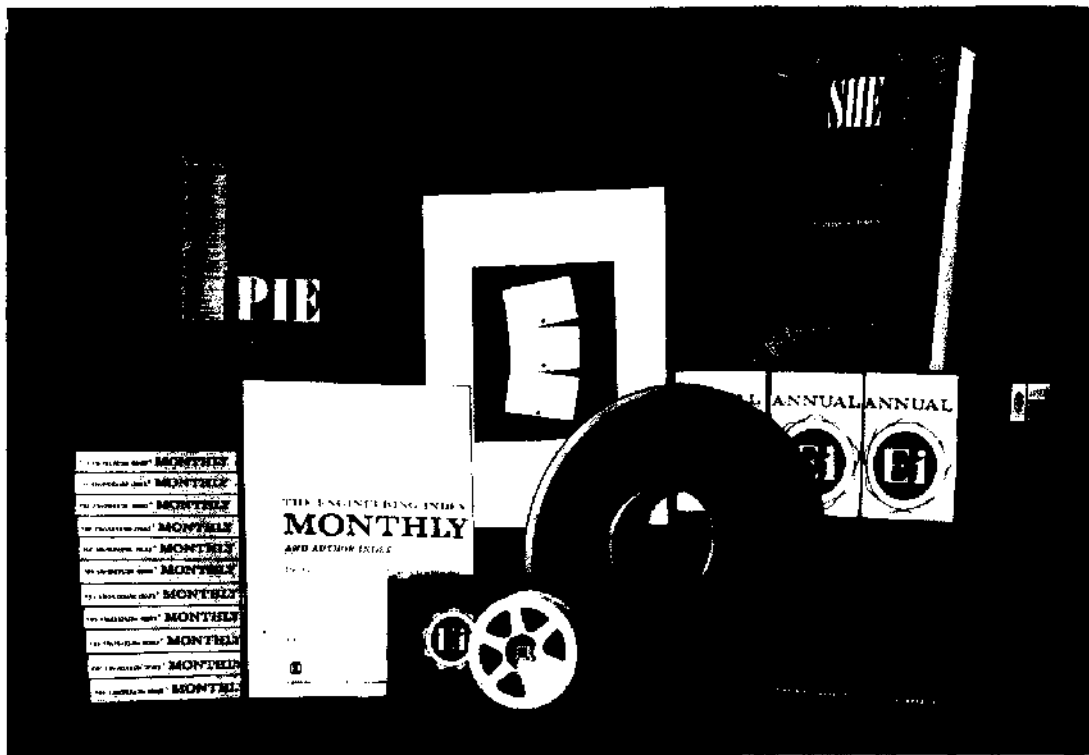


FIGURE 2. Major products and services of Engineering Index, Inc.

*Magazine** of New York purchased the property and introduced its present title, *The Engineering Index*.

A giant step forward was made when the American Society of Mechanical Engineers (ASME) acquired *The Engineering Index* in 1919. A cooperative arrangement was made with the Engineering Societies Library, making available to *The Engineering Index* for review, abstracting, and indexing the 1,200 engineering periodicals and other publications then received annually by the library. The immediate result was the number of publications indexed and abstracted was almost trebled. Equally important, the library provided for the first time, at a nominal fee per page, photocopies of any article, paper, or report abstracted and indexed in *The Engineering Index*. This arrangement has continued through the years.

Introduction of a card service in 1928 also stimulated the growth of Ei. Designed for the specialist, it provided weekly or daily 3×5 inch cards containing abstracts of literature in each of several hundred divisions or categories.

The business depression of the early thirties hit ASME's Engineering Index Service hard and, early in 1934, the ASME was reluctantly considering its discontinu-

* *The Engineering Magazine*, 1(1). (1891). copyright by the Engineering Co.—“an illustrated monthly magazine devoted to industrial progress.” It was later acquired by McGraw-Hill Publishing Co., and through mergers and changes of title successively became *Industrial Management*, *The Engineering Magazine*; *Factory and Industrial Management*; *Factory Management and Maintenance*; *Factory*; and *Modern Manufacturing*.

ance. Drastic economy measures, such as shortening abstracts to one line and voluntary salary cuts of 50 to 60%, led to the formation on June 16, 1934, of an independent, nonprofit, scientific, and educational corporation, Engineering Index, Inc., with the cooperation of the ASME. Only 12 of the former staff of 32 stayed with the new corporation. An outside organization retained to raise funds brought in \$160,000; the staff was reorganized; operating economies were made so that the staff salary cuts could be restored with back pay by 1938. ASME retained its interest, copyrights, and trademark rights of the names *The Engineering Index* and The Engineering Index Service until 1969 when it assigned these rights to Engineering Index, Inc.

The immediate impact of World War II was a wholesale cancellation of subscriptions from 23 different countries; the largest number lost were from Italy, Japan, and Russia. By 1943, however, new contracts from a booming wartime economy in the United States more than compensated for this lost business.

Growth of Ei was speeded in 1957 by participation in the accelerated technological development that was triggered by the launching of the Russian Sputnik, and again in 1962 by the introduction of *The Engineering Index Monthly*. The *Monthly* provided current awareness over the engineering spectrum covered by the *Annual* and, with the card service, it brought Ei's published products to three. Launching of the new publication, purchase of Justowriter equipment (which produced a paper tape as well as hard copy) to improve quality and to reduce publication costs of all three products, and employment of additional editors to improve the quality and scope of Ei's data base were financed by a grant from the National Science Foundation (NSF). *The Engineering Index Monthly* was an instant success, paying its own way from the start.

Engineering Index, Inc. entered the computer age in 1963 when it received another grant from the NSF to conduct a pilot study of a new form of computer-based indexing and abstracting service covering the plastics and the electrical/electronics fields of engineering. This project was called CADRE (Current Awareness and Document Retrieval for Engineers) (3) and a consultant, Fred Whaley, was retained to direct this operation. The basis for this project was the indexing and abstracting system and thesaurus sponsored by the Engineers Joint Council with modifications made by a research concern (Battelle Memorial Institute) to adapt them to Ei's needs. The CADRE project included publication of monthly awareness bulletins for plastics and electrical/electronics with computer-generated subject and author indexes, and development of a much deeper index for retrospective searching by computer. Further grants from NSF and the Engineering Foundation funded promotion of the two awareness bulletins and implementation of the pilot plan. Engineer-abstractor-indexers who were specialists in plastics and electrical/electronics were employed and, along with other qualified engineers already on the Ei staff, completed an EJC-Battelle training course. Additional space was rented to house the project.

Publication of the plastics and electrical/electronics awareness bulletins began in 1965. The electrical/electronics bulletin was discontinued with publication of the

December 1967 *Electrical/Electronics Section* as part of a cooperative agreement with the Institute of Electrical and Electronics Engineers (IEEE) to avoid duplication with *Electrical and Electronics Abstracts* published jointly by the IEEE and The Institution of Electrical Engineers, London. Publication of the plastics awareness bulletin, originally called *Plastics Section* but changed to *Plastics Monthly* in 1969, was terminated with the December 1969 issue as it had not become a viable service, and continued support from NSF was no longer available. The expanded coverage of both fields, however, continued in other Ei publications.

An experimental end product of the pilot project (CADRE), utilizing the computer-produced indexes was introduced in 1967. Called User Participation Program, or UPP, and later Current Information Tapes for Engineers, or CITE, it consisted of monthly magnetic computer tapes in plastics and electrical/electronics which were issued through December 1969. These experimental products paved the way for COMPENDEX (*Computerized Engineering Index*), Ei's present monthly magnetic tape information service, which provides on tape the data base beginning with January 1969. COMPENDEX makes available on tape the more than 6,000 items published in each issue of *The Engineering Index Monthly*, spanning all engineering disciplines, thus enabling the user to search the entire current data base of *The Engineering Index* by computer. Also, a project long in process was finally finished during 1969—the complete up-dating, reorganization, and redesign of Ei's Card Service under a new name CARD-A-LERT. These services are described later.

Organization and personnel of the Ei staff have varied widely over the years to meet the current requirements and conditions. The founder, J. B. Johnson, served as editor from 1884 until 1895 when the property was acquired by *The Engineering Magazine*. Joshua E. Hannum, editor of *The Engineering Index* when it was owned by ASME, was replaced by Frank Y. Stewart, with the new title of executive vice president, as top staff executive in 1935 after Ei had become an independent non-profit organization. In 1947 Mr. Stewart was elected Ei president, and the executive vice president was replaced by an Operating Committee composed of three staff members. During 1958 the Operating Committee was replaced by one of its members, Carolyn M. Flanagan, with the title of general manager. In a major reorganization, early in 1968, the present (1971) executive director, Bill M. Woods, was appointed to head the staff, and Miss Flanagan was made editorial director.

The corporate organization of Ei (see Figure 3) starts with the trustees—fifty are provided for in the Constitution. Trustees represent leadership in all aspects of engineering and information activities; provide important support and counsel to the directors and staff; and elect the directors from their number. Trustees serve 3-year terms, about one-third being elected each year. They meet at least once a year.

Six directors administer Ei with the assistance of the executive director and the secretary-treasurer. Directors serve 3-year terms, two being elected each year and also continue to serve as trustees.

The president and vice president of Ei are elected by the board of directors to serve for a 1-year term. The board also appoints the executive director who is responsible for appointment of the Ei staff and all operations. The secretary-treasurer is appointed annually and need not be a member of the board.

The total staff (1971) includes approximately 100 persons. As indicated by Figure 3, organization is both by line and by staff. Staff organization includes an editorial director, a planning associate, and an administrative associate.

There are three line operating divisions headed by qualified professionals as managers and broken down into functional sections administered by chiefs:

An Editorial Division that included twenty-three full-time and six part-time editors (abstractor/indexers), one vocabulary specialist, and three nontechnical editorial assistants in 1971.

A Production Division responsible for processing the material generated by the Editorial Division through the various operations, such as typing, keyboarding, proofreading, layout, data processing, and printing, necessary for the creation of the various Ei information products.

A Marketing and Business Services Division responsible for promotion and distribution of Ei products, and for accounting and bookkeeping functions.

Another feature of the administrative organization which has been in effect since 1968 is a Management Council consisting of key staff people that meet regularly with the executive director to assist him in the discussion and solution of management problems.

Although not itself an engineering society, Ei has maintained close relations with engineering and scientific societies over the years. Similar to these societies, Ei is a nonprofit, scientific, and educational corporation, incorporated in the State of New York and with the same basic objective—to collect, develop, and disseminate scientific, technical, and engineering information. Ei was founded by an association of engineering societies and was owned by one (ASME) for 15 years as described earlier. For over 50 years Ei has had a cooperative arrangement with the Engineering Societies Library (ESL) that amounts almost to a partnership. ESL is sponsored by five founder societies—American Institute of Chemical Engineers (AIChE), American Institute of Mining, Metallurgical and Petroleum Engineers (AIME), American Society of Civil Engineers (ASCE), American Society of Mechanical Engineers (ASME), and the Institute of Electrical and Electronics Engineers (IEEE)—and provides Ei's raw material in the form of various publications used in indexing.

Finally, the physical proximity of the library as a next door neighbor to Ei in the United Engineering Center in New York City, and the location of the offices of many of America's important engineering societies in the same building, insure maintenance and strengthening of Ei's relations with professional societies.

As a result of this relationship, Ei is in an excellent position to continue to expand its services to the engineering societies—services such as the preparation or exchange of abstracts, standardization of vocabulary and indexing terms, year-end indexes, bibliographies, and other subsets of Ei's data base. At various times in recent years Ei has provided such services to the American Iron and Steel Institute (AISI), American Society for Metals (ASM), Engineers Joint Council (EJC), IEEE, Society of Plastics Engineers (SPE), Society of Automotive Engineers (SAE), and Society of Photographic Scientists and Engineers (SPSE).

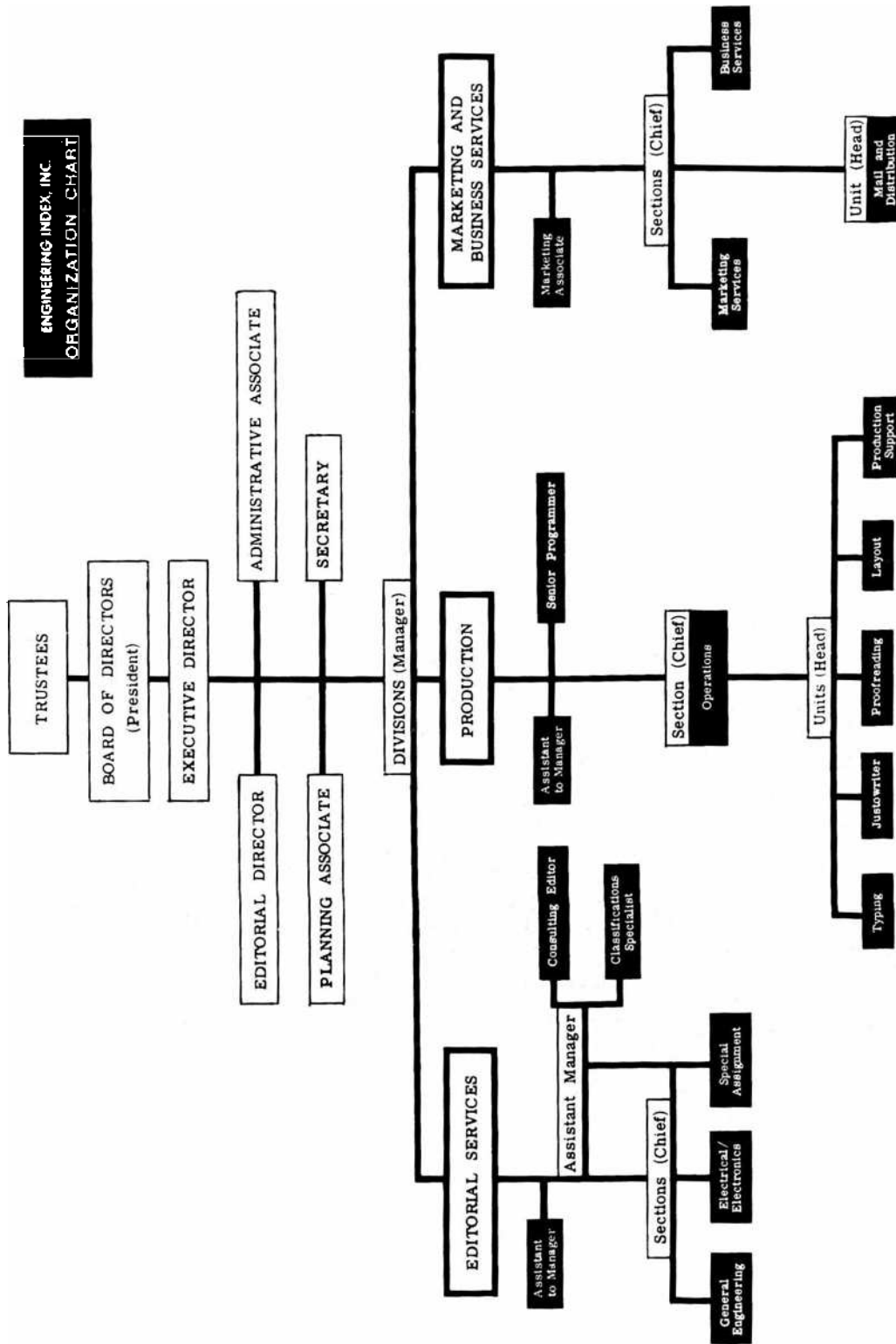


FIGURE 3. Organizational chart, Engineering Index, Inc.

As indicated, *The Engineering Index* was founded to fill the need of individual engineers to keep abreast of a constantly growing mass of technological literature—to keep them up-to-date not only on significant developments in their specialized fields, but also in other fields where developments might be adapted to their use. From the beginning Ei provided engineers with various guides to the world's technical literature, yearly at first, then weekly and monthly, covering the full breadth of all engineering disciplines. These services are indexed and cross-indexed to lead the engineer quickly to the abstract, citation, or specific technical subject he seeks. Then, by reading the brief abstract or citation (see Figure 4), he can quickly determine whether or not he wishes to obtain and study the full article. As Ei developed into the sole English-language information service responsible for worldwide transdisciplinary coverage of the engineering literature and, as its subscribers grew to include the nation's major universities and technical institutes, public libraries, government agencies, nonprofit research organizations, and industrial corporations, Ei recognized its responsibility to the entire engineering community—not only to the engineers in it. This responsibility is reflected in the Constitution of Ei:

The purposes of Engineering Index, Inc., are the dissemination of scientific, technical, and engineering information by means of descriptive indexes and annotated bibliographies, and by other appropriate methods, for the use of libraries, educational institutions, professional men, and the public generally [emphasis added]. . . .

Ei is accomplishing these purposes by bringing together, in a unified system, information products and services. Since these needs are constantly changing, product development is going on continuously. Basically this is being done by creating a data base encompassing an expanding coverage of the literature within Ei's scope. Also, by multiple use, this data base is fully and efficiently exploited to generate a broad spectrum of information services and products.

Since 1919 when a cooperative agreement with Ei was first reached, the Engineering Societies Library has provided most of the literature that serves as the raw material for *The Engineering Index's* operations. The library receives numerous journals, trade magazines, transactions, proceedings, symposia, monographs, reports, and books. Currently (1971), Ei evaluates 3,500 of these publications for the purpose of abstracting and indexing.

A second vital service provided to users of Ei products by the library is to make available, for a nominal price, photocopies of the full text of documents in its custody indexed and abstracted by Ei. Another source of Ei's input is the direct acquisition of material that is not available initially from the library and which Ei's editors believe will enhance its services. This is accomplished by exchange agreement, subscription, or purchase. Such material can be in the form of periodicals, books, abstracts, or computer tapes which are then deposited in the library for regular use.

Engineering Societies Library was founded in 1913 by joint action of the American Institute of Mining, Metallurgical and Petroleum Engineers, the American

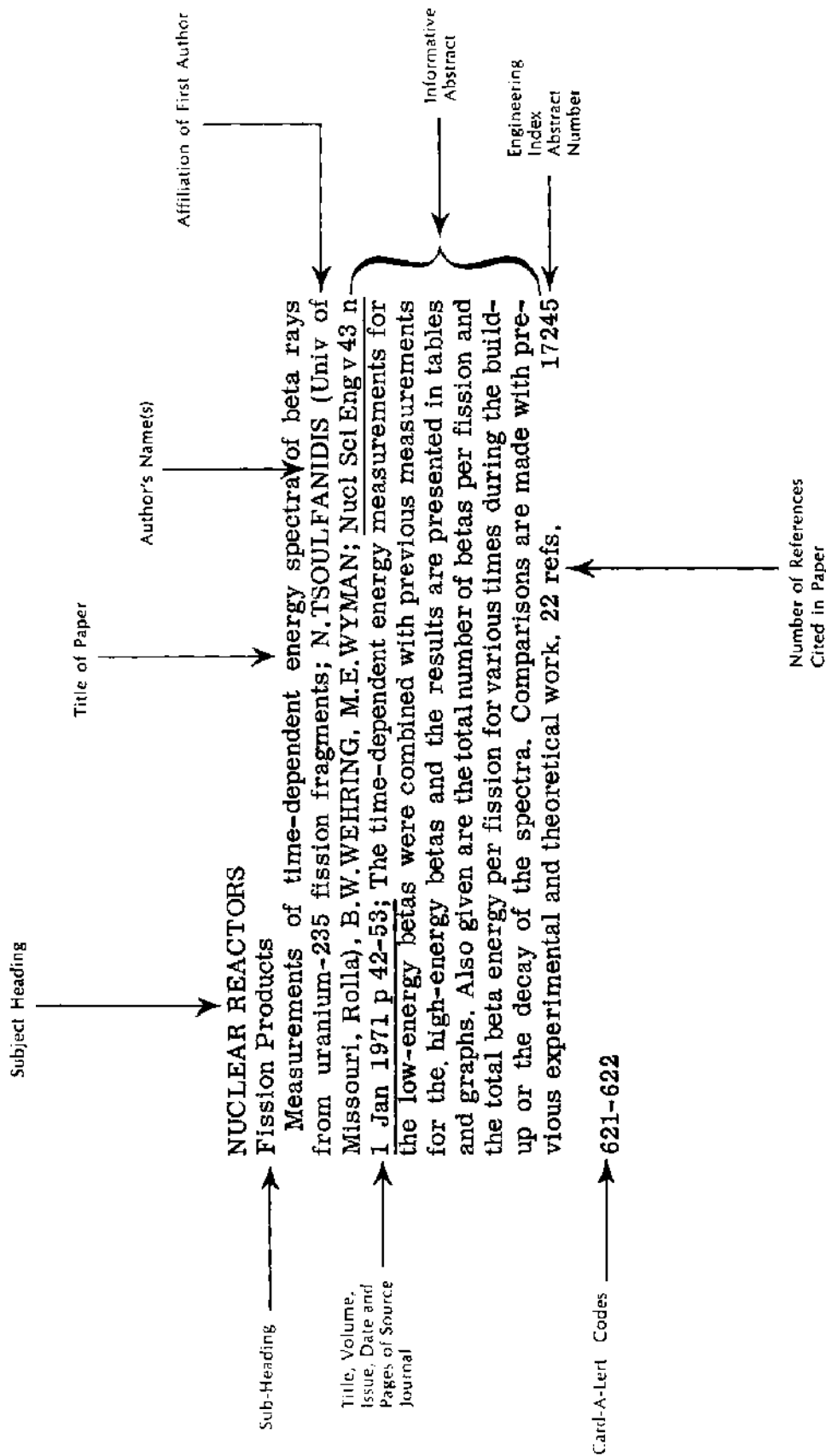


FIGURE 4. A sample abstract from The Engineering Index.

Society of Mechanical Engineers, and the American Institute of Electrical Engineers (now the IEEE). In 1916 the American Society of Civil Engineers and in 1958 the American Institute of Chemical Engineers joined the original three societies in sponsoring the library. Seven other engineering societies contribute to ESL as associate members, bringing the total number of sponsors to twelve.

Since the selection and maintenance of acquisition material is of vital importance both to Ei and ESL, and since the basic aim of both organizations is to respond to the current information needs of the engineering community, a joint Ei-ESL committee operates on a continuing basis to evaluate both these needs and the material available to fulfill these needs. This is why it is only on rare occasions that Ei will need to seek other sources of literature than ESL.

All incoming literature is evaluated immediately by Ei's editors, whether received from ESL or from other sources. These editors are engineers, physicists, chemists, or other technical specialists qualified by education and practical experience in the various fields of their professional specialties. Selection of material to be abstracted and indexed for Ei's input is made on the basis of significance, timeliness, and permanent value. There are two steps to the evaluation and selection for journals or serial publications. First, the journal is evaluated as to whether it should be abstracted and indexed completely, partially, or simply monitored. Then each document in a journal or proceedings is evaluated separately. Material thus selected is assigned to an editor for abstracting, indexing, and other processing in such a way as to be readily available, easily retrieved, and pertinent to the needs of engineers in all disciplines. In this way, the material becomes part of *The Engineering Index* data base available for use in any or all of Ei's products and services.

For example, the publications of the major engineering societies receive cover-to-cover or "complete" (90 to 100%) abstracting and indexing of the technical articles and documents that they contain. Excluded from "complete" coverage are casual notes, editorials, new products, appointments, speeches (if not engineering), book reviews, errata, society news, "how-to" material, and advertising. Other journals that always have some, but not all, papers that qualify, are indicated as "partial." Excluded from "partial" coverage are nonengineering topics; pure chemistry, physics, and geology; theoretical mathematics; and material of doubtful lasting value. Publications that occasionally have one or more qualifying documents are "monitored" to find them. On an approximate percentage basis, the "complete" coverage represents 34%, the "partial" 38%, and the "monitored" 28%.

In addition, contents of conference proceedings are abstracted and indexed on the basis of importance. If the contents are considered to be basic in nature, each paper is covered. If the interest is merely marginal, then only titles and authors are included. All appearances of the same paper are indexed, but it is abstracted only once.

The second criterion for depth of coverage is found in the length and type of abstract prepared for each document according to the judgment of the editor as to the relative value and type of the document. The abstract can vary in length from a minimum of one line, and/or it can be either the informative, the indicative, or the informative-indicative type of abstract as follows.

An Ei abstract is an abbreviated, accurate representation of the significant content of a document without added interpretation or criticism. It is intended to permit readers to decide whether they need to read the entire document and is not intended as a substitute for the original.

The informative abstract is a succinct condensation of what the document says, leaving little or no question about the contents or usefulness of the document. It covers the purpose, type, results, and conclusions of the document. Informative abstracts are especially useful for documents describing factual tests, such as those describing experimental work.

The indicative abstract is a descriptive guide which tells what the document is about and establishes its type. It makes general statements about the contents of a document but excludes qualitative and quantitative data. It is suitable for review papers and portions of monographs.

The informative-indicative abstract contains informative statements about the primary elements of the document and indicative statements about the lesser aspects.

Although the Ei abstract tends toward the informative, any of the three forms may be used according to the judgment of the editor.

Ei abstracts usually run between 50 and 150 words and, when possible, follow a logical structural pattern; document type, objectives, methods, results, and applications. A short indicative abstract of fifty words or even less is suggested for documents of lesser value and/or transitory interest. Each Ei abstract includes the usual bibliographic citation (title of document; name and affiliation of author; name, volume, issue, and page of publication).

In addition to those prepared by Ei's editors, abstracts written by the authors of documents are used when they meet Ei standards, as are abstracts that may be acquired by purchase, exchange, or for services rendered from engineering societies, from other abstracting and indexing services, or from primary publishers. In this way duplication of intellectual work already performed by other organizations is avoided.

Also, to further eliminate duplication, Ei maintains a working membership on the Sectional Committee Z39, Library Work, Documentation, and Related Publishing Practices of the American National Standards Institute (ANSI). This organization is dedicated to bring together conflicting standards into a single, nationally accepted standard. Ei cooperates with ANSI in the development and practice of standardization policies concerning the production of abstracts and other bibliographic and publishing matters. Ei has a representative on the subcommittee on Thesaurus Rules and Conventions.

The method of subject indexing using specific names of things and processes in alphabetical order and liberal cross indexing employed by Ei's founders is basically the same as that used today in *The Engineering Index Annual* and *Monthly*. Important additions came later that made citations and abstracts even more accessible. These included an alphabetical author index and adoption of a system of subject headings (in 1929) based upon the classification of "Subject Headings" approved by the U.S. Library of Congress and used by libraries all over the world. Thus Ei's

interdisciplinary subject and author indexing and cross-indexing calls an article to the attention of users in all fields of engineering to which it is relevant regardless of the particular disciplines indicated by the author's application or profession, or by the journal in which it was published.

An "authority list" of 12,000 subject main headings and subheadings is used by Ei's editors to index and cross reference the abstracts or notations of contents which they prepare. It is called *Subject Headings for Engineering* (SHE), and will be described in a later section. Ei also provides leadership in interdisciplinary indexing vocabulary development.

To supplement this basic index of the data base, special indexes are employed involving access words and free language terms for COMPENDEX, the monthly computer tape service, and one involving divisions and fields of interest for CARD-A-LERT, the weekly card service for specialists.

The editorial development of Ei's products has been enhanced by the use of the following methods and study projects.

In most cases, when indexing an item for Ei's data base, use of headings and subheadings included in Ei's published "authority list" will be applicable and satisfactory. However, when there is no word in this list or controlled vocabulary that exactly identifies the subject of a given document, then the "free language" used by the author is applied. Free language terms provide one of the access points to facilitate machine searching of Ei's monthly COMPENDEX computer tapes. This flexibility offsets the inherent lag of controlled vocabulary behind fast-moving engineering developments. Such free language terms being identified by Ei editors are later considered as candidates for permanent terms in SHE.

Project "A" consists essentially in utilizing nontechnical personnel for a part of Ei's abstracting and indexing job that does not require full participation by engineering specialists. Nontechnical assistants are assigned the task of doing all classification and preparation work for abstracts already prepared by authors or by other abstractors and appearing with the original paper and then turning them over to the editors for review and approval. Since the experimental project was successful, it has been adopted as standard procedure, and a significant improvement in editorial output and efficiency has resulted.

Project Omega is a follow-up project to Project A. A Consulting Editor insures the over-all accuracy of both the specialist and nontechnical personnel. This is accomplished by monitoring the approved abstracts as well as those that have been returned for correction. This project has also met with success for quality control.

A new study (Project V) is now in process to determine if there are some areas that are not covered by the present editorial staff because of the lack of time or expertise. To accomplish this, part time editors, out-of-the-office, are independently researching specialized fields of interest. Also being studied are ways in which these editors can improve the flow of abstracts by eliminating certain time-consuming steps that are now in use.

Continuing studies of the elimination of duplication and overlap of coverage among the various technical abstracting and indexing organizations and services has

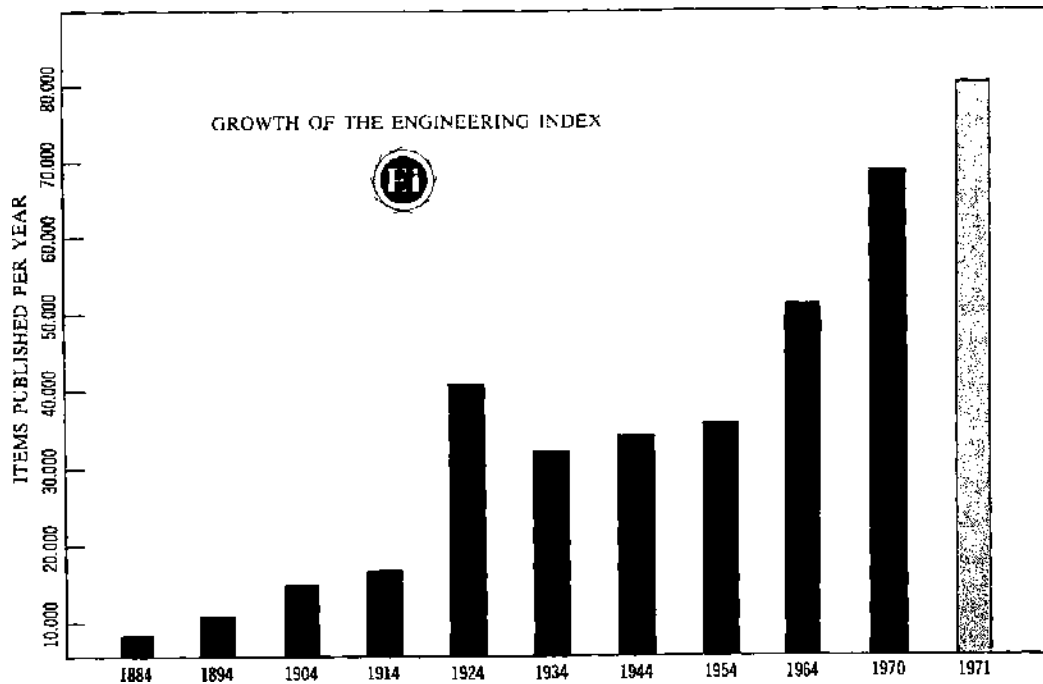


FIGURE 5. *The growth of The Engineering Index, items published per year.*

long been an important objective of Engineering Index, Inc. As a result of cooperative discussions with the Institute of Electrical and Electronics Engineers in 1967, Ei discontinued its electrical/electronics awareness bulletin and initiated with IEEE a program of supplying Ei-produced abstracts to IEEE. A third member was involved in the exchange—The Institution of Electrical Engineers (IEE) in London. The direct contact with IEEE was discontinued in 1970, but the exchange with IEE continues. Similar arrangements with other organizations are contemplated to avoid duplication of intellectual effort. Standardization has been a prerequisite to an effective exchange.

Beginning in 1970, Ei worked with two other major secondary information services, Chemical Abstracts Service, and the BioSciences Information Service of Biological Abstracts, on another joint coverage study titled, "The relationships between and overlap in printed and computer-readable publications and services."

This study among the three services consisted of five phases: (1) identification of the degree of overlap in the lists of journals; (2) a detailed study of statistically derived samples of citations to determine the amount and kind of overlap in document analysis; (3) to pinpoint the differences in editorial policies and practices with regard to the format and content of bibliographic descriptions and abstracts of other forms of document condensation; (4) the format, data content, and character set of the machine-readable records will be analyzed to determine the degree of compatibility or interconvertability among these records; (5) to characterize the approaches used in indexing the same or related concepts.

TABLE 1
Growth of Data Base for *The Engineering Index*, 1884-1970

Category	1884 Ei data base	1970 Ei data base
Number of items	924	67,600 (60,091 abstracts)
Publications reviewed	100	3,500
Authors	1,202	78,000

Services

The number of items—basic units of all *The Engineering Index* services—is one of the best criteria of the growth of Ei's data base. Figure 5 and the comparison of the data base in Table 1 dramatize the growth that occurred from 1884 to 1970. Figure 5 also shows the effects of depression, wars, and changes of ownership.

The cumulated total of items for the 86 years from 1884 to 1970 is 1,661,360 items in *The Engineering Index* data base, over 99% of which include abstracts. This total breaks down as shown in Table 2.

The first half-million items was reached in 1934, 50 years after initiation of the service, while it took 20 years (1954) to reach the next half million. Thirteen years later, in 1967, the 1.5 million mark was passed. With 77,000 projected for 1971 at the present rate of growth, the two millionth item in *The Engineering Index* data base should be indexed in 1974 and quite possibly earlier. The full inventory of pertinent engineering literature is not known although figures as high as 200,000 have been given. Ei does not cover patent literature and excludes all but a small percentage of the technical report literature and has no immediate plans to include such items.

Since 1884 *The Engineering Index Annual* has been a unique cumulative record of the preceding year's worldwide engineering literature. It has long been the standard reference for the retrospective search of the technological literature in the libraries of many nations. The 1970 three-volume set contained over 60,000 abstracts, reporting more than 67,000 items arranged with 2,500 main subject headings and 10,000 subheadings, liberally cross referenced, and an author index of 78,000 authors. Each *Annual* contains all the abstracts and items published in the 12 monthly issues of the preceding year of *The Engineering Index Monthly*.

TABLE 2
Items in *The Engineering Index*, 1884-1970

1884-1891	11,000 notes and cross references
1892-1895	6,000 entries from 62 journals
1869-1900	40,000 entries from 200 journals
1901-1905	50,000 entries from 250 journals
1906-1927	95,034 abstracts
1928-1970	1,459,326 items

Since its introduction in 1962 *The Engineering Index Monthly* has been the only printed English monthly service covering the worldwide engineering spectrum. Each 1971 issue contains more than 6,000 items of significance, annually covering some 3,500 journals, conference proceedings, transactions, and symposia. Quick access to abstracts and notations is provided by main headings and subheadings which are cross referenced to enable the user to locate rapidly the titles and abstracts pertinent to his search. A computer-generated author index gives reference to page and abstract numbers of articles by persons known to the user.

Each week CARD-A-LERT provides the user with 3 × 5 inch cards that contain specialized up-to-date information pertinent to his particular area of interest. This data has been selected from over 77,000 items produced annually. CARD-A-LERT, and its predecessor, The Engineering Index Card Service, have provided engineers with Selective Dissemination of Information (SDI) (4) since 1928—long before these terms or concepts came into popular usage. A CARD-A-LERT catalog includes a comprehensive index and descriptions to 6 Disciplines, 38 Groups, and 167 Divisions.

The purpose of the computer-based pilot project CADRE (5), and of UPP and CITE magnetic tape services that were created from it, was to develop a system of computer storage and retrieval of technical information in the fields of electrical/electronics and plastics engineering. The system was designed to retrieve rapidly and accurately to Boolean logic from storage on magnetic tape reference to documents matching the user's search profile or specific field of interest. The project was intended as a prototype of an automated information system that would eventually serve all engineering disciplines (a goal later achieved by COMPENDEX).

UPP utilized the data base developed by deep indexing by the "Combined File Search" (6) system developed in 1964 as part of Ei's pilot project, CADRE, with computerized information.

CITE was the name of the commercial product that superseded UPP in 1968. CITE tapes contained an input for plastics engineering of 30,000 articles during 1965–1969; and for electrical/electronics engineering of 60,000 articles during 1965–1969. The tapes provided indexing and citations only; abstracts were made available by the *Plastics Section*, 1965–1968, and the *Plastics Monthly (PM)*, 1969, and the *Electrical/Electronics Section (E/E)*, 1965–1967, and on microfiche 1968–1969.

The original project CADRE combined and coordinated the contributions of a number of organizations:

- (a) The Engineers Joint Council whose thesaurus was the basis for the pilot project thesaurus and whose terms and concept designations formed the basis for the indexing system.
- (b) The Battelle Memorial Institute whose instructional courses for the indexing system were used to train pilot project indexers and abstractors.
- (c) International Business Machines Corporation's CFS system, originally designed for engineering drawings, was modified to handle descriptor indexing.

- (d) American Society for Metals which used the same CFS system and which accepted major responsibility for developing a publishing program system.
- (e) The National Science Foundation and the Engineering Foundation which provided substantial financial support of the project.

The project involved abstracting and indexing of technical literature at the rate of 1,000 articles or documents per month for electrical/electronics, and 600 articles per month for plastics. The coverage in this data base reflects significant worldwide developments reported in more than 325 journals in both disciplines. The system was designed for implementation on an IBM 1401 computer with four tape drives and an 8K (later 12K) storage.

Document input information and search requests were made machine-readable by keypunch or magnetic tape data recorder-operators from coded worksheets. The worksheets were prepared by trained engineer/chemists-abstractor-indexers and contained for each document:

- (a) Ten or twelve deep index terms taken from a highly structured thesaurus.
- (b) One to seven index terms for the computer-generated indexes of the monthly electrical/electronics and plastics awareness bulletins.
- (c) Abstract, citation, and bibliographic data of the document.
- (d) Notations of contents—enhanced titles that give better descriptions of the content of articles.

Although this pilot project did provide high recall and relevance figures of 60 to 80% and higher, it was abandoned in 1969 because of its high input costs and lack of viability in the market place.

The purpose of COMPENDEX is to make available, in machine-readable monthly computer tapes, the entire Ei data base beginning with January 1969. This data base covers the engineering spectrum worldwide and permits interdisciplinary and transdisciplinary retrieval of engineering information. In 1971 the annual Ei data base is expected to total 77,000 items, over 90% of which will include abstracts, gleaned from more than 3,500 sources of technological literature.

Tapes are designed for rapid current awareness with automatic retrieval by means of computer scanning of all abstracts contained in the tapes. The computer can retrieve pertinent abstracts or bibliographic references from current or back numbers (retrospective search) of the COMPENDEX tapes in response to the specific information needs of users. Ei provides a search service of its machine-readable data base in close cooperation with various information centers. Ei pulls from its data base subsets or smaller information packages which government agencies, technical societies, or companies want to repackage, market, and distribute.

Each COMPENDEX tape record includes the following discrete access points to facilitate machine processing, and to provide the user with the option of searching the complete record (full text search), or of searching selectively on chosen data elements:

Subject heading and subheading (from the more than 12,000 headings used for Ei's *Monthly* and *Annual*).

Author(s).

Ei abstract number (assigned to each abstract appearing in the *Ei Monthly*).

Codes assigned to CARD-A-LERT divisions.

Access words (cross references chosen for the *Ei Monthly*).

Free language terms (up to five words chosen for concept enhancement by editors from the literature being indexed).

The input format of COMPENDEX tapes is IBM TEXT-PAC 360 written in EBCDIC (Extended Binary Coded Decimal Interchange Code).^{*} A typical COMPENDEX record is shown in Figure 6. Further information on hardware compatibility and tape specifications can be found in a special COMPENDEX publication.

The entire file of *The Engineering Index*, Volumes 1 through 68, was made available on microfilm in the spring of 1970 on a lease arrangement. This file, with its annual additions, provides in a compact, easily accessible form, a complete cumulative record of the world's pertinent engineering literature dating from 1884. At the end of 1970 this file comprised over 1,600,000 items, over 99% of which include abstracts. *The Engineering Index Microfilm Edition* is issued in 16mm, 35mm, positive and negative microfilm, to meet the specifications of all microfilm readers and reader-printers. Three coding systems—image, line scale, and odometer—permit the user to retrieve any item quickly and easily.

PIE, or *Publications Indexed for Engineering*, lists the journals and certain other serial publications indexed and abstracted selectively for each calendar year and published in *The Engineering Index Annual* of that year and as a separate publication. These publications, most of which are received by and permanently housed in ESL, include the regular professional and trade journals, publications of engineering societies, scientific and technical associations, universities, laboratories and research institutions, government departments and agencies, and industrial organizations. Papers of conferences, symposia, and standards are also covered.

In addition to the alphabetical listing of such publications, CODEN,[†] its ANSI abbreviation and the type of editorial review given to it—whether complete, partial, or monitored coverage—are included. The 1971 issue of *PIE* contained 2,725 entries, comprising 2,246 unique titles and 479 cross references.

SHE, or *Subject Headings for Engineering*, publishes the authority list of main headings and subheadings used for in-depth alphabetical subject indexing of Ei's data base.

This published authority list of controlled vocabulary is available as a reference, indexing, and classification tool to aid in the development of literature search profiles; to identify the CARD-A-LERT Division codes to which subjects are as-

^{*} Tapes are also provided in 9 track with a density of 1600 bytes per inch (bpi), as well as 7 track BCD (Binary Coded Decimal) with densities of 556 and 800 bpi. COMPENDEX is provided in the ASCII (American Standard Code for Information Interchange) code when required.

[†] CODEN is the abbreviation coding system developed by the American Society for Testing and Materials (ASTM) for identifying scientific and technical journals.

LINE	F.C.	TEXT	P.
01		EIX70X120164	
02	00	Photomodification processing of biologically recalcitrant pollutants	
03	09	ENVIRONMENTAL ENGINEERING	57676
04	10	EIX70X120164	
05	201	KLEIN DA	
06	3	57676	
07	4 Z	IEEE Trans Geosci Electron v GE-8 n 3 July 1970 p 139-44	
08	4 4	IEGEA	
09	401	Oregon State Univ, Corvallis	
10	50	Recalcitrant pollutants, such as pesticides, plastics, and	
11		ligninsulfonates, a product of paper manufacture, are of increasing	
12		concern because micro-organisms are not able to break these down at	
13		desirable rates. Therefore increasing accumulation of these	
14		materials in the environment can be observed. To aid micro-	
15		organisms in metabolizing such materials, photolytic processes have	
16		been developed that show the potential of treating process streams,	
17		allowing more efficient microbial utilization. These systems can be	
18		envisioned for production of microbial protein and for the	
19		pretreatment of materials before release into natural environments.	
20		Photolysis efficiency is dependent on the wavelength of light used,	
21		with light in the ultraviolet range, from 180 to 210 nm being most	
22		effective. An active free-radical reacting reagent, such as	
23		oxygen, is required for efficient modification. After modification	
24		a substrate can be used in growth chambers for production of	
25		microbial protein or be treated in a lagoon system before release to	
26		a natural environment. Aspects of control and instrumentation,	
27		which should be considered in future large-scale use of such	
28		processes, are discussed. 12 refs.	57676
29	60	ENVIRONMENTAL ENGINEERING	
30	610	00-A445	
31	611	00-A741	
32	612	00-A811	
33	650	PAPER AND PULP MILLS	
34	750	RECALCITRANT POLLUTANTS	
35	751	PHOTOMODIFICATION	

FIGURE 6. A typical COMPENDEX record from The Engineering Index.

signed; and to provide an overview of the subject structure of the Ei information services. Terms from this list are added to each entry in the COMPENDEX tape service as separate access points. The list is undergoing constant revision and is republished after each significant revision. The late 1970 publication of *SHE* contained over 12,000 descriptions.

EIT, or *The Engineering Index Thesaurus*, was created to maintain control of the terms in indexing materials in the electrical/electronics and in the plastics engineering fields during the development of the pilot program system CADRE. It contains more than 11,800 descriptors. *EIT* will be published by mid-1971.

Ei assists universities, technical societies, government agencies, or corporations conducting information seminars for their personnel to acquaint them with the available tools for handling engineering information. This is done in order to promote the effective dissemination and utilization of the wealth of engineering information by those who must solve problems. Ei assists by making available to these organizations the background of experience of its staff in planning and producing such seminars.

Ei, The Organization—The Service (7) is a comprehensive booklet that tells the story of Ei's unique service to the engineering community—why there is an Ei; how Ei has and is serving the information needs of engineers; what Ei provides; how Ei plans to serve in the future. Designed as an educational resource, the booklet provides guidance for the selection and use of the information services now available from Engineering Index, Inc.

Educational motion-picture films for student and employee audiences, and intended to supplement the seminars and booklet just described, were in process of development in 1971. They will cover information transfer developments in general, the principles and purposes of Ei services, and how to get the greatest value from their use.

Professional Involvement

To maintain and strengthen Ei's position of leadership in the professional field of technological information processing, members of Engineering Index, Inc.'s staff participate actively in a number of information, engineering, indexing, library, computer, and other organizations. The following merit special but brief attention.

National Federation of Science Abstracting and Indexing Services (NFSAIS)

In 1971 Ei's executive director, Bill M. Woods, was president and a member of the Executive Committee of this organization. This position was held in 1965 by Ei's editorial director, Carolyn M. Flanagan, one of the founders of NFSAIS in 1958, when she was general manager of Ei.

Other key staff members also participate in the federation. This organization strives to improve their members' operations by providing better access to the ever-increasing store of scientific knowledge through a series of publications, conferences, and other projects.

American Society for Information Science (ASIS)

This organization is of principal interest to a number of the Ei staff as the primary professional society for persons involved in the broad aspects of information handling. Ei participation has included the presentation of papers and exhibitor seminars, an exhibit program, and service on local and national committees.

Information Industry Association (IIA)

Engineering Index, Inc. is represented in this association by Executive Director Woods who is an associate member and participates on committees and in meetings.

Tripartite Committee (TC)

This committee was formed in 1965 by the Engineers Joint Council, Engineering Index, Inc., and the United Engineering Trustees (for the Engineering Societies Library), "to develop and bring into being a united information system and center." It was composed of the presidents and vice presidents of these three organizations. It met frequently, conducted numerous studies and surveys, and published a number of reports (8-10). By 1970 it had become evident to the Tripartite Committee and to its sponsoring organizations that, in that period of rapid development and change in the information processing field, the proposed united engineering information service and center was neither practicable nor economically feasible, and the committee was dissolved.

Coordinating Committee on Engineering Information (CCEI)

Ei staff members played a leadership role in forming this committee composed of staff representatives of key organizations in the engineering information processing field. It was first an ad hoc committee and later a permanent organization. The ad hoc committee accepted Ei's information system design as a basis for its position on computer software for storage and retrieval of engineering information. An Ei role statement was developed out of discussions with CCEI.

Projections

Engineering Index, Inc. recognized the need for continuing future development and conducted, with the support of NSF, a management study entitled, *Information System Development: Phase I Management Planning (11)*. This project made possible an over-all view of Ei and recommended a strong management structure to meet the challenge of information transfer—specifically, managerial strength in planning, research, editorial services, development, production, marketing, and business services. In addition it suggested that the planning responsibility have enthusiastic participation by two or three levels of management. Further, it advised increased attention to matters of editorial policy, reduction of time lags between

original publication and publication by Ei, and the development of computer-based indexing and production.

The recommendations included in the above study led to the commitment by Ei to an integrated and flexible high-speed information processing system involving computerized publishing, and *Transdisciplinary Engineering Information Program* (TEIP) (12) is the developmental plan established to accomplish this goal. By use of developing technology, Ei plans to improve its production methods by providing greater efficiency—thus facilitating greater coverage; supplying greater speed—thus improving timeliness of Ei's products; and providing improved Ei products by the introduction of new features and the development of additional information services. This plan consists of a series of projects, each building on the previous project as follows (with target start and completion dates):

Computer Typesetting. 1971–1972: The essential first step is the adoption of computerized typesetting and photocomposition. It will provide full editing capability to make possible a central file of all processed information on magnetic tape, and it will utilize high-speed computer-controlled phototypesetting for generating published products. This should result in improved appearance and scannability of Ei products.

Coordinated Operations. 1971–1973: A follow-on project will develop new clerical/editorial procedures, current awareness products, and production services, such as year-end indexes for journals of engineering societies and similar organizations; indexing for special services; and abstracts for use in primary and in other secondary publications. This will make the fullest possible use of the new photocomposition production system.

Expanded Coverage in Areas of Safety and Environmental Engineering. 1971–1973: Expanded coverage of ecological and sociological effects of technical developments in all fields of engineering. It is anticipated that this project will require the development of new approaches to the analysis, abstracting, and indexing of some documents.

On-Line Input Processing. 1972–1974: Technological upgrading of the production system will be made for further gain in efficiency, quality, and speed. Data input systems are currently in volatile development and this project is timed to await and utilize anticipated stabilizing and maturing in this area of technological development.

Citation Indexing. 1973–1975: This refers to the incorporation of citation indexing into Ei files. It should provide major opportunities for increased reliance on clerical and machine processing of source documents, and lead to more efficient and effective utilization of the highly trained editorial staff.

Computer-Assisted Indexing and On-Line Access. 1973–1977: Coordinated development of computer-assisted indexing and search services will be advanced. This project makes the system more immediately responsive to editors for further gain in efficiency, quality, and speed. Development of search services is part of the same project because it is technologically related to computer-assisted indexing. In particular, Ei has a deep interest in assisting other organizations in the development of on-line access to address the Ei data base. Presently, one university has this capability and Ei is working with other potential users to bring about in-

creased interest and usage. Commercial service bureaus or similar organizations are also being interviewed to determine if they can function as intermediaries for ultimate on-line users.

Engineering Data Indexing. 1973–1977: A project for the indexing of hard data results reported in source documents, presently being examined by Ei editors, will be initiated.

Summary

What was true at the founding of The Engineering Index is even more true today—that with the global wealth of information available, ways and means must be developed for the easy transfer of knowledge to the ultimate user. This has been Ei's goal for over 86 years by its unique transdisciplinary approach. With future expansion, the abstracting and indexing functions of acquisition, retrieval, evaluation, and dissemination of information will provide improved methods and services through advancing technology.

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ENGINEERING LIBRARIES AND COLLECTIONS

A better understanding of what engineering libraries are and what they do can be gained by first defining and examining the structures of special libraries, and seeing how the same characteristics apply to them.

Johns, in her book, *Special Libraries; Development of the Concept, Their Organizations, and Their Services*, provides an in-depth consensus of a wide variety of definitions of "special libraries" in England and the United States (1). She further goes on to trace their historical development and that of their professional societies, and gives an insight on special libraries in Australia.

Kruzas looks at special libraries in a light which seems to concur with many in Johns' book:

Special libraries have two major distinctions that differentiate them from other libraries. One is substantive and the other functional. Substantively, a special library is a special collection (usually limited by subject or form); functionally, it is an activity with a set of rules and objectives established by the type of organization within which it operates (2).

To sum it up, the special library's aims and objectives are oriented to meet the needs and interests of the people and/or organization it serves by tailoring its collections and services to the subject parameters dictated by the directions and goals of its clientele.

To parallel itself with a special library, the engineering library's public should consist of persons and/or organizations associated with engineering, and its collections and services should be keyed to support their information requirements in the fields of engineering and its related technologies.

Although this correlation is valid, the engineering library, in practice, must extend itself much further than the fields of engineering. Engineering's overlap with related and even unrelated subject areas due to the interdisciplinary nature of today's technology makes it impossible for an engineering library to isolate itself by confining the subject content of its collections, or by restricting itself to the specialty of engineering. The same is true of other libraries. This is not to say that this condition has not always existed, but that it holds more importance in our present day society than it did in any other era of our time.

Another factor evolves around the wide and diverse needs of those using the engineering library. A highway engineer has to consider and evaluate many elements, environmental aspects, safety codes and regulations, human factors, the use of computers in solving his problems, etc., in addition to his commonplace informational requirements in designing and developing highway systems. It is both legitimate and reasonable for him to expect his engineering library to provide all of this data.

The organizational position of an engineering library can also have a direct bearing on its duties. Some companies find it advantageous to establish one library to

cover multiple areas. Although its main purpose may be to support an engineering division, in addition to taking care of those information requirements, it may find itself providing business and economic and social data, and even perhaps maintaining recreational materials (such as the libraries of the early mechanics institutes). Others may have to provide material in both the pure and applied sciences, thus serving scientific and technical communities.

Consequently, today's engineering libraries have neither their subject scope nor their users strictly limited to the fields of engineering. Engineering libraries are therefore libraries that are able to satisfy the information requirements of their publics by making available whatever types of recorded communications are necessary to enable these groups to fulfill their obligations and carry out their endeavors in engineering related activities.

Engineering libraries can range from very small specialized units to massive combined science/technology establishments. Their placement within a particular organization (the unit which they support) changes from organization to organization, and although there are certain trends within similar organizations, i.e., academic, industry, public, etc., what will be defined here are four roles in which they can be categorized.

Single Engineering Libraries. Engineering libraries of this type are the sole instruments within their organizations to whom their people can turn for their informational needs. They are administratively controlled by nonlibrary divisions. In industry they might report to the research and development department, while in academic institutions they might fall under the auspicious of the school of engineering.

The physical size of such libraries have no boundaries, i.e., a technical library serving a small company does not necessarily have to be constant (in size) to its company, although there is some amount of correlation. Nor is size a fair gauge to measure their ability to meet and service their patrons' demands. A small engineering library specializing in direct energy conversion can have a very high degree of efficiency in meeting its company's information requirements with a limited collection and staff if that is the only criteria it must provide for within its prescribed subject scope. On the other hand, a large engineering library (that of a technological institution), which is responsible for many subject areas, and which must support the diverse needs of a much larger population, may only be able to provide its patrons with mediocre library service even though its physical size, staff, and collections are proportionally greater than the small library's. It is easy to see that organizations with wide-spread activities and large numbers of users place exponentially increased demands for resources and persons to service them on their libraries. As a rule, the ability of a library to service and fulfill requests in-house decreases as its subject scope widens, and as a consequence its need to rely on other libraries rises.

Size can also have a direct bearing on the proximity of a library to its public. Small libraries are generally placed near the laboratories and the people who use



FIGURE 1. *Automated circulation control systems can provide valuable data for analyzing collections as well as handling the circulation function.*

them, while large facilities tend to be in centralized locations so that all users will have an equal degree of access. Also related to size is a library's ability to conduct its transactions with users on a personal basis. Naturally, better opportunities exist for a small library to familiarize itself with its patrons' areas of interest, to use less sophisticated procedures to bring pertinent material to their attention, and to acquire and process material for its collections, as well as to conduct standard library operations. Mechanization in one form or another is an alternative for larger libraries if they are to provide the same degree of service (see Figure 1).

Single engineering libraries generally handle their own technical services (ordering, cataloging, processing, etc.), although in certain instances (academic libraries, for example) this may be done by the main university library even though they do not come under its control.

The persons who manage these libraries vary widely in their background and knowledge of library operations. Secretaries, pseudolibrarians, professional librar-

ians, information scientists, and engineers or other subject specialists are found in this grouping.

Departmental Engineering Libraries. Departmental libraries are another role in which engineering libraries can be cast. In contrast to single engineering libraries, departmental engineering libraries can fall under the administrative control of a library unit within its system or serve as main libraries with branches reporting to nonlibrary activities. An engineering library in a university under the jurisdiction of a main library, or an industrial library maintaining control over branches (at or away from a central location) are good examples. Thus they have library support from within their organizations which they can fall back on for handling requests which cannot be answered by their resources. This unity also furnishes cooperation in their over-all collection development programs. They are designed to meet the more specific and immediate needs of their patrons, not to be islands in themselves. As such they make frequent use of libraries within their system, as well as those outside, to carry out their obligations.

In harmony with single engineering libraries, departmentals also vary greatly in size, scope, and service. Their areas of interest range from engineering to one or more of its subfields and can spread to other disciplines depending on the pursuits of their organizations.

While in some institutions there is only one departmental engineering library, others have separate or combinations of departmental libraries, e.g., a civil engineering library, a civil/mining engineering library, or a chemical/petroleum/mining engineering library, for each of the subject specialties in which they are involved.

Similar to single engineering libraries, departmentals are often placed near their users. The smaller the library, the more likelihood there is for this to occur. The same parallel is also true for the personal nature of such libraries, as already discussed, as well as for the persons who staff them.

Technical Information Centers. Technical information centers (as defined here) differ greatly from libraries as they are generally known. Unlike their counterparts they make little or no effort to maintain extensive backfiles of journals or large collections of monographs, technical reports, and the like. Rather, they are preparers of information from information. Their charge is to analyze literature of all forms so that what they present their publics are the final products of their sifting and editing efforts. Consequently, the information they supply is in the most satisfactory form for maximum use and utility.

Like the single engineering and departmental engineering libraries their size is variable, but their subject scope is highly specialized and limited. Thus their selection policies are highly selective and refined, and the channels they use to acquire their material are very comprehensive and broad. Administratively, they can parallel either road.

Technical information centers are staffed with persons proficient and knowledgeable in their subject fields. Engineers and other members of the technical community, in addition to professional librarians and information scientists, are used to staff them. Clerical personnel are confined to clerical duties.

Technical information centers are service organizations with all forms of recorded information being the means to their ends. As such they must exploit all channels through which information can be found to fulfill their obligations. They prepare abstracts for literature that is not picked up by the indexing and abstracting services. Unlike the conventional engineering library which is content to catalog a conference or symposium by its main entry, title, subject, and added entries, the technical information center indexes each paper and treats it as a separate entity, as long as it meets its subject criteria. The same is true with technical reports, preprints, patents, etc. Thus its files (comparable to a library's catalog) contain in-depth indexes (with abstracts) of very specific pieces of information. This provides them with the tools to prepare SDI (Selective Dissemination of Information) and current awareness services, as well as retrospective bibliographic searches upon demand.

In addition to aiding them in making in-house searches, mechanized information retrieval devices enable them to add a tremendous amount of depth to their searches through the utilization of commercially produced data bases, such as COMPENDEX (*Computerized Engineering Index*), and those available from Chemical Abstracts, Inc., NASA, NTIS, DDC, etc. Smaller facilities often find it to their advantage to use the services offered by commercial firms or RDCS to search these same files.

Major Subject Libraries. Last but not least are engineering libraries responsible for entire subject fields such as the applied sciences, engineering, or science/technology, their scope being limited to these areas in their broadest context. Their charge is to satisfy the entire informational needs of their total technical and/or scientific-technologic communities.

Unlike the other types of engineering libraries that have been discussed, these are always large in size, scope, and service, and their collections strong in depth and breadth. Although they centralize the location of the scientific and technical literature, they can split it into more efficient units within their main framework.

Many of these major subject libraries are the results of consolidating departmental collections that had heretofore existed in various locations throughout their organizations. Others, however, such as the John Crerar Library and the Linda Hall Library were established from the start to cover these vast fields of knowledge.

They may be housed in buildings of their own, or occupy a floor or floors or specific areas in main library structures. When they are in their own buildings, they are usually placed at locations which are central points to their publics, keeping to a degree the advantage of the departmental library in being close to its users. Even if they are somewhat removed from these areas, the ability of a researcher to find all of his material in one location is a point in their favor.

From a managerial point of view they can report to main libraries or be self-controlled. This can also reflect on who handles their technical service functions.

They are staffed with persons knowledgeable in their fields, and subject specialists for specific areas are not uncommon. Since they are large units, comparable to major libraries, they are able to provide total library service. They are also able to make available the equipment to utilize nonprint materials (single concept films,

audiovisual aids, recordings, tapes, etc.), microforms, and many other features which may or may not be available in every one of the other types of engineering libraries that have been examined. Furthermore, they have persons whose sole working functions are devoted to specific areas of service, e.g., reference, bibliographic, and acquisitions. Thus their proficiency in each of these is quite strong.

The initial surge of engineering libraries with particular types of activities (academic, public, industrial, governmental, and a fifth miscellaneous category) was well underway by the start of the twentieth century. Technical information centers, which are thought to be a relatively new concept in information handling, had their start as early as 1861 (see Figure 2). This section will discuss the growth of engineering libraries within these five organizational categories.

Academic. Departmental engineering libraries exist in many colleges and universities, most of them starting as a department of engineering's collection or that of a professor or group of professors, and developing into the present day form. The strong trend in this direction came about by the inability of academic libraries to provide adequate support for the fields of engineering. This was due to the late arrival in the United States of formal engineering education which was awakened by the Morrill Act (1862). Following passage of the act the number of engineering schools rose from seven in 1862 to seventy 10 years later (3). The academic libraries in the United States, deeply entrenched in the social sciences and humanities, were unprepared for this sudden onrush in heretofore unfamiliar subject areas. Although engineering's undergraduate enrollment approximated 1,400 in 1870, this was insignificant in the country's total of 52,000 (4, 5). Engineering was making a scratch in that it was being taught in one-eighth of the 563 institutions of higher education which existed at that time (5). However, engineering's need for library resources was not helped by the small number of schools offering advanced degrees and the small number of students involved in graduate work. Before 1890 there were only six engineering schools with graduate programs, and as late as 1896 only three doctorates had been given (4).

Figures 3 and 4 show the sharp rise in the number of master's and doctor's degrees prior to and after World War II. Figure 5 relates the war's effect on science/technology libraries, when the number more than doubled. It should be noted that the number of libraries in Figure 5 (1,508) represent only those that reported founding dates in the survey. Table 1 shows a total of 2,500 science/technology libraries, and its data are taken from the same source (6). Crosland views the war's effect on engineering libraries in this statement:

Great university libraries have been built around the humanities and social sciences. Until World War II, engineering and science collections were viewed almost as untouchables. With their handbooks, professional journals, and slide rules, engineering faculties needed little else with which to teach With World War II, however, the picture changed. A neglected, outcast infant came into his own. That infant has grown into a giant whose weight is now being felt on every campus throughout the world (7).

YEAR	NUMBER OF TECHNICAL INFORMATION CENTERS FOUNDED
	(X = 1 UNIT)
1861	X
1843	XX
1910	XX
1925	X
1928	X
1929	X
1942	XXX
1946	XXX
1947	X
1948	XXX
1949	
1950	
1951	XX
1952	X
1953	
1954	XX
1955	XXX
1956	
1957	XXXX
1958	XXXXXXXX
1959	X
1960	XXXXXX
1961	XXXXXXXX
1962	XXXXXX
1963	XXXXXXXXXX
1964	XXXXXXXXXX
1965	XXXXXXXXXXXX
1966	XXXXXXXXXXXXXXXX
1967	XXXXXXXX
1968	XXXXX
1969	
1970	
no date	X

FIGURE 2. Federally supported technical information centers by founding date.
 Source: COSATI, Panel on Information Analysis Centers, Directory of Federally Supported Information Analysis Centers, Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 1970. Compilation of data from within report.

This is backed by the total number of special libraries in these fields in relationship to the other areas (8). It is further interesting to note that 590 special libraries (26.1% of the special libraries in this nation's colleges and universities) were devoted to science and technology in the early part of 1963 (9). Although Kruzak's

TABLE 1

Number and Per Cent of Science/Technology Libraries by Type of Institution (8)

	Type of institution					Total
	Academic	Public	Industrial	Government	Other	
Number of science/ technology libraries	590	76	1,275	308	251	2,500
Total number of special libraries	2,258	464	2,221	1,239	2,576	8,758
Per cent of science/ technology libraries to total for type of institution	26.1	16.4	57.4	24.9	9.7	28.4

survey does not break these down into specific subject areas (engineering, physics, chemistry, etc.), it does show the large proportion serving the scientific and technical communities.

The interdisciplinary aspect of science and technology with other fields of knowledge is the impetus behind the concept and need for the major subject library. Kaser sums it up with these words:

... The sciences are coming—as they were centuries ago—to be recognized as a single fabric, and the entire range of literature is coming to be needed as a single source. Thus pressure is beginning to build among academic scientists for broader-based science divisional libraries to supercede the old, narrow-subject collections. Institutions that have recently invested heavily in plant facilities that contain decentralized science book collections may soon find these facilities out-moded (10).

The major subject library is not a predominant species in the academic community. A check of the major engineering schools in the United States against the *Directory of Special Libraries and Information Centers* reveals this. It also shows that the single engineering library is generally found in smaller technological institutions where their main direction of study is geared to engineering.

Table 2 shows that one-quarter of the federally supported information analysis centers in the colleges and universities in the United States are engineering related. Although the survey takes only those which are federally supported into consideration, the breakdown is significant for gaining some perspective in the total number of technical information centers (as defined in this paper) in comparison to the total number of special libraries (Table 1) in the fields of science and technology.

Public. Engineering libraries in the public library system had their start as technical book collections which were part of the main facility. When the Carnegie Library of Pittsburgh opened its doors in 1895, it had a separate room for scientific and technical books and journals (11). In 1900 it became a Division of Technology, and in 1902 it was given departmental status, becoming the first of its kind in the

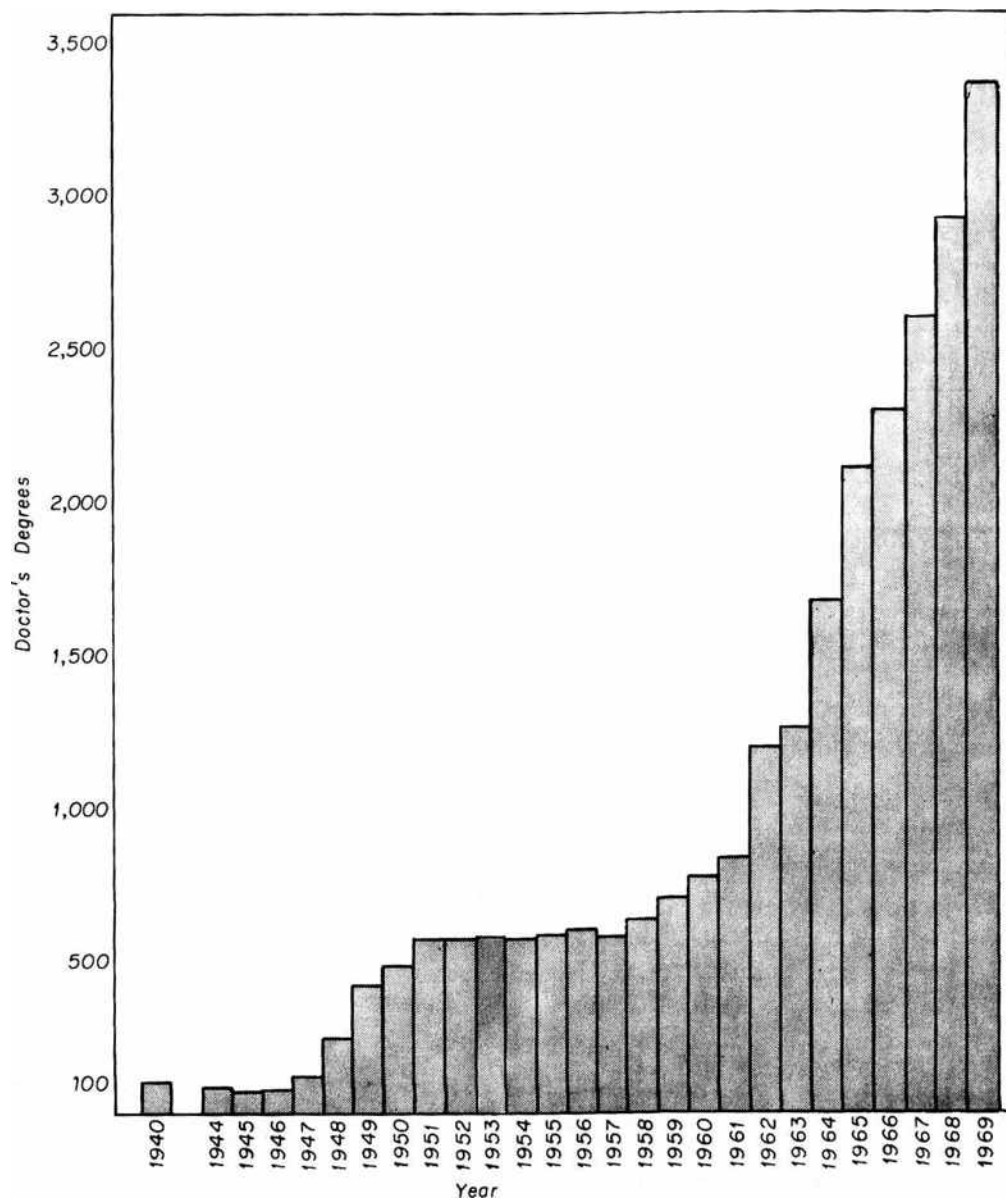


FIGURE 3. *Doctor's degrees in engineering in the United States. Source: Journal of Engineering Education for various years.*

United States (12). In 1900 the Providence Public Library opened an Industrial Department, while 1902 saw the Useful Arts Room in the Cincinnati Public Library, followed by the Applied Science Reference Room at the Pratt Institute Free Library in 1904, a Technical Department at the Newark Public Library in 1908, and in 1910 the St. Louis Public Library had an Applied Science Department (13). The New York Public Library's Science and Technology Division was formed in 1911 (14).

Thus departmental engineering libraries were established and implemented in the

TABLE 2

Number of Federally Supported Technical Information Centers by Type of Organization and Interest (Engineering Versus Nonengineering) ^a

Type of organization	Number that are engineering related	Number that are nonengineering related	Total
Academic	13	23	36
Public	0	0	0
Industrial	14	3	17
Governmental	25	38	63
Other	0	3	3
TOTAL	52	67	119

^a Source: COSATI, Panel on Information Analysis Centers, *Directory of Federally Supported Information Analysis Centers*, Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 1970. Compilation of data from within report.

public library system. Some of them have left these ranks to become major subject units. Pfoutz reports six with collections of over 200,000 volumes (15).

Two names that stand out in the public library field for libraries established with science and technology as their primary objectives are the John Crerar Library in Chicago and the Linda Hall Library in Kansas City. The John Crerar Library was incorporated in 1894 under the terms of the will of businessman, John Crerar, who died in 1889, and opened its doors to the public in 1897. The Linda Hall Library was named for the wife of Mr. Herbert F. Hall. It began to build its collections, which were housed and serviced in the home of its donor, in 1945. An interesting aspect of the Linda Hall Library is its obligation to the University of Kansas City which sold the Linda Hall Library its science and technology collections with the stipulation that they are to be made available to the university's community (16).

The number of public libraries operating in whole or in part as technical information centers is nil. Although some of them offer current awareness and/or retrospective services, e.g., the John Crerar Library in Chicago started its Research Information Service, which is available to anyone on a fee basis, in 1947, this is as close as they come in comparison to the operations of technical information centers.

There are no public libraries that can operate as single engineering libraries and still meet the criteria previously established for them.

Kruzas's study shows that public libraries constitute the smallest group of types of organizations in which special libraries fall; however, science/technology libraries represent the greatest number, 76 out of 464, or 16.4% of all special libraries within public libraries (8).

Industrial. Recognizing the need to supply their own personnel with technical information, industry began to establish their own technical libraries at approximately the same time as the movement began in public libraries. Of the 132 com-

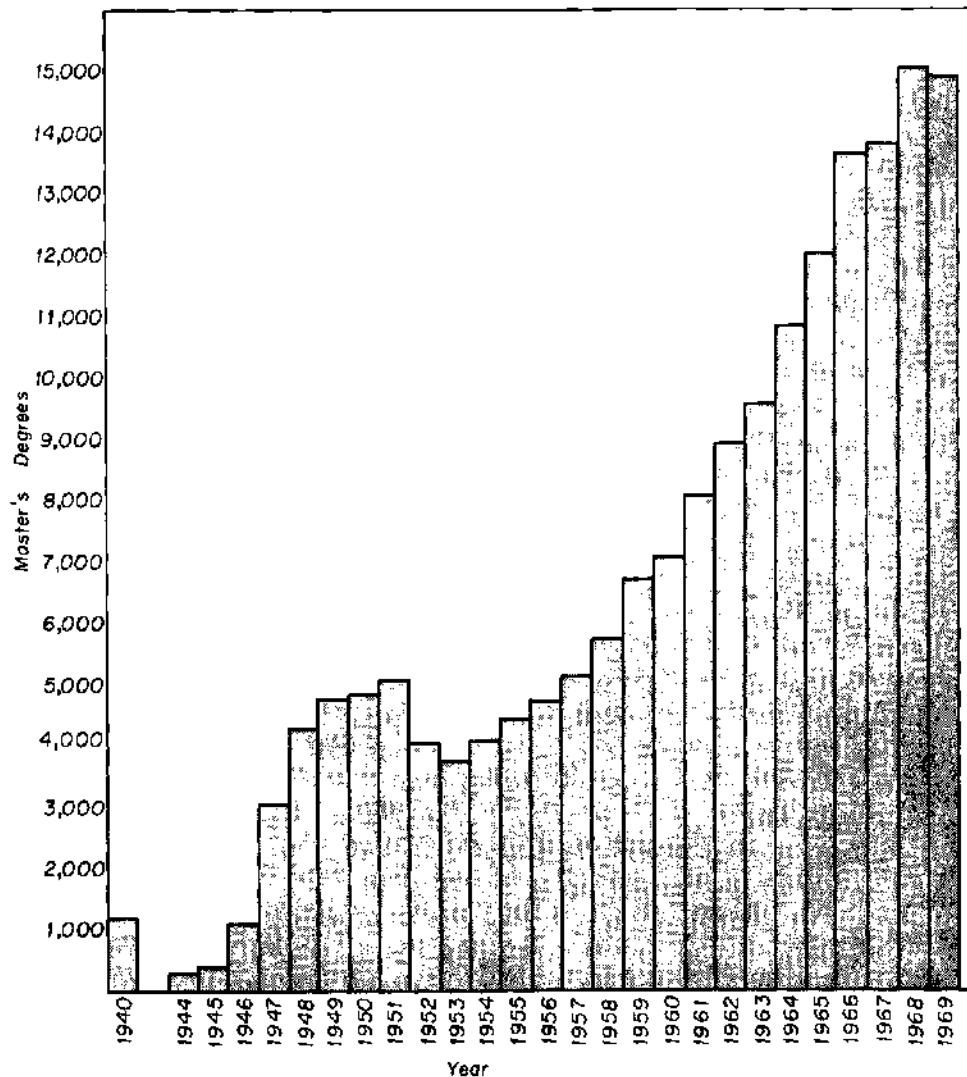


FIGURE 4. *Master's degrees in engineering in the United States.* Source: *Journal of Engineering Education for various years.*

pany libraries in the United States prior to 1910, 13 are credited as technical libraries, the oldest being that of the Arthur D. Little Company which had its origin in 1886 (17). Of the 1,010 industrial libraries surveyed in 1940, 340 were credited as technical, while there were 246 commercial/technical, for a total of 586 (18). Kruzas's later study credits industrial libraries with the highest percentage of scientific and technical libraries, 57.4% (1,275 out of 2,221 special libraries in commercial organizations) (8). This shows that science/technology libraries more than doubled after World War II.

Of the four types of engineering libraries that have been defined, the single engineering library and the departmental engineering library are the most predominant species in industry. Kruzas notes that:

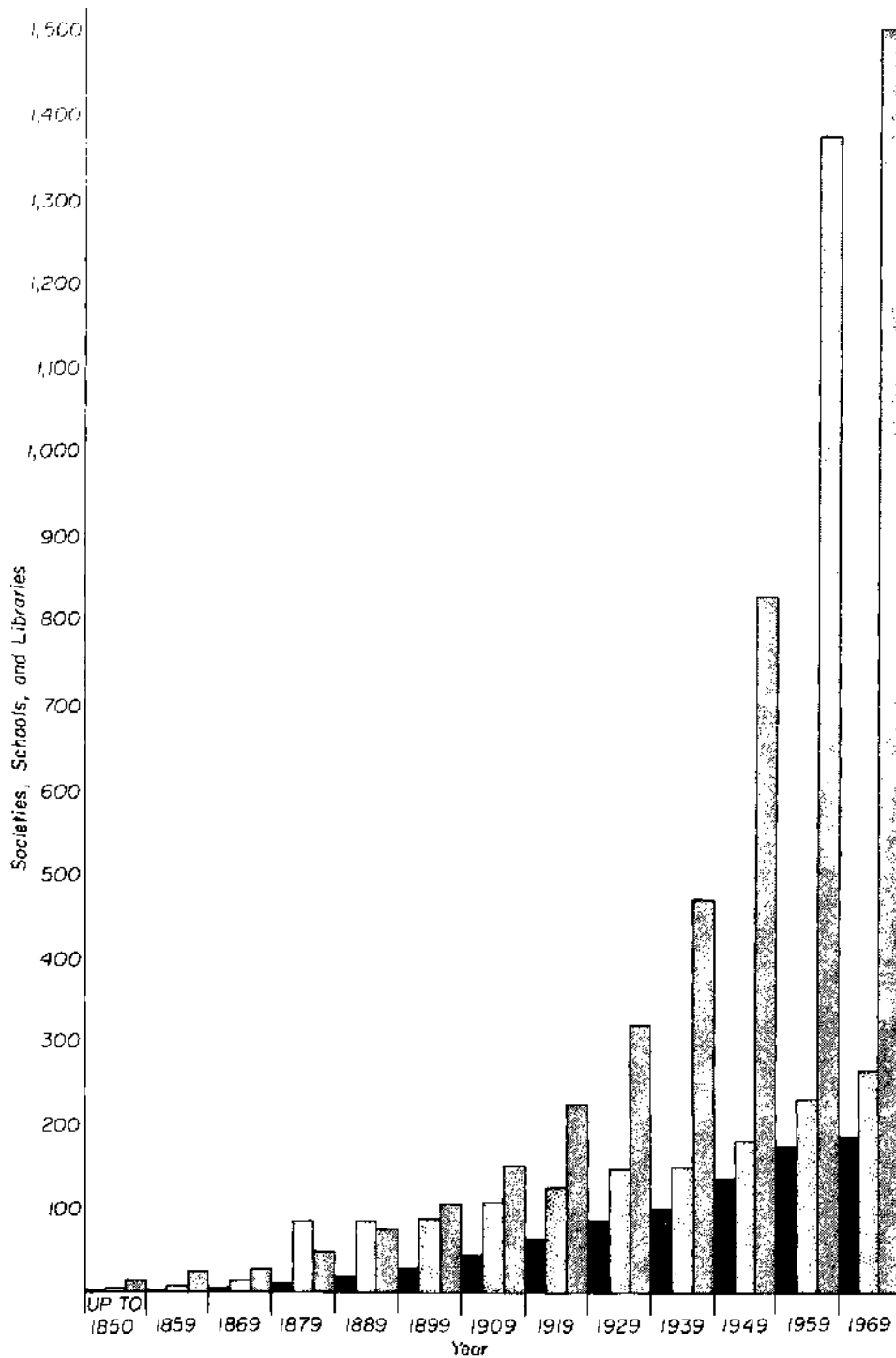


FIGURE 5. Growth of engineering and engineering related societies (■), engineering schools (□), and science/technology libraries (▣). The values for schools from 1869 through 1929 are approximate, and the extreme right-hand bar for science/technology libraries is through 1963. [Sources. Societies: Directory of Engineering Societies and Related Organizations, Engineers Joint Council, New York, 1970.] Schools: Journal of Engineering Education (various issues devoted to engineering enrollment); Esther L. Brown, The Professional Engineer, Russell Sage Foundation, New York, 1936, pp. 10-12; James G. McGivern, First Hundred Years of Engineering Education in the United States (1807-1907), Gonzaga Univ. Press, Spokane, Washington, 1960, v.p. Libraries: Anthony T. Kruzas, Special Libraries and Information Centers; A Statistical Report on Special Library Resources in the United States, Gale, Detroit, 1965, p. 17.

Five of the largest industrial corporations in the United States were supporting about 150 libraries in 1961, distributed mainly along company divisional lines (19).

Out of the 150 libraries, 125 were oriented toward the fields of science and technology (19). The General Electric Company led the list with forty-seven individual libraries; Union Carbide Corporation had thirty, General Motors twenty-six, followed by DuPont and IBM with twenty-four and twenty-three, respectively (19).

The single engineering library format is generally used for the many divisions within a company, while the departmental setup is found within libraries of a particular division. This decentralization can be attributed in part to protection of divisions against union strikes, and also to the organization of the company, i.e., if there are many diverse activities.

While there are a few industrial libraries that almost measure up to the proportions of major subject libraries in terms of the size of their collections, they are disqualified from this category due to their lack of comprehensive subject coverage. Kruzas's study revealed that 94% of industrial libraries had collections with less than 20,000 volumes (20).

On the other hand, industrial organizations were among the first to develop modern technical information centers. Commercial organizations are concerned about the cost of an engineer's time when he must use it to scan the output of technical literature to keep abreast of new developments and to solve specific problems. Consequently, the technical information center that sifts and edits and analyzes the information for him was welcomed. Nearly 27% of all engineering related federally sponsored technical information centers are within industry (see Table 2). Jahoda summarizes the results of two studies about the ways information centers serve industrial patrons (21).

Governmental. The best all-around representation of the various types of libraries that have been examined occurs at the federal government level. Kruzas notes that about 70% of the government libraries in his study were federal, while 25% came from the state level (22). This same survey shows that sci/tech libraries once again led the other categories, with medicine a close second (23). The 1970 *Roster of Federal Libraries* lists 100 libraries under the category of engineering, and an additional 79 under the science/technology heading (24). Schick's survey of federal libraries in 1965 listed 69 whose subject scope was oriented to engineering (25). This made up 21% of all Federal libraries' subject criteria (26). For the years 1963/1964 another survey has 30 libraries serving state governments in the fields of engineering and related sciences, all departmental in nature (27).

This nation's largest library also holds the greatest number of books in science and technology, for the Science and Technology Division of the Library of Congress has over 1½ million volumes. Other important libraries are those of the Atomic Energy Commission (Argonne, Los Alamos, and Oak Ridge), each with collections of over 100,000 volumes (28).

The Research Library at the Air Force's Cambridge Research Laboratory is ap-

proaching 200,000 volumes, while the one at Wright-Patterson Air Force Base has 100,000 (29). The National Bureau of Standards Library contains over 100,000 items while the U.S. Patent Office's Scientific Library has more than 300,000 volumes (29). Herner lists a substantial number of information facilities of the federal government which follow the patterns established for technical information centers in the dissemination of their information (30).

Others. Grouped here are those libraries serving professional societies and other nonprofit making organizations, and those of independent research institutes. Although Kruzas's work lists more of them than public libraries' special departments, they represent the smallest proportion (9.7%) of the total in comparison with the other four previously discussed groups of special libraries in science/technology (31).

This category is credited with having the first true technological library in the United States, that of the Franklin Institute in Philadelphia, which started in 1830 (32). Also contained in this class is the free world's largest engineering library, the Engineering Societies Library in New York. It came about through the merger of the libraries of three independent societies, the American Institute of Mining Engineers (now Mining, Metallurgical and Petroleum Engineers), the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers (now the Institute of Electrical and Electronics Engineers) in 1913, followed by the joining of the American Society of Civil Engineers in 1916, and the American Institute of Chemical Engineers in 1958 (33). It presently has a total of twelve founder and associate societies.

The president of the Engineers' Society of Western Pennsylvania mentions its library in his annual report for 1882:

A library of some three hundred volumes of carefully selected technical works, all paid for, is no mean achievement, and your Library Committee, now to be replaced by a permanent committee, deserves your regard for the large amount of work and care they have given to the selection of these books (34).

At about the same period, the American Institute of Mining Engineers reported the destruction of its library in a fire (35). In 1903 the Committee on Technical Books for Libraries of the Society for the Promotion of Engineering Education gave a report in which it suggested approximately 340 technical books for libraries feeling that there was a need for competent selection in these subject fields (36). Looking through other early societies' records will disclose the significant amount of interest and concern that their members placed on information resources and libraries.

Engineering Libraries of the Future

Tomorrow's engineering libraries (and today's, for that matter) are faced with the problem of quickly linking their users with the materials they demand. Much has

already been written and spoken about the accelerated and rapid growth of scientific and technical literature. It would be of little benefit to back this up by reiterating and restating the quantitative figures; however, Bourne's and Osborn's papers are recommended for those who care to delve into this area (37,38).

Today's engineers, except perhaps those working in very small and/or specialized areas, are having a difficult time locating, reading, and retaining (in some easily retrievable manner) just the abstracts in their fields of interest.

The ever-increasing amounts of recorded information pouring from an ever-increasing number of sources means that as the years go on, our libraries will be obtaining a smaller and smaller percentage to the total output unless they take drastic measures. This means that additional strains will be placed on their finances (to procure and process materials), their space (to house and maintain materials), and their methods (to retrieve materials), all of which involve both their staff and facilities.

Possible solutions to these problems have been many, but their practical application in a library or group of libraries is next to nothing. The report published by the System Development Corporation consolidates many major plans, studies, and recommendations, and points out their general objectives and directions, giving an excellent background and bibliography on this subject (39).

One of the earliest steps that libraries have taken has been the introduction of microforms to conserve space, but this does not solve their information handling needs. Due to the many problems associated with microforms, mainly wide user acceptance and the ability of libraries to service the many formats, sizes, and reduction ratios, their introduction has, in effect, opened another Pandora's box.

Although machine-readable data bases have been around for some time, it was not until 1969 and COMPENDEX that engineers were given an information tool. Until then they only had access to segments of already existing data stores, such as those produced by Chemical Abstracts and NASA. The CITE (Current Information Tapes for Engineers) tapes, produced (as is COMPENDEX) by Engineering Index, Inc., has been available since 1965, but covers just two areas of engineering: plastics and electrical/electronics, with citations as the output. COMPENDEX, on the other hand, is comparable to the printed monthly version of *Engineering Index*.

The high cost of leasing COMPENDEX tapes* (and others as well, for that matter) may mean that libraries will have to form "groups" to share the costs of instituting such programs.

Although the following relates the experience at just one institution, it raises a question about the acceptability of computerized information services. The Pittsburgh Chemical Information Center, which as one of its services runs current awareness profiles of *Chemical Condensates*, has found that a larger ratio of graduate students than faculty are using it, and that when a charge was made for this service, the number of academic customers fell off sharply (40). It is too early to say the same of COMPENDEX.

*\$6,500.00 a year plus \$25.00 for each tape reel.

The most recent study to meet the "engineering information" needs of the community of engineers was done by the Battelle Memorial Institute in 1969 for the Tripartite Committee (41). It is composed of the president and one vice-president of Engineering Index, Inc., Engineers Joint Council, and the United Engineering Trustees, and was established in 1965 to develop pathways for national engineering information needs (42). An "action plan" for implementing the results of the Battelle report were announced in 1969 (43). A news release by the Tripartite Committee told that their "action plan" had been reviewed by their respective boards, and that all three rejected it because:

... The reasons for the nonacceptance of the plan are complex, but they stem in part from the strong conviction that most, if not all, of the functions described for a new and independent information corporation can be carried out efficiently within the existing organizational structure of the engineering community. Also, some felt that the plan was too modest...

In a concurrent resolution on the Action Plan report, the Engineers Joint Council authorized the establishment under EJC auspices of a Commission on Engineering Information and has invited the full participation of all engineering societies irrespective of membership in EJC... (44).

The release further went on to state that its constituent boards recommended dissolution of the Tripartite Committee, and that it would cease to exist as of March 1, 1970 (44).

A promising direction is that which is being undertaken by Project INTREX (*Information Transfer Experiments*) at the Massachusetts Institute of Technology. To prepare for this project, the Barker Engineering Library at M.I.T. was rebuilt from scratch. The main elements of INTREX are (1) a computer-based augmented catalog, which is an in-depth index to the material in the system, and (2) a microfiche retrieval unit that contains the entire document in microform. Both devices are accessible from remote locations. The augmented catalog carries on a dialog with the user, enhancing his use of the system and leading him through it by instructing him as necessary and directing him to possible alternatives. When he finds what he wants, he is able to have the document displayed to him on a video terminal. Future plans call for consolidating these two separate devices into one remote access unit (45).

If this is projected on a larger scale, one might visualize the "engineering library of the future" as one that is able to give its patrons access to an interdisciplinary data base consisting of the entire world's literature, and through data transmission facilities users will have the option of viewing and/or obtaining a paper or micro-copy of any element in the system.

Professional Development of Engineering Librarians

The educational development of an engineering librarian does not stop when he gets his degree in library or information science (if in fact he has a degree in that

area), nor when he begins to work in his first engineering library, for in fact his educational process is just beginning. It is the ability of applying the knowledge obtained that qualifies him for the job that starts his practical working education. By associating with others and transferring information by word of mouth he will have the chance to consider what other libraries are doing and perhaps trying them out to see if they are good for his environment. This link is made via the professional society, although joining one carries no written promise.

Aside from the many associations which promote one's betterment in general or even specific areas of librarianship, there are two that are strictly devoted to engineering, the Engineering Division of the Special Libraries Association (SLA) and the Engineering School Libraries Division of the American Society for Engineering Education (ASEE). The Engineering Division of the SLA had its start as a Technology Group within the national organization, and held its first meeting in 1923 (46). As the result of a joint meeting with the Advertising-Commercial-Industrial Group in 1926, a merger was made out of which came the Commercial-Technical Group. It continued until 1933 when they went on their own ways as the Commercial Group and the Science-Technology Group respectively (47). There were sections within the Science-Technology Group and one of them was an Engineering Section which had started in 1941 as the Engineering-Aeronautics Section, later dropping the word "Aeronautics" in 1953 (48). In 1950 all "Groups" became "Divisions," so there was a Science-Technology Division with an Engineering Section as one of its subgroups. The Engineering Section petitioned for divisional status, and it was granted in 1966.

Another emerging faction is the Engineering School Libraries Division of the American Society for Engineering Education which began as a "Committee" under the society's Council of General Divisions and Committees. Conscious identification of academic engineering librarians as a viable group dates only from the late 1930s. Professor William N. Seaver, librarian of MIT, is credited with the notion that banding together would be professionally desirable. Nearing retirement himself, he presented his ideas to Harold Lancour, a recent Columbia Library School graduate, who had become librarian at the Cooper Union succeeding John Moriarity, who had gone to Purdue as Director of Libraries. Lancour, encouraged by Cooper Union's president, Dr. Edwin S. Burdell, who had been the first dean of humanities at MIT and a firm supporter of libraries, joined with Seaver and others in calling an organizational meeting at the annual meeting of ASEE which met that summer at MIT. Libraries of ten major engineering schools in the east answered the call and the Committee on Libraries was established and promptly approved by the ASEE with Lancour as its first chairman. Its status as "A special interest committee and not a division" was last noted in the 1966/1967 divisional listing of the ASEE membership directory which showed it to be fifty-four members strong (49). The following year it was given divisional status with a total membership of seventy-nine (50,51).

Having established a relationship with the engineering educators association, it was felt that a similar relationship should be developed within the library profession. Harold Lancour was, therefore, asked to explore the possibilities for an affiliation

within the ALA. At the Milwaukee Conference in 1942 he chaired another meeting which resulted in the Engineering School Libraries Section of the ACRL and became its first chairman, returning to that chairmanship after World War II. That section later became the Science and Technology.

As with other professions the librarian must become self-educating to some extent so that he keeps on top of new developments in the many facets of information handling. He can keep abreast by participating in, not just attending, conferences and by contributing to, not just reading, his professional literature. This two-way proposition is part of the recipe; the rest is what the individual supplies.

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ENGINEERING LITERATURE

The scope of writings useful in modern engineering have roots dating back to the lever of Archimedes, the geometry of Euclid, the physics of Galileo, and the mechanisms of da Vinci. Current awareness, however, is based on organized, primary-source periodicals related to the many branches of physical and chemical science and technology. Journals, transactions, bulletins, reports, symposia, and monographs form the data base for search of what is already known about a given engineering problem.

A distinction should be made between the literature which engineers generate and the literature they use. The publications which engineers and closely related scientists generate is a major part of that used in engineering, but on occasion it becomes useful to draw from a wide area of sources. Engineering requires information from economics, business, biology, natural resources, law, government, and the behavioral sciences in addition to engineering science, technology, and the physical sciences. It would thus be futile to attempt description of the full scope of literature for the engineer; this article will limit consideration to the more technical material generated by engineers and related physical scientists.

Gradually the sciences have been concentrating on ever newer topics, and some of the classical areas of physics and chemistry have, or are becoming, the province of the engineer. As a consequence, many engineers publish their works in journals of scientific societies. Alternately, persons trained in the sciences carry out practical investigations and publish them in engineering journals. There is no observable boundary between scientific and "engineering" literature. So this discussion proceeds to the core of literature generated primarily for engineers and in good part by engineers and related scientists.

TABLE 1
Categories of Engineering Literature

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- A. Journals, transactions, and proceedings of scientific, engineering, and technical societies
 - B. Commercial and business magazines associated with industries or specific technologies
 - C. Reports of government departments and laboratories, contract research, and company publications
 - D. Handbooks, monographs, dissertations, and textbooks
 - E. Patent literature
 - F. Abstracting and indexing services and other information centers
-

Six categories for engineering literature are listed in Table 1, admittedly an arbitrary grouping. Journals of the engineering societies represent the core of the literature by engineers for engineers. The commercial literature varies from magazines having circulation which highlight advertisements of equipment and services to catalogs of equipment and supplies. Many projects at governmental laboratories and from projects financed by the government result in progress and summary reports. As information accumulates in an area, compilations are made for quick reference in formal handbooks. Textbooks serve a very useful purpose in introducing basic concepts to the engineer. Significant fractions of patents are of paramount importance to a relatively small number of engineers. Since the engineer is being inundated with engineering information, he too resorts to secondary literature services and information systems developed for his use. Each of these categories will be elaborated with regard to character, source, and purpose served.

Journals and transactions have been published by engineering societies for over 100 years. At present, the most conservative of estimates would place the number of such serials at several hundred titles. Table 2 lists a selected group. Most are distinctive and often archival in nature. In general, most of their content originates in authored papers which have been recommended by an anonymous review procedure, preprinted, and evaluated by an audience of peers during oral presentation. This procedure leads to inclusion of corrections and elaborations before archival publication, which may represent as low a portion as 25% of all the papers presented at meetings of the society, and thus represent a distillation process of selection. The process of selection may consume a year or more between original manuscript and printed journal.

The number of such journals increases steadily as also do the pages published per year. Editorial and economic pressures have shortened the length of articles over the years, probably at some sacrifice of scope. When volume of material becomes too large, division into narrower interest groups often follows as, for example, the increase of *ASME Transactions* from five journals to seven during less than a decade.

Engineering literature is frequently quantitative in nature, including results expressed as tables, graphs, or equations. The reader expects to be able to use numbers or relations available in the article. Graphs and charts are preferred to assist the reader. In design calculations for and prediction of physical behavior of plants and

processes, the basic numbers which the engineer uses in his formulas are derived from the literature. Thus he is obliged to find quantitative information from articles, handbooks, and reports.

Correlations of data are often presented either as graphs or equations. These are a preferred manner of summarizing accumulated information on a given subject. To prepare such correlations, one must find the quantitative information from the original publications of the basic data, often from scientific publications.

As with most other literature, that concerning engineering grows yearly. One measure of this growth is the number of articles for which abstracts are prepared and indexed, as shown in Table 3.

The constant influx of new technologies based on results of scientific research and investigations contributes to the growth pattern by giving birth to new publications or revised names of existing journals to include new areas of interest. Library catalogs now require subdivisions under the headings "nuclear," "laser," and "computers," to name but a few. A recent report (1) lists 160 new titles or changes in title of periodicals to be scanned. Each new area of technology in turn subdivides itself into more specificity as more and more applications become of economic significance. The history of publications concerned with "plastics" over the past quarter of a century affords classical exemplification of this type of proliferation.

The relatively huge volume of printed pages outputted by publishing houses, large and small, can best be described as engaged in bringing information to their individual audiences which are mainly geared to individual industries. For example, *The Iron Age* serves the steel industry, *Electrical World* contains news and technology of interest to the electric public utilities, and *The Oil and Gas Journal* serves petroleum interests. Some of these publications are of interest to engineers in almost their entirety while others have sections or occasional articles of significance to the engineer. Those publications which contain advertising are listed in *Standard Rate and Data Service*.

A form of periodical publication, available historically in specialized areas of science, monthlies and quarterlies supported solely by subscription price or subsidy and containing no significant amount of advertising, is growing of increasing importance to engineering and related technology. A few examples are *Acta Mechanica*, *Carbon*, *Oxidation of Metals*, *Nuclear Materials*, *Quarterly of Applied Mathematics*, *Research Management*, and *Wear*, all of which denote in their titles the fields covered.

Design data, performance information, test data, and like specific material of immediate importance to engineers working on plant design and process are often collected and distributed through manufacturers' literature. These are mostly acquired by engineers directly by request and are rarely to be found in libraries or indexes.

Up-to-date information on new equipment, prices, processes, and methods must be found directly from manufacturers' literature or from updated magazines devoted to distribution of such material in sections or departments specifically allocated to this purpose.

TABLE 2

Selected Publications of American Scientific and Engineering Societies

AIAA—American Institute of Aeronautics and Astronautics
<i>Astronautics & Aeronautics</i>
<i>Journal of Aircraft</i>
<i>Journal of Hydronautics</i>
<i>Journal of Spacecraft and Rockets</i>
<i>AIAA Student Journal</i>
AIChE—American Institute of Chemical Engineers
<i>AIChE Journal</i>
<i>Chemical Engineering Progress</i>
<i>Chemical Engineering Progress Monograph Series</i>
<i>Chemical Engineering Progress Symposium Series</i>
<i>International Chemical Engineering</i>
AIIE—American Institute of Industrial Engineers
<i>Industrial Engineering</i>
<i>AIIE Transactions</i>
AIME—American Institute of Mining, Metallurgical and Petroleum Engineers
<i>Journal of Metals</i>
<i>Journal of Petroleum Technology</i>
<i>Mining Engineering</i>
<i>Transactions of the Society of Mining Engineers</i>
<i>Society of Petroleum Engineers of AIME Journal</i>
<i>Society of Petroleum Engineers of AIME Transactions</i>
<i>Metallurgical Transactions</i>
ANS—American Nuclear Society
<i>Nuclear Science and Engineering</i>
<i>Nuclear Technology</i>
<i>Transactions of the American Nuclear Society</i>
ASCE—American Society of Civil Engineers
<i>Civil Engineering</i>
<i>Journal of the Construction Division</i>
<i>Journal of the Engineering Mechanics Division</i>
<i>Journal of the Hydraulics Division</i>
<i>Journal of the Irrigation and Drainage Division</i>
<i>Journal of the Power Division</i>
<i>Journal of Professional Activities</i>
<i>Journal of the Sanitary Engineering Division</i>
<i>Journal of the Soil Mechanics and Foundations Division</i>
<i>Journal of the Structural Division</i>
<i>Journal of the Surveying and Mapping Division</i>
<i>Journal of the Urban Planning and Development Division</i>
<i>Journal of the Waterways and Harbors Division</i>
<i>Transportation Engineering Journal</i>
ASEE—American Society for Engineering Education
<i>Engineering Education</i>
ASM—American Society for Metals
<i>Acta Metallurgica</i>
<i>Metal Progress</i>
<i>Metals Engineering Quarterly</i>

TABLE 2 (Continued)

ASME—American Society of Mechanical Engineers
<i>Mechanical Engineering</i>
<i>Journal of Applied Mechanics</i>
<i>Journal of Basic Engineering</i>
<i>Journal of Engineering for Industry</i>
<i>Journal of Engineering for Power</i>
<i>Journal of Heat Transfer</i>
<i>Journal of Lubrication Technology</i>
<i>Journal of Technology</i>
<i>Applied Mechanics Reviews</i>
ASNE—American Society of Naval Engineers
<i>Naval Engineers Journal</i>
ASSE—American Society of Safety Engineers
<i>Journal</i>
ASTM—American Society for Testing and Materials
<i>Standards</i>
<i>Special Technical Publications</i>
AWS—American Welding Society
<i>Welding Journal</i>
IEEE—Institute of Electrical and Electronics Engineers
<i>IEEE Spectrum</i>
<i>Journal of Quantum Electronics</i>
<i>Journal of Solid-State Circuits</i>
<i>Proceedings of Conferences</i>
<i>Transactions of Professional Groups (35)</i>
ISA—Instrument Society of America
<i>Proceedings</i>
<i>Transactions</i>
NACE—National Association of Corrosion Engineers
<i>Corrosion</i>
NSPE—National Association of Professional Engineers
<i>Professional Engineer</i>
ORSA—Operations Research Society of America
<i>Operations Research</i>
SAE—Society of Automotive Engineers
<i>Journal of Automotive Engineering</i>
<i>Transactions</i>
<i>Special Publications</i>
SESA—Society for Experimental Stress Analysis
<i>Experimental Mechanics</i>
SIAM—Society for Industrial and Applied Mathematics
<i>Journal on Applied Mathematics</i>
<i>Journal on Control</i>
<i>Journal on Numerical Analysis</i>
SME—Society of Manufacturing Engineers
<i>Manufacturing Engineering and Management</i>
SNAME—Society of Naval Architects and Marine Engineers
<i>Technical and Research Bulletin</i>
<i>Journal of Ship Research</i>
<i>Transactions</i>

TABLE 3
National Federation of Science Abstracting and Indexing Services^a

	1957	1967	1970	Estimate 1971
American Petroleum Institute	—	29,000	40,000	40,000
<i>Applied Mechanics Reviews</i>	4,245	8,802	10,030	10,300
<i>Biological Abstracts</i>	40,061	125,026	230,025	230,000
<i>Chemical Abstracts</i>	101,027	239,481	309,742	330,800
<i>Computer and Control Abstracts</i> (IEEE/INSPEC)	—	6,205	22,591	23,000
<i>Electrical and Electronics Abstracts</i> (IEEE/INSPEC)	6,451	24,039	39,927	40,000
<i>Engineering Index Monthly</i>	26,300	56,560	66,000	77,000
<i>Metals Abstracts</i> (ASM)	8,219	23,800	24,255	25,000
National Information System for Physics and Astronomy	—	—	20,000	25,000
TOTAL (Including other NFSAIS)	244,578	606,187	951,065	1,005,600

^a Selection from member service statistics, February 1971.

Federal and state governments, universities, foreign countries, international organizations, trade associations, and individual companies issue a vast number of separate reports, some serialized and some not, which often contain engineering data and information available nowhere else. Reports of aerospace science are indexed in *STAR (Scientific and Technical Aerospace Reports)* and *International Aerospace Abstracts*; reports of the U.S. Atomic Energy Commission are found from *Nuclear Science Abstracts*; other specialized indexing and abstracting systems such as *Applied Mechanics Reviews*, *Chemical Abstracts*, *Electrical and Electronic Abstracts*, *Mathematical Reviews*, and *Meteorological and Geostrophysical Abstracts* attempt to correlate information and data contained in report form pertinent to each specific field.

Most important to engineers are the results of research and experiment contained in reports of the national laboratories of NASA (National Aeronautics and Space Administration) and AEC (U. S. Atomic Energy Commission) and such as derive from ORNL (Oak Ridge National Laboratory), ANL (Argonne National Laboratory), and many others.

Most government contracts with universities, research institutions, and private industry provide for published reports so that specific development work becomes available to all. It is usual for company libraries to maintain a complete file of their in-house reports, which are often proprietary in nature, while the published summaries become an important component of the engineering literature. Some purchasing specifications and procurement requests contain valuable design data of wider significance than the immediate objectives. These relatively obscure sources of

information require almost a personal knowledge of an immediate situation to accomplish retrieval.

Much prerequisite material contained in textbooks provides foundations for later specialization that marks the modern engineering function. Texts of early school years relating to arithmetic, geometry, mechanical drawing, and elementary chemistry and physics teach the basics of complex languages necessary to comprehension of monographs, handbooks, and research papers. Textbooks summarize accumulated knowledge of an area of science or engineering and provide the best place to start understanding a subject.

After an individual arrives at the end of his formal education, when coordinated information arranged for the student's convenience is no longer available under the guidance of an instructor or professor, there is need for up-to-date reviews of specialized and documented technology. Large numbers of "books" appear each year to bring up to date the rapid accumulation of information on narrowly bounded subject areas. These are, however, only as topical as the 1- to 5-year period required for book publishing.

While an engineer may well progress to near uniqueness in knowledge of his own narrow field, he will rarely be able to keep abreast of needed knowledge in related fields, or fundamentals and formulas not in everyday use. Handbooks offer ready access to established formulas and relationships and a measure of insurance against faulty memory. Vast amounts of certified and accepted data find their way into tabulations filed in handbooks. Carefully arranged indexes provide minimum search time for the busy engineer or scientist.

Sources of new titles are maintained in libraries in *Books in Print*, individual publishers' catalogs, or advertised in journals such as *Engineering Education* of the American Society of Engineering Education.

Highly specialized in form and widely diverse as to subject matter, the patent literature of the United States and other countries is of great interest to a relatively small group of engineers. In this segment lies the newest materials, mechanisms, processes, and configurations that represent concepts which are in turn the source of added generations of new ideas. The basis of the system depends on affording protection to the inventor's ideas while disclosing them so others may understand and enlarge upon or discover alternate ways to accomplish equal or different ends. Thus innovation spurs innovation. Although the *U.S. Patent Gazette* provides over-all coverage of current patents, many individual companies and private interests maintain access files in specific areas.

Journals, transactions of learned societies, bulletins, reports, symposia, and monographs are regularly scanned by the so-called secondary services to facilitate search of what may be already known about a given engineering problem. Of the 35,000 separate titles of periodicals estimated (2) to relate to science and technology, the *Engineering Index* has selected 1,516 primary sources which publish weekly, monthly, quarterly, or annually the principal core material of interest to engineers as well as more than a thousand individual nonperiodical reports, conference proceedings, monographs, and other special publications yearly. In addition, available

TABLE 4

Engineering Journals Abstracted by Engineering Index

Language	No. of journals
English	1,096
German	166
French	76
Russian ^a	40
Slavic	34
Japanese	22
Italian	13
Dutch	6
Spanish	2
Other	15
Multilingual	46
TOTAL	1,516

^a Where translations are available, Russian journals are listed as English.

technical papers presented at meetings of learned societies and other miscellaneous sources bring the total collection to more than 75,000 references per year.

About two-thirds of this original material is available in the English language (including those available in translation), with German, French, Russian, Japanese, Italian, Spanish, and Dutch each making a significant contribution (see Table 4).

Other secondary services listed in Table 3 are but a few of the many more or less specialized search tools available. In general, each of these indexing and abstracting publications is evaluating methods for increasing the speed and specificity of the finding process. In addition to the increasing use of abstracts, inclusion of key words and additional classification systems are being practiced. Machine readable magnetic tapes have been developed to the verge of automated systems. Computer search of the tapes is already possible, based on a profile of individual interest using key words and combinations. Structured compilations of abstracts will eventually be stored for on-line computer interrogation for finding the full body of literature contained in a wide variety of data bases of direct and indirect interest to engineers.

Engineers have traditionally shown interest in European developments, both as reported in British literature and in other languages. In recent years this interest has been expanded, as indicated by the publications indexed in secondary services, to a greater degree in the European publications and extending gradually to more Russian, Japanese, and Indian technical journals as well as whatever originates in Australia and South Africa. Government sponsorship of translations, particularly from the Russian language, has fostered such increases, while the Japanese have undertaken to publish selected material in English and to provide English abstracts for less general subjects.

The increasing variety and complexity of the engineer's needs for specific and concrete detail relating to a present problem often calls for a corresponding increase in the sophistication of the finding process. To fill normal demands, the company library, the engineering school library, and the engineering section of some public libraries provide a point of entry to current and archival literature by way of card catalogs using the Universal Decimal System. For this approach the searcher requires only a sufficient vocabulary in the chosen subject to enter a well-organized domain.

Such a search can lead to several areas for investigation such as textbooks, handbooks, annual reviews, and an increasing number of most extensive bibliographies. Also found are current publications which afford means of scanning general fields. The sophistication of such searches can best be described as browsing.

Another approach, by way of one or more of the "secondary" services such as *Chemical Abstracts*, *Science and Technology Index*, *Engineering Index*, and *Nuclear Science Abstracts*, to name only a few, is apt to be preferred by the experienced searcher as a means of saving time, for these entries can sometimes afford greater immediate specificity.

For a quick rundown on some subject related to the inquirer but where his vocabulary and background may be less explicit, the encyclopedic shelves afford such entry points as the *McGraw-Hill Encyclopedia of Science and Technology* and the *Pergamon Dictionary of Physics* which provide in almost every subject area a limited reference list that can carry an investigation another step forward.

A distinction has been made that the literature which the engineers write is one domain of interest. It has a group of components which is ever-enlarging in size, in part due to the growth of the profession and to the need for technical data as engineering work becomes more sophisticated. Research and development is at an ever-multiplying scale and the documentation of this effort gives much of the expansion in the journals in which engineers publish.

The other aspect of the engineering literature is that which the engineer uses but which he does not necessarily write. The engineer utilizes economic, business, and scientific data for many of his problems and considers the literature of this type to be his domain as well. Today biological information, especially that relative to the environment, has become of great importance to him. Engineers will shortly be contributing to the environmental and biological journals in medicine, pollution control, and other areas where hitherto they had not been appearing as authors. Wherever there is an application for scientific knowledge in the workaday world, the engineer becomes involved. The literature of the past, which is pertinent to solving such problems, and the literature of today, which describes solutions, will be in the engineers' domain.

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ENGLISH CATALOGUE OF BOOKS

The *English Catalogue of Books* is the keystone of the oldest extant system of trade bibliography in the United Kingdom. Erected on the base of the listings of new books in English included in the trade journal, the *Publishers' Circular* (founded in 1837) and its successors, it extends backwards in unbroken sequence to 1801, and for most of the nineteenth and the early twentieth centuries is the major trade source of bibliographical information about British books. Sad to relate, at the time of writing there are signs that its end may be near.

The system (occasionally referred to after its founder as the Sampson Low

system) comprises three distinct but interlinked units. During the period of its prime which lasted for some 50 years from the 1890s, the pattern followed was:

- (a) First, a listing in the weekly issues of the *Publishers' Circular* of the new books published in the United Kingdom. With authors and catchword-titles in one alphabet, the entries would give full titles, size, price, publisher, and date. These weekly lists were consolidated in the last issue of each month as "Books of the Month."
- (b) Second, an annual cumulation appeared as the *English Catalogue of Books for the year*.
- (c) Third, every 5 years these annual issues were cumulated in their turn into permanent volumes.

From this basic pattern there were, of course, variations in the earlier years as the work was establishing its position, and in the more recent years of its decline.

The origin of the system can be traced directly to the need expressed in 1836 by a number of London publishers for "an authorised medium for the publication of their advertisements." A committee, headed by John Murray, appointed as editor Sampson Low (1797–1886), son of a successful Soho printer who had died when the boy was three, a time-served apprentice of Longmans, and now the proprietor of a large bookshop, a circulating library, and reading room at 42 Lamb's Conduit Street. The late eighteenth and early nineteenth centuries had seen a steady improvement in English trade bibliography after the long gap which succeeded the lapsing of the *Term Catalogues* in 1711. The most successful contemporary system was that founded in 1779 by William Bent, continued by his son Robert and their associate Thomas Hodgson. Appearing under various titles, and most conveniently known by the generic name the *London Catalogue of Books*, it was currently represented in 1837 by *Bent's Monthly Literary Advertiser*, "including a catalogue of the new books and principal engravings, published in Great Britain, with the sizes, prices, and publishers' names."

Low brought out the first issue of his *Publishers' Circular* on October 2, 1837. Comprising 16 pages of publishers' advertisements of new books, 3,000 copies were distributed free and 750 were sold. To these announcements the editor added a classified index of books advertised, but in the second issue 2 weeks later this had become an alphabetical list of new works, *whether advertised or not*, and Low's great trade bibliography was thus modestly founded. It continued to appear regularly on the 1st and 15th of each month.

The next stage of Low's system was tentatively erected at the end of 1838 when he issued an annual cumulation of his listings, with a classified index. The following year his cumulation took the form of an author/title list in one alphabet, and thus was born the direct ancestor of the annual *English Catalogue of Books*. Low was soon claiming his system as "the first and only catalogue of the works published in Great Britain approaching completeness." When in 1844 he became the proprietor as well as the editor of the *Publishers' Circular* he felt able to take the further significant step of issuing his annual list as an independent publication entitled *A*

Catalogue of Books Published in the United Kingdom during the Year 1844. Also a Classed Index, Referring to the Full Title of Every Book as Given in the Publishers' Circular.

The culmination of any traditional bibliographical system is, of course, the set of permanent cumulated volumes, and Low began to provide these in 1853 with his *British Catalogue of Books Published from October 1837 to December 1852*.

By this time he was offering a direct and substantial challenge to the Bent-Hodgson system, as represented by the latest *London Catalogue of Books* cumulation covering 1831 to 1855. But he had now taken his eldest son into partnership, and had moved first to Fleet Street and then into even larger premises further up Ludgate Hill towards St. Paul's. Joined in 1856 by a third partner, Edward Marston, Low felt confident enough by 1860 to conclude arrangements with Thomas Hodgson for the take-over of his *London Catalogue*. This fusion resulted the following year in the first *English Catalogue of Books*, which was to appear annually thereafter for over 100 years. The structure was completed in 1864 with the first cumulation entitled *The English Catalogue of Books Published from January, 1835 to January, 1863, Comprising the Contents of the "London" and the "British" Catalogues, and the Principal Works Published in the United States of America and Continental Europe, with the Dates of Publication, in Addition to the Size, Price, Edition and Publisher's Name*. This was in fact more than a mere cumulation: Low tells us in his preface that "the great Catalogues of the British Museum have been carefully searched . . . it is believed that a larger amount of information on modern English bibliography is thus brought together than has ever been presented in any similar work." It is also worth noting, as Edward Marston tells us in his memoirs, that "the volumes of the 'English catalogue' were somewhat erratically published. The first volume went two years backward—before the 'Publishers' Circular' was started in 1837."

As 1860 had also seen the rival *Monthly Literary Advertiser* incorporated in the infant *Bookseller*, founded in 1858, the ground was clear for two generations of unchallenged dominion over British trade bibliography. For the first 30 years even the details of the pattern remained unchanged. New books would first be listed quite fully under author in the twice-monthly *Publishers' Circular*. The annual *English Catalogue* would simply give abbreviated title-a-line entries with separate author and catchword-title sequences. The permanent volumes, cumulated at 9-year intervals, contained author lists only, for Low instituted in 1858 a separate series of cumulated indexes with entries arranged alphabetically under catchword-titles.

As the *fin de siècle* approached, the system seemed to be more firmly established than ever, with over a quarter of a million books listed in its cumulations, although Sampson Low himself had left the editor's desk in 1875, given up the publisher's chair in 1883, and had died on April 16, 1886. Before the end of the century, however, his former employee, partner, and successor, Edward Marston, had transformed the pattern in three significant ways. From January 1891 the *Publishers' Circular* became a weekly; the *English Catalogue* began to incorporate author and catchword-title entries into one alphabet; and from 1897 the brief single-line entries

were abandoned for full titles, the increased information in most cases obviating further reference to the *Publishers' Circular*. When the next permanent cumulation (for 1890–1897) appeared, this new look was found there also, and the issue of a separate index therefore ceased with the volume for 1881–1889. An experiment of issuing the weekly lists as a separate *Monthly Part of the English Catalogue of Books* was abandoned after a 4-years' run in December 1900, but success was achieved with the "Monthly List of New Books" included in the last weekly issue of the *Publishers' Circular* each month from May 1906. Under its later heading "Books of the Month," this was to remain a valued addition to the "Books of the Week" listing for more than 50 years.

Meanwhile, a readjustment of the business arrangements in 1905 included the winding up of Sampson Low, Marston & Co., and the foundation of a new company, Publishers' Circular, Ltd., with Edward Marston as chairman and his son R. B. Marston as managing director. The editing of the monthly, annual, and cumulative lists was entrusted to a professional librarian and bibliographer, James D. Stewart, who was to hold office for over 30 years. Professional bibliographers were responsible for another significant venture, the retrospective *English Catalogue of Books, 1801–1836* by R. A. Peddie and Q. Waddington (1914), which they "put forward as the completion of Sampson Low's great series . . . compiled from similar sources on similar lines."

As the twentieth century progressed the dominant position held by the *Publishers' Circular/English Catalogue* system was increasingly challenged. First, its main trade rival, J. Whitaker & Sons, publishers of the *Bookseller*, took a great step forward with the foundation in 1924 of *Whitaker's Cumulative Book List*, thus providing themselves with the apparatus of a full trade bibliography. There was a curious little interlude when, after abortive negotiations between the *Publishers' Circular* on the one hand and the Publishers' Association and the Associated Booksellers on the other, the *Bookseller* was appointed in 1928 as the official organ of both the trade associations and renamed the *Publisher and Bookseller*. Five years later this journal was taken over by the *Publishers' Circular*, which thus in its turn became the official organ of the trade, while the defunct *Bookseller* was born again as an independent book trade journal. This new role for the *Publishers' Circular* did not hamper its function as a trade bibliography, however, and in any case the arrangement was suspended by mutual consent in 1939 for what was described as "a holiday period" of 12 months. It was never resumed.

The second blow suffered by the *Publishers' Circular* was the successful High Court action for infringement of copyright by J. Whitaker & Sons, who accused Publishers' Circular, Ltd., of large-scale copying from their weekly listings of new books in the *Bookseller*. Between October 1944 and May 1945 Whitaker's introduced some 400 deliberate errors in their *Bookseller* listings. The *Publishers' Circular* fell headlong into the trap, for in the words of the judge, "Whenever and as often as those books were entered in the lists of the defendants, those errors were reproduced." He went on to estimate that somewhere around a third of the *Bookseller's* entries were being copied in this way. Although the *Publishers' Circular*

were able to show that the blame lay with an agent in the trade who had been supplying them with the offending entries, they were still legally liable. Damages for infringement were merely nominal at £5, but all infringing matter, including the complete edition of the 1944 *English Catalogue of Books*, by order of the Court had to be delivered up for destruction. Fortunately, it was later found possible to publish a replacement edition, based on the listings in Simpkin Marshall's *Books of the Month*, and so the annual sequence was preserved unbroken. An incidental feature of this lawsuit is that it is now the leading case in establishing that a compilation such as a bibliography is indeed the "proper subject of copyright" under English law.

By the 1950s the system had listed its millionth book, but was now faced with a further rival in the shape of the *British National Bibliography*. May 1959 saw the end after 121 years of the weekly *Publishers' Circular* and its replacement by the monthly *British Books*. The author/title listing, "Books of the month," continued, supplemented from March 1961 by a "Paperbacks of the Month" sequence. In 1966 this became a separate supplement, *Books of the Month*, but with individual sequences for authors, titles, and paperbacks. This arrangement continued when the parent *British Books* was replaced by the *Publisher* in January 1967, but none has appeared since the December 1969 issue. And after dwindling first to a two-monthly and then a quarterly, the *Publisher* itself suspended publication with the issue for April 1970. Until the very end, these listings have provided the base for the annual *English Catalogue* and for the larger cumulations. Although in recent years there have been changes (not always for the better) in arrangement, size, and method of printing, now it seems that these must also cease.

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ENGRAVING

See also *Etching*

In its broadest sense engraving is the making of incised lines on various surfaces to produce writing, ornament, or illustration. It has been employed in the decoration of armor, gems, and metalwork and, in ancient times, to produce records on tablets. In the narrower sense the term is applied to the making of designs for reproduction by printing.

In contrast to wood engraving (q.v.), which is used for relief printing, the printing of metal engravings is an intaglio process, the ink being transferred to paper from the incisions cut below plate level. It should not be confused with other autographic intaglio processes which, with the exception of mezzotint, rely on the eating away of metal by acids.

Many types of metal have been used for engraving, including iron, zinc, silver, steel, brass, and pewter, but copper has proved the most satisfactory. Its relative softness, combined with strength, renders it fairly easy to work and offers to the craftsman wider scope in cutting than any other metal. This same quality, however, implies an inherent drawback in that the plate surface wears fairly rapidly with successive printings. For this reason steel was used by many engravers from about 1815, even though less fine effects could be achieved. Where the medium is used today, prints are made from steel-faced copper plates or else the design is transferred to a lithographic plate and printed planographically.

Due to plate wear, the earliest *states* of a copper engraving are often the best from the point of clarity. The term *state* refers to prints made from the plate at various stages of production; thus prints in various states are of interest in studying the evolution of an artist's design.

Linen rag paper was used for printing by the early engravers, but Indian and Japanese papers were in general use from the seventeenth century. One drawback to its use in books was that the printing of intaglio plates did not combine with the printing of the text from a relief surface, so that many engravings used to illustrate books appear on separate pages. When used to decorate title-pages most often both text and ornament were engraved on one plate. Engraving has been used both as an original art form and as a reproductive medium: it is therefore important to distinguish between the work of an artist who engraves his own plates and the engraver who works from the designs of others.

The design is first drawn or traced or transferred in reverse onto a polished copper plate. The main lines are fixed with a light scratch, made with a steel point, to ensure against subsequent erasure in working. The engraving can then be executed according to the requirements of the design by forming sinuous lines which swell or taper and by building up tones composed of close parallel lines or cross-hatching.

Lines are cut by means of the *burin* or *graver*, a steel tool about 4 or 5 inches in length, which is square- or lozenge-shaped in section and cut at an oblique angle

at the end. The wooden handle into which this is inserted is rounded for holding in the palm, the cutting edge being directed by the thumb and forefinger as the tool is pushed forward. The plate is supported on a pad so that it may be freely turned in any direction until a line is completed.

The graver throws up a very slight ridge of metal known as the *burr*, on either side of the line, which is afterwards removed with a *scraper*, a tool with a triple-fluted blade, so as to leave a clean furrow. Unwanted lines may be removed with the scraper or, if these are shallow, by means of a *burnisher*, an instrument, oval in section, which has a rounded and highly polished edge.

After completion, the plate is inked and the ink further worked into the lines using a *dabber*. Superfluous ink is then wiped from the plate with fine muslin. A softened effect may be obtained by drawing out some of the ink from the incisions onto the plate surface where it remains on the line edges, a technique known as *retroussage*.

Prints may be obtained by hand pressure, using the burnisher to rub down the paper onto the plate, but they are more satisfactorily made by using a copper-plate press, a horizontal press consisting of a sliding board passing between two rollers. Damped paper is placed in contact with the plate and pulled through the press, shielded from hard roller pressure by thick blanket layers. Except where some papers are used, the resultant print will bear the *plate-mark* characteristic of intaglio printing. A further characteristic is that the ink stands slightly in relief.

Drypoint is a form of line engraving which has occasionally been used alone but which is more frequently combined with either line engraving or etching or both. The lines are incised in the copper with a *drypoint tool* which is a solid piece of steel, tapered and sharpened to a fine point at each end. The tool, in cutting, raises a more significant burr than the graver. This is left on the plate where it holds extra ink, giving a soft edge to the lines and richer effects in the dark areas of the print than that obtainable in line engraving. The life of the burr is extremely limited and begins to wear away after a mere fifteen impressions or so have been taken, a factor which renders drypoint unsuitable for use in books.

The ornamentation of metalwork by line engraving is of very early origin, but no prints from engraved plates can be dated further back than the fifteenth century. The earliest engravers remain anonymous, their separate identities being distinguishable only by date or by certain characteristic features of their work. Unlike the early woodcutters who translated the artistic endeavors of others into wood, the metal engravers were themselves artists.

The craft would appear to have evolved in the workshops of goldsmiths, in Germany or the Low Countries, between 1410 and 1430.

Examples generally considered to be the earliest extant emanate from an artist named, from his most significant work, the Master of the Playing Cards. It is assumed that he was a goldsmith who lived either in South Germany or Switzerland. His work displays an individual artistry and an already accomplished technique and would appear to antedate that of the Master of the Year 1446, so named after the first dated engraving, a *Flagellation* from a Passion series. His engravings,

though artistically less interesting, show similarities in technique. More clumsy draughtsmanship is displayed by the Master of the Banderoles, named from the use of ribbon scrolls on his prints, and also known, less aptly, as the Master of the Year 1464, who contented himself largely with copying earlier originals.

The large number of surviving engravings signed E.S. suggests that, whatever the original profession of their creator, engraving became his chief occupation. His work, some of which is dated 1466 and 1467 and which shows strong influence by the Master of the Playing Cards, made a marked contribution to the technical if not the artistic progress of the craft. He developed a stronger line style enhanced by regular cross-hatching which laid the foundation for the greater artists of Durer's time. His style is strongly representative of the Gothic elements in design which pervaded most German engravings of the fifteenth century.

As an artist E. S. was eclipsed by Martin Schongauer of Colmar, ca. 1438–1491, who may have been his pupil. Schongauer's technique, though similar stylistically, displays greater delicacy and precision which, combined with his greater distinction as a designer, make his engravings some of the most beautiful to emerge in the fifteenth century. He had many followers and imitators, but the only contemporary engraver to achieve anything approaching Schongauer's standard was an anonymous artist known as the Master of the Amsterdam Cabinet or the Master of the Hausbuch. His free and vigorous draughtsmanship, combined with a rare gift for direct portraiture from life, serve to disguise his somewhat amateur approach to the techniques of engraving. In one particular his technique is interesting in that he seems to have used a metal softer than copper on which he drew with a tool resembling a drypoint needle leaving a burr and thus a less harsh line.

Engravers working in the Netherlands after 1450 followed a similar path of development but as individual artists were less distinguished than their German counterparts.

The earliest Italian engravings, which probably emanated from the workshops of Florentine goldsmiths, lack some of the technical proficiency of German work yet display a much finer artistic sense. Whereas in Germany the art had been used largely for the dissemination of small religious prints, Italian engravers worked in a more liberal range of subjects with the obvious motive of multiplying designs which might serve as models in the workshops of the various artistic crafts. Their main concern was to interpret the work of the great painters so that most often the artist was not the engraver of the plate, a factor which was to lead eventually to a host of second-class engravings.

The first small group of engravings produced in Florence about 1450 is technically the inferior of German work with one exception, a profile *Portrait of a Young Woman* which may have come from the workshop of the goldsmith-painter, Antonio Pollaiuolo, 1432?–1498. The first group was succeeded by a second, traditionally associated with Maso Finiguerra, 1426–1464, in that their style is closely related to works in intarsia by him and to a large group of works in niello of which he was reputedly the greatest master. It is probable that the engravings were late work of the master and may not be much earlier than 1460.

These and other niello-like engravings, including the well-known *Prophets and Sibyls* series, and the illustrations to Bettini's *Monte Sancto di Dio* and the Dante of Landino, are in what is generally termed "the fine manner." They are characterized by fine lines and close cross-hatching which is irregular.

The other group of late fifteenth century Italian engravings, appearing in Florence about 1470–1475, is in "the broad manner," distinguished by broader parallel shading in the manner of a pen drawing after Botticelli. Many were variants of engravings done in the fine manner. Notable examples from this group are the two series *Life of the Virgin and of Christ* and the *Triumphs* of Petrarch.

The work of Antonio Pollaiuolo, the first great painter to use the graver himself, exhibits the same broad style though the only work extant to be unquestionably by his hand is the large and powerful *Battle of the Nudes*, one of the greatest achievements of Italian engraving.

Generally speaking, it was the lesser artists who engaged in the craft though one exception was Andrea Mantegna, 1431–1506, of Mantua, whose engravings follow closely the style of his drawings. Some twenty-five plates are ascribed to Mantegna, but it seems doubtful that of these the master engraved more than seven or eight, the quality of which far excels the rest. These include a *Virgin and Child*, two *Bacchanals*, and the *Risen Christ Between St. Andrew and St. Longinus*. There is extant a large group of engravings, by various engravers, working from Mantegna designs. In direct contrast to these in style is the work of Jacopo de' Barbari, 1450–ca. 1516, a Venetian who worked much out of Italy and whose work displays a bolder design and some affinities with drypoint.

The beginning of the sixteenth century heralds the arrival of three important engravers of whom by far the greatest was Albrecht Durer of Nuremberg, 1471–1528, the son of an Hungarian goldsmith, whose apprenticeship was served under the painter, Michel Wolgemuth, and whose chief and lasting influences came from Schongauer and Wolgemuth. He carried on the Gothic tradition and later developed it in contact with the artists of the Italian Renaissance into a grand and all-powerful style of great formal dignity. While the greatest achievements of his artistic career lie in his woodcuts, some of his best work rests in his line engravings. These include sixteen prints constituting his *Passion* series, ca. 1507–1513, his *Knight, Death and the Devil*, *St. Jerome in his Study*, and *Melancholia*, all executed 1513–1514, and various portrait engravings. In addition to his woodcuts, line engravings, and etchings, a few drypoints remain extant of which the two best are *Man of Sorrows* and *St. Jerome in the Wilderness*, both dated 1512.

The second great engraver of the period was Lucas van Leyden, ca. 1494–1533, of the Netherlands who would appear to have attained a high standard of proficiency in early life, e.g., his *Mahomet and the Monk Sergius* of 1508. The excellence of his early genre engravings was not repeated in later work when, strongly under the influence of Italian art, it became more pretentious and less original.

The last of the great triumvirate of the early sixteenth century was Marcantonio Raimondi, ca. 1480–ca. 1540, who was to wield incalculable influence throughout Europe, more so than any other engraver, Durer notwithstanding. He was trained

in the workshop of Francia, ca. 1487–1557, a goldsmith-painter of Bologna, whose work he copied in his early engravings. The later ones owe much more to Durer whose work he frequently copied. After a period in Bologna and Venice he settled in Rome from about 1510, where he made contact with Raphael who supplied him with sketches. From then on he gained a considerable reputation for his engravings after the master, the best of which is exemplified in the *Massacre of the Innocents*.

The fruitful collaboration between painter and engraver exerted great influence over much contemporary European art though it was slow to take hold in Germany where, towards the end of Durer's lifetime, the work of the Little Masters, so-called on account of their diminutive plates, held sway. Albrecht Altdorfer, the oldest of the group, 1480–1538, of Regensburg, originally an architect, who specialized in landscapes, is noted for his highly individual style. The most delicate engravings of the group were executed by Barthel and Hans Sebald Beham and Georg Pencz, all working ca. 1520–1550 in Nuremberg. Others of the group working outside Nuremberg include Heinrich Aldgrever, 1502–1555, of Soest, a fine engraver of ornaments, Jacob Binck of Cologne who died ca. 1569, noted for his portraits, and Hans Bossamer working in Erfurt ca. 1537–1555.

The middle of the century in Germany saw a marked decline in engraving as in other arts, fewer and fewer works of quality being produced. The main center of production moved now to the Netherlands where engravings became increasingly commercialized. Here engravings from Dutch, Flemish, and Italian paintings, published by Hieronymous Cock of Antwerp, Galle, Van der Passe, and other notable publishers, were much in demand.

An interchange of styles began to appear in Italian and Netherlands engravings so that national features were no longer clearly delineated. In midcentury a proliferation of undistinguished engraving emanated from what is now Belgium where the work of Jan, Jerome, and Anthonie Wierix should be noted. Most of their engravings were small religious prints which, though technically accomplished, were not of any true artistic significance. The best engravers in the Low Countries at the end of the century were Hendrik Goltzius of Haarlem, 1558–1616, who revitalized the medium by producing a range of hitherto unknown surface tones, Jan Saenredam of Leyden, 1565–1607, Jan Muller of Amsterdam, 1571?–1625, and Jacob Matham of Haarlem, 1571–1631.

Meanwhile, in Italy, the greatest influence came from Marcantonio in his final and less original phase. By about 1560 Italian engraving was largely in the hands of foreign engravers such as Cornelis Cort, ca. 1530–1578, Cock's pupil, who settled in Italy in 1571.

French engraving is of no real account before the sixteenth century, Jean Duvet, ca. 1485–1561, being the first engraver of any standing. Most of his work was copied from Italian originals, Mantegna and Marcantonio in particular, and is heavy, overworked, and characterized by inferior draughtsmanship. He is sometimes known as *le Maître à la Licorne* from the oft repeated use of a unicorn in his engravings. Meanwhile Jean Gourmont of Lyons, fl. 1506–1526, followed the style of the Little Masters. Other contemporary French engravers, of which Étienne Delaune of

Paris, 1519–1583, was the best, were renowned for their use of ornamental and architectural subjects.

Portraiture was another French speciality. This, with ornamental engraving, often found its way into books. Significant portrait engravers of the late sixteenth and early seventeenth century include Pierre Woeiriot, ca. 1531–1589, whose best work is seen in the *Kings of France* published in Cologne in 1591, Thomas de Leu, fl. 1560–1620, and Léonard Gaultier, 1561–1630.

It was not until the sixteenth century that engraving was introduced into England. Even then most of the engravers were foreigners, many of them expatriates from the Netherlands. This was not a propitious time for the foundation of a new school, being coincident with a period of decline in the rest of Europe. The earliest notable published prints appeared in 1545 in an edition of Vesalius' *Anatomy* by Thomas Geminus, a Flemish surgeon attached to the court of Henry VIII, ca. 1524–1570. This has a clearly cut engraved title-page of little artistic merit, being an early example of the mixture of strapwork and grotesque which became popular all over Europe in the latter half of the century. John Shute, an Englishman, produced engraved plates for the *First and Chief Groundes of Architecture*, 1563, but may not have engraved the actual plates himself. Humfray Cole, Richard Lyne, and Augustine Ryther were engravers for the mapmakers Saxon, Speed, and Norden, but their work was generally inferior to that of Jodocus Hondius, the last and greatest of the contemporary chart engravers who hailed originally from Amsterdam.

Other important Netherlands engravers working in England were Franz and Remigius Hogenberg, fl. 1558–1590, who were probably employed by Archbishop Parker, and Theodor de Bry, 1528–1598, best known for more than thirty plates he contributed to the Funeral Procession of Sir Philip Sidney. The most important native engraver was William Rogers, fl. 1589–1604, a goldsmith who produced many overornamented plates of interest largely for their accurate costume detail. He was responsible for many portraits of the Queen, most notably the print, thought to commemorate the Armada, the *Eliza Triumphans* of 1589. Books in which his prints appear include Sir William Segar's *Honour Military and Civill*, 1602.

By the early seventeenth century engraving was regarded primarily as a reproductive medium and thus held in low esteem by the more important artists. Moreover, it suffered fierce competition from etching, an easier medium to master. Portrait engraving, which had been in vogue in France for some years, gained in popularity and was to become the prime branch of the art in Europe.

It was the French engravers who brought it to the highest perfection. Claude Mellan of Abbeville, 1598–1688, was probably a pupil of Gaultier whose style he first copied before assuming a bolder style of his own after his return to Paris from Italy in about 1637. His work is most notable for the discarding of cross-hatching in favor of parallel line shading, the abandoning of outlining, and the achievement of tone by causing lines to swell and diminish. Equally noteworthy is the work of his contemporary, Jean Morin, ca. 1590–1650, who relied for effect largely on the combination of etching and engraving.

Unlike Mellan and Morin, Robert Nanteuil, 1623?–1678, himself drew the vast

majority of the plates which he engraved which gave him an easy advantage over his rivals. Nanteuil is generally regarded as the supreme master of the French school of portrait engravers. The lineal techniques of Mellan and of Abraham Bosse are easily discernible in his early work, but from the mid-1650s his style changed, gaining more of the strength and subtlety of the Netherlands engravers. This was overlaid with his own individual style which was direct and free from mannerism. His use of closely laid short strokes to model the face was much copied and formed the most distinct element in French engraved portraits. In 1659 he became official portrait engraver to Louis XIV and thus portrayed many of the important members of the court. It was at his instigation that engraving was raised from the rank of an industrial to that of a liberal art under the edict of St. Jean-de-Luz.

Nanteuil's nearest rival in quality if not in quantity was Antoine Masson, 1636–1700, who produced some vigorous, lifelike portraits which perhaps lack the quality of Nanteuil's finish. Gerard Edelinck of Antwerp, 1640–1707, trained under Cornelis Galle and later moved to Paris where he fell under the influence of Nanteuil. He has left a number of engravings which, though technically excellent, lack originality. He is best remembered for his reproductions of paintings by Le Brun and Philippe de Champaigne. The sheer technical skill of these engravers was continued and even improved by the Drevetts—Pierre, 1663–1738, his son Pierre Imbert, 1697–1739, and his nephew Claude, 1710–1782. Despite their brilliant tone rendering they had none of their predecessors' gift for portraiture, and the quality of their work is often marred by overattention to detail, a common fault in many contemporary paintings. Their work marks a stage in the decay of French engraved portraiture.

In the Low Countries the virtuosity of Goltzius was handed down to the school of engravers that centered around Rubens and Van Dyck. Rubens' great reputation gave him a virtual monopoly of the best Flemish engravers who worked to his designs. His pupil, Pieter Soutman, 1580–1657, a painter and engraver, also frequently supplied designs. His own engravings display variety but are often flawed by weak and indecisive lines. The early engravings of Lucas Vorsterman, ca. 1595–1675, are characterized by a brilliant technique which is lacking in the work of his middle period when, after a break with Rubens, he worked in England for the Earl of Arundel. Not until the engravings later executed under the guidance of Van Dyck did his work regain its former stature. Vorsterman's pupil, Paul Pontius, 1603–1658, also engraved for Rubens, but his best work was engraved for Van Dyck.

Boetius and Schelte a Bolswert, 1580–1634 and 1586–1659, respectively, though not trained in the Rubens school, were among his most powerful interpreters. Van Dyck was of equal importance as an inspirer of reproductive engravings, the best of which appear in the *Iconography*, a collection of portraits of eminent contemporaries, many engraved by Pontius and the Bolswerts, which he prepared soon after his return from Italy in 1626. Outstanding early Netherlands portrait engravers also include Jonas Suyderhoef, ca. 1610–1686, noted for his engravings after Frans Hals, Cornelis Visscher, ca. 1629–1658, a prolific artist in the medium who fre-

quently mixed engraving and etching on the same plate, and Cornelis van Dalen the Younger of Amsterdam, fl. 1632–1646, who is best remembered for a series of English royal portraits, most notably an unfinished one of Charles II after P. Nason, one of the finest portraits of the king extant.

From the early seventeenth century engraving flourished in England where it was frequently used for the embellishment of books. Much of it, competent but artistically disappointing, was produced by engravers of Flemish extraction. Names most commonly found on contemporary prints include Renold Elstracke, fl. 1598–1625, Francis Delaram, fl. 1615–1624, John and Martin Droeshout, fl. 1620–1652, Simon and Willem van der Passe, ca. 1595–1647 and ca. 1598–1637, respectively, and the Englishman, William Hole, fl. 1607–1624. A broader style was later introduced by the visit to England of Van Dyck and others of his following. Their influence is seen particularly in the work of George Glover, fl. 1630–1652, who was the first English engraver of any true artistic merit. England produced one portrait engraver of merit in William Faithorne, ca. 1616–1691, who took as his models first Mellan and then Nanteuil. During the Civil War he was responsible for several good portraits of Royalist and Parliamentary leaders and in the late 1640s emigrated to Paris for a few years. His most accomplished work is seen in the portraits executed after his return to England. Outstanding examples are the portraits of Charles II, the playwright Thomas Killigrew, and Sir William and Lady Paston. David Loggan, fl. 1658–1690, produced portraits of uneven quality though he is perhaps best remembered for the outstanding architectural prints which appeared in *Oxonia Illustrata*, 1675, and *Cantabrigia Illustrata*, 1690. The popularity of line engraving was eclipsed in the closing years of the century by mezzotint, a medium so favored in England as to become known throughout Europe *à la manière Anglaise*.

During the eighteenth century portrayal of society genre took pride of place over portraiture. The style was well adapted to the illustration of books for which it was more frequently used than engraving in former times. It now becomes difficult to trace the development of pure line engraving for, more often than not, it was combined with etching, though one medium was normally subservient to the other. In the following outline mention will only be made of those artists in whose work engraving formed the principal medium and who normally used etching merely for fixing the main design lines prior to engraving.

France was now unquestionably the artistic center of Europe. Engraving techniques, developed during the previous century by Gérard Edelinck and Gérard Audran, were continued and refined. The best work is to be found in the school of engravers inspired by Boucher, Greuze and, above all, Watteau. In the reproduction of Watteau's work the play of light on costume was well rendered by the clear lines of engraving while the etcher's needle provided the subtle variations of tone in the background landscapes. Many engravers worked to his designs. All were excellent craftsmen, but the best were Jean Audran, 1667–1756; Benoit Audran, 1700–1772; Nicolas Henri Tardieu, 1674–1749; Charles Nicolas Cochin the elder, 1688–1754; François Joullian, 1697–1779; Laurent Cars, 1699–1771; and Michel

Aubert, ca. 1704–1757. Watteau's decorative panels, which *fêtes galantes* enclosed in scroll ornament, were engraved mainly by Jacques Gabriel Huquier, Jean Moyreau, Louis Crépy, and François Boucher.

Many of the larger French engravings of the period are comparatively uninspired but not so the work of the successful vignettistes which was frequently used in book illustration. There was now a distinction to be made between draughtsman and engraver, the best artists employing engravers to work for them. Hubert François Gravelot, 1699–1773, produced a copious number of engravings, the best of which, reflecting the society and the manners of the period, are among the most excellent of their kind. He spent some 20 years in England prior to 1754 where he exerted considerable influence on contemporary book illustration. Elaborate ornament, such as decorated many books of the period, is best seen in the work of Pierre Philippe Choffard, 1730–1809, e.g., Fontaine's *Contes*, 1762, and Ovid's *Metamorphoses*, 1767–1771.

Charles Nicolas Cochin the younger, 1715–1790, was responsible for many illustrations which he engraved himself and for a series of frontispiece portraits for which he merely supplied the designs. His enthusiasm for the craft is reflected in his revision of Bosse's treatise on engraving. A draughtsman whose work shows considerable delicacy and refinement is Charles Eisen, 1720–1778, notable for his designs for C. J. Dorat's *Baisers*, 1770.

Almost in the same class as Cochin and Eisen is the work of Clément Pierre Marillier, 1740–1808, remembered for his illustrations to Le Sage's *Gil Blas*, 1796, and to French editions of Richardson's *Sir Charles Grandison* and *Pamela*, 1784. The most gifted illustrator of the school was undoubtedly Jean Michel Moreau le jeune, 1741–1814 whose best work is found in the first volume of J. B. de Laborde's *Chansons*, 1773, and in Rousseau's *Oeuvres Complètes*. His later work, more classical in style, was less successful.

Next in distinction was Augustin de St. Aubin, 1736–1807, who was responsible for many engravings in books after other artists but whose great achievement lay in his series of frontispiece portraits. Other outstanding French engravers include Noel le Mire, 1724–1800; Nicolas Delaunay, 1739–1792; Joseph Longueil, 1733–1792; and François Marie Isadore Quéverdo, 1748–1798.

An attempt was made to revive pure classical engraving by Jean George Wille, 1715–1808, a German who worked most of his life in Paris. His work is characterized by regular flick and dot work interspersing cross-hatching. Though he exerted great influence over other engravers in the latter half of the century, his work lacks true artistic merit.

Engraving in France virtually came to an end at the time of the Revolution. Such good illustrations as existed at the turn of the century were mainly engraved after Pierre Paul Prud'hon by his son Jean, 1778–1837, Barthélemy Joseph Fulcran Roger, ca. 1767–1841, and Jacques Louis Copia, 1764–1799, who used stipple for finishing.

English engraving of the eighteenth century, though less distinguished than that of France, nevertheless includes some competent work. Sir Robert Strange, 1721–

1792, the best English classical engraver, learned his craft in Edinburgh but later studied in Paris under Le Bras until ca. 1751. All his work shows etching of the principal outlines afterwards worked over with the graver. From 1760 he spent a few years in Italy where his engravings, after great masters, wielded considerable influence over Italian engravers, especially Volpato and his followers. Strange's best work belongs to the last decade of his life and includes several royal portraits after Van Dyck. Using much the same technique and working in a similar subject range, though technically Strange's superior, was William Sharp, 1749–1824.

The method of combining etching and engraving was carried even further by William Woollett, 1735–1785, the landscape engraver, who used two or three stages of etch before finishing with the graver. Most of his work is after Claude. Other notable works are his *Views of Oxford* after John Donowell, 1755, his large plate of *Niobe* after Richard Wilson, 1761, and two celebrated battle scenes. William Hogarth, 1697–1764, mostly engraved his own work. He was perhaps the first English artist to realize the potential of the commercial print in terms of sales and became his own publisher. He was highly skilled neither as a draughtsman nor as an engraver; his great gift lay in didactic satire and social comment. His first venture into publishing was his print *Masquerades and Operas* of 1724. His three best known works are *Harlot's Progress*, 1733–1734, *Rake's Progress*, 1735, and *Industry and Idleness*, 1747. His friend and contemporary, John Pine, was a superior engraver whose main work lay in book illustration. An early example of his engraving is the frontispiece to the first edition of *Robinson Crusoe*, 1719. His greatest achievement is his edition of *Horace*, 1733, in which both text and illustration are engraved throughout.

Late eighteenth and early nineteenth century English illustration was much influenced by the heavy manner of Woollett and his followers, though the work of some artists clearly shows the more delicate influence of Gravelot. In the welter of contemporary reproductive engraving the inventive genius of William Blake, 1757–1827, stands out as an example of a unique art. The majority of his work, produced by his own peculiar method of relief etching, lies outside the scope of this article, but it must be remembered that some of his best work lay in the field of straight line engraving. This includes his forty-three plates for Young's *Night Thoughts*, 1797, a large engraving of the *Canterbury Pilgrims*, 1810, the superb *Book of Job*, 1825, and seven large designs for an edition of Dante, a series left uncompleted at his death. Thomas Stothard, 1755–1834, is, apart from Blake, the most prolific and the most gifted artist working in the field, though he seldom engraved his own plates which is a pity for much of their delicacy and charm is lost in inferior engraving.

The work of Joseph William Mallord Turner, 1755–1851, fared better, doubtless due to his careful supervision of the engravings throughout all stages. Under his inspiration English illustration found its own most characteristic expression in landscape. Though there is more etching than engraving on most of these plates, in finished effect they lie nearer to the art of the engraver than the etcher. The best of the many craftsmen to engrave after Turner were William Bernard Cooke, 1778–1855; George Cooke, 1731–1834; John Pye II, 1782–1874; William Miller of

Edinburgh, 1796–1882; Robert Wallis, 1794–1878; and James Tibbits Willmore, 1800–1863. Notable Turner engravings among published works are *Rivers of France*, 1837, *Picturesque Views in England and Wales*, 1838, ostensibly books of plates, and the illustrations to Roger's *Italy*, 1830, Scott's *Poems*, and the *Prose Works of Walter Scott* of 1834.

Large numbers of impressions of the engravings of this school were made possible by the use of steel as a substitute for copper, which took place 1815–1860.

The introduction of the mechanical processes of reproduction which followed the invention of photography sounded the death knell of engraving as a reproductive process and eventually brought to an end its long and respectable history as a major art form.

As in other countries, line engraving in Italy suffered from the competition of etching. Among those who attempted to keep it alive was Giovanni Volpato, 1733–1803, who founded a school of engraving in Rome. The amount of preliminary etching in his work was minimal. His work is not in the first rank of engraving, but he is remembered chiefly for his series of plates after the frescoes in the Stanze and Loggie of the Vatican and for his book *Principi del Disegno*, 1786, with thirty-six plates engraved after antique statues by himself and his son-in-law, Raphael Morghen, 1758–1833. Though Morghen surpassed Volpato in technical virtuosity, his elaborately designed engravings are stilted and lacking in spirit. Giuseppi Longhi, 1766–1831, the author of a treatise entitled *Calcografia*, 1830, was responsible for some interesting engravings. Carlo Lasinio, 1757–1839, and his son Giovanni Paolo, 1796–1855, produced some notable outline engraving, a technique popular at the beginning of the century.

The most influential Italian engraver of the period was Luigi Calamatta, 1802–1869, who worked in Paris and later in Brussels before his return to Milan in 1861. Portraits and subjects after Ingres were his chief contribution.

A laudable attempt in France to preserve the art was made by Louis Pierre Henriquel-Dupont, 1797–1892, professor of engraving at the *École des Beaux-Arts* in Paris who, in 1868, was instrumental in forming the *Société Française de Gravure* which encouraged engraving by commissioning plates. Freely combining etching and engraving, he discarded former rigid conventions by greater freedom in the formation of his lines and hatchings. His teachings were followed by Claude Ferdinand Gaillard, 1834–1887, who produced some remarkable original portraits, and by Pieter Dupont, 1870–1911, working in a bolder style.

Engraving has been revived in the present century by a handful of artists who have exploited its virtues and peculiarities in seeking to find a means of expression. Of particular note, from the technical viewpoint, is William Strang, 1859–1921, who from 1908 on used a backward pointing graver which he drew through rather than pushed through the copper in the usual manner. Also worth mentioning are the works of Stanley Anderson, 1884–1966, Robert Austin who was born in 1895, and the genre engravings of Harry Morley, 1881–1943. The stylized austerity of Eric Gill's work in the field is of interest as is the work and teaching of Stanley William Hayter, born 1901, in Paris and the United States. In France Jean Emile Laboureur,

born 1877, popularized a simple linear style in the 1920s and 1930s, while in the United States Mauricio Lasansky, born 1914, has had considerable influence on several American artists.

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DOROTHY A. HARROP

ENOCH PRATT FREE LIBRARY

During the early 1880s the people of Baltimore watched a building going up on Mulberry Street a few blocks from the main business district. The building was Romanesque in style. It was basically brick with elaborate masonry, granite, and marble embellishments, arched windows, pillars and pilasters, and a pointed tower. The interior, reached by a marble stairway, was richly appointed.

On January 21, 1882, Enoch Pratt sent the following letter "To the Honorable Mayor and City Council of Baltimore:"

I have for some years contemplated establishing a Free Circulating Library, for the benefit of our whole City, and in pursuance of this plan I have entered into a contract to erect a fireproof building on my Mulberry street lot, capable of holding 200,000 volumes—my purpose being to have branches connected with it in the four quarters of the City, under the same management.

The excavation for the foundation has been commenced, and the building will be well advanced this year, and completed in the summer of 1883. It will cost, when ready for occupancy, about two hundred and twenty-five thousand dollars (\$225,000), and upon its completion I propose to deed it to the City. The title to all the books and property is to be vested in the City, and I will pay to your Honorable Body, upon its completion, the additional sum of eight hundred and thirty-three thousand three hundred and thirty-three and a third dollars (\$833,333 $\frac{1}{3}$), making one million fifty-eight thousand three hundred and thirty-three and one-third dollars, provided the City will grant and create an annuity of fifty thousand dollars (\$50,000) per annum forever, payable quarterly to the Board of Trustees, for support and maintenance of the Library and its branches.

I propose that a Board of nine Trustees be incorporated for the management of "The Pratt Free Library of the City of Baltimore," the Board to be selected by myself from our best citizens, and all vacancies which shall occur, shall be filled by the Board. The articles of incorporation will contain a provision that no Trustee or officer shall be appointed or removed on religious or political grounds. The Trustees are to receive from the City quarterly payments, and to expend it at their discretion for the purposes of the Library. . . .

The plan proposed for the support and management of the Library is the result of long and careful consideration, and, I am satisfied, is well adapted to promote the great object in view, the free circulation of the books of a large and ever-growing Library among the people of the whole City. I trust that it will receive the approval of your Honorable Body, and of the citizens of Baltimore.

Enoch Pratt

Thus was established a public library system which has served the people of Baltimore, and, increasingly, all Marylanders for almost 100 years.

Transplanted from his native Massachusetts, Enoch Pratt became a highly successful and respected Baltimore merchant, railroad director, and ship operator. He did not have the kind of bookish background one might expect in a man who gave his fellow citizens a library. However, Pratt had been a trustee and treasurer of the

Peabody Institute, founded in Baltimore some years earlier by George Peabody. He also had before him the examples of Johns Hopkins, who established the famous university and hospital, and of Moses Sheppard, the devout Quaker, whose fortune was the basis of one of the earliest humane psychiatric hospitals.

The mayor and City Council of Baltimore gratefully accepted Enoch Pratt's gift, and appropriate city and state legislation was enacted. On October 1, 1884, Mr. Pratt formally transferred the management of the library to the Board of Trustees. In the transfer he mentioned the "main building" which was fireproof and the four branches which had been completed. He instructed and advised his Board of Trustees, of which he was president, as follows:

These, I think, are all accessible to the people, who, I hope, will avail of the advantages it is my wish to offer them, they being for all, rich and poor, without distinction of race or color, who, when properly accredited, can take out the books, if they will handle them carefully and return them. . . .

I now hand the management over to you, not doubting you will make all proper arrangements to carry out my wishes and make the Institution what I wish for the people of Baltimore and State of Maryland.

I leave it to you with confidence. In my opinion, much depends on the selection of a Librarian and organizing a proper system. I would suggest your availing of the experience of old, well-established circulating libraries, and proceed with caution. . . .

Now, if spared to see the Library in full and successful working order and appreciated by my fellow citizens, I shall pass to a future life with the self-consciousness that I have contributed my mite for the talent entrusted me.

Enoch Pratt

Now the library was on its way. It soon had five branches and within 10 years it boasted a collection of almost 150,000 volumes. This put it fourth in the country in size of collection and in circulation, which by 1895 was over a half million.

Not only was the library well used by Baltimoreans, it attracted attention outside the city. The fourth annual report of the librarian for the year 1889 quotes an article by Andrew Carnegie which showed that the steel tycoon was well informed about Enoch Pratt and his benefaction to his adopted city.

Many free libraries have been established in our country, but none, that I know of, with such wisdom as the Pratt Library of Baltimore. . . . During last year (1888) 430,217 books were distributed; 37,196 people of Baltimore are registered upon the books as readers; and it is safe to say that the 37,000 frequenters of the Pratt Library are of more value to Baltimore, to the State and to the Country than all the inert, lazy and hopelessly poor in the whole country. And it may further be safely said that, by placing within the reach of 37,000 aspiring people books which they were anxious to obtain, Mr. Pratt has done more for the genuine progress of the people than has been done by all the contributions of all the millionaires and rich people to help those who cannot help themselves. The one wise administrator of his surplus has poured his fertilizing stream upon soil that was ready to receive it and return a hundred fold. The many squanderers have not only poured their streams into sieves which never can be filled, they have done worse; they have poured them into stagnant sewers that breed the diseases which affect the body politic. . . . We

need have no fear that the mass of toilers will fail to recognize such as he as their best leaders and their most invaluable allies; for the problem of poverty and wealth, of employed and employer, will be practically solved whenever the time of the few is given and their wealth is administered, during their lives, for the best good of that portion of the community which has not been burdened by the responsibilities which attend the possession of wealth (1).

Here was the classic attitude of the rich man who wanted at once to help the poor, to assure himself of a steady supply of smart and sober workers, and perhaps to earn his way into heaven.

When Mr. Carnegie wrote, "No millionaire will go far wrong in his search for one of the best forms for the use of his surplus who chooses to establish a free library in any community that is willing to maintain and develop it" (1), he was not speaking casually. He soon began pouring out millions of dollars to build almost 1,700 libraries in the United States alone. So it is clear the gift of Enoch Pratt in Baltimore was a major factor in the public library movement through the wholesale generosity of Andrew Carnegie.

In its early years the library was under the direction of Dr. Lewis Henry Steiner, who served from 1884 to the year of his death 1892, and his son Dr. Bernard Christian Steiner who was librarian from 1892 until 1926. The Steiners were scholarly men interested in history. Under their leadership the library's collections were probably more broadly based than those of many public libraries of the time. Dr. Bernard Steiner used the term "people's university" in describing the library. He thought of it as an educational institution. And he acquired not only the classics in English, but in foreign languages as well.

Working with Dr. Steiner during the early days was Charles Evans, later to become a famous bibliographer. Evans prepared the initial list of 10,000 books to be ordered. He set up a classification scheme as well. However, there was friction between Evans and Steiner. Things got so bad that Enoch Pratt, even though he valued Evans' abilities, asked for his resignation saying, "His temperament don't brook serving under a master" (2). But Evans left his mark on the collection, to the long-term advantage of the library's users.

Under Dr. Bernard Steiner the library system grew in size and service. By 1902 there were nine branches and daily delivery of books was begun to branches, stations, and schools. But the endowment left by Enoch Pratt, which yielded \$50,000 per year, was not enough to operate a system with a staff of 76. Dr. Steiner in his annual report for 1903 told the board the income should be at least \$100,000. He pointed out there was no city in the country of over 300,000 population not appropriating more money than the total income of the Enoch Pratt Free Library. Dr. Steiner wrote, "Our needs are pressing. We should be able, at once, to open at least a half dozen new branches or stations, to double the size of our Central Building, to enter upon new fields of usefulness in that building, and to increase largely our annual expenditure for books."

In 1905 Andrew Carnegie offered \$500,000 to build twenty branch library buildings. In making his offer Mr. Carnegie said, "I trust that the Branch Libraries in

Baltimore will be considered part of his [Mr. Pratt's] scheme and not a new departure" (3).

Gradually the new Carnegie branches were built and the city began appropriating funds to be added to the \$50,000 annual yield from the Pratt endowment. In 1911 the City put up \$35,000. This increased over the years as the librarian kept bombarding the trustees with statistics which illustrated how poorly Baltimore showed up against other cities in supporting its public library.

In January 1926 Dr. Bernard Steiner died suddenly and an era of pioneering ended. During the first 40 years of the library's history, twenty-six branches had been established and the circulation was over a million books a year. The Central Library had been outgrown for years and residences along Cathedral Street were taken over to handle the expansion. For many years before his death, Dr. Steiner's annual reports were full of pleas for a more adequate budget from the city and for a large annex to the old Central Building.

With the arrival of Joseph L. Wheeler in 1926 the library came under the dynamic leadership of one of the outstanding librarians of the twentieth century. Mr. Wheeler had behind him solid administrative experience in the public libraries of Jacksonville, Los Angeles, and Youngstown. As the first Pratt librarian with professional training (New York State Library School, 1909) he knew the value of library education. Having planned the departmentalization of the Los Angeles Public Library, he was knowledgeable in organization. He was also deeply interested in library architecture. And he was a publicist of great skill and energy, which he used in telling the public about the library.

To meet the need for qualified staff, a training class was begun in 1928. It began turning out graduates who moved into some of the responsible positions on the growing staff. In addition to producing librarians this way, Mr. Wheeler brought in a number of library school graduates of distinction. He also encouraged promising young staff members to study in the library schools which were being organized in universities.

Although the new central building completed in 1933 may not have been Joseph Wheeler's most significant contribution to Baltimore, it is the most obvious. The building was the first large central library in the United States to be developed on a fairly open plan. Books were highly visible and available to the readers on open shelves. The staff were out where they could be easily identified and queried by the public. And the main facade along Cathedral Street was punctuated by twelve large exhibit windows, the first of their kind to be seen in a big central library. The main entrance was on ground level, without even one step to be climbed to enter the building. Within, the library was completely departmentalized, combining circulation and reference in nine departments (see Figure 1).

As important as the central building was, more important probably was the outreach that Mr. Wheeler accomplished. Kate M. Coplan, first director of exhibits, publicity, and publications, told about part of this outreach in the 10-year report of 1926-1935 (4):

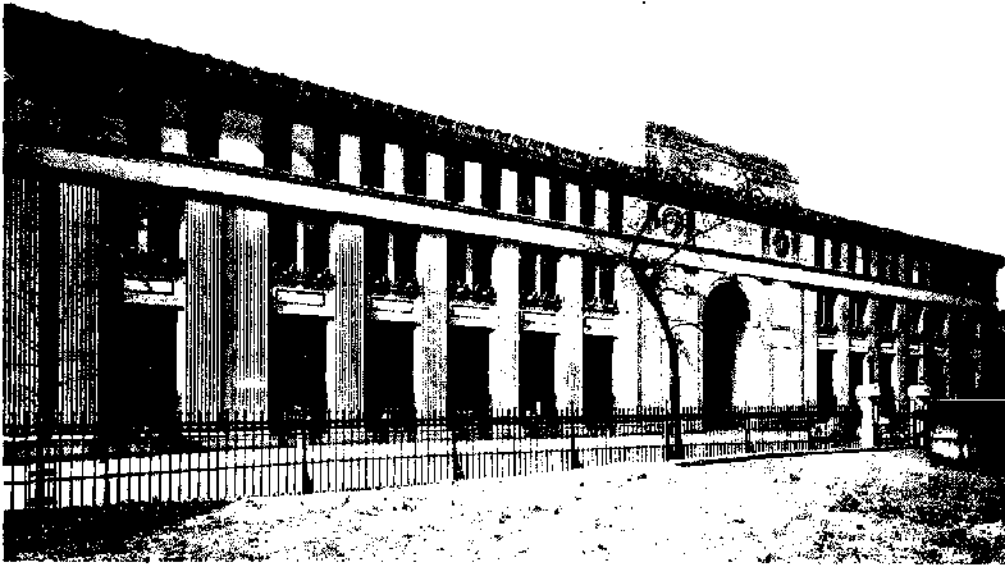


FIGURE 1. *Central building (completed 1933) of Enoch Pratt Free Library.*

Enoch Pratt book lists have had a wide distribution, both in Baltimore and its vicinity and in other towns and cities, through their public libraries. In Baltimore clubs, study groups, colleges, schools, banks, churches, office buildings, department stores, the street railway system, dairies, laundries, factories, etc., have distributed hundreds of thousands. A garden list, for example, may be distributed through seed shops dealing in garden implements. A book list dealing with the care and repair of automobiles goes to customers of auto accessory shops; or a list of books for adolescents is put into the hands of boys and girls through the Playground Athletic League, the Boy Scouts of America and similar agencies.

On occasion, theater programs, trade and school papers, neighborhood magazines and similar publications have been drawn into disseminating information about books.

Outside Baltimore our book lists and other publications have been sold in quantities of one to fifty thousand to other libraries and educational agencies, either through outright selling or on consignment, with or without the purchasing institution's imprint. The profits of this activity help to meet the expense of printing and distributing lists free of charge in Baltimore and also mean a substantial savings to the purchasing library, which would have to spend many times the price in preparing this material independently.

When Mr. Wheeler left the library in 1945, he had every reason to be proud of his accomplishments. The new central building was functioning well and was admired throughout the library world as well as by its daily users. The library system was operating twenty-six branches, forty-five stations, and school deposits in 792 classrooms. Circulation had risen to over 2½ million volumes. The book collections totaled 824,911. The staff numbered 292, of whom 147 were professional and 145

nonprofessional. Although Joseph Wheeler left the library "because of continued ill health," as all those familiar with library developments know, he remained active after leaving Baltimore, as teacher, consultant, writer, and gadfly to the profession. At past 85 he was still active and had completed "Project No. 175" as a consultant just before his death on December 3, 1970.

Following Wheeler as directors were Emerson Greenaway, 1945-1951; Amy Winslow, 1951-1957; Arthur H. Parsons, Jr., 1957-1959; Robert S. Ake (Acting Director) 1959-1960; and Edwin Castagna, 1960-. The years since 1945 have seen the library develop and change in a number of ways.

In 1944 the positions of coordinators of work with children, young people, and adults were created. The Films Department, a major agency, was established in 1949. And in the middle 1960s the Central subject departments were reorganized. In 1967 the Telephone Reference Service began to give speedy answers to the easier reference questions. In its first full year almost 200,000 questions were handled.

With increasing professionalization of the staff and the creation of the positions of coordinators, work in adult education, and with children and young adults, was intensified. A series of Wednesday noon lectures in the central hall has continued since 1944 to attract people on their lunch hours. These talks have brought outstanding speakers on subjects of timely and continuing interest to audiences ranging in size from 60 to over 100. A noteworthy exhibition and institute on atomic energy brought big crowds to the library in 1947. And a Books and Ideas for an Age of Anxiety lecture series in 1960 was typical of the library's response to current concerns (see Figure 2). Exhibits were also arranged for meetings and conventions of all kinds, and speakers were supplied. The children's librarians worked closely with the schools and developed story and film programs. Individual attention to young readers was stressed. The young adult librarians were reaching into the secondary schools with book fairs and were involving teenagers in many ways which demonstrated to them the importance of books and reading in all their varied interests.

After World War II and continuing for 25 years, a total of thirteen functional branches were built, some replacing obsolete libraries. Several branches were remodeled and enlarged. All these branches had stronger, larger staffs and expanded book collections (see Figure 3).

In 1965 the library undertook one of its most ambitious projects, the reclassification of the entire collection of almost 2 million volumes (about 400,000 titles) to the Library of Congress classification. Simultaneously a book catalog was begun.

Increasingly over the years the Pratt Central Library has become in effect a state library. In 1970, under legislation proposed by a Governor's Commission to Revise Public Library Laws, the Pratt Library was recognized as the state library resource and compensated accordingly by the state. This role is consistent with Mr. Pratt's advanced thinking, since he mentioned not only Baltimore, but Maryland, in giving the library to the people.

In the years since Mr. Wheeler became director, the staff has been increasingly involved in professional activities. Through these activities and by way of the library's publications, the Enoch Pratt Free Library has had an impact on public

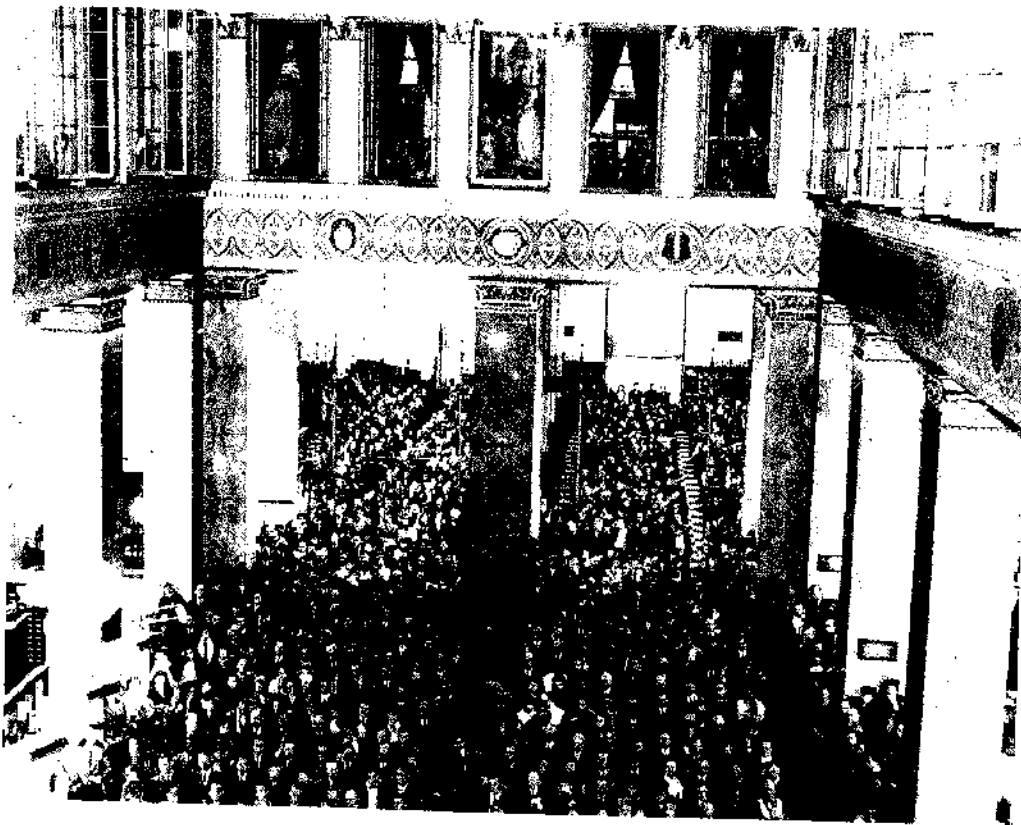


FIGURE 2. *Opening of Atomic Energy Institute in central hall (1947) of Enoch Pratt Free Library.*

libraries throughout the United States. The central building has been the model for many other public libraries in the United States and abroad since 1933. The form of the library's organization (see Figure 4) and its methods and procedures have been studied by librarians from all over the world. Several librarians from foreign coun-

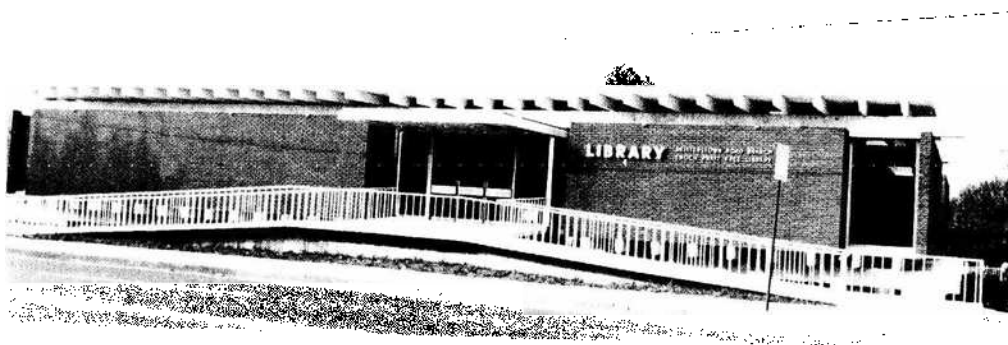


FIGURE 3. *Reisterstown Road Branch Library (opened 1967) of Enoch Pratt Free Library.*

tries are usually on the staff for periods of a year or more. And via the hundreds of librarians who have begun their work at Pratt and moved on to important library positions, the library's influence has also been widely diffused. The Deiches Studies, a series of surveys designed to help Pratt improve its services and also be useful to other public libraries, directed by Dr. Lowell A. Martin, during the 1960s and the early 1970s, have also had an impact on the library world through distribution.

In 1970 the library was operating twenty-four branches, several small stations, two bookmobiles, and a number of deposit collections. It was deeply involved in the service to people in the inner city, the poor and deprived, through its Community Action Program, which operated more than twenty service points. In addition, the County Services department was lending books and giving reference service to the citizens of Maryland through their county libraries and a number of academic and state institutions. The circulation of books was just under 4 million, with almost 50,000 films lent. The library was also operating the Peabody Institute Library as a branch. This had been part of the Pratt since 1966. It is one of the outstanding scholarly libraries of the region. More than a million readers were assisted by the Pratt system with reference and other professional help. The collections totaled about 2,250,000 books, around 400,000 titles in microforms, and substantial collections of photos, pictures, prints, maps, slides, sound recordings, and films. The Public Information Center, a joint Pratt-University of Maryland School of Library and Information Services research demonstration project, was launched in 1970. This was designed to make the library a more effective information resource. The library's budget was over \$6,000,000 and more than 700 staff members were working throughout the system.

Although the library's collections are basically made up of material generally found in a public library, a number of special research collections are noteworthy. These include the Maryland Collection; the H. L. Mencken Collection of books, manuscripts, and letters; the Poe Collection; and the genealogy, map, exploration, and rare book collection in the Peabody Library.

One of many studies made of the Pratt Library, *The Enoch Pratt Free Library: A Social History*, by Philip Arthur Kalisch, concluded:

Through its many services, the Enoch Pratt Free Library, as an institution, reflected the society in which it operated as well as being a force that was sufficiently powerful to have a definite influence on the development of the City of Baltimore (5).

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EDWIN CASTAGNA

ENTROPY

An important goal in any communication process is to reduce the uncertainty of the receiver of a message about the state of affairs at the source. The receiver cannot predict with certainty what the speaker is going to say. If he had no uncertainty, then it would not be necessary for the speaker to speak. "Entropy" is a measure of the amount of uncertainty that is cleared up for the receiver when a message from the source is communicated. Historically the concept of entropy was introduced in the physical sciences. It had its origin in thermodynamics and it was better understood with the advent of statistical mechanics. It was not fully understood until after the publication in 1948 of Claude E. Shannon's paper, "A Mathematical Theory of Communication."

The invention of the steam engine was the first practical demonstration of the principles of thermodynamics. The significant contribution was made by N. L. S. Carnot (1796-1832), whose major effort was in converting thermal energy into work. He proposed an ideal expansion of gas, whereby the gas would be allowed to expand in a cylinder by pushing on a piston without permitting flow of heat to or from the gas. As a result of the expansion of the gas into a larger chamber, the gas becomes cooler through the loss of some of its thermal energy. The loss of

energy by the gas is equivalent to work done against the piston, and the energy stored in the piston to be reused again. If work could now be done by pushing the piston back to its original position, all initial conditions would be restored; i.e., the gas would again have the original volume, pressure, temperature, and energy. This would be a "reversible" process and the "entropy" of the gas would remain constant at the expense of a change of thermal energy to mechanical energy, and back. In the ideal situation the exchange of thermal energy of the compressed gas and the mechanical energy of pushing up against the piston can take place continuously. In practice, physical systems are not reversible. Entropy is always on the increase because of the loss of energy in nonreversible processes. The change in entropy that a system undergoes is a measure of the irreversibility of the process.

Because the concept of entropy is rather illusive, an attempt will be made to present several illustrative examples. Imagine a cylinder partitioned into two compartments which permits no heat flow in or out of the system. Now, imagine that one compartment is filled with gas and the other is empty. Suddenly, the partition disappears and the gas expands into the whole cylinder without doing any work. Under these conditions the entropy increased but the thermal energy remained constant. If this gas was expanded into the other compartment via a little engine instead of by removing the partition, we could have obtained some mechanical energy, or work done by this engine during the expansion process. Similarly, when heat flows from a hot body to a cold body, thermal energy can be converted into mechanical energy. When this difference in temperature disappears, even though the total energy is still the same, it is no longer possible to convert thermal energy to do work.

The significant concept to us, here, is that an increase in entropy reduces the ability to convert thermal heat to mechanical energy. The fact of life is that an increase in entropy reduces the available amount of useful energy. When a process is reversible no change of entropy takes place; however, most processes in our universe are irreversible and therefore a permanent loss of useful energy is taking place all the time.

The concept of entropy came to us from thermodynamics. Statistical mechanics provided us with an insight into entropy from an organizational point of view. Basically what it tells us is that an increase in entropy means a decrease in organization, which implies an increase in disorganization or in randomness. If we go back to our partitioned cylinder with the gas in one chamber and nothing in the other, the entropy is greater and we know more about the position of the molecules of the gas than we would if the partition were removed. When the partition was removed, the molecules scattered across a larger space and we knew less accurately their position in this new larger space, and the entropy was increased.

Note that the organization of the molecules is translated here into knowledge about them, and an increase in entropy carries with it a connotation of a decrease in knowledge. In statistical mechanics, disorganization or disorderliness implies a lack of ability to predict, because of lack of knowledge, the position of the molecules in the gas and their velocities.

In communication theory our concern is in identifying a message emanating from a source which is capable of generating messages. When the source is capable of generating one of two possible messages, our uncertainty at the receiving end is only with regard to which of the two messages it is. If one of them is identified, all the uncertainty is removed. No matter how long these messages are, as long as the choice is between the two, each can be identified by a very simple signal or symbol, such as yes-no, head-tail, on-off, or 0-1 (a bit). Thus one bit identifies one out of two possible messages, or at the receiving end, one bit of information removes all the uncertainty with regard to which one of the two possible messages was generated or sent. As a measure of information content in the source, it is said that its entropy is one bit.

If the source was able to generate one of four possible messages, each could be identified by a two bit code in the following manner, 00, 01, 10, and 11. In this case, more uncertainty existed than before. The uncertainty of the recipient this time is with regard to discerning one of four possible messages; any two bits of the code above would clear up all uncertainty. The entropy of this system is two bits. Similarly, a message source composed of eight possible messages could identify each with three bits as follows: 000, 001, 010, 011, 100, 101, 110, 111. The uncertainty of the recipient, in this case, is with regard to discerning which one of the eight possible messages is intended for him. In this case a three bit message would identify precisely one of these eight, thereby clearing up all uncertainty. It is of interest here to note that a great deal more knowledge is required in the source with eight messages than in the source of only two, for identifying a specific message. Therefore the source with eight messages has a greater entropy.

From our definition of a bit, it is obvious that it is a symbolic representation of a binary situation. It turns out that there is a relationship between the number of possible messages and the number of bits it takes to represent them uniquely. This relationship is a logarithmic one, so that the logarithm to base 2 of the number of possible messages is equal to the minimum number of bits necessary to represent them uniquely:

$$\begin{aligned} \log_2 2 &= 1 \\ \log_2 4 &= 2 \\ \log_2 8 &= 3 \\ &\vdots \\ &\vdots \\ \log_2 256 &= 8 \end{aligned}$$

i.e., if there were 256 possible messages, then a string of 8 bits would be required to identify each uniquely. In communication theory, the entropy of a message source is measured in bits per message, which is equivalent to the logarithm of the total number of possible messages in the source. An 8-message source has an entropy of 3 bits per message and a 256 message source has an entropy of 8 bits per message. As the number of possible messages at the source which the system can

generate increases, so does the entropy of the system. This is equivalent to saying that as the freedom of choice increases, so does the uncertainty increase. When a choice is identified, all of the uncertainty is cleared up. Entropy is a measure of this uncertainty. Any restriction reduces choice at the source and uncertainty for the recipient. At the limit, if only one specific message out of many is allowed to be transmitted, then we know with certainty which one it is going to be. Not having any uncertainty, its entropy is zero.

The entropy concept of information theory derives its roots from thermodynamics and statistical mechanics. In general, it consists of a finite scheme of a set of (n) events, such that one and only one of them can and must occur at each trial, each with its own probability of occurrence. If the event was a toss of a coin, then $n = 2$, and we have a pair of mutually exclusive events, i.e., head or tail. If it were a throw of a die, then one out of six possible messages would be the outcome. This suggests a probabilistic scheme with a state of uncertainty with regard to its outcome. The amount of the uncertainty or entropy increases with the increase of the number of possible outcomes, provided they are all just as likely to occur. In the case of the die, each side has its own probability of occurrence, $p_1, p_2, p_3, p_4, p_5, p_6$, and the entropy of the scheme is equal to the sum of the logarithms of all possible outcomes. The entropy of any one side of the die is the logarithm of its probability of occurrence, i.e., $\log_2 p$, where $p = 1/6$. But any one side will not occur on each toss. It will occur only with its own frequency of occurrence, which is $1/6$ in this particular case. Its contribution to the total entropy of the scheme is only $1/6$ of its entropy $\log_2 p$, i.e., its contribution is only $p \log_2 p$. Since p_i is always less than 1, its logarithm is negative and the total entropy of the scheme is $-(p_1 \log p_1 + p_2 \log p_2 + p_3 \log p_3 + p_4 \log p_4 + p_5 \log p_5 + p_6 \log p_6)$. If entropy is designated by H and the sum by Σ , then

$$H = - \sum_{i=1}^{i=6} p_i \log p_i \quad \text{where } i = 1, 2, 3, 4, 5, 6$$

If "tossing a die" is a message generating source, then it would have six possible messages and its entropy would be $\log_2 6 = 2.585$ bits per message. Using the above formula, the probability of any one number 1 to 6 to come up in a throw of a die is $1/6$ and its entropy is $\log_2 1/6$. But any one number 1 to 6 would come up only $1/6$ of the time; i.e., its contribution to the total entropy is only $1/6 \log_2 1/6$. This is true for each side of the die; therefore the entropy for the whole system is

$$H = - \sum_{i=1}^{i=6} p_i \log p_i \quad \text{where } p_i = 1/6 \text{ and } i = 1, 2, 3, 4, 5, 6$$

The sum of $p_i \log p_i$ is taken for 6 p_i 's which is equivalent to taking $6 \times p_i \log p_i$ where $p_i = 1/6$ and $\log 1/6 = -2.585$

$$\begin{aligned}
 H &= - \sum_{i=1}^{i=6} \frac{1}{6} \log \frac{1}{6} \\
 &= -6 \times \frac{1}{6} \log \frac{1}{6} \\
 &= -\log \frac{1}{6} = -(-2.585) \\
 &= 2.585
 \end{aligned}$$

which is equal to the entropy of the message source.

It was shown above that the entropy of a 4-message source was 2 bits and that of an 8-message source was 3 bits. In the situation of the die the message source has 6 possible messages, and its entropy turns out to be somewhere between the other two. This is as it should be. It is not exactly the average of those two, because of the logarithmic rather than linear scale relationship.

If in a message source each unit of information, no matter how small, could be identified uniquely by a binary code, so that if two messages were almost, but not exactly alike, there would be a separation of the two by this code; then the length of this code could be a measure of the amount of information it contains, provided that this code was the shortest possible one to construct. The amount of choice that exists at the message source for generating a message is equivalent to the amount of uncertainty that exists in receiving the message. The shortest possible binary code which identifies the sender's choice uniquely clears up all the uncertainty for the recipient. The amount of information content in the message is equivalent to the amount of uncertainty that it clears up for the recipient of the message. This is measured by the number of bits per message. The average number of bits for the shortest possible binary code structure for the message source should be the entropy of the message source. In practice, however, it is impossible to develop a binary code which will meet this requirement exactly. The entropy of a message source will be

$$H = - \sum_{i=1}^{i=n} p_i \log_2 p_i \quad \text{where } i = 1, 2, 3, \dots, n$$

The average code in bits will always be slightly larger than H , the entropy of the system.

How useful are these measures of information? With properly designed experiments it is possible to determine which body of documents, among several, has a higher entropy, i.e., provides more information. For example, based on a set of specified assumptions, the entropy of citations and the entropy of abstracts in a given environment can be determined. This information could be very useful, because creating abstracts is costly. Citations, on the other hand, are clerically derivable and therefore are free. The difference in entropy between the two can be related to the additional cost required to create abstracts.

In a practical and immediate sense, entropy can tell us how to shuffle a deck of cards properly. Suppose we are playing cards with a 52-card deck. A perfect shuffle of the deck exists when every possible combination or ordering of the cards is equally as likely. The number of possible such orderings of the deck is factorial 52 (52!) and the entropy is $\log_2 52 = 225.7$ bits per deal.

Suppose we now cut the deck into two equal subdecks and interleaved the two. This interleaving constitutes 52 steps if we take one card from each subdeck sequentially. This would provide only 2^{52} possible sequences. If each outcome or combination was equally probable, the maximum amount of information, i.e., its entropy, associated with this shuffle is $\log_2 2^{52} = 52$ bits per shuffle. If a perfect shuffle has 225.7 bits per deal and one interleaving shuffle only 52, then $225.7/52$, or at least 5 interleaving shuffles are required to shuffle the cards properly.

Thus we have a methodology, based on the given premises and assumptions, for evaluating the entropy of a system in bits per message. This entropy, in a way, is a measure of the amount of new information which the system can convey. All possible messages which this system can generate can be encoded in such a way that, on the average, the number of bits will be only slightly larger than the true entropy.

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EPHEMERAL MATERIALS

To an increasing degree, libraries are becoming involved in the collecting of ephemeral materials. Such materials present special problems in acquisition, cataloging, housing, and servicing. Special library collections cannot adequately cover their areas of interest without collecting ephemeral materials.

In actuality every librarian has a different concept of ephemeral materials. Most would agree that they include scrapbooks, photographs, prints, post cards, maps, clippings, menus, programs, posters, calendars, letters, legal documents, genealogical documents, designs, video tapes, slides, and moving picture films. Others would include the three-dimensional objects which inevitably arrive as one begins to collect ephemera.

Acquisition of these materials does not pose a problem. As soon as word is about that a collection is interested in such materials, the ephemera begin to arrive in profusion. The Curtis Theatre Collection at the University of Pittsburgh, which was founded less than a decade ago, is already refusing gifts of New York theatre programs of certain dates. With the profusion of special collections in recent years, it would seem that very clear-cut definitions of the scope of the collection must be formulated and followed. It should be decided, for example, what types of ephemeral material will be collected, what period in history is of interest, and what geographical areas should be represented.

The second problem to be faced is the proper cataloging of these materials. Should special cataloging be considered? Should the cataloging of the ephemera be made to conform as much as possible to that of books and periodicals? One of the distinct problems is that often these materials are three-dimensional objects which require special housing and handling. One thinks of citations, models, figurines, medallions, coins, and other objects which will come to collectors of ephemera. These, it might be said, are the concerns of museums and not of libraries. They come, however, as integral parts of collections and often provide important information for researchers.

Random perusal of the *Directory of Special Libraries and Information Centers* (1) indicates that the variety of ephemeral material in various library collections ranges along autograph collections, phono-disc collections, transcriptions and tapes, photographs, maps, blueprints, and sales catalogs. The Library of the Steamship Historical Society of America on Staten Island, New York, houses 20,000 post cards of ships and 1,000 steamship company folders. The History, Biography and Travel Division of the Cleveland, Ohio, Public Library contains an English parish register collection, a place names collection, and genealogical records.

These two examples will, it seems, illustrate the diversity of materials. The chief problem in processing the materials is to guarantee reader retrieval and to house the items in a way to allow proper shelving. It is advisable, as much as the requirements of the material permit, to make the cataloging of the material conform to the cataloging of the book collection—as has been stressed. However, the limitations of the Dewey or of other systems often make this difficult. In some cases, this material can be classified into a geographical location or into a specific item of the library's furnishings: e.g., "Closed shelves Northwest corner Special Collections Reference room" or "Locked cabinet Librarian's Office."

Another workable device is to designate a section of the library's stack area as, for example, the Robinson Locke Collection. In this portion of the stacks not only can the books and periodicals received in the archive be shelved, but also manu-

script cases of letters and documents, map cases, boxes of photographs, curios, and memorabilia. The boxes can be lettered or numbered or dated and the catalog card for a given item indicate that this miniature of Mrs. Locke is in Box #4 in this area or in the box covering the 1850-1899 period.

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PAUL MYERS

EQUIPMENT, LIBRARIES

Introduction

Well-equipped physical facilities are necessary to house library collections and provide library service. Special buildings for library use have been constructed for centuries. Most of these do not fit well into our modern ideas of library operation; however, they were considered appropriate at the time they were constructed. Any significant development of special furniture and equipment for use in libraries has been of more recent vintage than the concept of the special library building. In the twentieth century new emphasis on active service to users of library collections has resulted in significant changes in the concept in library architecture. As the library building assumed a more active role, the need for special purpose furniture for libraries became apparent and such furniture and equipment began to appear.

In early library buildings the furniture and equipment was general purpose furniture made to function for library use. Libraries before the twentieth century consisted largely of high-ceilinged rooms with books on high shelves requiring ladders for access, rows of long tables lit by individual reading lamps and seating many readers at straight chairs. Books not on shelves in reading rooms were in closed stacks which were serviced by members of the library staff. An early technological development that assisted in serving these libraries was the annunciator board which enabled library staff to notify silently the requestor that the material requested was available. These can still be seen in some large libraries using closed stacks.

The first 40 years of this century saw no great changes in library practice and operation; therefore library architecture and interior planning remained relatively static. The early development of the branch library system and accelerated development of libraries in the smaller institutions of higher learning seem to have begun to bring about innovations. Such institutions did not have book collections large enough to require page service and they became open stack libraries. Opening the stacks in these libraries of relatively generous size permitted less formal grouping of library collections and relieved the necessity to concentrate seating into relatively tight quarters. Some informal furniture and furniture groupings began to appear in such libraries. This de-formalization quickly invited librarians to begin providing advisory and reference services that had previously not been feasible. As competent librarians became acquainted with the needs of their users in these less formal relationships, it became apparent that users found this de-formalization pleasant and that their needs for information and library materials were much more easily met. This, of course, accelerated further de-formalization of libraries, and this trend continues today.

The intent of librarians to answer as completely as possible the informational needs of their users has extended to a need to satisfy patron needs for information that is available in forms other than books. The recent development of microform technology and other educational media has great influence on the type of furnishing provided in libraries today.

Today's new libraries are nearly always planned to be open and flexible and to provide maximum access to whatever library materials the users may need. The few exceptions seem to be some national and special libraries (law, medicine, business, etc.), and the trend toward openness and informality is making rapid progress in these relatively conservative bastions of library formality.

LIBRARY FURNITURE TECHNOLOGY

Before World War II only three or four companies did any significant percentage of business providing furniture and equipment for libraries. Pioneering technology seemed to be concentrated mostly on bookstacks and card catalogs. Book trucks and special stands for atlases and dictionaries were available relatively early, but these were not necessarily distinctive to libraries. The end of World War II saw new libraries springing up all over the country, and the consequent interest of the

industrial community in this market resulted in the establishment of a number of companies, a major part of whose business was furniture and equipment for libraries. The "Edubusiness" boom of the Sputnik era further accelerated this trend, and today there are probably a hundred companies concerned to a large extent with providing furniture, equipment, and supplies for libraries.

While some of these companies are in direct competition with early pioneering companies which produced general library furniture and supplies and are basically competing for this enlarged market, a good many other companies are selling items that no library would have thought of purchasing 50 years ago. In many cases, of course, these products were not even in existence 50 years ago. The new library under construction today will be furnished with diverse items such as mimeograph machines, sand urns, exhibit panels, spotlights, paging systems, wrapping tables, printing presses, computers, automatic typewriters, and fork lifts, along with the more traditional carrels, shelving, dictionary stands, microfilm readers, and card catalogs. An annual listing published in the Building and Equipment Issue of *Library Journal* and reprinted in the *Bowker Annual* lists manufacturers who provide products for libraries along with the subject listing of such products that refer back to the company producing them.

Architecture and Furnishings

Our change in life style during this century has been reflected in architecture as in all the arts. De-formalization in architecture acted upon and reacted to the changes in philosophy of library service, which, of course, also was a reaction to our change in life style in this century. As concepts of space and architecture became less formalistic, more open and flexible space design became possible for architects. Thus the librarian writing a program requesting space planning that permitted an informal program of library service was responded to sympathetically by an architect who now himself inclined in this direction. The result has been library spaces that are much more appealing to users and comfortable for staff operation. These spaces permit changes in function without difficulty.

One important result of the new library architecture is provision of fewer closed rooms. It was formerly necessary to provide these for separate functions to allow privacy, satisfactory environmental conditions, and because of structural considerations.

New advances in structure have now made it possible to design library spaces which are similar to lofts; the use of carpeting and increased flexibility in distribution of mechanical systems have resulted in great reductions in the number of closed rooms needed in libraries. Along with obvious results in flexibility and increased attractiveness, this trend has also resulted in the use of such movable library furniture as partitions and room dividers. Bookstacks, both full height and counter height, with and without backs, can divide functions in an attractive way and yet can be rearranged or removed overnight. Exhibit panels and decorative screens of various sorts offer similar possibilities.

The new flexibility allowed by newer styles of architecture has encouraged other important trends in furnishing libraries. Built-in furniture, with its attendant problems and inflexibility, has become less popular. Modular furniture has become more popular. For instance, the built-in charge desk with nonstandard components seems to be on its way out.

Architects should be encouraged to consider the importance of satisfactorily furnishing new buildings so that they can provide for functional, flexible service patterns through the life of the building. The librarian should point out in his program such things as the difficulty of utilizing satisfactorily building perimeters when insets and offsets are used frequently as part of fenestration. It is, of course, possible to design building equipment to fit into such spaces, but this is obviously adverse to the concept of flexibility. It is even possible sometimes to get standard furniture to fit into such areas but this is by no means certain and the librarian should not be forced into having to place certain kinds of functions or furniture in certain locations because of spaces the architect has provided. It is also important to see that mechanical designers do not obviate the utility of perimeter and other spaces with unit ventilators and other kinds of mechanical distribution systems that obtrude into library functional space. It is perfectly feasible with present technology to mount mechanical systems in such a way that there need be no conflict with furniture placement, and librarians should insist on such design.

Fads in architecture often cause difficulties for persons planning library interior spaces. The trend toward expansive use of glass experienced several years ago had many unfortunate results, among them a disinclination to place anything undecorative inside glass walls for fear of disturbing the aesthetic for the viewer. The result of this, of course, was that librarians responsible for furnishing such spaces were limited in their choice. The current fad (1971) is for use of rather massive forms in architecture which, in turn, almost calls for use of relatively massive furniture. This in turn limits flexibility, capacity, and makes specification more difficult. It is easier to furnish a relatively unspectacular building design than it is to furnish the "prize winner." The "prize winner" frequently reflects the current thinking of some architect to such a degree that it may be almost unlivable and it will certainly be difficult to furnish. Of course, the architect's answer here is that he should furnish the building. This frequently has disastrous results.

Economic Considerations

At this writing it appears that the end of an era in building and furnishing libraries is here. In the years since Sputnik, libraries have enjoyed expanding interest from a population that has been willing to equate unprecedented support of the expansion of public schools, public libraries, and institutions of higher education with progress. Those libraries that have already been built and equipped are indeed fortunate. It is hoped that the furniture for them was well-selected because it is likely to be difficult to replace in the new economic climate. Those libraries that are still needed

and fortunate enough to be funded in an era of lesser revenue devoted to educational purposes should consider the furnishing of their libraries very carefully. Such institutions would be well-advised to learn from the errors of the past. It would be helpful here to visit libraries that have been built and furnished during the last 5 to 15 years. Furniture that has not retained its appearance and utility for 15 years is certainly not appropriate for the needs of the library being furnished today. A competent consultant who knows furniture construction and who can help to educate the specifier in this area can be helpful. A few dollars spent on visits to libraries and furniture factories with a consultant as well as paying the consultant's fees will be more than repaid by money saved for an institution by a now knowledgeable specifier.

The librarian specifying furniture for a new library should be very careful about audio, video, and other relatively advanced systems of media. The best planned of these have often foundered on the seas of faculty indifference or inadequacy, and the library cannot do this job alone. It is unfortunately too frequent that, for lack of programming material, such systems sit idle in recently built libraries. On the other hand, it is important to prepare in any way possible for development of future technology within newly designed libraries. Some institutions have placed blank conduits in columns of newly planned libraries for later addition of distribution systems along with provision of ample power for future development of such systems. Such provisions can be made in advance at relatively low cost, but their later addition will cost considerably more. The librarian concerned with furnishing the new building should bear in mind that funds for initial equipment are often relatively generous. Occasionally quantities of chairs, shelves, etc., above those immediately needed can be bought and stored for later use.

Operating funds are frequently harder to come by than initial equipment funds. A sharp buyer can often buy initial equipment that will result in a later saving of labor.

Layout

If the librarian has been as closely involved in planning the building as he should be, the general layout of the spaces in the building will be designed for the program to be carried out in that building. However, a great deal of time will still need to be devoted to the specific layout within each area. When an architect plans a building, he is, of course, concerned with the interior spaces as well as the building's exterior. He will certainly want to be involved in the specific planning of interior spaces. However, the librarian must take ultimate responsibility for the satisfactory layout of the building for only he understands the functional considerations in the building's operation as a library.

The librarian working with the layout of specific spaces must be sure that he has the proper tools to work with. First, and foremost, is an accurate plan of all the building's interior spaces. This plan must reflect the latest changes in the building's

design and construction. The wise librarian will not accept the plan at face value but will conduct measurements in areas where tolerances are close. This can cause particular problems when trying to fit stacks into a tight module. Columns are frequently misdimensioned or mislocated by fractions of an inch and this can make a difference in utilizing planned areas. Architect's scales, drafting pens and pencils, templates that have furniture used in libraries, and other drafting aids can be helpful in this process. Many librarians will have difficulty using two-dimensional plans as aids to visualizing interior spaces. There are sets of models on the market that will permit layout in three dimensions.

When assistance in layout is not available or requested from architects, professional assistance is generally available from the manufacturers of library furniture and equipment who hope thereby to influence the selection of furniture. The assistance these firms can offer, particularly the larger and older firms, can be helpful and should be accepted if all understand that there are no strings attached and no guaranteed order. On the other hand, a librarian cannot expect too much free service from a manufacturer whose basic purpose is to sell furniture. In some cases, the services of interior designers will be available to librarians for layout of interior space. However, it is the rare interior designer who has any understanding of the operation and function of libraries. Again, work on layouts can be initiated by architects, by manufacturers' representatives, and by interior designers. However, the librarian must be in a position to make final determination of layout for only he understands in full the functional operation of the building. During this process the assistance of a knowledgeable library consultant can be very helpful. The experienced consultant will have worked with a number of different libraries and their layouts and can caution against pitfalls as well as bring ideas in from outside.

Some Tips On Layout

1. Most of the standard items of library furniture are designs based on long experience. Do not try to redesign everything. On the other hand, it is frequently useful to consider new approaches. For instance, there are types of library furniture where no satisfactory standard product is yet available (i.e., microform carrels). A good new design is overdue. However, most items of library furniture are designed and work the way they do because of years of experience. It would be unwise to replace a standard item that had proven itself with an untested new item without very good reason to anticipate success in its utilization.
2. Simplicity is almost always a virtue. This is particularly true with furniture and its layout.
3. Try to avoid large regular placement of similar elements, for instance tables or carrels. Avoid the "prison dining room" effect by varying arrangements.
4. Shelving can frequently be placed to advantage in a radial pattern. A person standing in the area of main traffic concentration can thus see end panels of shelves with their directory information.
5. Functions change and layout must change with them. Don't expect the initial

furniture organization to be satisfactory for all time. Equipment should be readily movable. Don't buy excessively large pieces (i.e., four- or six-place carrels, tables seating more than four, etc.).

6. Try to use right-hand traffic pattern at the entrance and exit. Users will feel more comfortable.

Of course, the basic purpose of laying out the space, and this should never be forgotten, is to make the building an easy and pleasant one for its users. Traffic patterns should be kept as simple as possible. Whatever the type of library, the building should be organized so that the materials being sought by the largest number of users are located closest to the main entrance-exit and that the bulk of traffic does not need to come too far into the building. This means that those readers looking for more serious or esoteric items will come further into the building but will find more personalized service as well as peace and quiet in these remoter recesses. Another important consideration in this connection is a layout that permits the least transportation of library materials. This will save staff time, cut down on operating expenses, and improve staff morale.

A final most important consideration is the importance of keeping the library simple, easy to use and find one's way around in. Too frequently it is difficult for the first-time user to become acclimated to and feel comfortable in large libraries. Many potential library users are "turned off" by forbidding or unduly complicated interior arrangement, frequently complicated by inadequate directory information. Simplicity in organization and layout and inspired use of graphics and directional signs will accomplish much more in making the library a pleasanter place for its public to use.

Selection of Furniture

A new building's architect has a natural concern for the total concept of the building and its aesthetic values. His natural interest in the planning of interior space will almost certainly be accompanied by ideas about how he wants it furnished. An architect's feel for the design and color of the space he has designed is natural, and the institution and the library should certainly appreciate his concern and advice in this matter.

His advice in the area of color will probably be superior to that of most librarians and can usually be accepted almost without question. This is almost equally true of design. The architect's feel for sizes and shapes would be superior to those of most librarians.

The librarian, on the other hand, will be principally concerned about utility and durability. The librarian will be the ultimate authority on utility and will frequently have to be the chief advocate of durability. Librarians have been accused of being unreasonable in their demand that library furniture be durable enough to last 25 or 30 years while retaining as much as possible its original appearance. Architects and

decorators, accustomed to working with furniture for commercial purposes that is replaced every 10 years, find it difficult to think of furniture durability in these terms. Nonetheless, it has been fortunately true that the best manufacturers of library furniture have produced products that have lasted 25 or 30 years or longer and do not think it unreasonable that the furniture selected for new buildings should perform equally well.

This seems to indicate conflict between the aesthetic concerns of the architect or designer with the librarian's concern for durability. This conflict is more apparent than real. It is possible for a *good* manufacturer of library furniture who is accustomed to the stringent requirements of librarians for the best in construction methods and finishing to take nearly any intelligent design from an architect or designer and make up furniture that will last long enough to suit the most demanding librarian.

The solution then is to utilize to the maximum the talents of the architect and/or designer for their aesthetic judgment in design and color and for the librarian to work closely with the furniture specifier to assure that the specifications are written in such a way that the furniture the architect/designer chooses is indeed manufactured to the standards necessary for durable library furniture.

Architects and designers will frequently want to design, specify, and purchase furniture for the library. This should be discouraged. It is difficult to get really competitive bidding and difficult to avoid the possibility of collusion between the designer, for example, and the vendor. Incidentally, custom designed furniture is invariably more expensive than standard furniture of the same quality. If it is competitive in terms of price, the value is typically less per dollar. After all, it does cost money to design and engineer new items or lines of furniture, and if it is a custom design for a given library, this development cost must be added to the cost of each piece. An item available in a standard line, on the other hand, amortizes its design and development costs over much greater volume.

Another important factor to be considered when selecting furniture is that of maintenance. Too frequently institutions are being forced to lower maintenance standards in days of stringent budget cuts (1971), and the furniture that requires little or no maintenance while retaining its beauty and utility is obviously superior to a piece that is difficult to care for or requires constant attention.

If the librarian is to be involved in the actual selection of furniture, visits to other libraries, furniture showrooms in large cities, furniture factories, and conventions not usually attended by librarians, can all be very helpful.

Wood, Metal, or Plastic

Most early library furniture was made of wood and, to a lesser degree, of metal. Metal provides the maximum in strength and durability, can be fabricated relatively easily, and is not terribly expensive. However, in many applications it is not appealing to sight or touch and its use in designs are mostly of the straight-line variety.

Wood is warm in appearance, quite durable, easily fabricated and worked, and relatively inexpensive. It is no longer available in quantities that will permit it to be used in solid form for most applications, and it is quite commonly used in veneer rather than its solid form. Plastics come in many varieties which have different aesthetic and utilitarian qualities. They are almost infinitely workable, are quite durable, and offer many possible colorations. However, they are somewhat cold in appearance and feel and do not have the warmth and character of wood.

Two or three of these materials are frequently used in combination in any given piece of furniture. Wood continues to be the preferred material for much library furniture because of its warmth, lasting beauty, and ease of fabrication. It does not come in a great range of color or finish possibilities. When color is added to wood it looks either artificial or no longer looks like wood. On the other hand, the principal objection to plastics and metal lies in their tendency to look tired after relatively short periods of use. Many persons selecting furniture for libraries will use wood principally because of its warmth and aesthetic qualities, and will attempt to introduce color in upholstery on seating and in other ways.

Wood

Wood used in library furniture is frequently not solid wood but wood veneers used over other materials. The supply of solid wood available in large sizes is no longer generous and, when such wood is available, it is very expensive. On the other hand, veneer can be sliced from relatively small trees. A tree cut into fitches (slices) of veneer will go a long way. These veneers are then laid up into plywood, sometimes called lumber core. Plywood is a series of layers of thin slices of veneer fastened together by alternating layers of glue. Frequently slices from less expensive woods are used in the center plies and only the "face veneer" is of the species specified. Another type of formation utilizes face veneer with chip core or particle board or flake board. These last three are different names for what is essentially the same material; a plasticized wood material fabricated from chips of wood held in suspension in adhesive. Many librarians will be familiar with this material in one library manufacturer's version of workroom shelving which is chip core with no veneer facing. Placing of face veneer over this chip core provides the kind of work surface used for most library tables, carrels, wood office desks, and similar materials.

Solid wood is quite expensive, particularly in the close grain, more durable woods. These are hardly ever available for anything larger than table legs or tops of quite small tables. The use of solid wood in table tops of any size is generally not advantageous because of its cost and lack of dimensional stability. Wood is an organic material and it changes in size and shape as its moisture content increases and decreases. Great care must be taken during the manufacturing process when solid wood is employed to assure that the moisture content is reduced to between 4 and 8% and that the finish is applied in such a way that it can do a reasonably

good job of retaining this moisture content. Otherwise in nonair-conditioned facilities wood will expand and contract with the seasons and this can have some very unfortunate effects on its appearance and utility. The best industry practice in working with solid wood utilizes air drying for probably 4 to 6 months, followed by a period of concentrated drying in dry kilns. Some of the better manufacturers feel that 4 to 6 weeks is about the right period of time for furniture wood to be treated in the dry kiln. Then a period of perhaps 2 weeks for the wood to temper or rest before it is worked seems advisable according to the best practice. If these steps are taken, the wood to be worked with, if properly finished during the fabrication process, can retain its dimensional stability and attractiveness for many, many years and there should be no problem with joint separation due to seasonal moisture variables.

Dimensional stability is less of a problem with plywood and still less a problem with veneer covered chip core. However, the best manufacturing practice still demands that adequate moisture control be maintained during the use of these materials in construction as with solid wood.

Lumber core plywood has less tendency to warp than solid wood and is its equal in nearly every other way. Chip core is superior to solid wood and lumber core plywood in dimensional stability, uniformity, ease of fabrication, and cost. On the other hand, many experts feel it falls short in resistance to displacement under heavy weight. For this reason, many knowledgeable specifiers prefer lumber core or solid wood when load bearing is important, such as in wood shelves and the tops of long tables.

In selecting wood furniture, an important consideration is the variety of wood chosen. Woods vary greatly in toughness, color, and appearance. Maple and birch are the hardest woods generally used in the manufacture of wood library furniture. They are both light in color and lack grain and contrast. They can be finished in a great variety of finishes but their lack of grain still remains a handicap. These woods, if not used throughout the library, should be seriously considered for use in side chairs which probably take more of a beating than any other piece of library furniture. White and red oak are not as tough as maple and birch, are somewhat darker in color, and have a pronounced grain. White oak is superior to red for nearly all applications and should be the preferred type. As of this writing the use of oak in libraries seems to be the current fad, but it is difficult to tell how long this will last. Oak will accept stain and become quite dark when desirable but always retains its characteristic grain. Walnut and pecan are darker woods with some grain. Walnut has been used in libraries for many years and continues to be popular. It is a less close-grained wood than either oak, maple, or birch, and for this reason does not have quite the strength that these woods possess. However, it is heavy enough for nearly all application in libraries. If the specifier chooses to furnish the library in walnut, he may possibly want to have the side chairs and card catalog drawer fronts made of maple with a walnut finish.

Other woods are occasionally used in libraries but tend not to be so readily available and are generally more expensive. Ash is beginning to see some popularity,

and chairs in elm, primarily made in Canada, are beginning to find a market in this country. Some libraries have been finished in cherry although this is an expensive wood and its distinctive color has a sameness that becomes apparent in a large installation. Teak and rosewood are occasionally found in veneer tops of special pieces, but these woods are probably too expensive for most libraries even when fabricated in thin veneers.

Another factor of considerable importance in the strength and durability of woods is the part of this country in which they are grown. The hardwoods from which library furniture is fabricated are found from Maine to Georgia. However, the hardwoods that grow in the South grow more rapidly because of the longer growing season while the hardwoods grown in the northern part of the country take longer to mature. As a result of this longer period of maturation, northern hardwood is tougher and more long lasting than southern woods of the same variety, other factors being equal. An additional factor which must be taken into account, of course, is the quality of the wood to be used in fabrication of wood library furniture. This difference of quality within varieties of the same wood results in the necessity for grading lumber. While these ratings are not as clear-cut as those of the USDA program for grading meats, it is well for the specifier to learn the differences among the grades and to write specifications that assure inclusion of the highest grade lumber in the furniture to be purchased.

We have just mentioned the importance of working with wood of high quality that has been brought to the proper degree of moisture content. Two other factors are of extreme importance in the manufacture of good wood furniture. They are joinery (the techniques by which different wood components are fastened together to produce finished furniture) and finish (the final treatment of the surface and subsurface of the fabricated item of furniture with a protective coating to keep out elements that would do damage to the wood fibers and maintain a relatively constant moisture content).

Joinery is accomplished with mechanical fasteners (screws, nails, clamps, etc.) or adhesives. In wood chairs, where joinery is especially critical, butt joints with corner blocks and double dowels for increased gluing surface are superior to other joints. Some manufacturers continue to insist that only animal glue, which must be kept in heated pots and used the day it is made, will provide the best joint; other manufacturers of furniture of equal quality swear by some of the new synthetic glues. Some of the larger manufacturers are adding electronic gluing equipment for gluing up large, flat surfaces. This can be a very good technique for table tops but obviously is of little help in the fabrication of chairs. Incidentally, few manufacturers of wood case goods (tables, carrels, card catalogs) manufacture chairs as well. Generally chairs are manufactured by specialists in chair manufacture. Some manufacturers of high quality case goods may not sell seating of equal quality. Consequently, some specifiers will write specifications for separate bids for case goods and for seating, utilizing the practice of the best manufacturers in each field as a guide. There is no single source of supply for library furniture through which the very best quality in both seating and case goods is available.

Metals and Plastics

There are greater possibilities for imaginative design in metal and plastic furniture or in furniture combining these two with wood than there is in furniture of wood alone. As mentioned earlier, however, furniture made of metal and plastic does have a tendency to look old before its time, and while this may not affect its usability, it certainly becomes an aesthetic problem. The specifier will not need to be as concerned about the subtle differences in quality among metal and plastic furniture as he must in wood furniture. Metal and plastic are not so subject to variations in temperature and moisture and the consequent possibilities of damage and violation of joints. Joints in metal and plastic furniture can be tight and rigid for they need provide no possibility of expansion and contraction. In such furniture, finish is generally not a problem area. In general, the only concern in such furniture is that it be strong enough to hold up under heavy use. Incidentally, if metal bases are used and the specifier wishes to avoid the metallic appearance, mirror finishes pick up floor color and look less metallic.

The use of furniture made only of plastic is continuing to increase at a relatively rapid rate. Polyurethane foam, which was used primarily as a padding for upholstered pieces, is now being molded into rigid frames with softer versions of the same foam covering the hard frame. A variety of imaginative free-form approaches to furniture design are possible using these materials. It has not yet been conclusively demonstrated that such pieces can have general use in the library where the requirement for durability and long life is so important.

Specification

Once the furniture desired is selected, it becomes imperative that the selector work closely with those officials actually responsible for purchasing to assure that the furniture received is equal in all respects to the furniture he wants to specify. This is no easy task. Many purchasing agencies are firmly wedded to the principle of awarding contracts to the lowest bidder without questioning bidder qualifications. The wise librarian will learn as much about furniture construction and the products of the companies that serve libraries as possible. After doing this homework it is wise to get a consultant who knows the library furniture business. The librarian is then in a position to be influential in writing specifications for the furniture needed for his library. The average purchasing agencies will generally respect a specification that will open the bidding to the largest number of competent bidders and yet will eliminate those whose products cannot meet the necessary standards. Specification can be as simple as the manufacturer's name and model number of a product which the specifier wants from only one source or can be a complicated document that lists physical characteristics, performance standards, exact dimensions, and describes the process of manufacturing or fabrication in minute detail. Few institutions will consider ordering an item of furniture or equipment costing any considerable sum

of money from one manufacturer without attempting to obtain quotations for similar items from other manufacturers because of the hope of getting the same merchandise for a better price. Indeed, any agency receiving funds from any of the various levels of government will almost certainly have to obtain competitive bids for the item needed. Any specifier who insists that only the product of a given manufacturer will suit his purpose had better be prepared to justify his course.

Another form of specification is the "or equal" specification which lists products of one manufacturer but permits bids from other manufacturers who feel that they have a product that is comparable or superior to that specified. The specifier listing an "or equal" specification should have enough technical information at hand to be able to determine whether or not the competitively bid items are indeed as equal as they claim to be.

Specification writing, i.e., preparation of detailed specifications for items of equipment or furniture that include physical properties, performance, exact description, dimensions, and methods of manufacturing, is extremely difficult and requires some technical knowledge. Generally the librarian will not have enough information to enable him to produce satisfactory specifications. Furniture manufacturers, of course, are generally happy to provide specifications but the specifier must be careful that the specification provided is not "proprietary," i.e., that only the manufacturer supplying the specification can meet the specifications. Again, a consultant can be of some help in distilling from a specification the parts of it that are general enough to assure high quality and promise of durability without limiting the bidding to products from the manufacturer who has supplied the specification.

A potential problem is that some manufacturers of low-quality merchandise will say that they can meet the specification for a high-quality item, then supply low-quality items in hopes that the purchasing agency will not take the trouble to reject the item and require that the low bidder meet the specifications satisfactorily. Strangely enough, some purchasing agencies will not bother to return unsatisfactory merchandise, and it is frequently worth the time of some such companies to bid without actually expecting to meet the specifications, counting on the low rate of specification enforcement to give them sufficient business to get by on. If one of the companies bidding is generally known to manufacture items of quality lesser than specified, visits to other installations made by that manufacturer, insistence on presentation of samples, and a check on financial responsibility can provide information that will help justify throwing out this bid.

Some purchasing agencies wisely permit limiting of the bidders to those who are known to be responsible and capable of providing the needed objects. Frequently they request bids from three competent bidders and will not solicit or accept bids from other bidders. This can be helpful in keeping the manufacturers of merchandise of low quality from getting involved in the bidding process.

As mentioned earlier, manufacturers are a principal source of specifications but the specifier must be careful not to permit these to become proprietary. Designers, architects, and purchasing agents are other sources of specifications. Those provided by architects and designers too frequently do not recognize the importance of dura-

bility in furniture for libraries, and the same is true to a degree of those specifications purchasing agents may have available. An amalgamation of specifications by several manufacturers, general enough so that they can be competitively bid, yet demanding a high standard of quality, is a good approach to specification preparation. A draft of such a specification can then be sent to interested manufacturers for reaction and suggestions. This method is time consuming but is almost certainly worthwhile for relatively large contracts.

Obviously, the best specifications are worthless if the purchasing agency is not willing to enforce them upon successful bidders. The careful specifier will need to work very closely with the purchasing agency at every stage of specification preparation, bidding, and final negotiation to be sure that the contract awarded to the successful bidder is indeed for what he wants. If, for some reason, he is dissatisfied, every effort should be made to investigate carefully the apparent low bidder to determine whether there are reasons why he is unlikely to be able to complete the contract satisfactorily. Such evidence can then be presented to the purchasing agency to prevent awarding of contracts to an unsatisfactory bidder.

It is not possible to prepare a specimen specification that will cover all cases, but listed below are a good number of factors for inclusion in those specifications that have proved useful to some specifiers.

Hints on Specification

The bidder should be himself or a representative of a long-established, thoroughly experienced, financially responsible concern which has been for a period of time manufacturing library furniture. Some specifiers will use a specific period of time such as 5 or 10 years.

All wood furniture should be manufactured in one factory with all lumber being on hand at the time of bid. Air drying, kiln drying, tempering, cutting, fabrication, and finishing should be performed in the same factory. Obviously, a manufacturer who is able to make all his frames and components (excepting hardware) is in a much better position to control quality than the manufacturer who assembles furniture from components manufactured at other locations. Also, mentioned earlier was the critical importance of maintaining proper moisture control in wood furniture. This requires that lumber be delivered, fabricated, and finished in one plant before it has a chance to absorb moisture. The manufacturer must have facilities for air drying and kiln drying on his premises. It is not satisfactory to bring in kiln-dried wood from other locations, for it is impossible to control the conditions under which such wood is transported.

Each bidder should be required to submit a list of locations where he has made installations of his furniture within recent years. At least some of these should be close enough so they can be visited.

The manufacturer should be required to guarantee fully and unconditionally the items of furniture against defects in workmanship and materials for a period of 1 year of use and occupancy. He should bear all expense for repair or replacement of furniture during this period of time.

It is often well to require an affidavit from the manufacturer to the effect that the wood used in the furniture was properly kiln dried, that he had the actual lumber used in the furniture on hand for the proper period of time before the furniture was fabricated, and that he will meet the specifications without deviation.

If the bidder does propose to bid alternates to the material specified or to deviate from the specifications in any way, such deviation should be clearly indicated by the submission of detailed shop drawings with complete specifications showing exactly what substitutions the bidder proposes to make.

It is almost always a valuable practice to require the submission of samples on the part of all manufacturers. Such samples should be delivered at the time of bid submission so that the purchasing authorities and specifiers can have an opportunity to evaluate the merits of products of various manufacturers and to see any proposed deviations that manufacturers wish to make. In addition, of course, provision of samples does require some financial responsibility and effort on the part of the manufacturer so that it sometimes helps to indicate serious intent.

When bids are received from unknown manufacturers, it is helpful to check the credit rating of the manufacturer. There have been cases where very small companies with no financial resources have taken on large contracts and then been unable to fulfill them, leaving the purchasing agent without the furniture needed when the building is ready to occupy. Checking financial responsibility with Dun & Bradstreet or other agencies will assist in determining fiscal responsibility.

In the manufacturing of wood seating one sign of good manufacturing capability is the availability of steam bending machinery. Steam bending provides the capability of putting simple and complex curves in wood chair rails and similar wood surfaces without loss of strength. The availability of steam bending equipment is one indication of a company that is willing to invest funds in workmen and machinery to enable them to make furniture of better quality.

It is well to ascertain that the facilities of the manufacturer are open to inspection by knowledgeable personnel from the agency concerned to insure that the manufacturer meets the requirements of the specifications. As mentioned earlier, it is important to ascertain that satisfactory moisture control has been maintained throughout the manufacturing process. Wood should be air dried to a moisture content of 17 to 20%, kiln dried to a moisture content of 4 to 8%, and then allowed to cool and temper approximately 14 days before fabrication.

The best furniture is at least partly finished by hand. Unfortunately, most manufacturers spray all their finishes. Hand rubbing is imperative to provide the best finish.

The intent of the specifications shall be to indicate that the intent of the specifier is that bidders should not provide furniture of ordinary commercial quality, but rather that the furniture shall be of the highest grade, workmanship, and materials, that the best cabinet making practices and construction shall be utilized, that the dimensions shall be maintained accurately and that $\frac{3}{4}$ -inch work shall be a minimum thickness unless otherwise specified, that all joints shall be morticed and tenoned, that all work shall be securely glued, that all glue used shall be the best quality, water-resistant glue having the greatest possible resistance to moisture, and

that exposed surfaces shall be entirely free from machine marks and evenly sanded for finish.

Specific Items of Library Furniture

TABLES AND CARRELS

Readers have apparently used tables as long as there have been libraries. The ancestors of carrels were tables that had partitions erected on them to provide privacy for their users. Both have changed and become more sophisticated and specialized in recent years.

Library tables come in a variety of sizes and shapes but the rectangular table, 3×5 or 4×6 feet, seems to be most common. The 4×6 foot table is becoming more common recently because the 3×5 foot table seems to be so small that a fourth reader is hesitant to join three other readers for lack of apparent space. The 4×6 foot table, on the other hand, provides what seems to be a comfortable amount of space for each reader and a fourth user seems to have no qualms about taking the seat. Earlier tables were much longer, seating ten or more. Such tables are still found today in some larger research libraries and, of course, some national libraries (see Figure 1). They offered little in terms of flexibility or aesthetics but



FIGURE 1. *Inflexible libraries used inflexible furniture. Sullivan Memorial Library, Temple University. (Courtesy Library Bureau, Remington Rand.)*



FIGURE 2. *Table of modern design, but built to last. (Courtesy Sjoström USA.)*

were appropriate in some installations. Round tables are relatively common in libraries and occasionally square, trapezoidal, and triangular tables are encountered. These generally do not provide efficient use of seating area and do not provide readers with a comfortable space.

The apronless table, 29 inches in height, is a table under which the reader's legs fit comfortably, and it has become almost standard in libraries in recent years (see Figure 2). Table undercarriages are generally left relatively plain for ease of maintenance. Table tops were once solid wood but are generally wood veneer over chip core or lumber core plywood. Libraries anticipating heavy use or abuse of table tops frequently utilize high-pressure laminate surfaces on the table top. These are relatively indestructible, can match the finish of the wood satisfactorily, are easily replaceable, and can be obtained in many different colors, surfaces, and degrees of light reflectance. This writer feels that lumber core construction is most satisfactory in tables 4 × 6 feet or larger. Chip core is used satisfactorily for many purposes in library furniture construction but there does seem to be a tendency toward warping and sagging in the longer expanses. The construction of the edge banding around the table top is most important. Use of a rounded lumber edge or T-model vinyl pad seem to be satisfactory ways of absorbing the kind of abuse table edges receive. Self-edging is less satisfactory and is not recommended.

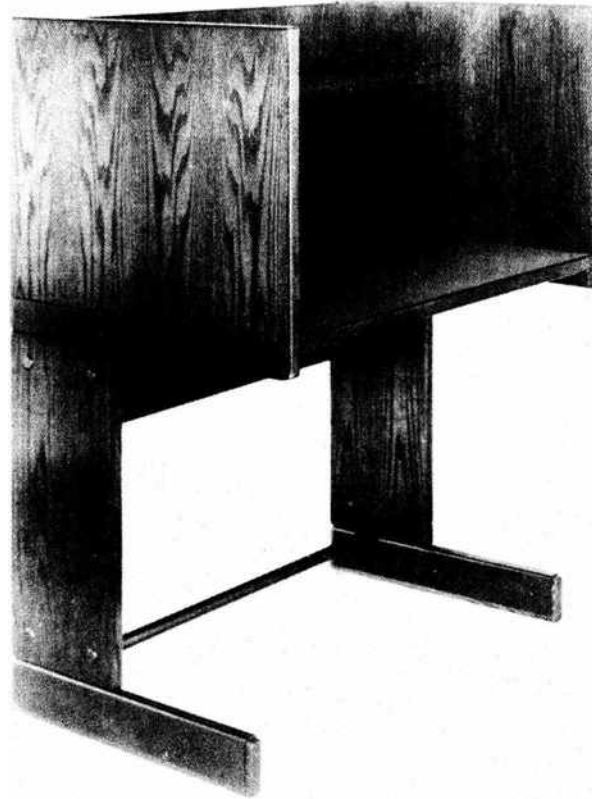


FIGURE 3. *Up-to-date design in an oak carrel. (Courtesy Sjoström USA.)*

Cushioned self-leveling glides are recommended on library tables and carrels. Keels are generally added to the undersides of long or wide tables to help beef up the structure so that the weight bearing capacity toward the table's center is satisfactory.

Recent years have seen a great increase in use of carrels in libraries, particularly academic libraries (see Figures 3 and 4). Their use is frequently related to the needs of the serious reader or researcher who needs the additional privacy such single user stations afford. Carrels come with partial and full returns. In the partial return, the sides of the carrel do not come all the way out to the front of the work top. The full return offers greater privacy, bringing the carrel's sides out to the front of the work surface or beyond and assuring a considerable degree of protection from visual and aural noise. Most carrels have a book shelf at the back above the work surface for books and other materials. Single carrels generally provide work surfaces approximately 24×36 inches or 6 square feet, the same as is available to a user in $\frac{1}{4}$ of a 4×6 foot library table. Carrels larger than 24×36 inches are becoming more popular, particularly in colleges and universities where students and faculty seem to require larger working surfaces than a standard carrel affords. Work surfaces of carrels are generally 29 inches above the floor and the back of the carrel should probably be 52 or 53 inches above the floor to insure freedom from

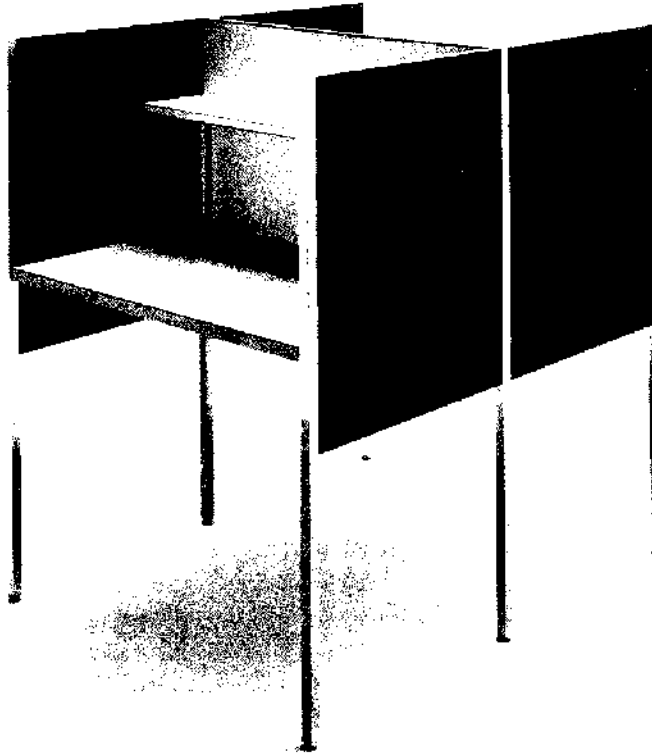


FIGURE 4. *Attractive carrels are available in metal and plastic. (Courtesy Steelcase, Inc.)*

visual disturbance. The comments about work surfaces, construction, and edge banding are the same for carrels as they are for library tables.

In recent years, carrels have become a popular medium for installation of audio and video equipment. Nonbook learning resources seem to lend themselves to use in private study spaces such as these. Many carrels these days are specified as "wet" carrels, i.e., they either come with audio and visual equipment installed or have wire channels, gutters, raceways, or are in some way prepared in advance for later installation of audio or visual equipment. Such carrels intended for private use of audio and visual equipment are often intended for use over relatively long periods of time and frequently include locker space for lunches and other personal belongings, coat hangers, and are frequently fully or nearly fully enclosed. Of course, the more specialized and complex they become, the less flexible they are. There currently seems to be a trend away from dial access and other systems which employ audio and visual receiving equipment fixed in place. This year the cassette, both audio and video, seems to be the coming thing, and cassettes and their performance/recording equipment are more amenable to experimentation and rational growth, and offer flexibility that locked-in-place systems cannot offer. Cassette players for audio tapes are frequently small, easily portable, and can be carried to carrels and other places in libraries.

Carrels come in different configurations with seating capacities from one through four-, six-, eight-, or more. It is more economical per seating unit to buy multiple carrel units. On the other hand, they are difficult to construct properly, difficult to move, and offer less flexibility than is usually desired. The writer prefers to purchase single or double carrels, arranging them in whatever configurations are desired. There is always the possibility of easy rearrangement when working with single and double carrels.

Individual tables are preferred by some librarians. Some of these will have a partial molding around the back and sides, others will not. They are generally the same dimensions as a carrel, i.e., 24 × 36 inches. They offer privacy of a sort but no real protection from aural and visual disturbance.

Card Catalogs

Few furniture manufacturers seem to be able to produce completely satisfactory card catalog drawers and the cabinets that contain them. Their manufacture requires use of the best materials, care in fabrication, experience in the problems their manufacture entails, and an understanding of their use. One still too frequently finds a card catalog cabinet whose drawers are not interchangeable, i.e.,—will not fit all of the available openings. The recent trend toward use of plastic drawers reduces the problem of tolerances considerably and eliminates the possibility of breaking an entire drawer. The appearance of a plastic drawer is offensive to some people, particularly if there is not a wood drawer front attached to the drawer itself.

There is considerable disagreement about different styles of catalog drawer fronts, pulls, card windows, and rod releases. No general recommendation can be made in any of these areas for it will depend to a large degree on individual tastes of the selector or, in the case of rod releases, the special security needs of some libraries.

Cabinets containing catalog card drawers come in a variety of sizes and configurations. However, the larger ones for sizeable libraries generally use cabinets containing sixty or seventy-two drawers each. Seventy-two drawers are generally to be recommended, for librarians nearly always underestimate their needs for total card capacity and a seventy-two drawer unit is as comfortable to use and very little more expensive than a sixty drawer unit (see Figure 5). On the other hand, the use of ninety-drawer catalogs is not to be recommended except in cases of extreme necessity. In order to fit ninety drawers into a cabinet of drawers six wide, the bottom row will be only 10 inches from the floor and the top row will be too high for many women to be able to handle satisfactorily.

Special Storage and Display Furniture

Atlas Cases

The small library will find these to be useful not only for atlas cases but for the few very large folio volumes they may have. For a few dollars more these can be purchased with roller shelves.

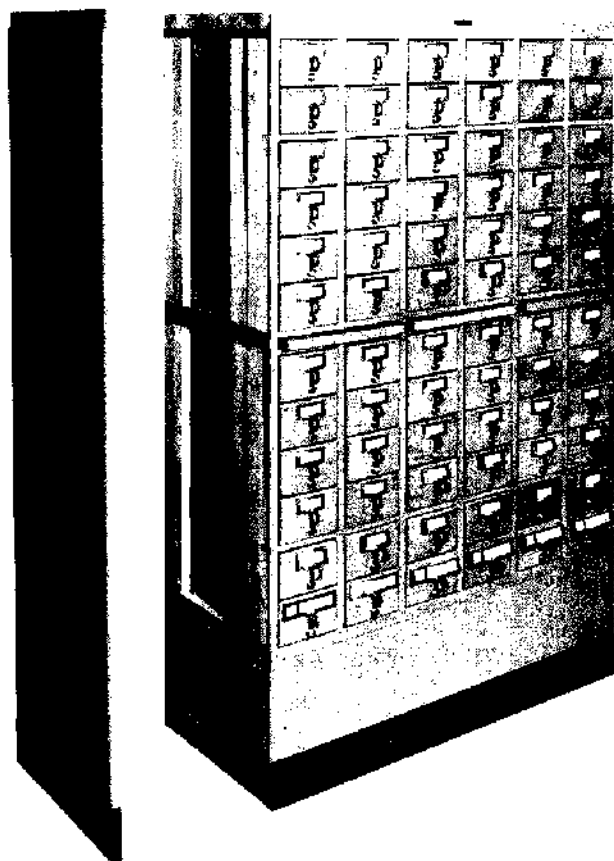


FIGURE 5. Card catalog trays and cabinets should be purchased from firms experienced in their manufacture. (Courtesy Library Bureau, Remington Rand.)

- | | |
|--------------------|--|
| Dictionary Stands | These are available in small counter type. Usually these revolve and can be used for many large objects that need to be displayed. A few stand-up dictionary stands will be useful in all libraries. The shelf space below can conveniently hold small quantities of associated reference material. |
| Book Display Units | Most libraries will have one or two such units for showing current new acquisitions. These frequently are double-faced with a bulletin board, which can be used to display book jackets, separating the two sides of the unit. Larger special units are available for book display where there is a need for them. |
| Files | Vertical filing cabinets in both wood and metal are used both in library offices and to house the pamphlet files. A librarian considering these should not overlook the alternative possibility of purchasing lateral files which offer greater storage density and do not require the aisle extension that the vertical files do. |

- Map Cases If the specifier has difficulty finding satisfactory map cases, companies supplying drafting equipment have files for architectural plans which will serve quite satisfactorily.
- Index Tables Nearly all libraries need index tables. If square footage is a problem and the degree of access will permit, these can be purchased in double-height double-faced units or even triple-height double-faced units. The latter become rather bulky, but if there is little need for simultaneous access by large numbers of people, the use of these larger units will help save space. A frequently used alternative to index tables is addition of a reference shelf, either pull-out or stationary, to units of steel shelving in the reference area. These can provide satisfactory reference and storage space for relatively low access materials. Heavily used materials will, of course, be much more satisfactorily housed on index tables.
- Charging Desks
(Circulation Desks) The circulation desk is a very important unit of furniture in nearly every library. Architects and designers frequently recognize this as an interesting problem and want to get into the act. It is strongly recommended that the librarian insist on a circulation desk containing standard 3-foot modular units as manufactured by regular library manufacturers. These units have been developed over the years on the basis of long library experience and there are good reasons for their configuration. They will certainly function better than anything any architect or designer can devise. Using the standard components, it is perfectly feasible to have the architect or designer custom design a case for the charging unit that will allow it to be more carefully integrated into the aesthetics of the space design while retaining for the librarian the necessary functional units. Incidentally, it is recommended that the individual units not be permanently fastened together and not be purchased with a continuous top. No one can predict the future of library systems, and it is entirely likely that it will be desirable someday to reorganize, add to, or subtract from, the present charging desk.

Seating

Library tables, carrels, the card catalog, and seats probably receive the highest use of any categories of furniture in the library. Of these, seating probably takes the greatest beating. It is critical that seating for libraries be of the highest quality and offer the utmost durability (see Figures 6 and 7). This is particularly true of the side chair or chair that is generally used throughout the building for seating at tables and carrels. This chair will receive the greatest abuse both from users and maintenance personnel and needs to be manufactured by the best techniques from the best materials with the best finish. No matter what the wood finish to be used throughout the interior, it is strongly recommended that the side chair be fabricated from northern hardrock maple or northern birch to assure that the wood in the

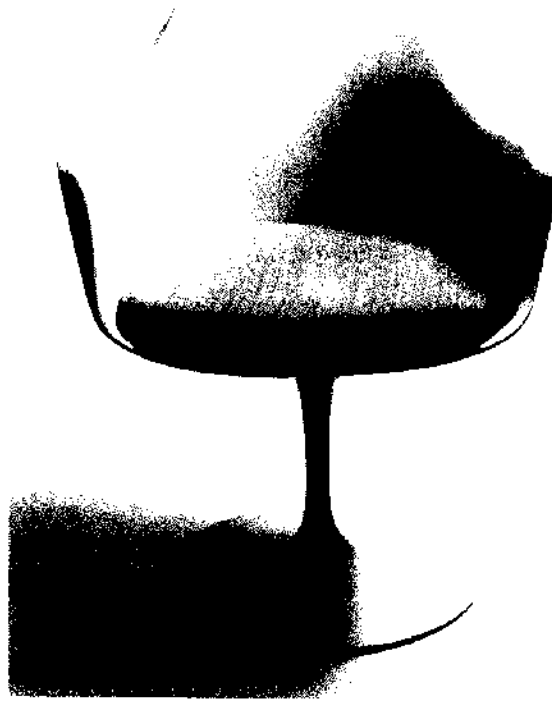


FIGURE 6. *Manufacturers of furniture for larger markets produce items useful in furnishing libraries. (Courtesy Knoll International.)*

chairs is the toughest, most durable available for general furniture manufacture. These can be finished to match whatever wood finish is to be used throughout the building. This dense tough wood of proper moisture content should be joined by double doweled joints with corner blocks. The best animal or white glue in ample quantities should be used for all glue joints, and dowels should be compressed grooved. All curved wood in posts, rails, and backs should be steam bent, not sawed, to achieve the desirable radius. If upholstery is to be used in seats, the pad should be foam rubber, not polyurethane. Polyurethane is generally satisfactory for upholstered seat backs.

In selecting a side chair, dimensions are important. Chairs less than 19 inches wide should not be considered. Users are larger and need at least this much width to be comfortable. The included angle between the seat and back is also important. Too frequently side chairs are not satisfactory for study because the angle between the seat and back is too great. An included angle of 95/97° is about right.

All-wood side chairs are still the most popular, although upholstered side chairs are being used more and more. Use of fabric upholstery on general use chairs in libraries is not recommended. Vinyl or leather of good quality will hold up almost indefinitely under the kind of use and abuse chairs receive in libraries, but no fabric will retain its body and appearance under such use for more than a few years.

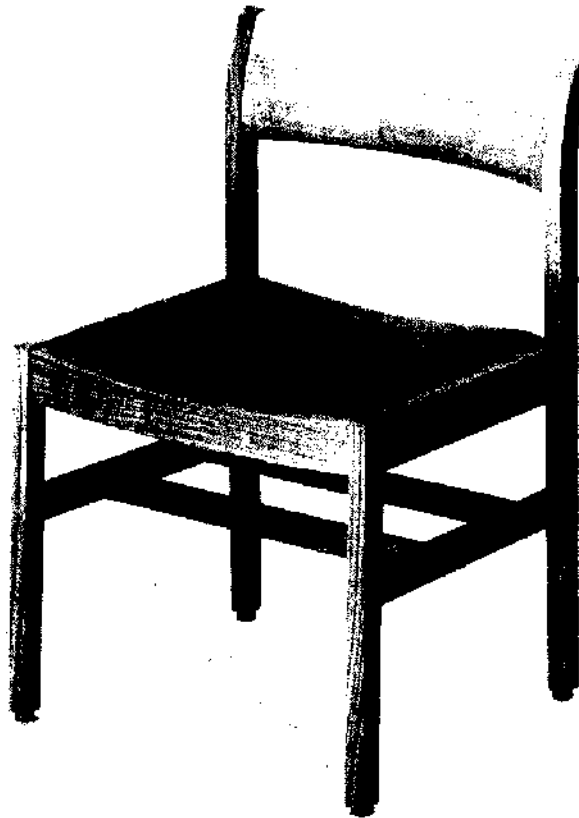


FIGURE 7. *This chair is the kind of sturdy yet comfortable side chair that more and more libraries are using. (Courtesy W. H. Gunlocke Chair Co.)*

Floor Coverings

Until very recent years most library floors were covered with one of the several different kinds of resilient floor coverings such as vinyl tile, vinyl asbestos tile, cork, rubber tile, and similar materials. These coverings generally are long-wearing, are available in a great variety of colors and patterns, and are relatively inexpensive to purchase. Many new libraries of the last 10 years have been carpeted. Along with its obvious aesthetic appeal, carpet offers ease of maintenance, greater comfort for the user, and insulation against noise as its principal advantages. Carpet is more expensive to purchase and install but its other advantages overcome this cost disadvantage for many people. A recent Library Technology Project publication gives satisfactory and comprehensive information on the subject of floor coverings. It should be pointed out that recent advances in carpet with integral backing have proved to be so satisfactory and so easy to install that carpet with integral backing should be seriously considered for libraries. It should also be pointed out that some of the second generation nylons and nylon blends should be seriously considered for they offer the toughness and long-wearing qualities of nylon with the aesthetic

appeal and richness of wool. Before selecting carpet the specifier should learn as much as possible about it so that he is sure the selection made accurately reflects his needs and the situation under consideration.

It has been found useful to specify a percentage of carpet, perhaps 2%, above what is needed for the actual installation. This extra carpet can be stored and used to replace and patch in case of accidents. While it will not pick up dirt, it will have been dyed in the same lot with the remainder of the carpet and have aged to the same degree so that you will get a reasonable match several years later.

It is sometimes desirable to specify two grades of carpet (weight and weaves) in the same installation, with the heavier grade going in the area of greatest traffic expectation and the lighter weight going in the remainder of the library. Even the lighter weight should be a heavy commercial grade carpet, and the carpet in traffic areas should be of an extra heavy grade.

Lighting

Lighting of good quality in proper quantity is crucial in libraries. Unfortunately, most libraries in this country are lit either poorly or indifferently. In recent installations there are more examples of overlighting than underlighting. In several recent new libraries a reader could use written material on table tops comfortably only with sunglasses. A range of 70–100 foot candles seems to provide the most satisfactory range of light quantity for library use. Quality of light is as important as its quantity. This has received inadequate consideration in most libraries. Both direct and indirect glare should be avoided as much as possible. Light should be evenly diffused throughout the room without shadows and with no directional orientation. There must be no attempt to correlate orientation of lights with orientation of bookstacks. Bookstacks may someday be relocated. Lighting should be evenly distributed throughout the room so that any of the furnishings can be located anywhere without penalizing the reader with insufficient light. Various types of prismatic diffusers offer good capability for light diffusion and prevention of glare. The writings of Dr. Ellsworth Mason on this subject offer intelligent insights into this important problem. Few architects can be trusted to supply satisfactory lighting for library purposes. The use of a good consultant will assist the librarian in ascertaining that lighting will meet the building's needs.

Microform Readers, Printers, and Storage Equipment

Libraries have used roll microfilm, mostly 35mm, for the last 30 years or more. It is only in recent years, however, that microfilm publishing and the associated reading, copy, and storage equipment have begun to become really heavily used. The last few years have seen the increasing use of 16mm microfilm, microfiche (flat sheets of film containing multiple images), and other microforms. Microforms have been available for some time in a variety of magnification ratios and these

continue to proliferate. Micro-publishing programs are utilizing ultramicrofiche which uses reduction ratios of $75\times$ and more. This proliferation of types of microform and magnification ratio results in considerable confusion among users and buyers and the eventual necessity of owning a considerable variety of microform reading and reproduction equipment in order to be able to handle all the formats and magnifications. A further complicating factor from the standpoint of libraries is that equipment for microform viewing and reproduction is produced primarily for the use of industry, with libraries regarded as a distinct secondary market. As a result the equipment available is generally not as appropriate for use in libraries as it might be, and it is strongly recommended that the potential purchaser of such equipment obtain samples for side-by-side evaluation. If this is not feasible, it is very valuable to go to trade and library conventions where a large variety of microform equipment is on display. The annual conference of the National Microfilm Association has excellent exhibits of such equipment.

Audiovisual Equipment—Media

The entire subject of audiovisual materials and so-called media is adequately covered elsewhere. It is useful to point out here that there is an enormous variety of equipment of this sort on the market. A considerable industry has grown up in recent years that concentrates on manufacturing and marketing these devices to the large public school market. It is unfortunate but true that many such materials, equipment, and systems have been purchased in recent years with the assistance of federal and other grants without adequate study on the part of the school or library that purchased them. Such systems can be seen all over the country sitting idle, gathering dust, for lack of programming capability. The author can offer few guidelines for approaching this complex subject. It does seem that the commonly quoted virtue of simplicity is certainly of value in considering such systems or programs. The more complex, elaborate, and permanent of these seem to be the ones that become the most easily obsolete whereas the more flexible, less proprietary approaches seem to offer better promise for effective utilization. The *Audio-Visual Equipment Directory* is a helpful guide to specifications, capabilities, and other brief information about some of the simpler and more commonly utilized equipment within this area.

Other Sophisticated Library Systems

The last 10 years have been a period of great innovation and exploration of possibilities for utilizing modern technology to assist in operating more efficiently or in providing more satisfactory user service in libraries. Many such systems have utilized computers or at least electronic data processing equipment. Libraries have attempted to use such equipment for acquisition, cataloging, serials control, and a variety of other problems. Large amounts of brain power and money have been

expended on these programs through the years with a deplorably small result in increased efficiency or savings of time or money. It is unquestionably true that many of these experiments were worth trying, and it is still worth the while of those institutions that can afford it to try to make these machines relieve librarians of some of the tedious work so that trained personnel can spend more time on professional work requiring discretion, judgment, background, and personal contact with users. The recent articles (1971 in *College and Research Libraries* and in the *Library Journal*) in which Dr. Ellsworth Mason enumerates the failures of such systems have caused great controversy. They offer useful insights into this difficult problem.

Another group of library systems that have become popular in recent years involve communication and transportation of library materials among libraries that have organized themselves into networks. Most such programs are expensive, although probably not to the same degree that computer-based systems are expensive. While these are frequently not justified on a cost effectiveness basis, the usefulness of the material provided through such networks has realized a considerable return on the investment. Some such systems have utilized facsimile for transmission of page copy, others have utilized digital communication and teletype communication to transmit messages among system nodes, others have used trucks and station wagons for transportation of library materials among network members. It seems likely that these systems will continue to grow, particularly as more and more institutions discover that funds are not available to permit them to develop self-sufficient collections. These shortages should encourage further development of cooperative systems and result in increased use of new programs and devices for transportation and communication among libraries.

Conclusion

This very general review has barely touched on the full diversity of equipment and furniture used in libraries. Some of this is produced specifically for the library market or for the educational market in general, with libraries being a fairly sizeable segment of that market. Other equipment is found in libraries that is not specially intended for libraries but is used in many kinds of installations. Librarians furnishing new buildings will frequently find that they need all sorts of nonlibrary items such as office machines and furniture, display materials, planters and pottery, mail distribution units, packaging materials, folding walls, directories, etc. There is no single source for information about all these materials. However, a good single source that contains information about many kinds of materials not commonly thought of as library furniture and equipment is *Sweet's Interior Design File*. This very useful multivolume collection of manufacturers' catalogs may not be available to some libraries. However, copies of it will be available through architects or interior design offices which will generally be willing to allow potential purchasers to refer to them.

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WILLIAM S. PIERCE

ERAGNY PRESS

The Eragny Press was one of the smallest but aesthetically one of the most successful of the private presses established in England in the 1890s, following William Morris' "little typographical adventure" at the Kelmscott Press. Its owner, Lucien Pissarro (1863–1944), was the eldest son of the French impressionist painter Camille Pissarro (1830–1903). After a childhood in France, he came to London in 1883 to learn English, ostensibly so that he could later obtain a commercial post in Paris. But temperamentally he was utterly unsuited for this—like his father he was an artist—and in the following year he returned to France where he studied illustration and color printing with the firm of Manzi in Paris. In 1890 he returned to England where he lived most of his life. At first eking out a living in art teaching, he soon became close friends with Charles Ricketts and Charles Shannon, who were starting their magazine *The Dial*, and who asked him to contribute to it. He was very closely connected with Ricketts' early experiments in book design, and with Ricketts' Vale Press, which grew from these early experiments.

The first of Pissarro's own books was started soon after his marriage to Esther Bensusan in 1892. Inspired by the English children's books of Randolph Caldecott and Kate Greenaway, he had planned a book illustrating children's songs, *Il était une Bergère*, with illustrations to be reproduced by process-engraving. But the project was not well received by publishers who thought the production costs would be prohibitive, and so Pissarro determined to print it himself. With financial help from his father he bought a handpress. Though the first book, *The Queen of the Fishes* (1894), was produced while Pissarro was still learning the craft of printing and gave him immense trouble, and though the text was reproduced from hand lettering (which is seldom satisfactory), the book was a complete success (see Figure 1). In its use of four- and five-color wood-engraving it prefigured the whole of the work of the Eragny Press, as Pissarro named it after his father's home in Normandy. It was these colored wood-engravings, in which Pissarro caught the spirit of impressionism and the Normandy landscape, and combined it with Japanese influences in composition and the use of color, which gave the Eragny Press a sureness of touch unrivalled by any other press, public or private.

For his second book, *The Book of Ruth* (1896), and for the thirteen other books which followed it down to the very successful *Aucassin et Nicolette* (1903), Pissarro



when he told her about the colonies
of birds who built in his wide branches
& what the winds said to him as they
waved his boughs in play or in storm
& how near his little topmost twigs were
to the sun & how they could see the

FIGURE 1. Page from *The Queen of the Fishes* (1894), the first Eragny Press book.

printed in the "Vale" type, the proprietary typeface which Ricketts had designed for the use of his Vale Press, and which he generously made available to Pissarro. The Eragny books were also sold through the Vale Press, which gave Pissarro an immediate entrée to potential purchasers, and eased his problems in distribution and advertising considerably. But despite this help, and the high esteem in which the Eragny publications were soon held by a small circle of admirers, the books did not make much money, and Pissarro (unlike most private press owners of the time) was largely dependent on their sales for his living. He was too little the businessman to increase the editions or his prices; instead, because he could seldom afford to pay a pressman, most of the work in the production was done by himself and his wife, who engraved some of the blocks and supervised the presswork. Nearly all the Eragny books were simply bound, in paper over boards, the patterns of which in their freshness and delicacy have been judged perhaps the finest of all such work.

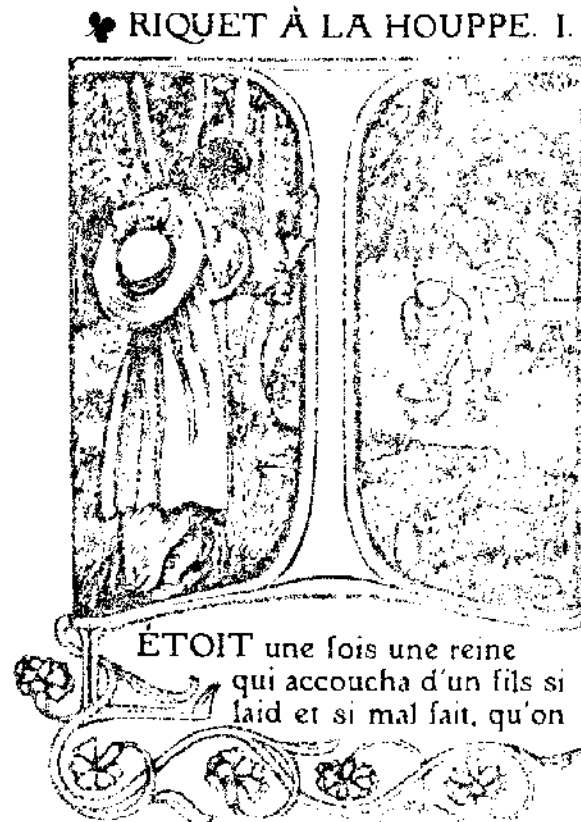


FIGURE 2. Page from *Riquet à la Houppe* (1907) set in the "Brook" type.

In 1903 Charles Ricketts closed the Vale Press, and the types were destroyed. Pissarro designed his own typeface, the "Brook" type, which, once more with financial assistance from his father, he had cut for him by the master punch-cutter E. P. Prince. This face received its first showing in T. Sturge Moore's *A Brief Account of the Origin of the Eragny Press* (1903) and was used in all subsequent Eragny work. It was fairly closely modeled on the "Vale" type, the principal change being to shorten the extenders. Pissarro was not, essentially, a printer concerned with purity of letterform, but an illustrator interested chiefly in producing a typeface which would harmonize in color and tone with his wood engravings. Stanley Morison's verdict that the type was "sophisticated, rather than eccentric" is one in which most authorities would concur (see Figure 2). But though he was not primarily a printer, Pissarro did later design another typeface based loosely on old Flemish manuscript hands, the "Distel" type which was used with great effect by the Dutch private Press De Zilverdistel.

There were altogether sixteen Eragny Press books printed in the "Brook" type, of which the most successful was perhaps Gérard de Nerval's *Histoire de la Reine du Matin et de Soliman Ben Daoud* which Pissarro printed for the Société des Cent Bibliophiles of Paris in 1909. Several of the other books he printed were also

privately commissioned before the outbreak of war in 1914 compelled Pissarro to call a halt to his work. To obtain the right paper became impossible, and the loss of his continental subscribers made continued production impracticable.

Though Pissarro hoped to resume work after the end of the war, he never did so; the printing press was regretfully sold in 1928. The "Brook" types survived until 1947, after his death, when his widow cast them into the English Channel, in the way that much earlier the Vale and Doves Presses' types had been "bequeathed" to the River Thames. Specimen sorts of the types, and the engraved blocks for some of the initials used in the books, are now preserved in Cambridge University Press's collection of private press material; some of the engraved blocks used in the books are in the Ashmolean Museum at Oxford.

The influence of the Eragny Press was not great; its work was too individual and too closely tied to Pissarro's own artistic genius to produce many followers. But as examples of delicate illustration its books are without rivals, and today command very high prices from book collectors.

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RODERICK CAVE

EROTICA

Erotica refers to all that material which is sexually oriented. The term is singularly appropriate as it is derived from the Greek name of the God of Love. The fact that no major serious article discussing erotica exists in the literature of library and information science is curious, but easily explained. Erotica is primarily confused with pornography, the part that has tended to color the whole subject. Pornography is a

special kind of erotica, as we use the word here, and as such has been the object of censorship throughout the western world since the invention of printing. Further, erotica could only be discussed in serious terms, as a literature like that of any other special field, since the battle against moral censorship has been won. In an international sense this is true. In 1967 Denmark repealed all laws dealing with obscenity except those which protect children from purveyors of "obscene" materials. What was accomplished in Denmark by legal action of a parliamentary body and contemplated in similar legislatures in many different places has now been accomplished, in effect, by the courts of the United States. Recent decisions have virtually negated all those laws dealing with obscenity except those which are intended to protect children. Changes in the federal law that were not proposed as purely political sops thrown to a public supposedly adverse to pornography take into account the different legal status of so-called obscene material. There is little point in arguing censorship here since it has been fully discussed elsewhere in this work; hence this article will describe the literature of erotica and its possible significance in a library collection. The assumption which underlies this article is that censorship is negative and selection is positive. This article will describe the literature of erotica, including pornography, and will establish criteria for the selection of erotica and its importance in modern scientific pursuit, in literature, and in other areas of the humanities.

Whatever definition is attempted of pornography (aside from its derivation from Greek words meaning the writing of harlots) will invariably conflict with the definition of erotica. If erotica is all sexually oriented material, then pornography is a special kind. Much that is labeled pornography is, in effect, erotica and not pornographic at all. The word pornography is often employed as a kind of pejorative meant to label material which the reviewer dislikes. Just as poor verse is called doggerel, and a poor painting is called a daub, so erotica disliked by a given reviewer will be called pornography.

Strictly speaking, pornography is sexually oriented material very carefully calculated to excite the sexual desires of a person viewing or reading the material. From its outset pornography has been used to stimulate the sexual response of males, which is by no means so immediate and reliable as the writers of pornography would suggest. In fact much pornography stating that the male is indefatigable and can stimulate female response endlessly is a kind of suggestive technique of psychology. Granted that certain males will feel that the enormous sexual organs depicted in pornography and descriptions of endless sexual activity constitute a threat by posing a standard which he may not obtain, the average male, judging himself to be somewhat less than a sexual athlete and somewhat more responsive than a vegetable, will locate himself fairly accurately in a scale of response for which he feels adequate. Men are, in fact, rather frail in their sexual accomplishments.

Pornography seeks to amend this frailty by sufficiently stimulating the male whenever means or circumstances fail or interfere. That is, a male with an inherent dislike of prostitutes, rather more prevalent in the twentieth century than in the nineteenth, may be stimulated to adequate sexual performance by a prostitute who works in a circumstance where pornographic books or movies or pictures are available.

Similarly, pornography has been used in marriages where the same purpose is served, by fathers in instructing their sons, and by mothers in instructing their daughters, and in each case some success almost invariably results. The reason for this as established by many different psychologists is that the male is more readily stimulated by purely psychological factors than the female, but most women are highly stimulated by the erotic suggestiveness of a fully aroused male in her presence. Although the stimulation may be expressed as panic, in marriage it is usually expressed as love. In fact, conjugal love is at least in part an expression of sexual desire and sexual satisfaction. It is from this basis that the satisfactions of marriage are derived, even when the sexual appetites have cooled because of age. Any erotic material that stimulates sexual response may be labeled pornography without necessarily implying a purgative effect. Unless all sexual activity is labeled socially undesirable, and population control may finally tend that way, then whatever arouses sexual desire in the proper context and circumstance cannot be truly reprehensible.

True pornography, however, must take into account a curious feature of all instinctual appetites. Once sated, no appetite remains. The fact is that erotica can sate the appetite, denying further stimulation, and consequently the pornographer must lead the viewer from what is socially acceptable to what is far beyond the individual's own abilities, desires, or even imagination. As perceived by the Kronhausens's various works on pornography and the law, pornography leads from reality to wild flights of fancy. As opposed to pornography, the Kronhausens separate erotica into two other types of sexually oriented material: erotic realism and erotic surrealism. In their early work the Kronhausens, who were often asked to testify in obscenity trials, established that erotic realism was educational and, supposedly, pornography was not. Hence erotic realism was its own excuse for being, and pornography could safely be controlled. However, the line between the two is not so readily established. Even the Kronhausens have difficulty when it comes to distinguishing between erotic realism and erotic surrealism and especially between erotic surrealism and pornography. In fact, all literary description is likely to be vague and to draw no clear lines of demarcation, whether the subject is comic material or material which stimulates tears. Other writers have tended to imply that pornography is crude. Erotic realism, by the same context, would be rather more artistic.

If the object of pornography is sexual stimulation, if we are to label anything which stimulates the sexual appetite as pornography, as many American writers have observed, one of the most pornographic works ever published was the Sears Roebuck Catalog. It is fascinating that the catalogs of two previous periods have appeared in reprint editions, one from the early twentieth century and one from the third decade of the twentieth century. At this time practically no one would consider a Sears Roebuck Catalog pornographic unless its underwear sections were the only sexually stimulating materials available. Such catalogs in the early part of the twentieth century ordinarily were used in lieu of toilet paper, most often in the outdoor privies which dotted the landscape in any aggregation of human dwellings. Secluded in these outhouses, an adolescent boy would be stimulated to masturbate by almost anything, especially when it had a human form however modest and well covered.

No attempt was ever made to censor the Sears Roebuck Catalog, possibly because no adult at the furthest stretch of his imagination could regard the pictures of women in underwear as pornographic. It is entirely possible, however, that such sections were removed by vigilant parents before their adolescent sons could see them, because up to the third decade of the twentieth century it was widely supposed that masturbation was a source of innumerable evils, physical and mental. The authors of *Light on Dark Corners*, sometimes called the Kama Sutra of the Midwest, in its later editions acknowledge the fact that no credible scientific investigation showed harm resulting from masturbation. Some physicians continued to warn adolescent boys against masturbation on the basis of its being physically harmful right up to the period of World War II.

Unless pornography is used in circumstances like the "Japanese Bride Book," or the porno collection of a brothel, the only sexual activity which commonly follows perusal of sexually exciting material is masturbation. Part of the taboo which surrounds erotica derives from the taboo which has surrounded masturbation, even to the expression of the word, until very recently. In interviewing Dr. Reuben, the author of *Everything You Always Wanted to Know About Sex But Were Afraid to Ask*, Johnny Carson on the "Tonight Show" explained that the NBC censors had forbidden him to use the word "masturbation." He was able to use the word having successfully overcome these obstacles, and a frank and interesting discussion over nationwide television was made possible. Doubtless among those groups which regard masturbation as a mortal sin (the Roman Catholic viewpoint), or at least a terrible sin against the Creator (certain Protestants and Jewish groups), or likely to create bad karma for which the individual must pay in succeeding reincarnations (certain Buddhists and Hindu sects), the fact is that masturbation is probably the experience of all but a very small number of males and possibly some two-thirds of all females, depending on the definition of masturbation for the latter. If any kind of sexually stimulating movement is considered masturbation in the female, then the 100% would apply to females as well, who enjoy dancing, close bodily contact, and other forms of sexually stimulating activity, whether conscious or unconscious. These facts lead us to re-evaluate the idea of pornography, and in this essay we will limit the use of the term pornography to material that was consciously conceived and intended by the person responsible for the content as a means of sexual stimulation at an ever-mounting degree, finally reaching orgasmic climax. By this definition, *The Memoirs of a Woman of Pleasure* by John Cleland, commonly called *Fanny Hill*, is clearly pornographic. That it has additional values has fortunately been seen within the past decade. Similarly, *Lady Chatterly's Lover* by D. H. Lawrence is in no way pornographic.

The distinction between erotic realism and erotic surrealism is unnecessary, because pornography may be established as that material which begins, for instance, with the subjects completely clothed and concludes with a photograph of the male orgasm and ejaculation. This is the common story-line of Danish photography as seen in such periodicals as *Fucking*, *Color Climax*, and *Con Amore*. Even the homosexual periodicals such as *Pagan Males* tend to follow this established sequence of

photographs. Similarly the printed pornography of earlier periods began with a commonplace circumstance and led by degrees to a great orgy. Apparently the effort is made to provide visual shock on each succeeding page and there is some connection between this kind of communicative shock and sexual stimulation. The question arises whether this shock may be considered to be a characteristic of all material meant to stimulate emotion, such as comic material, or sentimental material for audiences which are given to crying. As such, a collection of erotica, especially of pornography, forms the necessary basis for any scientific examination of the relationship between the focus of attention, physiological responses to symbolic material, and the function of memory in providing a meaning for the symbol. Much pornography is now readily available on the open market and although some of it is disguised as scientific instruction in sexual activity, the net result is the same. Such books commonly begin with a description of the sexual organs and continue to a description of those activities which are still subject to legal restraint in most of the states in the United States. The sequence is obvious and corresponds to that building of tension that is each time satisfied by shock.

A librarian attempting to build a collection of true pornography will find that the recently republished bibliography of erotica by Pisanus Fraxi appearing under several different titles but in fact a photoreproduction or republication of the rare original will greatly assist him if historical pornography is sought. This material is unfortunately quite rare and was expensive when first published; however, much of it has been reprinted and is readily available although under a bewilderment of titles as the author of the bibliography explains. The response to the legal restrictions on pornography has been to disguise it in several different ways, and equally, because the two coincide, to make commercial profit of a societal decision. The obscenity laws have had the chief effect of raising the price of material and of insuring poor quality. They have had no other effect that is noticeable either in the amount of material published or in the expanse of its distribution. Under the succeeding sections, specific titles will be recommended because they appear to serve a good purpose in establishing the areas of research which may now take place since restraints on obscenity no longer prevail except for children. It should be understood, if it even needs to be stated, that no part of this article is meant to apply to any person below the legal age of consent in the particular area where the reader lives: that is, from about age 18 to about age 21. Libraries for children must leave to the parents all of the responsibility for the child's sexual education except in those circumstances where the parents have specifically given their approval.

The word taboo as it will be used in this section refers to the societal restraints which are accepted without need of further explanation or proof. A taboo is a kind of axiom of behavior that all society respects to the point of never wishing to investigate it. Such taboos have applied to human beings, if the customs of aboriginal tribes are any indication, from the beginning of mankind so far as is known. Some of the taboos refer to codes of dress, others to codes of respect for parents or for members of the family, others to proprieties of food, and others to sexual behavior. It would be quite incorrect to say that all people at all times had the same taboos on

sexual behavior. This was a favorite idea of the late eighteenth and nineteenth century philosophers of society, but modern anthropology has changed the viewpoint considerably. We are now aware that certain societal groups, such as the indigenous inhabitants of the Pacific Ocean Islands, have regarded sexuality as totally natural and not worthy of the unquestioned restrictions, true taboos, put on aspects of eating, drinking, family relations, and sacred objects. Several writers, mostly anthropologists, have discerned that the tribal customs among natives of New Guinea and among other aboriginal tribes include severe restrictions regarding a particular, supposedly sacred, or deadly area of their territory and yet have permitted widespread concubinage, preceded by very relaxed customs of child rearing allowing maximum sexual experimentation with a minimum of parental control. The only sexual taboo among some tribes is that prohibiting incest. This is a remarkable taboo in that it is possibly the only widespread restraint found through history and among the peoples of the world. It is interesting that this taboo insures what sexual reproduction apparently obtains when it is viewed in a biological sense: the exchange of genes so that those most likely to insure survival will have the widest distribution. Incest taboos, from one point of view, may be regarded as restraints arising from society's view of the family. Because of the long period of time needed for a human infant to reach biological self-sufficiency, human groups tend to center around a mother caring for children with the assistance either of the father of the child or of some other appointed or designated male and an appointed, designated, or familiarly connected female. The violation of this taboo is seen as a shock word intended to cause stimulation.

Stimulation as the term will be employed here represents an instinctual, physical response to symbols used in communication, whether verbal or graphic. This stimulation may be laughter, tears, anxiety, or sexual stimulation indicated by purely physical responses involving the genitalia and the autonomic nervous system. The easiest comparison, possibly because of overlap, exists between material meant to cause laughter and material meant to cause sexual stimulation. It is fascinating that although the substance may coincide, the effect never does. That is, comic material may employ sexually oriented phrases and suggestions, but the results will be laughter, or at least a predisposition to laughter, not sexual stimulation. Erotica includes comic material such as limericks, which have only recently come into focus as a result of the relaxation of obscenity laws. William F. Baring-Gould in his book, *The Lure of the Limerick*, includes not only examples of so-called clean limericks but also examples of dirty limericks.

Psychologists have commented at length on the opposition of clean and dirty in American parlance. A dirty book is a book that contains erotic material; a clean book is a book totally without erotic material so far as the author's intentions are concerned, and as indicated above the reader may obtain erotic stimulation from almost anything verbal or graphic. The response to limericks, however dirty, is laughter if the limerick succeeds. Much has been written about the form of limericks as contributing to the stimulation of laughter, and equally as much about the content of the limerick and whether clean limericks can ever be truly funny. The argument that

only dirty limericks are really funny and represent a kind of game for intellectuals is based on the inclusion of sexually oriented material usually expressed in cant or slang. The dirty words of English, established by Sagarin in his book, *The Anatomy of Dirty Words*, are capable of stimulating a physical response because of a shock value. This physical response is at the emotive level, that is, a physical manifestation of a mental state. Usually the emotion is laughter, although it is not suggested that one tells a dirty limerick to a person whose response cannot be adequately predicted. Dirty limericks and smutty stories, which fit into the same class, fell under obscenity restrictions because of the dirty words employed. These are truly obscene, in the sense that a person may not wish to have them presented to his consciousness and may object strongly when they occur. The response, whether laughter or anger, is nevertheless not sexual. A library could build a collection of limericks, clean and dirty, for several different purposes among which are studies of folklore, studies of authors such as Charles Swinburne, Aldous Huxley, and others, with the purpose of showing how comedy arises, even to the point of supporting theories of Henri Bergson. There seems to be no valid reason for prohibiting books on limericks in college libraries unless these colleges are devoted to educating students in a particular religious tradition. In the general college library, such books as those by William S. Baring-Gould and Norman Douglas assist the student in a knowledge of light verse and methods of obtaining comedy in purely verbal structures. Fear of sexual stimulation is not sufficient reason, nor even applicable in not selecting such books for a college collection where English literature is taught. A desire not to have students use so-called dirty words, what we will henceforth call taboo words, may be a good reason, and students wishing to learn how to write for children might wisely limit themselves to the wit of clean limericks. Clean limericks rely to some extent on the same method of comic writing as dirty limericks, but they lack the one element which gives the dirty limerick an advantage, that is, building of tension and the shock or surprise that comes with the last line.

The violation of a taboo is likely to be stimulating in itself, because taboos are learned at the very early age and partake of the emotional climate which prevails throughout childhood. This has been seen in many different studies and is quite obvious to adults at about the time they become grandparents. It is perhaps most obvious now, in the latter half of the twentieth century, when so many taboos have given way before technological advance. Several authors have used this characteristic of human response to communication as the basis of novels, such as Aldous Huxley's *Brave New World*, in order to show that taboos are not established by divine revelation but rather by societal pressure.

Erotica in graphic form has also recently come to light, originating from many artists, such as Rembrandt, Rowlandson, Zichy, Von Bayros, and Picasso.

It is interesting to note that taboos function in all erotica, so that incest and the violation of incest taboos forms almost a necessary part of the verbal erotica labeled pornography, as seen in several examples cited by the Kronhausens. Graphic art obviously can do very little to show the violation of the incest taboos, except by the suggestion of children who are possible siblings involved in sexual manipulation.

Such graphic representation may be stimulating though, because the beholder reads into the picture the violation of an incest taboo which is not necessarily depicted. That the violation of taboo caused stimulation and that this stimulation may be sexual in nature form the substance of Sigmund Freud's theory of the "censor." Authors on modern sexual practice point out that the incest taboo is regularly violated throughout the world, with perhaps very damaging effects upon the children involved. The violation of this taboo is not necessarily to be considered as purely sexual in nature because of the familial attitudes that may govern the adults. No critics of erotica have ever suggested that widespread incest would result from the use of pornographic materials, but this observation rather more explains an oversight than it establishes a principle.

The second strongest taboo, arising possibly from the behavioral pattern of man established from his stage as a primitive hunter, surrounds male homosexuality. Because such material is sexually oriented, regardless of its nature, we may consider it erotica even though the response of anger as a result of stimulation is commonplace among heterosexual males when confronted with blatant male homosexuality. For this reason, pornographers have generally avoided scenes of male homosexuality, apparently in the belief that few men were interested. In most cases incidents of homosexual activity represent an experimental phase of the psycho-sexual development of adolescents. As such, the taboo is not so strongly operative and may represent nothing more to the professional advisor of male adolescents than an episode, the diminution of which will substantially aid a boy in establishing a heterosexual orientation.

The literature of homosexuality is neither so vast nor so complicated that it cannot be encompassed by a researcher in some few years of dedicated study. The incest taboo that has given rise to psychoanalytic theories has traditionally been used to explain male homosexuality. However, a new area of research is established by Lionel Tiger's book *Men in Groups*. Tiger suggests that the taboo against male homosexuality arose among hunting groups where sexual activity would have severely limited the effectiveness of the group. Many involved theories need to be explored fully before this suggestion can be disproved or proved. Theories of dominance and submission among men, theories of male interpersonal relations, and theories of male bonding are hinted at by Tiger but not explored. Modern homosexual erotica ranging from *The Ways Homosexuals Make Love*, vividly illustrated, to supposedly objective studies such as those of Bieber and English do less to depict the nature of male homosexuality than does fiction and quasi-fiction, the publication of which expanded very rapidly in the seventh decade of this century with the relaxation of obscenity laws in the United States. There is a large market for male homosexual erotica chiefly among male homosexuals themselves. Nevertheless, just as the sentimental novel of the nineteenth century forms a basis for an important and useful view of the society of the time, the male homosexual novel forms a basis for research into the methods of fiction and the human condition. Typical erotica of this sort, published at an earlier time, such as Vidal's *The City and the Pillar*, tended to relegate the homosexual to a criminal class, an appropriate method in view of the prevailing laws of the

time. The word homosexual was invented by a German psychiatrist in the 1860s and did not come into the English language until 1897 at a time when Oscar Wilde was being tried for the commission of homosexual offenses. The study of male homosexuality in anything but a hysterical sense is a development of modern psychology and represents a very complex issue often polluted by moral considerations. Some psychiatrists, like Bieber, seem to be rather preaching hatred of homosexuality than describing pure research. One is bound to suppose that such an unscientific approach is the result of the function of the taboo rather than the mischief of the investigator.

Homosexuality has always had a bad name but it became much worse with the Oscar Wilde case in England and then with the Alfred Redl case in Vienna. Colonel Alfred Redl was the Intelligence Officer for an important corps in the Austrian Army in Prague, after having served in the Intelligence Bureau of the General Staff in Vienna for many years. Redl had in fact reorganized the Intelligence Bureau and was able to support a young man in the Austrian army who went through the rigorous training to become an officer with great ease because of Redl's financial help. Redl is the perfect example of the male homosexual who was successfully blackmailed into betraying his country by a foreign intelligence agency; in Redl's case a Russian named Colonel Batjuschin. Apparently from about 1900 to 1913, when Redl was discovered, he sold secrets widely, first to Russia to prevent the disclosure of his homosexuality and then to France and Italy as well for funds which he needed to support his taste for luxury and his generous impulses towards those men who were his lovers. Indeed Redl's final discovery resulted when he presented himself at the Vienna post office to pick up a letter containing money which had already been identified by members of the Austrian Intelligence Bureau (ironically ones he had trained). Redl needed £8,000 to pay off a gambling debt of his lover, Stefan. Asprey in *Panther's Feast* retells the story in vivid fashion, combining no element whatever of the erotic by his brief descriptions of Redl's practices.

There is a question whether such works are erotic at all, that is, those dealing with male homosexuality in anything but a pornographic sense. Pornography which utilizes male homosexuality in most cases introduces this theme at a point where the corruption of the main character has reached a kind of crucial stage, so that any kind of sexual activity is acceptable. Such modern works of pornography as *Part Time Prostitute* go from shock to shock and include homosexuality as an integral part of the basically bisexual and troilistic scenes. That such works take advantage of a violation of a very important taboo has been recognized by both the Kronhausens and by other investigators of pornography. Erotica involving male homosexuality has often been rather sentimental in nature, even in sado-masochistic work, or it has exposed in a very realistic fashion the practices of male prostitutes. The prime example of this is Rechy's *City of Night*. Rechy's later works, particularly *Numbers*, described further complications of the confused male who uses the homosexuality of others as a means of gaining a livelihood while insisting that he is not homosexual. In some works the denouement occurs when the main character is converted to homosexuality. This theme enters into *City of Night* briefly, but more importantly Rechy investigates the total incapacity for love of the main character. In *Numbers* Rechy investi-

gates the compulsion that drives a young man to acts of irrumation with a wide variety of men. This book includes a vivid scene of heterosexual intercourse. Both books may be considered erotic realism, a type of erotica that is highly significant in exposing the actual conditions of a society. Other works of erotic realism with male homosexuality as their theme include Arcangelo's *Homosexual Handbook* and works by Phil Andros, both of which deal with hustlers. This is the cant term for a male prostitute whose services are almost exclusively available to men. Sometimes the term "stud-hustler" is used, but in all these works the basic theory of Lionel Tiger and other ethologists is borne out.

What the hustler exemplifies is the male who is not able to form any bond with another male because of the difficulty involved in his prostitution. Tiger's chapter entitled "Men court men" examines the characteristics which exist among heterosexual men who are nevertheless in close relationship as the result of belonging to a particular group from which these males derive a highly valued sense of identification.

It is not invalid to suppose that male bonding has in the past served an important function in preserving the race. Tiger explains that he has not considered homo-erotic behavior; however, he indicates that the field of ethology would find in its investigation of male bonding a productive area of research, a suggestion that is borne out by homosexual literature. Despite Kinsey's report that approximately one out of every six men has engaged in homosexual relations with other men over a considerable length of time, and that nearly one third of all men have at least had some kind of transient homosexual relations, the subject has been hemmed round with fears and superstitions to the extent that valid investigation of this phenomenon has been until recently quite impossible. At the present time the situation is very analogous to that involving masturbation which prevailed during the latter half of the nineteenth century. There is a general realization at present that taboos function both to skew scientific literature and to restrain works of the imagination dealing with this subject. However, a play like *Boys in the Band* by Mart Crowley, which became a popular movie, did much to free the subject from the strictures of the taboo. It is not too much to suppose that given the proper circumstance and stimulation, any virile male might turn to homosexual relations more or less readily when he is denied other sexual activity. Erotic passages that occur in works of fiction dealing with just this circumstance in males, are therefore sometimes considered pornographic or obscene. However, in selecting material for a college library, the librarian should be aware that homosexuality represents a problem for possibly a third or more of the male student body. Therefore the better works on the subject can do much to calm the fears of some students and develop in others a kind of tolerance for men who differ in their sexual appetites.

This tolerance has become increasingly important because male homosexuals, and indeed female homosexuals as well, have formed into organizations which are now challenging the laws in some states of the Union that are repressive or unfair to male (or female) homosexuals. Such organizations as the Mattachine Society in the past published periodicals meant to explain the life style of male homosexuals and the problems they face. New organizations such as the Gay Liberation Front are com-

bating the inequities in a manner established by the black community in their fight for social and economic quality. There was a time when no man would dare to admit that he had even had one homosexual experience, let alone that he preferred homosexual relations to heterosexual relations. Such an admission was sufficient to ruin his career and his social standing. At the present time, however, the life style of the male homosexual is likely to be channeled into certain occupations and to be entirely satisfying to the individual.

Benson in his book *In Defense of Homosexuality* attacks the studies made previously which are in fact based on erroneous assumption or twisted evidence. It is very likely that a researcher interested in the history of science and particularly the history of psychiatry would find the changing attitudes toward homosexuality most useful in resolving the hypothesis that the taboos arising possibly from the earliest age of man in modern times prevented honest research and have tended to color otherwise scientific opinion.

It should be observed, however, that those men who wish to rid themselves of homosexual compulsion would do very well not to investigate the male homosexual literature. Much of it is an apology for such activities and tends to romanticize or glamorize, perhaps accidentally, the sexual activity. Hatterer in his book on *The Treatment of Male Homosexuals* makes this point quite clearly as a therapeutic measure. The book *How Homosexuals Make Love* is an example of a kind of sex manual for male homosexuality emphasizing the use of various positions and offering some cautionary advice regarding the dangers involved in male homosexual practices. This differs not at all from the marriage manuals available for heterosexual couples. Such a work might be seen as pornographic, used in the pejorative sense, but in actuality it is simply a type of eroticism which might be classified as Erotic Realism—Nonfiction.

As taboos are brought into open discussion and compared with evidence gained through use of the scientific methods, they disappear and the restraints which formerly held no longer exist. Some psychologists noting this have tried to establish the fact that male homosexuality is in reality a disease. But Hooker in various works deriving from the study of male homosexuals has firmly established that there is no clinical entity which can be identified with sexual practices between consenting males. This disappearance of the taboo, a phenomenon that probably began with the Kinsey Report in 1948, is most interesting to watch as it appears in the literature of psychology, of sexology, of law, and in works of the imagination. Reviewing media exists for this literature and an investigation no more difficult than that necessary to build up a collection in another area will result in the important books being brought to light for any given collection. Several different periodicals of the male homosexual viewpoint are now published, and complete runs of these periodicals are available in most cases. Among the most interesting is *Tangents*, both because it is well written and because it does not appeal to the eroticism which categorizes several other periodicals. In fact, it would be hard to label this periodical erotica if it were not for the fact that it is devoted to the problems of male homosexuals. We conceive from this discussion that erotica is not necessarily stimulating, but that pornography aims at

sexual stimulation. The intention of the person responsible for the work is crucial because erotic stimulation may be derived from almost anything by the beholder. As Rembar is often wittily misquoted, obscenity is in the groin of the beholder.

Female homosexuality, or as we shall term it here, lesbianism, is extremely stimulating to some men. What operates is probably a fear of male homosexuality, or a disgust with, or envy of, men engaged in heterosexual activities. This disgust of course derives from any kind of sexual activity in which a male participates. The erotica with a clear lesbian intention is rather more abundant and generally tends toward sexual stimulation more than does the literature of male homosexuality. As Kinsey points out in *Sexual Behavior in the Human Female*, the users of erotica are more likely to be men than women. This does not mean to say that women have no interest whatever in erotica, but that women will gain more from the explication of erotica in an intellectual sense than they will be stimulated by erotic passages or by pornography. Many women tend to regard it as nonsensical and worthless. The taboos involving lesbianism are not nearly so strong nor so prevailing as those involving male homosexuality. This is seen in its complete omission from laws of the nineteenth and twentieth centuries punishing sex acts between men. There is a story that Queen Victoria refused to permit her parliamentary advisor to include laws involving women because she simply could not believe that such activity ever took place. Crushes between school girls are tolerated and the avowed lesbian who is not only discreet but makes an important contribution to society is likely to be tolerated so far as her sexual activity is concerned and appreciated for her contribution. Nevertheless readers of biographies of lesbians are often men who derive great sexual stimulation from the fantasy of two women engaged in some kind of sexual manipulation. Characteristically, pornographic works published in Denmark include two women and one man or two women alone. There are almost twice as many collections of pornographic photographs involving troilistic activity among heterosexuals and lesbians, as there are similarly constructed picture books involving male homosexual activity. The common factor of all such works is the incredible repetition and the speed with which the curiosity of the beholder is jaded. In several tests by the National Commission on Pornography and Obscenity, by various groups of psychologists, and by this author, it was found that after the initial shock subsides little interest in the picture books exists. A kind of casual and hasty turning of the pages represents the reader's interest in the last of four such books although the first few photographs that are truly pornographic may be studied at some length. Such tests are rather easily constructed and could be of great significance in developing an understanding of physical response to verbal and graphic communication. In particular, evidence of fear of homosexuality may be highly useful in constructing a therapeutic technique for individuals with severe emotional problems. Such fear is very easily established by a sequence of erotic photographs arranged so that the least taboo activity is supplanted by pictures of activities where stronger taboos exist. About midway between heterosexual intercourse and male homosexual activity we would find lesbianism.

Bestiality, sexual relations involving animals and human beings, has been a part of pornography practically since its inception. Danish pornographic picture books in-

clude a few devoted to bestiality, usually involving dogs, and less graphic but similar paintings exist from the sixteenth, seventeenth, and nineteenth centuries. It is impossible here to determine whether true societal taboos govern such pictures because of this author's own disgust. Granting disgust as the evidence that a taboo exists, then the author is willing to state that there is a taboo but that he is incapable of investigating it further.

In summary we may conclude that the acceptance of a taboo will deny sexual stimulation when the recipient of an erotic work seeks to obtain the fullest understanding of what is included. Where the taboo has not been accepted, then sexual stimulation is likely to result. Continued confrontation with graphic depiction of violated taboo is likely to remove the taboo altogether. In fact, almost as a general rule, we can state that the taboo survives only when not made a part of the flow of communication. This is most clearly exemplified by that erotica devoted to heterosexual intercourse. This material is least likely to arouse the shock which comes with the violation of a taboo.

Any discussion of erotica in a work designed for librarians must consider the role and function of intellectual supervision or, more commonly, censorship. The intellectual in Eric Hoffer's view is a person dedicated to blessing the common events of life with words. Certainly sexual activity is a most repetitive pleasure, with frequencies ranging from several times a day in the case of adolescent masturbation to once in a while when old age is upon a man or in the case of men with minimal sex needs. Erotica, the recording of man's sexual nature, has been more circumscribed, more blessed with words, than almost any other form of communication. Part of this results from the taboos described above, but another large part results from the need of certain people to make a mythical structure out of otherwise rather tiresome facts. As the taboos break down, the first publications permitted have a scientific flavor, even though in some cases the supposedly factual is minimal, the speculative enormous, and both serve only as a vehicle to confound censors so that sexually stimulating photographs and descriptions can squeak past the guardians of the public morals. The final ending of the taboos is in the sort of innocent voyeurism that sexually oriented material gratifies.

Typical of such material is the spate of books that followed the decision of Justice MacBride in Los Angeles in dismissing a case brought by postal inspectors on a charge of violating the Comstock Law. In effect, MacBride's decision, reasoning from the Supreme Court's decision in *Stanley v. Georgia*, states that granting a citizen of the United States has the right to keep and use highly graphic sexual material, then it must follow that the government cannot have an interest in where or how he obtains the material. This case, in particular, may be a very difficult one for those who would reinstitute Comstock's rules that made smut-hunting such an invigorating pursuit for those who needed much practical proof of their superiority of morals.

Just how valuable this material is in a library collection is another matter. Collections of case histories transcribed exactly are highly useful to the academic institutions where the lives of human beings are studied. Social workers, psychologists, and psychiatrists cannot be educated in a vacuum, protected from the environment and

the reality where their services will be used. Significantly, much objection has arisen from the use of taboo words in these interviews. That these words convey shock value is no surprise, but to censor them out at this stage in the development of human knowledge is ridiculous in the extreme.

Taboo words are part of the reason for the depth and breadth of the generation gap, currently discussed at a length that exceeds interest by some hours. Taboo words are as much subject to the diminution of shock when the taboos are violated as any other area. The younger generation would find a term as horrid as "mother-fucker" only characteristic of ghetto language whereas a person the age of his parents or grandparents would be intensely disapproving that such a word might ever be used or seen by anyone. Robert Heinlein in his futuristic novel *The Door Into Summer* invents taboo words "kinky," "kink," and even "kinking" that are totally taboo, so that when the main character uses a form of the word, those in his presence are dismayed at his bad manners. Nothing in the word or its sound has any more effect than is granted by the arbiters of taste. This is intellectual supervision of the channels of communication, and it will apparently always operate so long as any one feels he has the authority and ability to make decisions.

No librarian would exclude a novel that contained the word "fuck" or even "cock-sucker" or "cunt," because these words have now virtually lost all their threat to the young and are, if anything, only boring to the middle-aged. The value of erotica to a collection for adults must be made on the basis of its usefulness and validity for the collections of which it is a part. Such books as *Anal Eroticism* by H. Erick Lester, *Guidebook to Sexual Positions Between Consenting Adult Males* by J. J. Proferes, *Male Homosexual Marriages* by C. Leslie Lucas, and *Teen-Age Masturbation* by Nicholas M. Dort would be not only repugnant in the extreme to the vast majority of adults but would also serve a purpose in only the most advanced collections where human sexuality is studied. It is amazing that they would probably not be found even there. Three of the authors, Lester, Lucas, and Dort, have apparently earned the Doctor of Philosophy degree, and some attempt at honest research is attempted, especially in the book by Lester. Included among the photographs are reproductions of old photographs in his collection depicting sodomy (interestingly enough, only of a heterosexual variety) in the nineteenth century.

Intellectuals of an earlier period were fond of circumscribing the areas of research that are valid. Even the Romans were able to find what is human is not alien but is of interest. Human sexuality is of paramount interest to many people, just as cookery is, or books on health and well-being. What interests human beings is human beings, and the sophisticated studies conducted at the request of the National Commission on Obscenity and Pornography conclusively show that the dislike of sexually oriented materials has resulted in the intuitive statements on its effects. That there is very little was conclusively proved and firmly rejected by President Nixon in a statement that compared strongly to President Hoover's rejection of the report advocating an end to the prohibition experiment of the Eighteenth Amendment to the U.S. Constitution. Pornography, as the term is used by President Nixon, must have bad effects. The author assumes that President Nixon's efforts are politically motivated as well

as based on a great distaste for the material. He might be surprised to discover that those who have made a serious study of sexually oriented material usually become very bored with it and find research in primary sources a very tiresome task.

A former librarian of the Sex Institute of the University of Indiana informed the author that very soon after the late Alfred Kinsey began his collection of sexually oriented materials, all interest in it ceased. The various items of the collection were cataloged as acquired, and no one who worked there could find anything of interest in what was being collected except as it added to the completeness of the library and increased its usefulness for research.

The intellectual whose blessing of words is rejected is rather like the priest of a religion whose adherents have all become apostates. Pythagoras warned his disciples against eating beans because they "partook of the wind of life." When he ceased to teach the mysticism of numbers, his disciples brought many of his ideas to very fruitful points of research, probably the most important of which is visual, practical proof of the great theorem of the right triangle, a figure that is possibly more indicative of the nature of science than anything else invented by the mind of man. But they began eating beans, and some of his most cherished beliefs were challenged and found invalid.

It is as true in the sciences dealing with man and his society that until we engage in counterintuitive research, until we challenge the most comforting of our axioms, we will know little. We are still engaged in the mysticism of numbers and imputing to a harmless vegetable a sinister purpose. So it seems with sexually oriented material. The manhood of man requires that he see himself not as he seems to be or wishes to be or hopes to be but as he is. His interest in his own sexuality will endure, and erotica is the literature that records this interest and preserves it for posterity. Beyond the taboos and the anti-intellectual decisions of intellectuals is the freedom of the mind of man.

Almost all sexologists agree instantly that the most important sexual organ of mankind is his brain. Among the results of the studies conducted for the National Commission on Obscenity and Pornography were some that confirmed much earlier investigation. No visual representation nor literary work, however frank or graphic, could equal in its powers or stimulation the private fantasies of the test subjects. Sexual arousal was more rapid and did not decrease on successive trials when the individual fantasized in the impenetrable recesses of his mind. Such fantasies in written form fail to provide sexual stimulation, and it may be that a curious person will turn to pictures in the hope of restoring the stimulative effects of sexual representations, but in time the ultimate exposure is achieved and the entire subject area becomes tiresome. In any case, it is harmless.

Intellectual supervision of graphic materials, the old fight of the censors, was waged to prevent the fantasizing that gave such pleasure to so many people. It failed. Now the supervision, it is the belief of this writer, must achieve a different purpose, selecting erotic materials carefully so that no collection is maltreated because of the prejudices, fears, and taboos of the librarian. Nothing about erotica requires us to change rules that require a librarian to know the community he serves and collect

materials of use to the individuals in it, not on a majority basis of those interested but on the basis of a balanced collection that will lead the user on as far as his interest takes him.

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JAY E. DAILY

ESCUELA INTERAMERICANA DE BIBLIOTECOLOGÍA

See also *Colombia, Libraries in*

The Escuela Interamericana de Bibliotecología (Inter-American Library School) at the University of Antioquia in Medellín, Colombia, began operations in February 1957. Realizing the increasingly important role that access to information would have to play in the socioeconomic development of Latin America, the administration of the University of Antioquia had proposed to establish a new library school to serve as a focal point for the training of librarians in Colombia. In addition to general support, the university had offered accommodations in the modern quarters occupied by its medical school; when Colombia's Fondo Universitario Nacional (National University Fund) and the Rockefeller Foundation agreed to provide additional financial assistance, the concept of a new and modern training program for librarians became a reality (1). Although library training had existed in Colombia as early as 1936 (2), the new school was created to provide the first full-scale university level program of library education leading to a university degree. The present article describes briefly the cultural and academic setting (Medellín and the University of Antioquia) before turning to the school itself. Successive sections deal with the school's administration and finance, its curriculum, faculty and student body, quarters, professional library, and extension program and publications.

The Setting

Colombia, the only South American country that borders on both Atlantic and Pacific oceans, has a population of about 21 million with a high rate of growth (3). The political subdivision corresponding to the American state is the *departamento*; there are currently 22 departments (and several territories), but one of the most important in all senses—political, social, economic, and cultural—is Antioquia, whose capital, Medellín, is just 24 minutes by jet plane from the national capital (Bogotá). Antioquia now has a population approaching 3,000,000, of whom about one third live in and around Medellín. Most of the department enjoys a pleasant climate because it is situated several thousand feet above sea level, and Medellín itself is famous for its “eternal spring.” Originally an agricultural area (with coffee still an important product), Antioquia underwent industrialization relatively early in comparison with other parts of Latin America. The textile industry emerged first and still remains important, but the factories of Medellín now turn out a wide variety of goods; in addition, banking and financial services make an important contribution to both the regional and national economies. The *antioqueños* are famous among Colombians for their drive and their shrewd business sense.

In view of the importance of the region and its capital, it is not surprising to find several institutions of higher education in Medellín. The most important of these is the University of Antioquia, which traces its origin back to 1801. Like most other Latin American universities, its original sponsorship was religious, but it is now a public university (although the largest source of support is the national rather than departmental government). Similar to most of its counterparts in Latin America, the University of Antioquia long existed as a kind of federation of faculties, schools, and institutes, scattered in several parts of Medellín; among these were, of course, the traditionally important faculties of law and medicine. Until recently there was little or no concept of general education or liberal arts; the student customarily entered the professional faculty of his choice and remained there until completing his studies (3 to 6 years—the longer period being necessary, for example, in medicine). At the present time the university consists of nine faculties (law, economic sciences, education, medicine, dentistry, veterinary medicine, engineering, chemistry, and sciences and humanities—established as a faculty only in 1967 and corresponding to the American college of arts and sciences); schools at university level include nursing, public health, and library science. In addition there are several other programs (e.g., in fine arts); two secondary-level units, the Liceo Antioqueño and the Bachillerato Nocturno (night school), account for nearly one-third of the total enrollment of 9,000 (Table 1) (4).

In addition to establishing the program of general studies, which resulted in the creation of the Faculty of Sciences and Humanities, the decade of the 1960s witnessed rapid expansion in enrollment. The number of students in the faculties and university-level schools went from 1,432 to 5,452—an increase of 281% (Table 2) (5).

Like the typical Latin American institution of higher education, the University

TABLE 1
Enrollment at University of Antioquia, 1968^a

Unit	Number of students
Faculty or school	
Law	125
Economic Sciences	225
Education	726
Medicine	425
Public Health	256
Nursing	174
Dentistry	155
Engineering	186
Veterinary Medicine	153
Chemistry	95
Library Science	68
Sciences and Humanities	2,837
Laboratory Technicians	27
TOTAL	5,452
Secondary programs	
Liceo Antioqueño	2,225
Bachillerato Nocturno	727
TOTAL	2,952
Technical and Fine Arts Programs	752
GRAND TOTAL	9,156

^a Source: Medellín, Universidad de Antioquia, Rectoría, Planeación y Desarrollo, *Plan General de Desarrollo, 1960-1973*, p. 47.

of Antioquia did not have a campus, but its various units were scattered through the city. However, this dispersion was not as acute as in the case of most universities because there were two distinct nuclei: those units housed in buildings around the Plazuela San Ignacio, not far from downtown Medellín (see Figure 1), and those several miles distant in newer construction accommodating the schools in the health professions. Other units, including the Liceo Antioqueño, were more distant from the city center. The university had long sought some way of physically unifying most of its programs on a single campus (*ciudad universitaria*), but the financing of such a large construction program remained a seemingly insurmountable obstacle. By the early 1960s conditions became more favorable, however, and in 1964 a suitable site was secured. Financing was accomplished by a combination of loans and grants from the Department of Antioquia, City of Medellín, Inter-American Development Bank (IDB), and university funds (including a grant from the Ford Foundation). Construction commenced in 1966 and moved forward very

TABLE 2
Growth in Enrollment in Selected Programs, University of Antioquia, 1959-1968 *

Faculty or school	Enrollment									
	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Law	180	129	194	141	146	163	167	195	146	125
Economics	161	169	170	175	282	305	255	253	220	225
Education	102	140	190	185	323	451	590	653	544	726
Medicine	450	409	400	435	462	470	442	457	410	425
Public Health	—	30	35	29	30	125	119	106	250	256
Nursing	129	135	134	145	140	144	139	166	171	174
Sciences and Humanities	—	—	—	—	—	99	1,329	1,175	1,015	2,837
Library Science	—	57	43	59	65	82	52	33	53	68
All university level programs	1,432	1,499	1,598	1,669	2,060	2,569	3,646	3,626	3,479	5,452

* Source: Medellín, Universidad de Antioquia, Rectoría, Planeación y Desarrollo, *Plan General de Desarrollo, 1969-1973*, p. 47.

rapidly; with all major buildings nearly finished in about 2 years the formal dedication took place in November 1969 (see Figure 2). The project cost approximately 10 million dollars, but even so it did not propose to achieve complete centralization of the university since there seemed to be no likelihood that sufficient funds and space could be secured to accomplish this. The new campus does not house the health professions, which continue to occupy the relatively new quarters not far from the *ciudad universitaria* and adjacent to the San Vicente de Paul Hospital; it is hoped that the university will eventually acquire a sufficient amount of land to establish a connection between the new campus and this biological sciences complex. The Liceo Antioqueño also remains in its old location. In addition, for historical reasons, the university retained its main building at the Plazuela San Ignacio, an important decision for the library school, which now occupies a portion of these facilities (as mentioned below) (6).

Administration and Finance

In this setting of Medellín and as a part of the University of Antioquia, the Inter-American Library School began operations in February 1957 with the aim of preparing "... professional librarians with sufficient academic background and technical knowledge to direct and administer libraries of all kinds ..." (7). An International Advisory Council, including representatives of the Pan American Union and UNESCO, was established, initially "to determine the objectives of the school, the scope of the training program and the content of the courses, to select the director and outline the needs of the school in terms of national and international

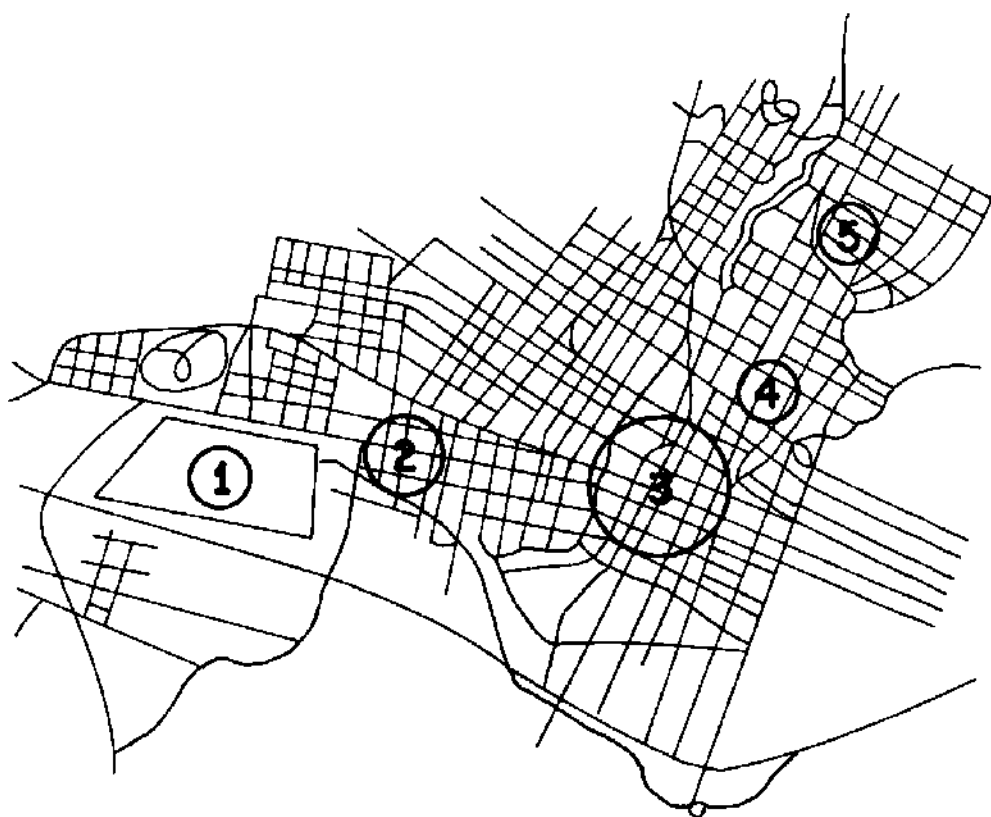


FIGURE 1. Location of Inter-American Library School in relation to new campus of University of Antioquia and downtown Medellín. 1: New campus of University of Antioquia. 2: Health profession complex of University of Antioquia (first quarters of Inter-American Library School). 3: Downtown Medellín. 4: Present quarters of Inter-American Library School (former administrative building of University of Antioquia), Plazuela San Ignacio. 5: Castillo de los Botero (quarters occupied by Inter-American Library School, 1960–1970).

faculty and library needs” (8). Its permanent function was to be one of advising on policy and planning and to aid the school in enlisting assistance from entities concerned with the improvement of library service in Latin America. Despite a promising beginning, a series of events, including internal difficulties at the University of Antioquia, led the council to recommend suspension of classes during the year 1959. When the school reopened in 1960 the council was reconstituted as an International Executive Council, assuming many of the functions of a Board of Trustees: advising the director on policy matters; reviewing, at its annual meeting in Medellín, the programs and activities of the past year and plans for the coming one; working with the director to secure staff, particularly visiting professors from outside Colombia; and approving the budget (especially that part consisting of funds supplied by the Rockefeller Foundation). In essence, the school, although functioning within the University of Antioquia, was to operate with a very great measure of autonomy. This system came to a close after 6 years; in January 1966 the University of Antioquia assumed full administrative responsibility for the school,



FIGURE 2. *Ciudad Universitaria.*

which since then has operated similar to other academic units (9). The director, for instance, reports directly to the rector of the university, but, as the executive officer of a school rather than a faculty (in Latin America the latter generally enjoys more administrative and educational autonomy than the former), he is not a member of either of the university's two boards (the *Consejo Superior* and the *Consejo Directivo*). Nevertheless, the director has generally had very good rapport with the rector (who is elected, as in other Latin American universities, usually for a 4-year term—although difficulties in Colombian higher education in the past several years have led to more frequent changes). It is true, of course, that the large measure of outside financial support which the school has received (as indicated below) has meant that the director had much less to ask the rector for, in terms of monetary support, than other deans and directors.

The school has had three directors since its establishment: Gaston Litton, 1956–1958; Lucrecio Jaramillo Vélez, 1958–1959; and Luis Florén, 1959 to date. The director has full responsibility for the school's operations, both academic and, until quite recently, financial. For some years disbursements from the Rockefeller Foundation were made to a dollar account under the director's—rather than the university's—control; annual audits insured that allocations approved by the foundation and the International Executive Council were followed. This has, in effect, added to the director's heavy administrative burden—one which would have been even more burdensome had changes in the incumbent occurred more often. There has never officially been an associate director. The first director returned in 1960 to occupy the position of head of instruction (*jefe de estudios*) in charge of the

over-all academic program, thus relieving the director of much responsibility in this area. But when he left, the position was not filled; the school instead created the post of general secretary (*secretario*), usually filled by a recent graduate, who handles much of the routine paperwork and also functions as a general administrative assistant to the director. Since the appointee teaches several courses, the position is not, however, a full-time one. Further lightening the director's administrative load is the fact that there is generous provision for general secretarial assistance. The role of the faculty in the school's administration has, on the whole, been somewhat passive, probably due in part to the fact that many were visiting professors from abroad. The director has, however, appointed some faculty committees and has done a considerable amount of consultation with his colleagues, especially those from outside Colombia. It would appear that greater use of faculty committees (e.g., on such matters as recruitment and the library) would allow him to devote more time to relations within the university and to external relations with the Organization of American States (OAS), other library schools in the area, professional associations, and to alumni affairs.

Certainly the director's administrative duties have increased in complexity in recent years. The fact that the school has received substantial financial assistance from external sources in itself imposed a burden of advising, consulting with, and reporting to agencies in New York and Washington with the consequent communications problems (e.g., delays in the mail, misunderstandings not clarified until further exchange of correspondence).

The Inter-American Library School has enjoyed an excellent level of financial support since its establishment. The Rockefeller Foundation made three grants for broad support in several major areas (e.g., visiting faculty) and three smaller grants for a total of \$557,690 (Table 3) (10). These grants provided assistance from 1957 through 1970 and thus represented an average of \$42,899 per year over the period (excluding 1959 when classes and other activities were suspended). From 1971 to date the OAS has provided special support, in effect replacing that of the foundation. This has amounted to \$81,400 in 1970–1971 with an additional \$75,262 budgeted for 1971–1972. (These figures include substantial amounts for scholarships and travel of students attending special courses at the school.) Although considerably smaller in quantity than the funds provided by the foundation and the OAS, the school has had three other sources of income: the University of Antioquia, the government's higher education board (ICFES, Instituto Colombiano para el Fomento de la Educación Superior, successor to FUN, the Fondo Universitario Nacional mentioned at the beginning of this article), and miscellaneous revenue from student fees, sale of publications and of photocopies, etc. In addition, the university has provided the school with quarters which otherwise—at least until the construction of the new campus—might have had to appear in the annual budget as rental. (Not a part of regular operating expenses but a significant contribution, nevertheless, were the sums spent by the university in refurbishing and making suitable the various quarters provided. Also the university made a large capital expenditure when it purchased in 1962 the large mansion which had served as the school's home since 1960.)

TABLE 3
Rockefeller Foundation Support *

Year	Purpose of grant	Amount (in dollars)
1956	General support, 1956-1958	58,000
1958	General support through 1965	265,000
1961	Expenses of seminar on the development of library training in Latin America	30,000
1961	To enable Dr. Gaston Litton to attend Inter-American Archival Seminar and to visit selected library schools	2,450
1963	To enable Dr. Robert B. Downs and Dr. Herbert Goldhor, Graduate School of Library Science, University of Illinois, to become acquainted with the school's organization and curriculum	2,240
1965	General support through December 1970	200,000
TOTAL		557,690

* Source: Rockefeller Foundation, *Annual Report, 1956-1970*. These figures exclude fellowship grants to graduates for advanced study in the United States.

On the whole, disbursements from these sources have been and continue to be coordinated (budget-making responsibility resting with the director). The foundation and OAS monies have generally provided for the salaries of the director and of visiting professors, for development of the school's professional library, for special short courses, and for international travel of the director and of the International Advisory or Executive Council (during the years of their operation). Funds from the University of Antioquia have supported the salaries of Colombian faculty and staff, administrative expenses, maintenance, and other general needs. The Colombian government, through FUN and later ICFES, has provided scholarships for a considerable number of students, in effect relieving other sources from maintaining a program of student aid. The school's own income from fees and sales has gone for some salary support, for library expenses in local currency, and for other miscellaneous needs. Given these various sources, it is difficult, if not impossible, to arrive at total annual expenditures. The school's detailed publication of its *Estadísticas*, an excellent source of information on most educational activities, unfortunately contains no financial statements, and the budget of the University of Antioquia is not regularly available. The yearly disbursements from the Rockefeller Foundation (out of funds allocated in its grants) have, in recent years, appeared in its annual report. Moreover, the loss of value of the Colombian peso, while neither as sharp nor as rapid as that of the Brazilian cruzeiro or Chilean escudo, remains a factor which needs to be taken into account. In addition, one needs to remember that not only is Colombia a relatively low cost country (in comparison with Brazil and Venezuela, for example), but that the cost of living in Medellín is 10% or more lower than it is in Bogotá, so that an equal amount of money represents greater purchasing power in the former. Even with all of these

problems, available evidence indicates that, at least in the mid-1960s, the school spent between \$55,000 and \$60,000 in a "typical year" (utilizing the current value of the peso for conversion), of which about 70% came from the Rockefeller Foundation and 30% from other sources (these are *not* actual figures, but estimates for a representative year). In general, such funds have provided for a relatively comfortable level of operations—certainly in comparison with most other library schools in Latin America. For the Sanz study twelve schools in the area supplied actual figures for their budgets, which ranged (in dollar equivalents) from \$343 to \$72,000 (presumably for 1962 or 1963) (11), while in the latter year the Rockefeller Foundation disbursement alone provided the school with \$45,292 (12).

TABLE 4
Professional Program at Inter-American Library School^a

Term	Course No.	Title	Hours
1	B-34	Research Methodology	3 ^b
1	B-12	Cataloging and Classification, I	5 ^b
1	B-43	The Reader and the Library	3
1	B-13	Reference	5 ^b
		TOTAL	16
2	B-44	Library Administration	5
2	B-17	Cataloging and Classification, II	5 ^b
2	B-14	General Bibliography	3 ^b
2	B-18	Selection and Acquisition	3
2	B-54	Periodicals and Serial Publications	3 ^b
		TOTAL	19
3	B-45	Documentation	3
3	B-38	Specialized Bibliography: Humanities and Science	3 ^b
3	B-52	Public Libraries	3 ^b
3	B-53	School Libraries	3 ^b
3	B-55	Publications of Governments and International Organizations	3 ^b
		TOTAL	15
4	B-25	Special Materials (Problems in Cataloging and Classifying)	5 ^b
4	B-46	University and Research Libraries	3
4	B-28	Planning Library Services	3 ^b
4	B-4	History of Books and Libraries	3
4	B-56	Use of Books and Libraries	2 ^b
		TOTAL	16

^a Source: Medellín, Universidad de Antioquia, Escuela Interamericana de Bibliotecología, *Prospecto*, 1970, pp. 10-11.

^b Also 2 or 3 hours of laboratory work.

Curriculum

The Inter-American Library School operates at the undergraduate level. Its original curriculum encompassed a 3-year program: a first year of general cultural studies, a second with basic work in library science, and a third consisting of more advanced professional courses. Four terms of English were also required. A considerable portion of time in the last year was reserved for the preparation of a thesis (a requirement of the university for the *licenciatura*). The theses prepared from 1960 to 1966 exhibit a wide range of topics, but the largest number are bibliographies and indices (13). Although some changes occurred in the first few years of operation, they were relatively minor; such basic areas as cataloging and classification and reference continued to bulk large in the student's program.

In 1964 significant modifications took place, both to extend the program to a full 4 years and to be in accord with the university's newly-adopted policy of having all students enroll in 2 years of general studies prior to their work in professional areas. This, of course, required some restructuring of the school's own curriculum, with the result that at present the student's 2 years of general studies include courses in the sciences, social sciences, and humanities as well as 2 years of English; in addition, he takes one 4-hour course entitled "Introduction to Librarianship." The student then spends his third and fourth years in the library school with the program shown in Table 4. From the American point of view these arrangements might be characterized as an undergraduate program with a number of liberal arts courses (mostly of the survey type) preceding a major in library science. On the whole, the professional courses are traditional in nature, with almost no opportunity for elective work and with as yet little introduction to information science. The present course structure reflects in part the original planning by the International Advisory Committee and recommendations made in the mid-1960s by the Three Study Groups on Education for Librarianship (14).

Faculty

The school has from the outset drawn many of its faculty for library science courses from outside of Colombia—the largest number coming from the United States. Although these persons were not all equally fluent in Spanish, serious problems in communication were few; their presence, of course, contributed greatly to a cosmopolitan atmosphere at the school. The thirteen Americans who have served on the faculty, generally for periods ranging from one to four terms, and dates of their assignments are as follows: Jonathan R. Ashton, 1967; Alice Dugas, 1965; Edwin S. Gleaves, 1971; Miriam Huddle, 1962–1963; William V. Jackson, 1960 and 1968; Gloria E. Kast, 1968–1969; Donald Lehnus, 1964–1966; Gaston Litton, 1956–1963; Josefina Mayol, 1961–1962; Eugene Moushey, 1963–1964; Mary Parsons, 1964; Emma Simonson, 1956–1958; and Justine Woodruff, 1968–1969. (In addition, several other Americans, usually resident in Medellín, have given the courses in English.) Faculty have also come from other Latin American countries, with Argentina, Brazil, Cuba, Panama, Peru, and Uruguay represented.

In all, from 1957 through 1970, the school had sixty faculty members, almost evenly divided between Colombians (32) and persons from other countries (28) (15). The long lead time necessary to arrange for visiting staff from outside Colombia has made it difficult to schedule and secure faculty, but the availability of Rockefeller Foundation funds greatly reduced financial complications.

From the beginning the school planned to send some of its outstanding graduates to the United States for advanced training in the expectation that they would return and join the school's faculty. The Rockefeller Foundation provided fellowships for several, and others obtained support from the Fulbright Commission in Colombia and from the Organization of American States; by 1971 seven graduates had received American master's degrees from the library schools at Catholic University, Illinois, Michigan, Peabody, and Rutgers. All but one of them did return as faculty, but after varying periods all but one resigned to accept another position in Colombia or elsewhere. In this respect faculty recruitment has been as difficult as at other schools receiving assistance from American philanthropic foundations.

In at least one respect the EIBM (the school is frequently referred to by the Spanish acronym) has been unique from the outset: nearly all of the faculty are full-time, a sharp contrast with other schools in the area where the inverse situation obtains. Moreover, the number has been and continues to be generous in relation to the enrollment. In 1971 the school had nine full-time professors, including the secretary and the director of publications (three supported by the OAS, and the other six by the University of Antioquia) (16). The general strengthening of staff which has taken place in Latin American library schools in recent years (17) has probably resulted in the strongest faculties emerging in Argentina, Brazil, and Colombia. The teaching load is relatively light; most professors give two courses in the regular program and have limited responsibilities in the special courses, although on occasion individual loads have varied considerably from this norm; also it is difficult to assess the weight which should be given to the supervision of the thesis required for the *licenciatura*—a burden which tends to be distributed somewhat unequally among the teachers. On the whole, salaries compare favorably with those paid in the other faculties of the University of Antioquia, although it is well known that for the visiting professors they have had to be individually negotiated not only on the basis of their experience and training but also on their salary level in the United States. The director has had a relatively free hand in making these arrangements, thanks to the support provided through the Rockefeller Foundation grants.

Students

The school opened in 1957 with 35 students (18). The total increased the following year with the addition of a second first-year class, but the cessation of operations in 1959 put an abrupt halt to this growth. With the reopening in 1960

TABLE 5
Chronological List of Graduates^a

Year	Graduates ^b
1958	2
1959	0
1960	16
1961	7
1962	15
1963	7
1964	21
1965	22
1966	2
1967	17
1968	8
1969	22
1970	28
TOTAL	167

^a Source: Medellín, Universidad de Antioquia, Escuela Interamericana de Bibliotecología, *Estadísticas, 1956-1970*.

^b In 1971 the school revised the basis for its statistics and now counts students as graduates of the year in which they receive their degree; for this reason the above figures do not agree with those published in previous numbers of the *Estadísticas*.

the initial enrollment amounted to 57, but withdrawals reduced the final figure for the year to 36 (15 in the first year, 5 in the second, and 16 in the third). In the 1960s the enrollment ranged from 33 to 82 (Table 2), although capacity in the quarters then occupied was assumed to be around 100. Of course, in addition to the regular students, there were often present, sometimes for as long as several months, the students in one of the special courses.

By 1970 a total of 167 persons had completed their studies, all but a few of them receiving the degree *licenciado en bibliotecología*; Table 5 shows the distribution of graduates by year. Unfortunately, about one-fourth of them are no longer active in the profession (a few are, however, engaged in advanced study in the United States or elsewhere), so that the total contribution to Colombian librarianship amounts to ninety-five. It is interesting to note that more than half of those in Colombia are working in university libraries; this is explained, in part, by the fact that the majority of scholarships came from the FUN (and later ICFES); in return for his grant the student agreed to accept a suitable position in a university library. The FUN provided scholarships to forty-eight of these graduates, and other sources an additional thirty-one scholarships, leaving eighty-eight of the graduates who utilized their own resources (19).

Table 6 indicates the distribution of graduates by present position and makes clear that Colombian libraries have been the chief beneficiaries of the school's program. It is well to remember that the twenty-eight now working in other Latin

TABLE 6
Distribution of Graduates by Present Position (1971) ^a

Type of library	In Colombia	In other Latin American countries	In U.S.	Total
National	—	1	—	1
University	54	23	2	79
Public	4	—	1	5
School	9	—	—	9
Special	22	4	1	27
Library Science Teaching	6	—	—	6
TOTAL	95	28	4	127
Inactive ^b				40
GRAND TOTAL				167

^a Source: Adapted from Medellín, Universidad de Antioquia, Escuela Interamericana de Bibliotecología, *Estadísticas, 1956-1970*.

^b Includes a few graduates presently studying for advanced degrees.

American countries generally came from and returned to countries without library schools (e.g., El Salvador and the Dominican Republic).

Quarters

During the 15 years in which the Inter-American Library School has operated, it has called three different buildings home—none of them containing accommodations originally designed for its needs, but all, after some adjustments, providing relatively adequate space for faculty, students, office staff, and library collections. In this respect it compares rather favorably with other schools. For example, in Brazil quarters occupied by library schools range from barely adequate to quite good (20), but few approach EIBM in total square footage available. During the first 2 years of operations the school occupied quarters on the third floor of the main building of the Faculty of Medicine, space more generous than might otherwise have been provided, because the School of Nursing's move to new quarters made it available. It was also useful to the school, especially in the period when it was organizing its own library, to have the faculty's well managed library available to its students, and there were advantages to the contacts between its students and those in the various health professions. However, following the suspension of activities in 1959, several reasons made it desirable to seek new quarters, and from 1960 until early 1971 the school occupied a charming mansion, constructed in the early years of the century and located about eight blocks from the buildings housing (until the move to the new campus) the university's general administration, library,

and several faculties. The downtown section of the city was about another eight blocks away, as shown in Figure 1. Originally leased and remodeled, this building was purchased in 1962 by the university's *fondo rotatorio* (a fund resembling an American institution's endowment) for about 500,000 pesos. During the several years of construction of the new campus, considerable discussion took place as to whether the EIBM should be moved to the new site, and specific possibilities were explored—one was to provide space in one of the regular classroom buildings, another to utilize the top floor of the new and spacious General Library. A related question was whether the school's outstanding professional library—strong not only in library science publications but also in general bibliography and many reference tools—should be merged with the resources of the General Library or remain a special, separate departmental collection. Another issue was that the fate of the university's buildings around the Plazuela San Ignacio—traditional location of the University of Antioquia—remained to be determined. The university authorities finally decided to retain the general administration building as a permanent memorial to the university's early days and subsequently agreed to utilize a portion of the space therein for the Inter-American Library School, and the move to this location took place in January 1971 (see Figure 3).

Returning to the mansion (known as the Castillo de los Botero) in the Buenos Aires district of Medellín, one is impressed by the successful adaptation of the

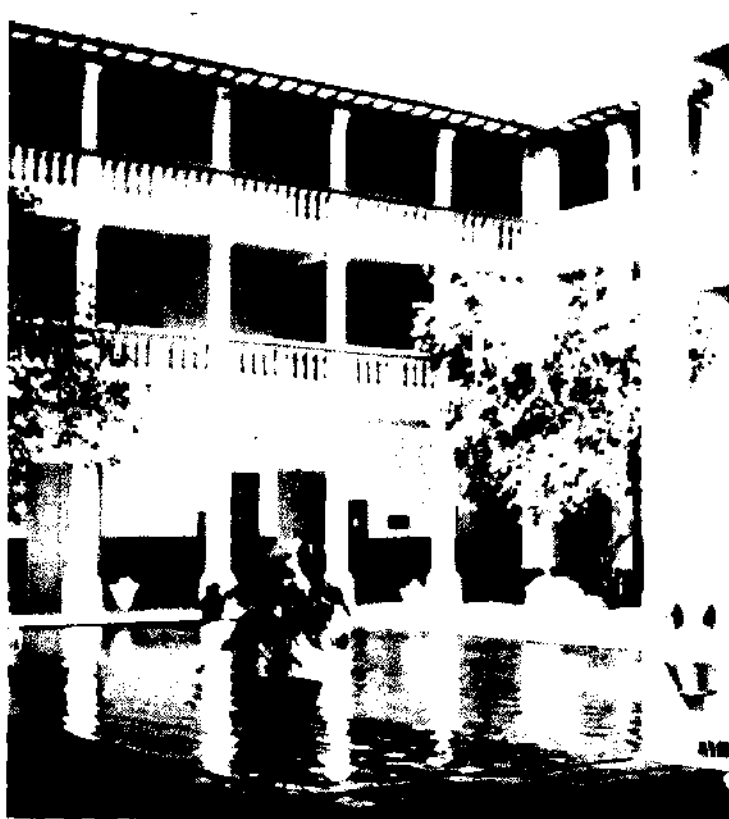


FIGURE 3. *Edificio San Ignacio.*

large residence to academic uses. Following the university's lease, the building's layout was utilized to provide three classrooms, offices, and a snack bar on the first floor; the director's office, lounge for faculty, and library on the second floor; storerooms for the library and for the laboratory collection for cataloging classes and additional offices on the third floor. The rapid expansion of the library soon created pressure for additional space; a library annex building to the rear of the Castillo was constructed in 1964 at a very favorable cost. Well-kept gardens and lawn surrounding the two buildings offered a pleasant retreat for faculty and students. Thus for a decade the school had quite attractive facilities, which met nearly all of its needs in adequate fashion and whose very isolation from the remainder of the university helped at first to heal the wounds of the 1959 difficulties and later to create a sense of esprit-de-corps among students and faculty.

The present quarters in the former administrative headquarters of the university are also satisfactory; there is generous provision for faculty offices, space for secretarial staff, and facilities for the library. Although no classrooms are reserved for the school's exclusive use, those in the building are shared only with a few units (chiefly the *Bachillerato Nocturno*), so remain available at most times for any activities of the school. An adjacent small snack bar serves light refreshments.

Library

One of the school's most significant accomplishments has been the development of an outstanding professional library; the holdings now found in Medellín rank as one of the two outstanding collections in the field in the entire Latin American area (the other is at the Instituto Bibliotecológico of the University of Buenos Aires). Its resources include general as well as specialized books, pamphlets, periodicals, and audiovisual material about different aspects of librarianship all over the world but with special emphasis on publications relating to Latin America and to the United States. In addition, there is an excellent general reference collection. In the decade from 1959 to 1969 holdings increased from 2,529 to 10,930 volumes; from eighty-three to 1,525 serials currently received; and from ninety-one photographs and other nonbook items to 4,582 pamphlets, 1,077 illustrations, 1,618 slides, and several thousand additional pieces. The investment in books, periodicals, and other bibliographical material over this period has come to about \$100,000 and approximately 250,000 Colombian pesos (exclusive of expenditures for organizing the collection and for personnel to provide service) (21).

At the outset there was a nonprofessional in charge, but it soon became apparent that the library's organization and service would fall short of what was necessary without direction from a trained librarian. Shortly after such an appointment was made the librarian of an outstanding American collection in the field (University of Illinois) spent 3 months in Medellín as a consultant on this phase of the school's operations. Since then one of the school's own graduates has always had charge of the library, and the staff has grown from one professional to five librarians, six

clerical assistants, and a secretary. This has meant that staff is adequate not only to acquire and process material but also to provide a high level of service to faculty and students. The director and faculty work closely with the staff in the selection process, so that collection is more inclusive of the field's specialties than it otherwise would be. The *Boletín de Adquisiciones de la Biblioteca* has appeared monthly since October 1959 and serves the double function of recording the library's accessions and publishing brief news items about the school and its graduates. An issue may run to as many as 30 pages; distribution is widespread both within Colombia and outside the country.

After the school's move to the Castillo de los Botero, the library occupied a large room on the second floor as its main reading room and work area; it also used a large room on the floor above for storage of most of the periodical collection. Within a few years it became apparent that the collection's rapid growth would require greatly increased space. After consideration of several possibilities, it was decided that construction of an annex building in the space immediately behind the Castillo would offer the best solution long-range to the problem. Utilizing funds in the Rockefeller Foundation grant, a good-sized building was completed in the second half of 1964. It contained adequate space for the collection (using open-stack shelving), seating for thirty or forty readers, areas for the card catalog and circulation desk, and generous accommodations for the growing staff. The library maintained the same hours as that of the school's offices: 8 A.M. to noon and 2 to 6 P.M., but also opened Saturday morning. At the end of terms the staff frequently arranged additional hours for the benefit of students studying for exams and completing their theses (the teaching faculty generally had keys). The advantages of this specially-constructed facility were, of course, lost in the 1971 move, but again the university's sympathetic concern led to suitable substitute. By connecting several large rooms in the former administrative offices adequate space was provided, even though it was necessary to occupy contiguous areas. In general, then, the library represents one of the school's most solid achievements; it will, of course, require continued support to maintain the level already reached.

Extension Courses and Publications Program

In Colombia, as in other countries where a shortage of librarians exists, there is a need to improve the training of the practicing librarian, who in many cases is self-taught. From its beginning the Inter-American Library School has attempted to do this by offering a series of extension or special courses—not in other locations, but at the school itself—lasting from 1 to 4 months. Eighteen such courses, or workshops, took place from 1960 through June 1971; ten of them were devoted to either medical or school libraries, while others were concerned with agricultural libraries, binational center libraries, university libraries, and research methods. Total attendance exceeded 200 persons, many of them coming with support from their own institutions or grants from their governments, the Pan American Union,

or the Pan American Health Organization (22). Staff for most workshops consisted of a combination of visiting professors and regular faculty of the school. The advantage of holding the courses in Medellín rests primarily in the access offered to all of the school's facilities and to its entire faculty, but the contact between regular students and those participating in the workshops also provides a mutually beneficial interchange; moreover, the number and variety of libraries in the city makes possible a series of profitable visits. Results of several of the special courses have been published (23).

A special series of meetings, of a different type, deserves mention here. Aided by a special grant of \$30,000 from the Rockefeller Foundation (Table 3), the school undertook to direct a project on the present status and future needs of the library profession and of library science teaching in Latin America. The school asked appropriate bodies in each of the Latin American republics to gather factual data, including information on training available through library schools and through other types of courses, on resources and needs of the schools, and on working conditions, library legislation, and the over-all need for librarians in the next 10 years; in 1965 the analysis of these national reports made by María Teresa Sanz appeared (24). In addition, working papers on various aspects of library education were commissioned for use of Three Study Groups, each consisting of about seven persons active in library education (directors of or teachers in library schools), which met in Medellín for 2-week sessions in November 1963, August 1964, and November 1965. The First Study Group made a number of suggestions regarding library schools and a minimum curriculum in terms of class hours and course content (25). The Second and Third Study Groups examined each of the proposed courses in detail, then prepared an outline and compiled a bibliography. Due to a series of complications, the working papers prepared for the three groups and the course outlines and bibliographies did not appear in published form until 1969 and 1970 (26). While these evaluations represented real progress in their attempt to raise the level of courses and to make available the consensus reached by leading library educators from several countries, they did not in themselves constitute the most important result of the project. This was, rather, the first set of standards for Latin American library schools: a series of qualitative statements on administration, organization and financial support, curriculum, faculty, quarters and equipment, and professional library. Appearing shortly after the meeting of the Third Study Group, the text of these standards has received wide distribution (27). While it was not expected that any schools in the area would be in condition to meet immediately the so-called "Medellín standards," it seems generally agreed that in many respects the Inter-American Library School came close on a number of points.

The school has also engaged in another type of extension work: providing technical assistance, undertaking surveys, and offering other forms of consultation to libraries in Medellín and elsewhere. As might be expected, most of this work has involved special and university libraries in Medellín, but a few assignments have been undertaken elsewhere in Colombia, in Venezuela, and in the Dominican Republic.

The school has also been quite active in the area of publications. Mention has already been made of the library's monthly accession list. The school has also issued several catalogs (*Prospecto para el año de . . .*), the most recent of them appearing in 1970. Intended as an annual, or at most a biennial publication, the catalog has not always met the goal. A large group of publications are teaching materials: outlines, syllabi, reading lists, and other materials from courses. Generally issued in processed form under the number and title of the course, they are particularly useful in countries where education for librarianship is still in the early stages of development (and conversely of less value in countries like Argentina and Brazil). Another group of publications consists of indexes (à la Wilson) to or bibliographies of Colombian publications in special fields: *Índice Agrícola Colombiano*, *Índice Médico Colombiano*, *Índice Económico Colombiano*, *Bibliografía Oficial Colombiana*, and *Investigaciones en Progreso en Colombia*; all of them started in the period between 1963 and 1966 and appear quarterly with annual cumulations. Many other processed publications are administrative in nature. A few of the student theses have been published (all are available in photocopy, however). Most of these publications are issued in editions ranging from 200 to 1,000 copies; although processed reproduction is most common, the final results of the 1963-1965 study of the profession were letterpress publications. The school has issued five editions of its *Lista de Publicaciones para la Venta* (the most recent dated December 1970).

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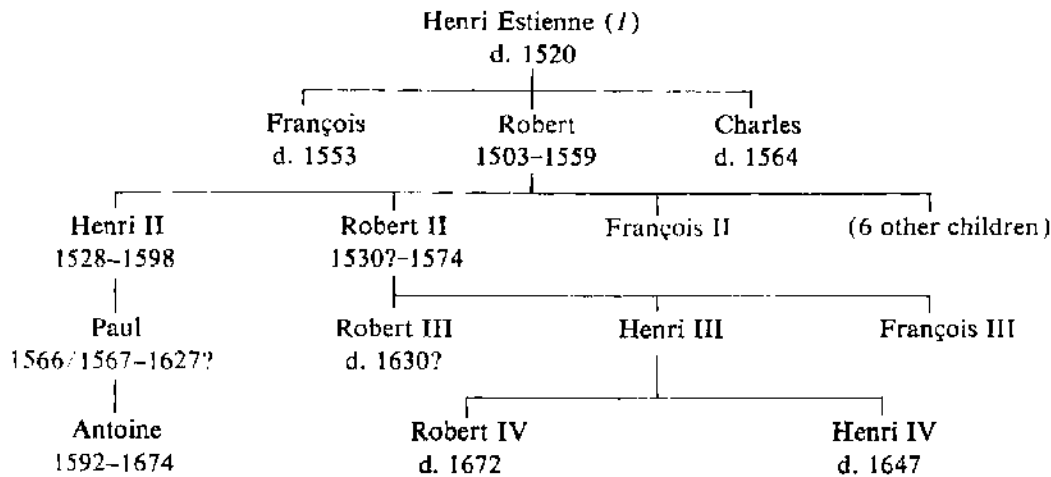
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WILLIAM VERNON JACKSON

ESTIENNE FAMILY



The Estiennes were a family of printers who first appeared in Paris at the beginning of the sixteenth century and continued their printing activities for the next 160 years. The family is also referred to by the Latinized form of their name, Stephanus, or the Stephani.

The first of the family to appear as a printer was Henri Estienne, usually referred to as Henri I, whose name first appears in a work, issued in 1502, as an associate of the Paris printer Wolfgang Hopyl. During the next several years these two were associated in the production of several works. Sometime during this period he married Guyone Viart, the widow of printer John Higman, a former partner of Hopyl, and took over the Higman press. During the following 18 years, until his death in 1520, Henry Estienne was active as a printer and during that time produced approximately 125 works. The output of his press was not large and it is for the accuracy of his work rather than for the number of works produced that he is noted.

Estienne acquired, with the Higman press, the support of Lefèvre d'Étaples, leader of a small group of Christian humanists, and the support of his followers and associates. The Estienne press was referred to by d'Étaples as "Officina nostra" (2). This group not only provided copy for the Estienne press but informally acted as proofreaders for the works for which they had supplied materials. Over 60% of the works produced by Estienne's press resulted directly from the association with d'Étaples and his circle (3).

Henri Estienne had three sons by Guyone Viart: François, Robert, and Charles. All were connected with some aspect of the book trade in Paris but the most notable was the second son, Robert, who carried on the tradition of scholarly printing established by his father.

François I became a bookseller, or a *libraire jurés*, i.e., an official bookseller for the University of Paris and at times apparently acted as a publisher as well in that he

arranged for the printing of books, primarily by Simon de Colines, that were then offered for sale in his bookshop.

At the time of his father's death in 1520, Robert was probably no more than seventeen years of age. His mother, shortly after the death of his father, married Simon de Colines, a printer and type designer. Robert Estienne completed his printing apprenticeship under de Colines, who for the first several years after marrying Henri Estienne's widow continued to operate the press established by the older Estienne (4).

In 1526 de Colines moved to another location and Robert began to print under his own name at his father's address. At that time he began to use as a printer's mark the olive tree design identified with his name and used in some form or other by all the later Estiennes.

The two areas in which Robert Estienne acquired his reputation as one of the pre-eminent scholar-printers of the period were in (1) his various critical editions of the Bible, and (2) his work in lexicography which grew out of his publications of the Latin classics. His critical editions of the Vulgate do not "merit the name of great scholarship" (5) when compared with current standards for critical editions. However, with his publication of Latin-French and French-Latin dictionaries, he "virtually founded modern Latin lexicography" (6). The *Thesaurus linguae latinae* had great influence on the development of similar works throughout England and Europe (7).

His editorial contributions to the works issued from his press were outstanding. Two-thirds of the fifty-two volumes issued as quartos during the period the press was in Paris directly represent his work as an editor or compiler. About 60% of the editions, many of them Latin texts, issued during this period were in a smaller format (8). They do not include any introductory apparatus so that it is not known whether he performed any editorial function for this group.

Updike considers the first 60 years of the sixteenth century the "Golden Age of French typography" (9). Henri I and his son Robert were both major contributors to this period of French excellence. Both were scholars as well as printers and were recognized for the accuracy of their printing. In addition, Robert Estienne was instrumental in the sixteenth century transformation of the French book. He and Simon de Colines "together with Geoffroy Tory the book decorator and Claude Garamond the engraver of types, transformed the French book. They copied the small format from Aldus, published the Latin and Greek classics at prices suitable for students, popularized italic types and produced a reformed roman which was to be the standard European type for two centuries" (10). Some of Estienne's most beautiful books were in type designed and cut by Garamond, with decorations and illustrations produced by Geoffroy Tory (11).

Soon after the invention of typography, the French Crown had displayed an interest in fine printing. An *imprimeur du roi* was "exclusively entrusted with the printing either of decrees of authority or certain specified works. . .," and the title "furthermore particularly denoted marked artistic ability in the practice of typography" (12).

That his excellence as a printer was recognized by his contemporaries is attested to by the fact that he became the Royal Printer in Hebrew and Latin in 1539 and,

although there was no official appointment, the King's Printer in Greek after the death of Conrad Neobar. The fonts of Greek type, the *grecs du roi*, were cut by Garamond under the direction of Robert Estienne and were deposited with him. Altogether, during the time Estienne was in Paris, he probably issued between 460 and 470 different editions (2).

The death of François I in 1547 removed the protection he had afforded to Robert Estienne. In 1550 Robert Estienne moved to Geneva with his family because of the condemnation of his Biblical publications which were found heretical. He renounced his Catholic faith and turned Calvinist. Within a year he had established a press in Geneva and continued printing there until his death in 1559. During this period he produced an additional sixty editions (2).

Robert had married the daughter of Joseph Badius. Perrette, by whom he had eight or nine children; three of the children, Henri II, Robert II, and François II, were important in the history of printing.

After the move to Geneva, Charles, the younger brother of Robert Estienne, took over the Paris press. Because Robert had moved to Geneva, his property in Paris was subject to confiscation. Charles had appealed to Henri II, then King of France, and by his appeal was able to secure *lettres de rémission* in favor of the children of Robert. The second son of Robert, Robert II, had returned to Paris and the Catholic faith. Robert II was an able printer and in 1556 took over the Paris press from his uncle.

By his will, Robert (I) Estienne virtually disinherited his other sons and left his Geneva press to his eldest son, Henri II, on the condition that it not be moved from Geneva.

From 1555, when he married and settled in Geneva, Henri II had been an active partner of his father. From 1550, when the family moved to Geneva, until 1555, Henri II had traveled over the Continent and in England in search of early manuscripts in Latin and in Greek. He may have been employed, part of this time, at the press of Manutius (13). His primary interest was in printing Greek texts, just as his father's major interest had been in the production of Latin texts. During his lifetime he compiled a major Greek thesaurus, corrected and edited seventy-four Greek, fifty-eight Latin, and three Hebrew editions. He also wrote some thirty original works (14).

In spite of the excellence of his work, Henri II was not successful financially. Patison attributes this to two factors: (1) Because the press was in Geneva, it was difficult to compete with presses established in France; and (2) the period during which the French were interested in classical scholarship had passed (15). His last years were spent in traveling, and he died in Lyons in 1598.

Paul succeeded his father at the Estienne press and although diligent, his work was not notable scholastically or typographically. Many of his productions were reprints of his father's works. He in turn was succeeded by Antoine, the last of the Estienne family. Until the end, the Estienne press was notable for the accuracy of its productions.

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ETCHING

Etching is an intaglio printing method which produces multiple copies of a design or drawing. A needle is drawn through an acid-resistant ground covering the surface of a metal plate which is then bitten into by an acid applied under the control of the artist; the remaining parts of the plate being protected by a resistant varnish. Lines so eaten down below the plate's surface will hold ink which is wiped off the un-etched surface; and prints are made by pressing a damped sheet of paper onto the plate to pull the ink out of the lines. The deeper any line is bitten, the more ink it will hold, and the darker it will then print. Both etched and engraved lines added with a burin may appear on the same plate.

The several techniques are as follows:

Basic

The plates may be of copper, zinc, steel, or aluminum. Zinc, being soft, wears quickly, limiting the number of good prints possible. Impurities in the metal may also affect the quality of the bite. Copper retains fine lines through larger editions;

iron and steel, being harder still, give even longer runs. Inks can be degraded by the various metals, so this must be allowed for with multicolored prints.

The metal surface may be polished or left in its natural machined state—when an additional faint texture will appear in the unetched areas of the print, for minute traces of ink are retained there, even after wiping.

Acid-resistant ground (beeswax, bitumen, and resin) is rubbed onto the cleaned plate, which has been heated to melt it, rolled into a smooth film, and left to set. The surface may then be smoked so that the black deposit shows up the needle lines more clearly.

Guide lines may be drawn directly onto the ground with a soft, colored carbon stick, or a soft pencil sketch pressure-transferred from paper; but the artist can work straight into the ground if he has sufficient skill. He uses a collection of needles, fine to thick, all blunted so that they will not gouge into the metal, and mounted in handles. The needle, held more or less upright, is made to penetrate the ground under firm, even pressure. Incorrect lines may be obliterated by brushing over them with a stopping-out varnish.

Etching acids are nitric, hydrochloric, or perchloride of iron, diluted to give a fast or slow action on the unprotected lines. The finest lines may be stopped by removing the plate from the bath and varnishing over them before successive bites for stronger lines. Over-bitten lines may be partially closed by rubbing over them with a burnishing tool, and whole areas lightened by scraping and then burnishing.

To print, the plate is heated, and etching ink worked into the lines. The surface is then wiped in every direction and finally hand-wiped with the edge of the printer's palm. The plate is laid on the bed of the special press, covered with a sheet of dampened paper protected by a series of cushioning blankets, and all are wound between the pressure rollers. After examining the first proof or state the artist may decide to rework parts or all of the plate by regrounding and etching, or by using a drypoint needle or an engraver's burin to strengthen some of the lines. Etched lines are of constant thickness and do not taper at the ends—unlike engraved lines—but the softness of the ground allows the needle to produce more flowing lines than those engraved with a burin.

Soft-Ground

This technique produces prints having a pencil or crayon drawing texture to their lines, and was often used to reproduce such work before the invention of lithography. Tallow or Vaseline is added to the ground, when even the lightest touch, even of a finger tip, will remove part of the ground, allowing the plate to be etched through the impression.

A reversed drawing is made on a textured paper placed over the ground, causing it to adhere to the underside of the paper where any line or mark is made. A reversed tracing of a drawing may be retraced over the ground with the same effect, and when etched the lines have an intermittent, grainy quality due to the pressure of the pencil having been varied along its course by the irregularities of the paper. Other marks may be made with almost any object directly onto the ground, and the process lends itself to the creation of textured tonal effects, as demonstrated with paper and fabrics by Nigel Lambourne.

Stipple and Chalk-Engraving

These are composite processes involving etching, engraving, and mezzotint techniques. Stipple-engraving produces tonal effects. The ground is dotted with

needles and roulettes (toothed wheels), and the plate etched, after which the tones are consolidated by flicking the metal with a stipple burin and roulette. In chalk-engraving (crayon manner) a prelithographic method of imitating or reproducing chalk drawings, lines are made by a roulette cut to resemble the texture of chalk. The effect is similar to, but more mechanical than, soft-ground etching.

Aquatint

This is a tonal process particularly suited to the imitation of flat washes or water-color paintings. The plate is covered with a porous ground, either by the deposition of a film of resin dust melted to make it stick and then allowed to cool into minute granules, or by dissolving the resin in alcohol and evaporating it away to leave the granules. Acid will bite the metal around them, evenly pitting the surface. Whites are stopped out before etching begins; the lightest tones are stopped after the first bite and the darker ones after subsequent bites. Prints were often colored by hand to complete the effect of a water-color painting.

Sugar or Lift-Ground Aquatint

This variant enables dots, lines, and tones to be made which retain the character of the pen or brush marks on the plate. Forms are not created by stopping out around them. The design is applied with a colored sugar solution; the plate is varnished, dried, and then soaked in lukewarm water. This causes the sugar deposits to expand under the varnish and lift it off to reveal the design as bare metal. An aquatint ground is next laid over the plate preparatory to etching.

Although the decorative etching of metal armor dates from the fifteenth century, the first use of the process to produce a print is considered to have been by Daniel Hopfer in Germany about 1504. Albrecht Dürer (1471–1528) experimented with etching, but only on iron, and concentrated upon engraving—whereby he could produce a delicate line more easily. The first dated copper etching was made by the Swiss goldsmith Urs Graf in 1513, but the first notable prints were those of Lucas van Leyden about 1520. Portraits by Jost Amman in *Iconographia regum Francorum* by Virgil Solis, 1576, are among the earliest examples of the use of the medium for book illustration.

About 1520 the Italians were the first to show a sound understanding of the possibilities of etching, and really developed it as an independent art. Parmigiano's freedom of line demonstrated that the needle was more than just a substitute for the burin and most of the great Italian painters produced the occasional etching. Jacques Callot (1592–1635) was born in Nancy, but spent some of his early years in Italy. His output was excellent as well as prodigious, and it was he who started to rework plates after the first bite. He had considerable influence on others in France, Italy, Holland (including Rembrandt and Van Dyck), and Scotland—where the Runciman brothers showed definite Callot influence in the eighteenth century. Little of Callot's work appears in books, but what there is marks a step forward in the use of the page. In Humbert's *Combat à la barrière*, 1627, his processions wander freely,

sometimes over a double spread, and there is lightness and space in the tiny illustrations for two emblem books of 1646.

The etchings of Claude Lorain (1600–1682) were only a small part of his work as a landscape painter, but his theatrical lyricism and the sense of light and atmosphere that made his paintings different is also found in his best etchings, which have greater contrast of bite and a wider spread of design than was achieved even by Rembrandt—though Claude could not match the delicacy and profundity of the Dutchman's technique.

The figure and landscape prints of Rembrandt, and those of his Flemish pupil, Anthony van Dyck, remain outstanding. Both, but especially the former, exerted great influence in their day and after. Van Dyck (1599–1641) produced simply but splendidly drawn likenesses. Rembrandt (1606–1669) is noted for the powerful characterization of his intimate portraits full of emotion and human experience. His dramatic pictures such as *Christ Healing the Sick*, *Descent from the Cross*, and *The Three Crosses* show how he could range from breath-takingly sure line to the most subtle and mysterious depths of shadow in masterly composition. His apparently simple landscapes have great beauty, a luminosity, and an amazing rendering of distance. Unfortunately, the delicacy of some of his lines inhibited the use of his work to illustrate books; the plates became worn during long book runs. His best book work is to be seen in Menasseh ben Israel's *La piedra gloriosa o de la estatua de Nebuchadnesar*, 1655.

Also of the Dutch school, Adriaen van Ostade (1610–1685) and Cornelius Bega portrayed peasant life; Karel der Jardin (1622–1678), Paul Potter (1625–1654), and Adriaen van de Velde (1635–1672) are most famous for their finely observed animals; and Zeeman (Reynier Nooms, 1623–1663) for his spirited sea-pieces.

Wenzel Hollar (1607–1677) spent most of his life working in England. Many of his 2,700 etchings are minutely accurate topographical records, but he also did some figure and still-life work which similarly concentrated on detail at the expense of emotion. William Hogarth (1697–1764) tended to execute his etchings more in the manner of engravings.

In the eighteenth century Italy and Spain were the greatest centers of etching. In Italy, Tiepolo (1696–1770) produced romantic groups, including fauns and satyrs, with accomplished sensitivity but no emotion. The Venetian scenes of Canaletto (1697–1768) are as full of light, with shading of close vibrating lines, and as architecturally meticulous as his paintings. Piranesi (1720–1778) made many large plates of antiquities, records rather than views, but his imaginary prison scenes, the *Carceri*, have considerable vigor, and their choice of viewpoint is recalled when looking at some of Muirhead Bone's work in the twentieth century.

In France, Watteau (1684–1721) and Fragonard (1732–1806) etched with more delicacy than others, who tended to mix etching with engraving for the reproduction of drawings, and it is in the French eighteenth century book that etching, though generally as a preliminary to engraving, really makes its mark to such an extent that special new type designs were developed to match the sharp new elegance, not only of the illustrations, but also of the decorative title pages, borders, and head- and

tail-pieces marking the beginning and end of the various parts of a book. Some of the decorations took the form of vignettes, now considered the special mark of the eighteenth century book in France, though the device had been used earlier. Sometimes the etching was done by the artist himself—as in the case of Claude Gillot and Nicolas Cochin, and later on, Boucher and Fragonard—but others such as Oudry and Eisen had their paintings or sketches interpreted by professional craftsmen like Le Mire, Delaunay, and de Longueil, etching and engraving in turn on the same plate, and being named thereon as well as the artist. On occasion the plate-work might differ greatly from the artist's original design. Typical books of the period are Motte's *Fables nouvelles*, 1719, La Fontaine's *Fables*, 1733, and the 1767–1771 edition of Ovid's *Métamorphoses*.

Francisco Goya (1746–1828) is at once the first Spanish etcher of any importance and one of the world's greatest. His early reproductions of Velasquez' paintings show a Tiepolo influence; his later work is powerfully drawn and vividly imaginative, his themes human anguish and suffering. Particularly fine are *Le garotte*; *Los desastres de la guerra*, inspired by the horrors of the Peninsula War; biting satirical scenes of Spanish life in *Los caprichos*; and some of the bullfighting scenes in *Tauramaquia*. He developed an original use of aquatint for backgrounds, yet their flat tones in no way detract from his passionate attacks on the decadent and bestial aspects of life.

J. M. W. Turner (1775–1851) etched with superb economy of line as a basis for mezzotinting by professional engravers—as with his *Liber Studiorum*. Constable (1776–1837), Cotman (1782–1842), and Cox (1783–1859) also used etching for some of their book illustrations, but the first notable English painter to etch for its own sake was John Crome (1768–1821), and *Mousehold Heath* is a landscape of a quality akin to Rembrandt's. Andrew Geddes (1783–1844), relatively unknown outside Scotland, often experimented with masterly combinations of technique to produce unusual and finely drawn work. The highly individual work of William Blake is also important. He developed a technique of relief-etching, writing and drawing on copper with an acid-resistant medium, and then etching down the rest of the surface to leave text and design in relief for printing. Colors were applied afterwards—crudely, by pressing inked cards on to the pages, or with more artistry, by hand. *Songs of Innocence*, 1789, *Songs of Experience*, 1794, and *Jerusalem*, 1818, are among the best-known examples, but he also etched the illustrations for *The Book of Ahania*, 1795, and *The Book of Los*, 1795, in the conventional fashion.

Charles Jacque (1813–1894), one of the Barbizon school and himself influenced by the Dutch and by Claude, was particularly to affect Whistler, Millet, and Legros. Jacque's animals are excellent. J. F. Millet (1814–1875) depicted French peasant life with an expressiveness that comes only from the shared experience. Sir Francis Haden (1818–1910) was an English surgeon who did not etch until he was forty. With vigorous line sketches—sometimes worked outdoors—he brought a new quality of selection to etching, but he was also capable of delicately elaborate work such as the *Breaking-up of the Agamemnon*, and his influence in England was greater than that of Whistler who had first inspired him. Charles Meryon (1821–1868), half-

French, half-English, has been called the greatest etcher after Rembrandt, but he really stands alone, like Goya. He would have been a painter but for color-blindness, and his technical mastery is equalled by his composition and artistic vision. *Le petit pont*, *La galerie Notre Dame*, and *Le stryge* typify his monumental conception, his vivid portrayal of light and shade, and his sombre genius. Sir D. Y. Cameron's *Chimera of Amiens* is technically superior to the latter—and its prototype—but his prints lack humanity.

Alphonse Legros (1830–1911), though French, worked and taught in London, where he exercised a lasting influence (William Strang, 1859–1921, and Sir Charles Holroyd, 1861–1917, were two of his outstanding pupils). The figure studies by Legros have exceptional power. J. M. Whistler (1834–1903) learned to etch as a U.S. Army surveyor, but quickly turned to art, and was largely responsible for the revival of etching in England, where he spent much of his life. His continental scenes and people show the influence of Rembrandt and Jacque; careful observation, personal feeling, and infinite variety of texture allied to perfect composition. The painter-etcher movement which developed under him in the 1880s was partly inspired by the amateur etching clubs of the midcentury which produced a number of books as vehicles for their art, but Whistler saw etching as an art form capable of a separate existence.

Of the nineteenth century book illustrators George Cruikshank (1792–1878) is remembered for his fantastic and humourous etchings in the *Comic Almanack*, but more especially for his illustrations to Grimm's *Tales* and the works of Dickens, to which his sense of the grotesque was well suited. Hablot K. Browne (Phiz) illustrated some of the Jorrocks series of humourous sporting books by Surtees, and there were others who did similar work and caricatures, mainly by etching, well into the second half of the century.

Sir Frank Brangwyn (1867–1956) drew some powerfully arranged scenes but, in breaking away from Whistler's influence, his heavy inking, in places painted on to the plate, often obscured his drawing in his desire to emphasize tone. Sir Muirhead Bone (1876–1953) specialized in the architectural theme. Augustus John (1879–1961) produced several beautifully drawn portraits full of sensitivity in the Rembrandt tradition, while the work of James McBey (1883–1959) is full of atmosphere, and some of his best and most original prints were made when he was a British war artist. In America Whistler's example encouraged some original work based upon a sound technique, and some of the best and most interesting work has been done by Joseph Pennell (1860–1926)—he has been called a pictorial journalist because of prints such as his scenes of industrial Pittsburgh—Mary and Thomas Moran, F. M. Armington, and A. W. Heintzelman. The bird pictures of Frank Benson (1862–1951) are delightfully different from the work of the others. Marius Bauer (1867–1932), in Holland, showed an affinity with the East, and his work ranged from delightfully simple line to the massed detail found in *Entry of a Queen*. He also illustrated a number of books. Anders Zorn (1860–1920), of Sweden, was a virtuoso though variable worker, and produced at least one masterpiece, a portrait of *Renan*.

In France the most interesting nineteenth century etched illustrations appeared late, after a period when the process was completely out of favor. The outstanding example was the joint effort of more than forty poets and etchers (including Doré and Manet), *Sonnets et Eauxfortes*, 1869; but, as in Britain, the method then began to lose ground in favor of the mechanical and faster photographic processes.

In the twentieth century the technique has appeared only rarely in books outside France. The British private press movement had revived the use of wood-cuts and wood-engravings as the most sympathetic method of book illustration, and the intaglio processes suffered accordingly. However, the private press did not blossom in France as it did elsewhere, and French publishers such as Vollard were less affected than others on the Continent or in America by a purely literary and typographic consideration of book design, and for their limited *éditions-de-luxe* they commissioned leading artists to produce illustrations for works which are often more important as vehicles for the distinctive illustrations than for the text. Typical of these *livres d'artiste* are those by Bonnard (Mirbeau's *Dingo*, 1924, and *La vie de Ste. Monique*, 1930); Dufy (Montfort's *La belle enfant*, 1930); Matisse (Mallarmé's *Poésies*, 1932); Picasso (Vollard's edition of *Métamorphoses*, 1931, and the Limited Edition Club *Lysistrata*, 1934); Dunoyer de Segonzac (Virgil's *Géorgiques*, 1947); Chagall (Gogol's *Les ames mortes*, 1948); Braque (Perse's *L'ordre des oiseaux*, 1962) and Alberto Giacometti (René Char's *Retour amont*, 1965). Many of these books have a very large page size, thus enabling the illustrator to work on a grand scale as he would tend to do for the conventional single print.

John Crome used *soft-ground etching* to some extent in his later years; while Thomas Gainsborough (1727–1888) used it alone or combined with aquatint. His book of landscapes, *English Scenery*, was published by Boydell in 1819. Cotman made some of his tree studies and, like Ruskin, used soft-ground for some architectural prints. More recent workers have included John Buckland-Wright, Ed Smith, Emil Nolde, and Nigel Lambourne.

J. C. François (1717–1769) is credited with the invention of *stipple and chalk-engraving* in France, where he illustrated Savérien's *Histoire des Philosophes Modernes*, 1760–1769, with portraits in the crayon manner that look almost like lithographs, but the technique really flourished in England, particularly in the hands of Italians like Schiavonetti and Bartolozzi after 1764. The latter's sentimental cupids and nymphs in luminous settings were much admired by the ladies, but his work is perhaps seen at its best in Thomson's *Seasons*, which Bensley published in 1797. Gillray, the caricaturist, used stipple as well as etching and aquatint.

The earliest aquatint known is by J. B. Le Prince (1734–1784). Goya demonstrated its possibilities as a creative process, and Paul Sandby introduced the technique to England in 1775 where it became very popular for the illustration of the handsome topographical books so typical of the period. William Gilpin's romantically picturesque guide books were illustrated with aquatints—and caricatured in William Combe's *Tours of Dr Syntax* similarly illustrated by Rowlandson, though in his later work the latter moved away from caricature. The views produced in great quantity for such print sellers as Ackermann have considerable charm and are still

cagerly sought after. The flat, water-color washes were applied, after printing, often by children, according to a master coloring left by the artist. Some of the best book illustration work is to be found in William Daniell's *Voyage Round Great Britain*, 1814–1825.

Modern artists who have used aquatint include Rouault, Chagall (Vollard's edition of La Fontaine's *Fables*, 1952), John Piper (*Brighton Aquatints*, 1939), John Buckland-Wright (the Folio Society's *Decameron*, 1954–1955, though the illustrations were reproduced in the book by collotype), Rudolph Ruzicka (the Grolier Club edition of Irving's *Notes and Journal of Travel in Europe*, 1921—a direct harking-back to English nineteenth century topographical book illustration), as well as John Paul Jones, Alfred Hackney, Norman Janes, and Graham Sutherland.

Gainsborough also employed a variation of sugar aquatint as shading for soft-ground work, and S. W. Hayter carried out later experiments, but it has been Picasso (*Stoire naturelle*, 1942, and Gongora's *Vingt poèmes*, 1948) and André have shown exceptional mastery of the process, both for book illustration and loose prints. Rouault has also used the process for some of his book

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JAMES A. DEARDEN

ETHIOPIA, LIBRARIES IN

Ethiopia has already possessed a script in the pre-Christian days of the Aksumite period which flourished in the first centuries of the present era. The literary tradition is therefore an ancient one, continuing without interruption to the present day, despite changes in language and alphabet.

The establishment of Christianity as a result of the conversion of King Ezana in the fourth century led to an influx of Christian literature, probably through Syrian monks bringing religious texts for translation into Ethiopic (Ge'ez), the literary language of Northern Ethiopia from early times until the late nineteenth century.

Scholars have detected Eastern Christian influences in Ethiopian manuscript paintings, and it is possible that the monks brought in not only texts and the art of illustration but also the skills of book production, including the preparation of parchment.

As copies of religious texts were manufactured and accumulated in churches and monasteries, book collections, if not libraries, must have become common in the Christianized parts of Ethiopia and may have spread southward with the expansion of the Ethiopian Empire. As Ethiopia was gradually isolated from the Christian world by the rise of Islam, the importation of Christian literature became more hazardous. The country was invaded by the Muslim conqueror Imam Ahmad ibn Ibrahim al-Ghazi, nicknamed Grañ, "the left handed" by the Ethiopians. He overran large areas of the Ethiopian highlands before his final defeat in 1543. Grañ's troops made a special point of pillaging and burning churches and monasteries, as his chronicler Shihab ad-Din proudly affirms.

The traditional method of storing books was to wrap them in leather or cloth cases and hang them by a strap to hooks on the walls of the *ika bet* or sacristy—literally "house of things"—among the vestments and objects of worship. Alternatively, they were stored with the grain for the communion bread in a special hut near the church. The "library" was sometimes the space beneath the chief priest's bed, which was supported by stone or wooden slabs forming a kind of cupboard. Despite the pillaging, some churches, purposely located in inaccessible places like the islands of lakes Tana, Hayk, and Zwai, survived with their manuscripts the worse only for wear, moisture, insects, and the passage of time.

In addition to the books stored in religious institutions, there were probably also collections by royal patrons, though the absence of a fixed capital at various periods of Ethiopian history must have prevented the development of such collections into permanent libraries. There is no reference to libraries in the official chronicles of the kings who ruled prior to the invasion of Ahmed Grañ despite the fact that between the fourteenth and sixteenth centuries there was a period of renaissance during which many works were translated into Ge'ez from Coptic and Arabic.

The first mention of a collector-monarch occurs in the chronicle of Emperor Galawdewos (1540–1559) who defeated Grañ in 1543. In spite of his activities as a war leader, the chronicle says he was deeply versed in the Holy Scriptures and he purchased a great number of books which cost him no less than 10,000 ounces of gold.

With the establishment of Gondar in the early seventeenth century a fixed capital replaced the roving military camps which had for several centuries been the centers of Ethiopian government; more permanent imperial buildings were gradually erected and a number of these are still standing today.

The building of greatest interest to librarians is one known as the "Library of Em-

peror Tsadeq Yohannes" (1667-1682). No description of the library's contents, indeed no contemporary reference to it, is extant, but tradition has it that the building served as a library. If so, the books would certainly have been of a religious nature, for little other literature existed in those days. One may further guess that the library contained some earlier chronicles of the kingdom and perhaps also other official records of various kings. The building probably continued to serve as an imperial library until the decline of Gondar in the second half of the eighteenth century when many of the books were destroyed or removed.

Mention must also be made of Queen Mentuab, the mother of Iyasu II (1730-1735). She was a great patron of the Church and the chronicle of the reign of her son enumerates the titles of sixty-three manuscripts which she donated to the Church of Qusquam on the outskirts of Gondar.

One private Ethiopian library in the same city is mentioned in the travel literature of the 1830s; it belonged to Liq Atsqu, a learned judge and scholar. One of the manuscripts from the library, a history which he had himself copied out and later gave to the German traveller Ruppell, is now in the State Library in Frankfurt.

The only reference in nineteenth century Ethiopia to what may have been a municipal library occurs in an account of a visit to the city of Aksum made by the French travellers Ferret and Galinier in the 1840s. They describe meeting a priest, Aba Kalemisis, "the librarian of the town," who listed for them the principal manuscripts to be found in the Province of Tigre. They noted that Aksum seemed to be the only town where there existed some semblance of a library and observed that the manuscripts were copied with great care on fine parchment. They added that, printing being unknown in those parts, books were rare and difficult to obtain.

The Emperor Tewodros (1855-1868) intended to build a great church near Magdala, a natural fortress in Northwest Ethiopia, to replace the modest church of Medhane Alem (Saviour of the World) which stood within the fortress. He wished to provide it with the traditional service books and other manuscripts which turned important churches into centers of study as well as of worship. For years he had been collecting manuscripts, many of them taken from the richly endowed churches of Gondar, and it is probable that he had assembled over 1,000 volumes in the sacristy of Medhane Alem Church.

After the defeat and suicide of the Emperor at Magdala in 1868 his collection was dispersed, some 600 manuscripts being deposited at the Church of Cheleqot, on the orders of Sir Robert Napier, leader of the British Expedition which captured Magdala. A further 366 volumes were officially purchased and taken to England. The vast majority were acquired by the British Museum at an auction held to dispose of the booty a few days after the capture of the fortress. A considerable number of Ethiopian manuscripts of the seventeenth, eighteenth, and nineteenth centuries were thus preserved in England, 350 of them being described in the catalog compiled by William Wright and published by the museum in 1877. Although this collection formed the biggest single acquisition of Ethiopian manuscripts by a library outside Ethiopia, other libraries, mostly in Europe, acquired collections of Ethiopian manuscripts from travellers and diplomats who had visited Ethiopia in the nineteenth and early twen-

tieth centuries. The largest collections are now in the Bibliothèque Nationale, Paris. Altogether more than 2,000 Ethiopian manuscripts are preserved in libraries outside Ethiopia.

In the time of Emperor Yohannes (1871–1889) and Emperor Menelik (1889–1913) the traditional pattern of ecclesiastical, monastic, and imperial manuscript libraries was maintained.

Like his predecessor Tewodros, Menelik intended to gather manuscripts from all over Ethiopia for the great churches he was establishing in his newly founded capital of Addis Ababa. In December 1893–January 1894 he led an expedition to the islands of Lake Zwai, about 100 kilometers south of Addis Ababa, in search of ancient manuscripts believed to have been taken to the islands for safe-keeping at the time of Grañ's wars. According to Menelik's Chronicler Guebre-Sellassie, many books were indeed found, though the islanders, who had been cut off from their fellow-Christians for several centuries, could no longer read them. Menelik had copies made and brought to the capital where manuscripts were being assembled at the main churches, especially Bata Church. According to a report which appeared in the *Centralblatt für Bibliothekswesen* in 1895, Menelik intended to found a national library in Addis Ababa but this project did not materialize.

It should be added that some Arabic religious manuscripts, mostly of recent origin, are to be found in collections attached to mosques and Muslim shrines. Some prominent Muslim families, such as that of Aba Jifar in Jimma, also own manuscripts. The city of Harar has been a center of instruction in the Muslim faith for several centuries; manuscripts in Arabic and occasionally in Adari, the Semitic language spoken by citizens of Harar, may still be found in the city along with printed Arabic religious texts imported from neighboring countries.

Ethiopia thus has a priceless written heritage mainly but not exclusively religious in character. There is as yet no complete register of manuscripts in Ethiopian churches, though church officials have made inventories in a few provinces. Church authorities estimate that there are over 12,500 churches and some 800 monasteries in the country. A complete inventory of Ethiopian manuscripts at home and abroad will require priority in the program of Ethiopian bibliography. Equally important is the crusade to preserve the manuscripts for posterity, in microtext form if not in the original.

In 1968, following an agreement between the German Federal Republic and Haile Sellassie I University, Professor E. Hammerschmidt of Hamburg University, with financial assistance from the Deutsche Forschungsgemeinschaft, led an expedition to the Lake Tana area to microfilm manuscripts. Altogether 182 manuscripts were filmed and microfilm copies of these were presented to the Institute of Ethiopian Studies in October 1971.

Another pilot project was carried out in cooperation with the Ministry of Education by the UNESCO Mobile Microfilming Unit which operated in Ethiopia from September 1969 to January 1970 and succeeded in filming 368 manuscripts, 177 of which were from monasteries and churches in the Eastern part of Gojjam Province. A catalog of these microfilms was published by the ministry in 1970.

Under the initiative of His Highness Leul Ras Mengesha Seyoum, Governor of Tigre Province, microfilming equipment was acquired at Mekele, the provincial capital, and a technician trained. Filming began in 1971 and is in process; important manuscripts are obtained on loan from churches in the provinces, filmed, repaired, and returned.

The University Library and the Ministry of Education have acquired microfilming equipment and have technicians partially trained by UNESCO.

It is hoped that, in cooperation with Church authorities and the Antiquities Administration, full-scale manuscripts microfilming projects will be launched before long.

In the early 1930s libraries of printed books began to emerge partly in response to the needs of modern education, which Emperor Haile Sellassie was encouraging, and partly under the stimulus of the growing foreign communities in the capital city of Addis Ababa. The Emperor, while still regent, had established the Berhanena Salam Printing Press in Addis Ababa in 1923. This press was an important factor in encouraging the growth of printed Amharic literature.

On the occasion of his coronation in 1930 the emperor had established a beautifully furnished public reading room in a museum opposite the palace. It was visited in the first months of the following year by a Belgian anarchist, Gaston Marin, who found a cupboard of Ge'ez and Amharic manuscripts, and another of splendidly bound printed books in French, English, Italian, and Russian. But there appeared to be few readers.

The reading room was later organized by order of the Ministry of Education by Georges Pecoul, a French teacher who was appointed advisor to the ministry in 1932 and died 2 years later. By 1935 the library contained more than 1,000 volumes including several hundred Ge'ez and Amharic printed books and manuscripts.

Another library now no longer in existence formed part of a bookshop established in 1930 by a Frenchman, R. E. Goyon, and subsequently run by his wife and children. It had collections of books in several languages which reached a total of over 1,000 volumes.

It is reported that a number of precious manuscripts and some archival materials were removed to Italy during the Italian occupation, but it has not been possible to ascertain the extent of Ethiopian losses during this 5-year period.

In 1936 the Italians established a central government library for Italian East Africa in Addis Ababa. It was at first open only to Italian officials and scholars and consisted mainly of collections of laws and regulations. In 1939 the Federation of Italian Publishers decided to send copies of all titles published by them to this library. By the end of 1940, when it was opened to the public, it contained about 10,000 volumes and had considerable collections on Eastern Africa. In Asmara, too, the Italians established a good library especially strong in materials relating to Eritrea.

Libraries as a public service began to make some impact in post-war Ethiopia largely through the establishment of the National Library. At the present time it holds over 100,000 volumes.

It was inaugurated in 1944 by the emperor who appointed Sereke Berhan Gebre Egzy as its first director. The Research Division inherited the East African Collection of the Italian Government Library and developed strong holdings of materials published in or about the country. A catalog of the 272 manuscripts in the possession of the library was published in 1970 in Amharic, the first bibliographical publication of the library. Understaffing and inadequate funds have prevented the development of national bibliographic and exchange services, and there is little prospect of their developing in the immediate future.

A spacious and well-furnished hall was from the beginning open to the public. The numerous visitors—mainly students—were offered reading and later, lending facilities. This service was very popular, especially as there was no other government library lending books to the public in Addis Ababa.

In October 1968, William B. Paton, librarian of Lanarkshire, Scotland, County Library, visited Ethiopia at the request of the Ethiopian Government, under the UNESCO participation program, and stayed for 3 months; he had been asked to prepare a long-term plan for nationwide development of public and school library services and to make recommendations concerning the future of the National Library. He recommended that it should leave to the University Library and its Institute of Ethiopian Studies branch the responsibility for national and reference functions, which these libraries were fulfilling to some extent already, and should concentrate its resources on public library functions, becoming in effect the headquarters of the central public library of a countrywide public library system.

The National Library has since then been seeing its role as the initiator and coordinator of public library services throughout Ethiopia along the lines envisaged by Paton. Small community libraries were opened at Yirgalem in 1969 and at Harar and Gondar in 1971. There are plans to open a total of ten branch libraries.

The only other public library financed from government funds is that of the Education Department in Asmara, though a few municipal authorities have sponsored local libraries in cooperation with groups of volunteers.

Community libraries have been springing up under local initiative in Addis Ababa, provincial capitals, and other towns. Enthusiasm is widespread, especially among the school age population. In 1971 the Addis Ababa Municipality was actively preparing to open a library in the Town Hall.

The Library Association of Ethiopia is pressing for a government decision to coordinate and develop existing public library services, and to create a single authority to direct and administer them.

Though the Tafari Makonnen School, founded in 1925, was provided with a functioning library in the days before the Italo-Ethiopian War, most school libraries were founded after the war when the major secondary schools were equipped with book collections, the librarian also often being in charge of the textbook store.

The fact that school librarians were held personally responsible for missing books in the same way as other keepers of government property hindered the development of open access collections in the 1950s and 1960s.

In 1970 the Department of Cultural Affairs and External Aid of the Ministry of

Education appointed its first professional librarian. Although the appointee was a graduate with only a minor in library science, this first step was significant as a particular person in the ministry was henceforth assigned the general responsibility for following up all matters concerning school libraries. In 1971 a Division of Libraries, Museums, and Antiquities was established and headed by a director-general.

A start has been made in purchasing, with external assistance, cataloging centrally, and distributing new books to schools. Training courses for school librarians were initiated by the ministry in 1971 with the assistance of the National Education Association of the United States and the United States Agency for International Development. Thirty-seven working librarians attended the first of three annual 6-week summer vacation courses in July–August 1971 in the towns of Gondar and Nazareth.

Haile Sellassie I University. As in many developing countries, university libraries have had more opportunities for growth than have public or other types of libraries. Being a part of the university, academic libraries are able to attract a larger share of government funds as well as considerable external assistance.

Haile Sellassie I University was created in December 1961 out of a number of previously autonomous institutions of higher learning, each with its own book collection; additional faculties and institutes developed and sprouted libraries almost overnight. However, a degree of centralization was gradually introduced so that a more homogeneous library system began to take shape. A statute on the library, incorporated in the university legislation in 1965, defines the role of the librarian, the library committee, and the relation between the central library and other libraries in the system.

By 1971 there were some 221,000 volumes in the university libraries. The largest and oldest library in the system was that of the University College of Addis Ababa, an institution founded in 1950. Ever since the establishment of that library, it had been the policy of the librarian, Stanislaw Chojnacki, to develop Ethiopian collections to serve the research needs of scholars and the requirements of the general readers, as well as the needs of the staff and students of the college. This policy still prevails. The responsibility of the University Library, now the largest library in Ethiopia, is increasingly seen as exceeding that of a library serving the needs of the university alone. External readers, some 1,000 in number, are encouraged to use all library facilities.

The Central University Library moved into a new building in August 1969. Given by the United States Agency for International Development, it was dedicated to John F. Kennedy and was inaugurated on July 23, 1970, by Emperor Haile Sellassie I and Mrs. Rose Kennedy. The library is a two-story concrete, aluminum, and glass structure covering an area of 5,000 square meters and capable of housing 200,000 volumes and 700 students. The basement, excavated but not finished, will house another 200,000 volumes (see Figure 1).

The University Library has collections of foreign government documents and enjoys depository privileges for the United Nations and most United Nations agency materials. It exchanges publications with several hundred institutions abroad and has interlibrary loan agreements with most libraries in the city. Because of the cost of

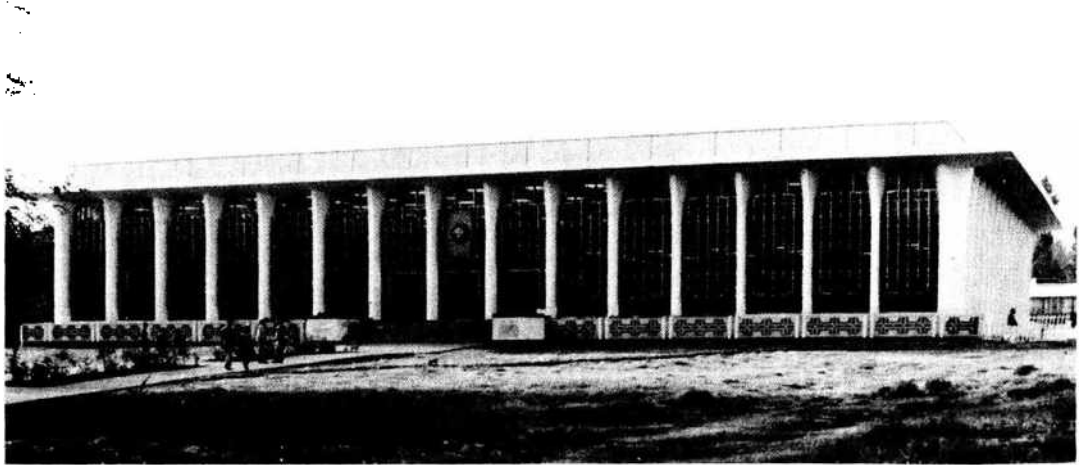


FIGURE 1. *Kennedy Memorial Library, Haile Selassie I University.*

sending books by airmail and because of the time taken for books to reach Ethiopia by sea from foreign centers of learning, prospects for extensive international loans, or even intra-African loans, are remote.

All libraries in the university contribute to an author union catalog housed in the Kennedy Library. Ordering and cataloging for sublibraries in Addis Ababa is done centrally at the Kennedy Library. The process of recataloging from the Dewey Decimal to the Library of Congress classification is almost complete in all libraries which are scheduled for reclassification. The annual list of some 4,000 current serials in the university libraries has since 1969 been incorporated in *Periodicals in East African Libraries*, a union list produced by computer at West Virginia University.

The Institute of Ethiopian Studies (18,300 volumes) was created in 1963 to act as a center for research on Ethiopia. Its library, incorporated in the University Library System in 1967 and with university resources behind it, had built up by 1971 a fine Ethiopian collection including 8,000 volumes in Ethiopian languages; there are over 650 microfilm units and 555 manuscripts and scrolls. The institute publishes a series of bibliographies compiled by S. Chojnacki and others, which make it in effect the center of national bibliographic activity. These are the annual *Register of Current Research on Ethiopia and the Horn of Africa*, 1963-, the biennial *List of Current Periodical Publications in Ethiopia*, 1964-, and the annual *Ethiopian Publications* 1965-. The latter publication lists and classifies books, pamphlets, and periodical articles published in Ethiopia but the list is not exhaustive as efforts to obtain a law of deposit have not yet been successful.

The monthly acquisitions list of the University Library lists separately the acquisitions of the Institute of Ethiopian Studies and is the nearest approach to a current national bibliography. A retrospective card index of Ethiopian periodicals is in preparation by the Reference Department.

The following divisional libraries are administratively centralized: Law Library (17,500 volumes), Medical Library (7,600), Science-Technology Library (27,000), Technology Reading Room (3,000), and Theology Library (4,800), all as of 1971.

The Faculties of Science and Technology (previously Engineering) are served by a joint library, but the Technology Reading Room, on the new Faculty of Technology Campus, is to be replaced by a full-scale Technology Library. The Law Library possesses a fine collection of African legal materials, completed where necessary on microfiche.

Other libraries in the system not under the financial control of the University Library are:

Addis Ababa: Laboratory School Library (8,000 volumes), a school library administered by the Faculty of Education; Technology Southern Campus Library (5,700 volumes), a library on building technology and related subjects which receives Swedish Government assistance.

Alemaya (548 kilometers east of Addis Ababa): College of Agriculture Library (21,100 volumes).

Gondar (748 kilometers north of Addis Ababa): College of Public Health Library (8,900 volumes).

The colleges outside Addis Ababa will in due course develop into regional campuses of the university. Their collections are presently being supplemented by a USAID loan which extends to all libraries in the system.

The university libraries have benefited immeasurably from Ford Foundation assistance and from the USAID loan. However, because of this assistance, the university book budget has received a lower priority in the apportionment of university funds than it might otherwise have done. Though the total library expenditure is over 6% of the university budget (government funds), more than half of the library budget is expended on salaries; the main reason for this is the fragmented nature of the university itself, which spreads over four campuses in Addis Ababa and two campuses hundreds of kilometers from the capital. Inevitably this fragmentation is reflected in the library system which employs over 100 persons in its eleven libraries. This multiple library system is expensive not only in terms of staff but also in the need to duplicate reference and other materials. From the student's point of view, on the other hand, the system offers several advantages: the library is close at hand, the collections are appropriate to his needs, the catalog is smaller and less terrifying, and the library staff is not so remote.

The professional staff of fourteen is largely expatriate. Ethiopian graduates are selected every year and are mostly sent abroad after a 2-year period of in-service training to obtain masters' degrees in librarianship. By the end of academic year 1971-1972, five Ethiopians are expected to have taken up professional positions in university libraries.

Librarians in the university have been working toward a development plan by producing projections of staff and book needs for the coming years. These are appended to annual reports. Special attention will have to be paid to the out-of-town campuses and to areas to be selected for postgraduate study. Mr. Paton suggested that "in the interest of efficiency and economy, consideration should be given to a proposal to merge the research department of the National Library with the University Library (i.e., the Kennedy Library) and the Ethiopian collections with the Institute of Ethiopian Studies."

In several African countries it has been decided not to duplicate expensive library services by developing research and reference collections both at a national library and at a university library; instead research workers are to be served by a single university and reference collection and the savings are to be invested in developing extensive public library services radiating from a large central public library. This pattern has emerged in Uganda, which does not have or plan to have a national library, and in Zambia where the university library was designated the National Reference Library in 1969.

Such a division of resources would appear to be a rational one for Ethiopia where public library services have not yet received the attention they deserve.

The private University of Asmara was founded by an Italian order of nuns, the Pie Madri della Nigrizzia, and was granted university status in 1967. Its library, in spacious new premises, has a book stock of some 40,000 volumes, consisting mainly of donated books in Italian. The collection is not yet organized.

In government ministries and agencies there has been a growing realization of the importance of library and information services, though budgets to develop these have often been small. Among the largest and most active libraries may be counted those of the Institute of Public Administration, the Abba Dina Police College, and the Air Force Library at Debre Zeit (see Figure 2). Most important departments now have some library provision. The Emperor's private library has collections of books donated by Ethiopian and foreign writers, as well as manuscripts of great interest, some 600 in number.

Of the special libraries in Ethiopia the most important is that of the United Nations Economic Commission for Africa, founded in 1958. Its strength is mainly in African government and agency documents and in an excellent serials section containing a large number of periodicals not easily obtained by purchase. There is also a fine collection of bank reports as well as a section of United Nations documents. The library has over 50,000 volumes excluding documents and is manned by a staff of twenty.

The most active among libraries supported by foreign governments is the American Library founded in 1952. It is a public library sponsored by the United States Information Service and it has pioneered library service in the provinces. In the



FIGURE 2. *Air Force Library.*

1960s reading rooms were opened, often in cooperation with the Ministry of Education, in Dessie, Dire Dawa, Gondar, Harar, Jimma, Leket, and Mekele, though the Harar library had subsequently to be closed. These libraries contain 2,000–3,000 volumes each. The Library of the British Council contains a good collection of 15,000 volumes from and about Britain. The German and Italian cultural institutes, the Russian Exhibition, the Alliance Française, and a number of other foreign cultural institutions maintain small libraries in the capital. There are also a number of libraries attached to missionary institutions, some of them possessing archive material relating to their work in Ethiopia.

Library Studies in Ethiopia. Traditionally little prestige accrued to the keeper of the books. In the late 1950s and early 1960s, however, courses in elementary librarianship organized by the Ministry of Education, the National Library, and the Extension Department of the University opened the way for a recognition of librarianship as a profession.

The Department of Library Science, Faculty of Education, Haile Sellassie I University, began in 1966 as a program in Library Science, part of a Secondary Teachers' Training Project of the United Nations Development Programme which was executed by UNESCO.

The first chairman of the program, C. P. Shukla, a UNESCO expert, was succeeded by Ruby Martz, an American librarian, who became first head of the Department of Library Science when this was established in October 1969. An Ethiopian graduate, Tesfaye Aldiga, who received a UNESCO fellowship for library studies, joined the department in March 1971 and is now its head. Other teaching is contributed voluntarily by University Library staff, five of whom held courses in 1969–1970.

The department offers a minor in Library Science to secondary education students working for B.A. or B.Sc. (Ed.) degrees and is oriented towards school librarianship. Eleven students graduated in 1969, sixteen in 1970, and seventeen in 1971—forty-four graduates in all. As of 1969–1970, enrollment was restricted to twenty students a year.

As part of their academic requirement, all degree students at Haile Sellassie I University spend 1 year on Ethiopian University Service in the provinces. This year of service is most useful in providing students with the opportunity of working in small school or community libraries.

A second course, designed to train library assistants, consisted of thirty-two semester hours and could at first be taken either as a full-time 1-year course or as 2½-year part-time course in University Extension. Seventy-two students had been awarded the diploma by 1971.

The Faculty of Education, in consultation with the Ministry of Education, is considering the possibility of lengthening the diploma course to 2 years in order to meet a more selective demand for better trained library personnel, but as yet there are no library manpower projections for Ethiopia and a survey is being undertaken. The diploma course was suspended in 1970–1971.

At a conference of head librarians of Eastern African Universities (see below), it was recommended that graduate programs in librarianship should be established to

serve the needs of Eastern Africa. To this end, and for purposes of coordinating existing training programs, curricula, and standards, the heads of the three existing programs of library studies (i.e., those of Makerere University, University of Zambia, and Haile Sellassie I University) have been asked to form a permanent committee.

The Ethiopian Library Association was founded in 1967 and achieved official status as a registered society in 1969. Presently there are over sixty members. High on its program of action is a campaign to obtain a law of deposit for Ethiopia, the lack of which is a serious obstacle to library development. The association has been pressing for adequate librarianship education in Ethiopia and has set up committees to study school, special, and government libraries.

The university librarian is a member of SCAUL (Standing Conference of African University Librarians), and the university library organized the inaugural conference of the Eastern Area (SCAULEA) branch of the parent organization, at which ten East African university libraries were represented. SCAULEA's aims are, broadly, closer coordination and cooperation between university libraries in Eastern Africa. The conference, held in February 1971, was the first move in this direction.

This survey has indicated that very recently there have been considerable developments on the Ethiopian library scene. Authorities interested in library development in Ethiopia face a great opportunity to unite their efforts. From these there should arise a comprehensive national plan envisaging:

1. Library legislation setting up a national authority for planning and coordinating library services.
2. An ordinance establishing legal deposit.
3. A plan for the preservation and registration of Ethiopian manuscripts.
4. A plan for a comprehensive national bibliography.
5. A plan for school library services.
6. A plan for national public library services.
7. A program of library science education at all levels from elementary school librarian to full professional librarian.

When these plans and programs are drawn up and put into effect, Ethiopia's library service will be able to make a more effective impact on national development.

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RITA PANKHURST

ETYMOLOGY AND SEMANTIC CODING

Commonly defined as the study of the origin and development of a given word or words, generally using the methods of comparative linguistics, etymology assumes importance as an avenue of investigative research concerned with automatic text searching and with other problems of subject analysis. As a background of studies which should precede the development of a subject heading list or a thesaurus for a specialized collection, etymology in a broad sense is essential for the understanding of natural language and how it affects information retrieval based upon natural language as an indexing tool.

It can now be accepted as axiomatic that procedures of indexing which use natural language are bound by the same laws and constraints as any other use of natural language for any other purpose. As a chief characteristic of *homo sapiens*, natural language is similar in many respects to other biological studies in that strict laws are very hard to discern and even the best generalization is subject to many exceptions. Some broad facts are now known after very many years of intensive work, and these are worthy of consideration as a part of the problems of library and information science. Anthropological studies have shown that many tribes develop a vocabulary consistent with their experiences but not beyond that, so that a tribe may have many different words that are not considered synonymous although a more widely used language would have only one term. The syntax and morphology of the languages of primitive tribes may be, however, exceedingly complex and include grammatical categories unknown in other languages. Improvement of cultural facilities and technology is generally accompanied by a vast enlargement of the vocabulary available, with concomitant loss of terms for activities that fall into disuse. Further, the languages which are used across ethnic and cultural boundaries have the largest vocabularies and equally the greatest facility for the addition of new words. English is the example par excellence of this characteristic of language. Historical evidence so far indicates that language accurately reflects cultural and social change to the extent that even the rate of social change can be correlated with linguistic evolution (1). We are concerned here only with the fact that there is more to name than we have words for so that language is in a state of constant flux, both grammatically and semantically, as the needs of communication and the messages to be communicated increase in number and variety.

Linguistic evolution occurs as many different aspects of a language change, involving sound shifts, syntactic change, as well as the creation, alteration of meaning, and displacement of various word groups. For instance, the terminology for the parts of a harness for horses can be obtained from many different sources, but the currency of a vocabulary, the number and variety of appearances of a given term, is of primary concern in the development of informational systems. Etymology that is significant to the information scientist is likely to be more concerned with practical matters of use rather than details, however interesting, of history. While the linguist might utilize etymology in order to arrive at general conclusions about the nature of language, the information scientist will employ techniques of etymology to establish whatever is necessary to analyze a given text for the determination of word boundaries, the grammatical structure of terms and phrases, and the significance of context. Some handy rules of thumb can be developed for text of a certain vintage but it is not wise to expect that these rules will extend beyond that vintage and certainly not into other languages than the one on which the rule is based.

Without sufficient context, it is impossible to ascertain what etymology applies to a given word. Without the etymology, it is difficult to assess the semantic value for a word. While a few widely appropriate rules would be ideal for natural language, as the model of mathematics constantly demonstrates, the intimate relationship of word-meaning and those facets of psychology which explain cognition and perception put the value in doubt except as very many modifications are added to the original rule. For instance, an effort to reject a certain sequence of letters will always exclude some perfectly valid word, even "xx" in the name Foxx. Consequently, rules that would reject certain affixes, whether of a grammatical nature or of a more semantic nature, are likely to come to grief because change of semantic value has made some affixes highly acceptable, despite logic, or a chance word utilizes the letters of the affix without in fact employing the affix. For example, a recognition procedure for automatic text searching which is supposed to pick up all words relating to man would have to include very many words which have nothing in common with the vocable "man" as an affix. "Mankind," "manhood," and "manliness" would all be picked up as well as "management," "maneuver," and "manatee." Rejecting this affix would invariably reject something which ought to be included. This holds true even for grammatical affixes in English where the "s" indicating plural and the "ing" characteristic of a verbal, a noun derived from a verb, are ambiguous in a significant number of cases. Some natural controls operate but they are fewer than would be useful. In general, ambiguous structures are replaced with those of greater accuracy, but this occurs in several ways, and loss of a frequently employed affix or development of a new affix is quite rare and in accord with the general rule that semantic value is most subject to change, and grammatical structures are slowly altered.

It has been supposed that a certain context, as Stone has shown, including five words to the left and five to the right of the word, will generally identify the semantic value of a term sufficiently so that it can be rejected or accepted on the basis of context with a certain degree of accuracy (2). There are many exceptions to this rule, especially where several different modifiers are required with the head of a construc-

tion in order to designate what may well be a single word in another language. In addition to these complexities, the fact that language is as useful for indicating moods, suggesting feelings, and by a kind of extension of meaning conveying simple information in an unusual fashion provides us with the conclusion that even the best method ever to be devised of automatic text searching will be proven deficient at times.

Lexical values are those dictionary listings with a word which give the most usual contexts in which the word may be found. These contexts may be quite literal and discriminate between homonyms, or they may be figurative and indicate tropes of all kinds. The function of metaphor is seen in such comparisons as "the ice melted in his hand" and "she melted in his arms." Two quite different phenomena are conveyed by the word "melt" simply as an extension of the accepted lexical value. Dictionaries customarily list and number the various common contexts so that we can say that "rock" 1, in the sentences "Quartz is a common rock" and "sun-baked earth is as hard as rock," differs from "they rock the cradle" and "they rock the boat." This is "rock" 2, and this is really a homonym, indicating that the same vocables may be employed for totally different semantic purposes. Because the left and right environments "rock" 1 and "rock" 2 differ, we can quite readily set up one as a desirable inclusion, in a concordance, for instance, and the other as a reject, basing the procedure not so much on the individual term as on the term within a given environment. Such anomalies as "he cradled the rock in his arms" would pass as possible but unenlightening, if the etymology of "rock" 1 and "rock" 2 is not considered. However the derivation of "rock" 1 from Middle Latin through Old French and "rock" 2 with clearly teutonic roots in Anglo-Saxon resolves the difficulty.

In effect, the development of automatic text searching may establish a kind of lexicon of usage which would sufficiently establish in accordance the semantic values of terms listed depending on left and right environment. Such a procedure has also been useful in the compilation of lexicons and in developing lists of descriptors for a thesaurus. The preparation of concordances by computer has tended to isolate the variation of terms within contexts so that the one is reasonably predictable from the other provided the term is not utterly commonplace or of purely syntactical usage. This predictability decreases as the number of sources of context and their variety increase.

Examples of usage vary widely even within the work of a single author, but provided several historical accidents have delimited a term within a specific context, the procedures of automatic text searching and recognition are productive within reasonable tolerances. The varying applicability of a given term may derive from its personal or impersonal use from grammatical peculiarities, and from its etymology.

Students of etymology are often able to trace the development of an area of semantic value from the simple naming function common to newly coined words through a variety of metaphorical uses to a new area of meaning for a word. The semantic value is at once broadened and weakened as the area of usage becomes less precise. A word that is widely known and accepted, for instance, "work," may have a wide variety of acceptable usages, so that we can say both "the clock works" and

"Jones works at the clock factory." Factories are sometimes described as "the works" and so that some such witticism as "Jones works at the clock works to make the clocks work" would be intelligible to a native speaker. Such an extreme case offends the careful stylist in English and is instantly interpreted as a play on words so that the problem present for automatic text searching is rather factitious. But in some subject areas and particularly in those disciplines identified as social sciences, the extremity may exist only in having the word in its different usages contained within the same sentence. In a longer article it is not unusual to find that the same word with different semantic values depending upon context provides a kind of history of usage.

A sanguine belief that common words make scientific concepts easy to understand fails to take into account the precise definition that gives a familiar term a special meaning. While new names may be derived from almost any source, even acronyms such as "laser" and "maser," and the fashion in the coinage of words changes, there is preponderant tendency to make new words of old. The age of Latin and Greek as the mark of an educated man led to coinage from those tongues. At the present time the tendency is to create acronyms that resemble or indeed are identical with common words and to make common words of acronyms. Not only acronyms serve this purpose, but following the model of Lewis Carroll in "Jabberwocky," portmanteau words are created which may have considerable currency and usefulness. The word "chortle" derives from that poem and is an example of a portmanteau word made up of "chuckle" and "snort."

The word "bite" is of great antiquity in the English language derived from Anglo-Saxon and allied to Gothic origins. The principal parts of the verb (bit, bitten, biting) are undergoing slow grammatical change to make them like "put" so that such a phrase as "he has bit off more than he can chew" is quite acceptable, if it is not preferable to some authors. The verb has a related noun form, "bit," of such currency that it is a good candidate for a suppress list in automatic text searching. In determining the frequency of "bit" as a past participle, "bit" 1, the search would be productive. Often, however, it is very nearly of syntactical importance only, serving as a handy partitive for mass nouns, "bit" 2, as in "a bit of apple" and a "bit of land." Finally, the derivation of "bit" as a unit of information can be traced to the formation of a portmanteau word like "chortle." "Bit" 3 in the sense of binary unit is made up of both words. A search for "bit" 3 would have to contend with an even vaguer use of the term, probably a development which began as a figure of speech, with the meaning of "somewhat" as in "a bit disturbed."

Fortunately, as Stone describes, there are procedures which may be used to isolate and nullify the effect of an ambiguous word so that the effect of such terminology is not so devastating as it may appear. We may find some comfort in the work of Gillieron who showed that new words will not long be used if they are homonyms of necessary syntactical structures. All this only indicates that whatever rules are adopted for automatic text searching, they will have to be delimited by all possible means, especially by the broad context in which significant words appear. These are identified not so much by repetition as by contextual significance, and the study of the history

of the jargon employed may serve to eliminate some, though not all, of the failures which have seemed to negate the possible value of automatic text searching.

The study of a sample of a given corpus of material will soon show what syntactical devices can be suppressed and what descriptive words are significant as indexing keys. The two extremes serve as monitors of the text, so that more may be retrieved than asked for but none will be omitted if of value. This fail-safe position is expensive but reliable, and time-consuming though it is, there is a real question whether further refinement would do more than increase the risk of omissions.

Etymology, then, is another facet of study which can be used to determine what depth of indexing is necessary and useful, and to provide clear rules to remove ambiguities wherever possible, but the history of words, or even of the language, will not provide a uniform method for the development of automatic text searching routines. The orthography of the language at hand may vary considerably from one period to the next, as with the Turkish language after World War I. Nor can any mechanical transformation of written terminology into spoken terminology be of great assistance, for pronunciations change as much as spelling does, and in a very large language like English with its multiplicity of homonyms, spelling may be a more reliable identifier of separate words than pronunciation. The stream of speech indicates that word boundaries are not purely typographical, as may appear from a text, but include both time and stress as signals of word endings and phrase continuity. Etymology, as indicated above, demonstrates that natural language is well-named. As with natural phenomena, models are derived by statistical analysis rather than by immutable marks of identification. Semantic coding with its still unexplored possibilities may rely in some measure on etymology as a useful means for understanding the evolutionary process of language.

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EUROPEAN COMMUNITY, CENTER FOR INFORMATION AND DOCUMENTATION

The European Coal and Steel Community (ECSC) was created in 1952 by a treaty signed between Belgium, France, Germany, Italy, Luxembourg, and the Netherlands. In 1958 the same six countries signed two other treaties, creating the European Atomic Energy Community (Euratom) and the European Economic Community (EEC), generally called "Common Market." Each of the three communities was headed by a commission.

In 1967 the six governments decided to have the three communities managed by a single commission of nine members, and to merge their administrations, libraries, information, and computer departments. Since 1968 the responsibility for dissemination of information in the fields of coal and steel, atomic energy, and economics, has laid with the Center for Information and Documentation (CID) in Luxembourg.

The community now has one major library, in Brussels, covering economic, legal, and social literature, and several libraries covering the literature of science and technology in Brussels, Luxembourg, Ispra (Italy), and other research establishments. Serving users with different needs in different locations, and having different degrees of mechanization, these libraries cannot be merged in the near future.

Only the responsibility for the collections of the scientific/technical libraries lies with the CID. It serves as a depository library for the U.S. Atomic Energy Commission and has an extensive collection of reports of other nuclear energy organizations. The CID is responsible for the information policy of the community itself, and it plays a coordinating role between the policy making bodies in the member countries.

The Brussels and Ispra libraries are being mechanized.

The CID publishes several hundred technical reports per year which represent the results of community research in the field of nuclear energy, coal, and steel. In addition, it publishes *Eurospectra*, a bimonthly journal of a scientific level in five languages, including English; *Euro-abstracts*, an abstract journal covering community activities; and *Transatom*, a bibliography of Eastern literature on nuclear energy, translated or not.

The operation of the European Nuclear Documentation System (ENDS), which was opened to the public in 1966, is the most important activity of the CID. Every year approximately 130,000 documents published in the field of nuclear energy are selected from a total of 1 million references; they are indexed and the descriptors stored in the memories of a third generation computer (now an IBM-360/50).

Every year also, several thousand batches of abstract copies are shipped to the center's users, according to user profiles or on request, after retrospective searching. Industry, universities, and research institutions in the member countries as well as in the Common Research Center constitute the clientele of ENDS.

CID developed the plans for the European Metallurgy Information System which went into operation in early 1972 with the assistance of the metallurgical informa-

tion centers of the six member countries. These centers contribute approximately 40,000 documents per year, abstracted, indexed, and cataloged, to the common file which is processed and duplicated for use by the national centers. CID also cooperates with the United Nations' Food and Agricultural Organization, the National Agricultural Library, and the Commonwealth Agricultural Bureaux in the development of a worldwide Agricultural Information System (AGRIS).

A number of innovations in the field of information science have had their origin in ENDS. One is the development of arrowgraphs and terminology charts for the graphic representation of scientific terminology. This facilitates the display and handling of complex hierarchical and other semantic relationships among terms and concepts, so that indexing and retrieval can take place on different levels of specificity. Automatic "generic posting" is performed by computer. The compressed file technique, through which the time required for the matching of queries and documents in a retrieval process is reduced to a minimum, is an innovation of considerable economic value. Another is relevance feedback, currently performed on retrospective searches. It shifts the semi-intellectual screening operations from the human documentalist to the computer.

Today the CID team of information scientists and computer analysts is experimenting with optical storage systems and the management of multilingual thesauri.

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R. BREE

EVALUATION AND TESTING OF INFORMATION RETRIEVAL SYSTEMS

Purpose of Evaluation

An evaluation of an information retrieval system (this term is used because it is the one commonly accepted, although strictly speaking an "information retrieval system" does not retrieve information but rather documents or document representations ("surrogates") such as document numbers, full bibliographic citations, or abstracts) is conducted to answer the questions:

1. How well is the system functioning?
2. Can the system be improved?
3. How may it best be improved?

The first question, relating to the present performance level, may be answered by *macroevaluation* (1) which involves measuring and expressing the performance according to some type of quantitative scale. The other two questions can only be answered by a more detailed level of evaluation, namely *microevaluation*. Microevaluation involves analytical procedures whereby the major sources of system failure are identified, thus allowing corrective action to be taken to raise the performance level of the system. Microevaluation implies *diagnosis*. Evaluation is essentially a diagnostic procedure which, like other forms of diagnosis, is intended to lead to *therapeutic* action. An evaluation program, hopefully, is not conducted merely as an intellectual exercise. Thorough evaluation tends to be expensive, and can only be justified if the evaluation program is likely to lead to significant improvement in the performance of the system.

Scope of Evaluation

Evaluation programs are associated mainly with retrospective search systems, particularly computer-based systems, although evaluation procedures are equally applicable to manual systems (e.g., card catalogs) and to other types of bibliographic products and services, including printed indexes and dissemination systems. Moreover, these procedures may be applied at any of several stages of system development: the experimental or conceptual stage, the prototype stage, or the fully operational stage (either by a one-time full-scale evaluation or by the implementation of some form of continuous quality control).

There are also several possible levels of evaluation:

1. Evaluation of system performance in terms of the degree to which it meets user requirements. This is the evaluation of *system effectiveness*.
2. Evaluation in terms of how to satisfy user requirements in the most efficient and economical fashion. This is *cost-effectiveness* evaluation.
3. Evaluation of the worth of the system (i.e., is the system worthwhile, does it justify its existence?). This is *cost-benefits* evaluation.

These are successively higher levels of evaluation. Only the first is of direct concern to the users of the system. Cost-effectiveness evaluation is of concern to system operators and managers, while cost-benefits evaluation is of concern to "top management." Ultimately, of course, cost considerations must be taken into account in all realistic evaluations. However, we cannot evaluate cost-effectiveness without also evaluating effectiveness. Generally speaking, the cost-benefits evaluation has already been done before the system is established. That is, a decision has already been made that the potential benefits of the system outweigh the costs involved in creating and maintaining it. This article is largely concerned with evaluation of effectiveness although the other aspects will also be discussed briefly.

Requirements of System Users

Evaluation of a retrieval or dissemination system could be completely subjective (i.e., nonquantitative). Users could be asked to assess the value of the service provided on some broad scale, such as "major value," "minor value," or "no value." This type of subjective assessment is useful because it at least gives us some idea of user satisfaction. However, such a sweeping "evaluation" is certainly not diagnostic and will not in itself lead to system improvements. It is preferable to make an evaluation less subjective and more quantitative if possible. "Quantification" implies the use of some type of performance figure to express the degree of success of a search or other service provided. Performance figures also identify the poor searches that will be prime candidates for detailed analysis to determine causes of failure (i.e., *failure analysis*). Failure analysis of this type provides the diagnostic aspect of evaluation. An information retrieval system is evaluated to obtain two types of data:

1. Performance figures for searches.
2. Results of analyses of reasons for failures in searches.

These data, when analyzed and interpreted, should yield recommendations from which decisions can be made on how system performance may best be improved.

To be able to quantify (i.e., derive performance figures) criteria must be established by which users can judge the success or failure of a search. Although it is possible to generate great inventories of "user requirements," the fundamental requirements can be reduced to quite a small list:

1. Coverage
2. Recall
3. Precision
4. Response time
5. User effort
6. Form of output

This list was first presented in this form by Cleverdon (2).

All users of a retrieval system have one fundamental requirement in common:

They expect the system to be able to retrieve one or more documents that contribute to the satisfaction of some information need (*relevant documents*). All users are presumed to have an information need—otherwise they would not have approached the system in the first place. Actually, the “fundamental requirement” presented above is a slight oversimplification. In some, comparatively rare situations the user wants the system to retrieve nothing. This is the situation where the user believes nothing exists and hopes nothing exists (e.g., certain patent searching situations). Under these circumstances (nothing existing) the system behaves perfectly if it retrieves nothing.

In most situations, however, the user wants and expects the system to retrieve some relevant documents. It is possible to express quantitatively the degree of system success in retrieving relevant literature from its data base. The appropriate ratio is the *recall ratio* which may be defined as:

$$\frac{\text{the number of relevant documents retrieved by the system}}{\text{the total number of relevant documents contained in the system}} \times 100$$

Suppose that for a particular subject request made to some retrieval system, it can be established (we will discuss possible methods for this later) that there are only 10 relevant documents in the entire data base. A subject search is conducted using normal system procedures, and 7 of these 10 documents are retrieved. The recall ratio of this search is, then, $(7/10) \times 100$, or 70%.

The recall ratio is one very important measure of the success of a search. But it is not the only important measure. In fact, taken on its own it is somewhat meaningless: 100% recall for any search in any system can be obtained by searching broadly enough and retrieving a sufficiently large portion of the collection. An information retrieval system is essentially a filter and, as in the case of other types of filter, it should be capable of letting through what is wanted and, at the same time, holding back what is not wanted. The recall ratio expresses the ability of the system to let through what is wanted but a companion measure is also needed to express the ability of the system to hold back what is not wanted.

One such measure (there are others, which will be mentioned later) is the *precision ratio* which may be defined as:

$$\frac{\text{the number of relevant documents retrieved by the system}}{\text{the total number of documents retrieved by the system}} \times 100$$

Returning to the hypothetical search mentioned above, assume that the system retrieved a total of 50 documents (or references), 7 of them relevant and 43 not. The precision ratio for this search is thus $7/50$, or 14%, so the search has operated at 70% recall and at 14% precision. These two measures used jointly indicate the filtering capacity of the system. They give a good picture of system effectiveness whereas either one on its own is inadequate.

The precision ratio measures the efficiency with which the system is able to achieve a particular recall ratio. Clearly, achievement of 70% recall at a precision of $7/14$ (50%) indicates greater efficiency than the attainment of the same recall at

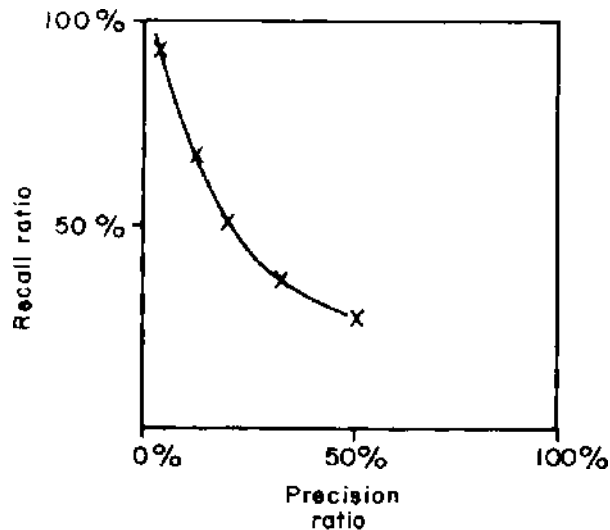


FIGURE 1. *Performance curve of recall versus precision.*

7/50 (14%) precision or 7/100 (7%) precision; greater filtering capacity has been brought into play. In a sense the precision ratio may be regarded as a measure of the effort required (from the user of the system) to achieve a particular recall ratio. This effort is expended after the search results have been delivered by the system in order to separate the relevant items retrieved from the irrelevant items. Obviously it takes longer to separate 7 relevant from 93 irrelevant (7% precision) than it does to separate 7 relevant from 43 irrelevant (14% precision), and the latter case requires more effort than the separation of 7 relevant from an equal number of irrelevant (50% precision). Viewed in this light, the precision ratio is clearly a valid and useful measure of search efficiency.

Recall and precision tend to vary inversely in searching. That is, whatever is done to improve recall (by broadening a search) will also tend to be reducing precision; and whatever is done to improve precision (by searching more stringently) will tend to be reducing recall. In fact, by conducting a search or a whole group of searches at varying strategy levels from very broad to very stringent, a series of performance points can be obtained which allow the drawing of a performance curve resembling that of Figure 1.

Different users will have different requirements regarding recall and precision. Take for instance the typical patron of an industrial library who comes in and asks for "some good recent articles on shielded arc welding." This man does not have a high recall requirement (i.e., he neither needs nor wants everything on the subject) but he will expect high precision (i.e., he will expect the set of articles delivered to him to be largely relevant.) At the other extreme, there is the research scientist who comes to MEDLARS and asks for a search to be done on the subject of "connective tissue in ocular disease." This man is writing a book on the subject and therefore wants to see everything. His recall requirements are high and the closer the system can approach 100% recall the happier he will be.

The user who needs high recall will usually tolerate a lower precision than the user who needs only "a few recent articles." The attainment of a high recall is important to him and he will probably be willing to look through a large number of document surrogates, discarding the irrelevant ones, to assure himself that he has not missed anything of importance. This user will probably prefer a search that achieves 90% recall but only 15% precision to one achieving 75% recall at 50% precision.

As previously mentioned, the precision ratio is one measure of the amount of effort required to obtain a particular recall ratio. This is effort expended at the output stage—in separating relevant items retrieved from irrelevant ones. However, there are other stages at which effort can be put by the user. For example, he can spend more effort at the request stage—by a detailed discussion of his requirements with a member of the information staff or by completing a detailed search request form. Or the effort could be expended at the search strategy stage—the user examines a proposed strategy and approves it, or suggests alterations, before the search is actually conducted. Finally, the effort may be made through the technique of *iterative searching*. Here a partial or preliminary search is conducted and the user examines the output of this search, indicating which retrieved items are relevant to him and which not. A revised search strategy is then prepared and processed against the entire data base, the strategy being designed to retrieve more documents of the type known to be relevant and less of the type known not to be.

The more effort a user is willing to expend in exploiting an information system the better the results are likely to be in terms of recall or precision or possibly both. Generally speaking the user who needs high recall will be willing to put in greater effort than the user who has less stringent recall requirements.

Response time is obviously important to users of information retrieval systems. Almost all users will have some deadline beyond which receipt of a system response will be of no value. Nevertheless, response time is always secondary to the recall and precision requirements and is never the prime user requirement. If it were, this would imply that users would be happy with immediate access to 100% irrelevant information, which is patently absurd.

Output from an information retrieval system may be in the form of document numbers, full bibliographic citations, citations plus index terms, citations plus abstracts, or complete texts of documents in hard copy form or in microform. The form of output is important because it affects the precision tolerance of the system user. A user is likely to tolerate lower precision in the product delivered by the system if this product is in a form that facilitates rapid scanning and thus allows him to discard irrelevant items fairly easily. The more information given to a user in a document representation the easier it is for him to make accurate relevance predictions. Saracevic (3) discovered, in an investigation of relevance prediction, that of 207 documents judged relevant from the full text, only 131 were so judged from titles and 160 from abstracts. In other words, given titles, users were able to recognize about 66% of the relevant items; given abstracts they could recognize about 80%. Similar findings have been made by other investigators.

Consideration of the factor of *coverage* in a sense may be regarded as the most

important user requirement of all—presumably a user will not even approach a system unless he feels that its coverage is such that it will contribute to satisfying his information need. However, comprehensiveness of coverage in a specific subject area is really only of concern to the user who needs high recall. In a way, coverage is an extension of recall beyond the immediate system data base to the entire published literature. The user who needs high recall may legitimately say, "You claim to have given me about 95% of the relevant literature in your collection but does this represent 95% of the published literature on the subject, or 50% of the published literature or only 10%?" This requester wants to find everything and is therefore legitimately concerned with the extent of system coverage (i.e., how much of the relevant literature on the precise subject of his request got into the system in the first place). The requester with a low recall requirement, on the other hand, is not particularly concerned about coverage. He wants a few good articles and does not really care whether these are *all* the relevant items published or only 1% of them.

Evaluation of Effectiveness

The effectiveness of an information system can be evaluated by determining the degree to which it meets these various user requirements. Some of this can be done by direct observation (determination of form of output) and some by relatively simple recording procedures (i.e., measurement of response time and amount of user effort expended). Coverage, recall, and precision, on the other hand, require special attention in the design of an evaluation program.

A complete evaluation program will comprise a number of stages:

1. Establishing the scope and purpose of the program (i.e., deciding what to evaluate).
2. Designing the evaluation.
3. Conducting the study.
4. Analyzing and interpreting the results.
5. Making system modifications, based on the evaluation results, designed to improve the over-all performance level.

The first step, defining scope and purpose of the study, should be a task undertaken by the managers of the system to be evaluated. Presumably they have certain specific questions they would like answered. For example, they may be particularly concerned about the system vocabulary (*index language*) and would like to know if it is sufficiently specific, across the subject areas covered, to be able to satisfy the various demands placed upon the system. Or they may want to know if certain devices presently employed to improve precision (e.g., links or role indicators) are really worthwhile. The evaluator of the system (assuming that he is not in fact also the system manager) needs to obtain from management an explicit statement of what he is to concentrate upon in his study. When he designs the evaluation program he must be sure that the data collected will, when analyzed, allow him to answer the various

questions posed by management. Lancaster (4) has presented a sample list of some of the specific questions that might be posed in a comprehensive evaluation of a large operating retrieval system.

Note that, although an evaluation program may *concentrate* upon one particular subsystem (e.g., indexing policy and procedures) this subsystem cannot be evaluated in isolation. The various major subsystems (indexing, searching, index language, user-system interface) are closely interdependent. A change in one will have effects and repercussions elsewhere. It is not, for example, possible to evaluate indexing in any meaningful way without considering the effect of indexing policy and procedures on the searching subsystem. Cooper (5) demonstrates this clearly in his discussion of the significance of indexer consistency studies.

An evaluation program must yield two types of data if it is to be useful:

1. Performance figures for a representative group of searches.
2. Examples of system failures to allow analysis of causes of failure.

The performance figures of major interest are recall ratios and precision ratios. By establishing these performance figures for a representative set of searches conducted by a system we will also be able to identify examples of recall and precision failures (i.e., situations in which known relevant items were not retrieved and situations in which irrelevant items were retrieved). A major task of the designer of an evaluation is to establish methods that can be used to derive recall and precision figures for a number of searches. To arrive at these figures we must be able to put certain absolute values, or at least estimates, into the 2×2 table illustrated in Figure 2.

Three of these values are directly observable: the total collection size ($a + b + c + d$), the total number of items retrieved ($a + b$), and the total not retrieved ($c + d$). The other values must be established, or at least estimated, in our evaluation program. The values a and b can be established relatively easily. A search has been conducted for a requester and has retrieved a number of documents or document

		User Relevance Judgment		
		Relevant	Not relevant	Total
System Relevance Prediction	Retrieved	a "Hits"	b "Noise"	$a + b$
	Not retrieved	c "Misses"	d "Correctly rejected"	$c + d$
	Total	$a + c$	$b + d$	$a + b + c + d$ (total collection)

FIGURE 2. 2×2 table of search results.

surrogates ($a + b$). These are presented to the requester so he can decide which items he considers relevant (a) and which he considers not relevant (b). Usually he will judge relevance on some type of scale ("major relevance," "minor relevance," and "no relevance" will usually suffice). Although the topic of "relevance" has generated much literature and heated discussion, and although a great many factors influence a requester's relevance decisions, when an operating system is evaluated in its entirety it is obvious that a "relevant" document is one that contributes to the satisfaction of the information need of the requester and an "irrelevant" document is one that does not. In other words, relevance assessments are value judgments placed on documents by individuals with information needs.

Once the requester has made these relevance assessments, there is a precision ratio $a/(a + b)$ for the search under review. In practical application, these relevance assessments should be recorded by the requester on assessment forms. The requester should be asked to indicate reasons for his various judgments (i.e., why is one document of major relevance, a second of no relevance, a third of minor relevance)—these recorded reasons will be extremely useful in our analysis of the search performance.

Two values must still be placed in the 2×2 table, namely c and d . These are the difficult ones to determine but we need them in order to establish a recall ratio. To be truthful, there is only one way to arrive at these values absolutely (and thereby derive a "true" recall figure) and that is by having the requester examine all the non-retrieved items ($c + d$) and judge which of them are relevant (c) and which are not (d). When this is done an absolute value for c is established and an absolute recall ratio $a/(a + c)$ can be derived. In the evaluation of experimental or small prototype systems it is sometimes possible to do just this. However in most operating systems, if the system functions at all effectively, $c + d$ will be a very large portion of the entire collection and it will be quite impossible to expect the requester to examine all of these items or even a large part of them. Moreover, $c + d$ will usually be so large that we cannot even use conventional random sampling procedures. That is, an extremely large sample would need to be drawn from $c + d$ to achieve any expectation of finding even one relevant document therein.

In evaluating a retrieval system of any size the idea of trying to establish true recall can be abandoned in favor of the best possible *recall estimate*. Probably the most reasonable method of doing this is that employed by Lancaster (6) and by King (7) and justified statistically by Shumway (8). The situation is illustrated in Figure 3.

For any particular subject request posed to the collection I there will be a set of documents X that the requester would judge relevant if he saw them. Identification of X and the portion of this set retrieved by a search in the collection would allow determination of absolute recall. But, as indicated above, the composition of X in a system of any significant size usually cannot be established. However, a portion of X can be found, the subset X_1 , and our recall estimate can be based on the proportion of X_1 retrieved by a search in the system. The subset X_1 is a group of documents contained in the data base of the system and judged to be relevant by the requester

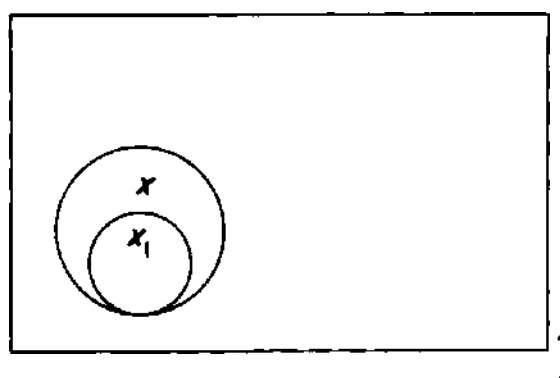


FIGURE 3. Estimation of recall from extrapolation from a known population to an unknown population.

but found by methods extraneous to the system to be evaluated. For example, X_1 can be composed of relevant documents known to the requester at the time he first approaches the system and makes his request. Alternatively, it can be composed of documents found by the evaluator through outside sources (e.g., other information centers or published indexes), submitted to the requester for his assessment and judged relevant by him. The subset can also be comprised partly of items from the first source and partly of items from the second. For example, a scientist comes to an information system and makes a subject request, at which time he already knows two relevant items. The evaluator does a parallel search in another source or sources and finds twelve "possibly relevant" items. Of these twelve, eight are judged relevant by the requester. This produces a group of ten documents that we know to be relevant to the request (the two the requester knew originally and the eight found subsequently). Assuming that all ten appear in the data base of the system, a *recall base* of ten relevant items has been established; i.e., the subset X_1 . A check of the results of the search actually conducted by the system finds that seven of the ten items were retrieved and three not. Our recall estimate is, then, $(7/10) \times 100$, or 70%. If X_1 is a representative sample of X , it is then reasonable to assume that the hit rate (recall ratio) for the entire set X will approximate the hit rate for the subset X_1 .

Another possible method of establishing a recall ratio is to use completely synthetic requests based upon documents known to be in the collection (i.e., *source documents*). Extract a group of 100 documents from one collection. For each, a subject specialist is asked to make up a request for which the document is regarded as relevant (i.e., this document should be retrieved in response to the request). The requests are composed according to certain guidelines and are made as realistic as possible. They should be of the type that might reasonably be put to the retrieval system in the normal course of events. The requests are then processed against the retrieval system and the retrieved items judged for relevance by the originator of the request, thus giving a precision ratio for the search. Recall for each search is 0 or 1 depending upon whether or not the source document was retrieved. The technique

gives a gross recall estimate over a group of searches. If, over 100 searches, the source document was retrieved 77 times and missed 23 times, the recall estimate for the group of searches would be 77%.

This approach to establishing recall has been used in various retrieval tests but is not particularly satisfactory in the evaluation of an operating system because of its artificiality. Moreover, when only one relevant document for each request is known, a recall estimate at the single search level can only be 1 or 0. Cleverdon (9) and Lancaster (6) have both used modified source document tests in which the source document, once used to generate a request, is discarded and the documents *cited by the source document* are assumed to be relevant and are used as the recall base for evaluating the search. Providing it can be established that the cited documents are in fact relevant to the derived request, this is a much improved procedure.

By methods described above, performance figures for a group of "test searches" can be established and thus allow derivation of all the necessary values or estimates in the 2×2 table of search results. Of course, it must be decided which searches we are going to treat as test searches. In a small system all searches conducted within a particular time period may be evaluated whereas in a larger system we will want to evaluate a sample only—either a purely random sample or a sample established by some stratification procedure. This question of sampling among searches is treated by King and Bryant (10).

Failure Analysis

Having established recall ratios and precision ratios for the test searches, an analysis of the recall and precision failures occurring may now be undertaken. This failure analysis is diagnostic and it is the most important part of the entire evaluation program. Take a hypothetical search for which a recall estimate of 7/10 and a precision figure of 15/40 has been determined. For this search there are 3 known recall failures and 25 precision failures for analysis.

Failure analysis involves a careful examination of the documents involved, how they were indexed, the request posed to the system, the search strategy used, and the complete assessment forms of the requester. Armed with this material the major cause of each failure can be determined. When such a failure analysis for a large number of searches is conducted, a large body of data will be established which, when analyzed and interpreted, will clearly indicate the principal problem areas in the system—the areas that require attention and modification if the over-all system performance is to be improved.

The analysis will attribute the recall and precision failures encountered to the principal subsystems (indexing, searching, index language, and user-system interface) and will identify the particular kind of failure occurring in each subsystem. The most important of the possible sources of failure are illustrated in Figure 4. Whether or not a requester approaches the system in the first place is dependent upon his expect-

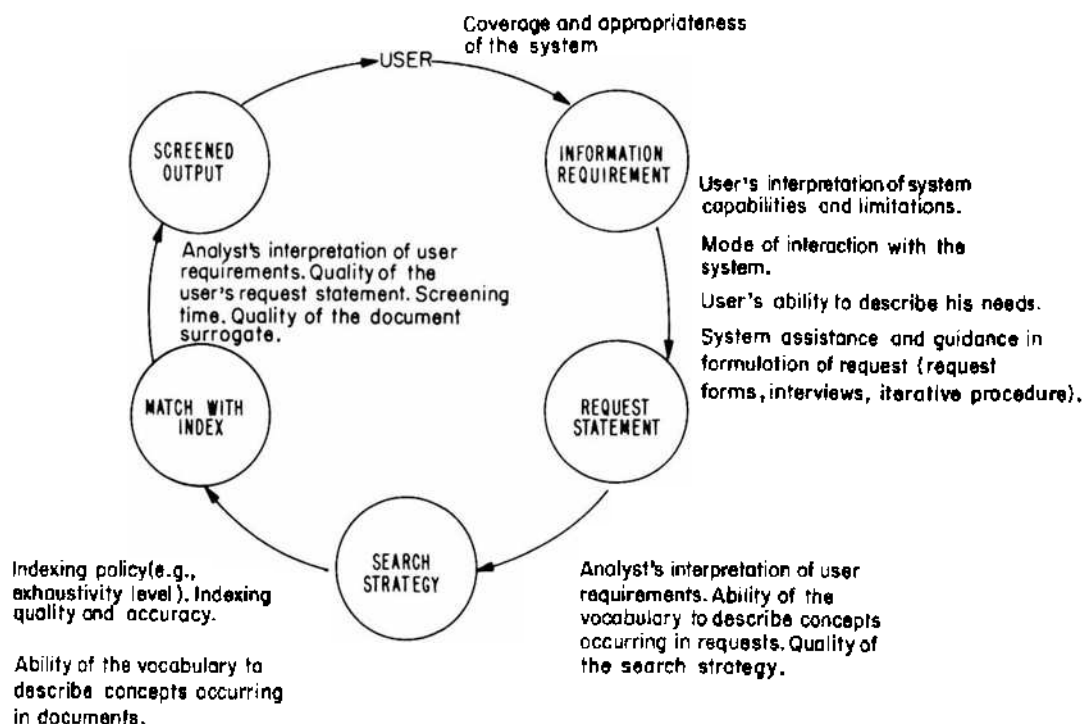


FIGURE 4. Possible sources of failure at various stages of the retrieval process.

tations regarding system coverage. Presumably he will not approach the system unless he feels that the collection is likely to contain the type of document he is seeking. Having decided to consult the system, he must make his needs known by means of a verbal request (11). The quality of this request (i.e., the degree to which it actually matches his information requirement) is dependent upon:

1. His own ability to express himself.
2. His interpretation of system capabilities and limitations. There is a strong tendency for a user to ask for what he thinks the system can give him rather than to ask for what he is really looking for.
3. The degree of assistance given to the requester by the system. Such assistance can take various shapes: a carefully structured search request form, a formal "request interview" process, an iterative search procedure, or some type of user training program.

The request having been made to the system, it must be translated into a formal search strategy by a member of the information staff (a search analyst). Now a new series of variables, affecting the recall and precision of the search, come into play:

1. The analyst's own interpretation of what the user really wants (which may be accurate or inaccurate).
2. The ability of the vocabulary to express the user's needs. For example, the user may specifically be seeking articles on argon arc welding (and the search analyst recognizes this) but the vocabulary may only be capable of expressing

this at a higher generic level—shielded arc welding or arc welding—and thus precision failures are inevitable.

3. The ability of the search analyst to recognize and cover all possible approaches to retrieval. To take a simple example, the requester may be looking for articles on possible adverse effects of commonly consumed beverages or components thereof. The searcher uses the terms caffeine, coffee, tea, and theophylline but forgets about the possibility of cacao and theobromine and thus misses some of the relevant documents.
4. The "level" of search strategy adopted. The searcher can choose to use a broad strategy (leading to high recall but low precision) or a tight strategy designed for high precision (but usually at the expense of a low recall) or a compromise between the two extremes.

When the search strategy is actually matched against the file of document surrogates (i.e., the search is conducted) further factors affecting performance come into play. One important performance factor is that of indexing policy, particularly policy regarding exhaustivity of indexing (which really equates with the number of index terms assigned). Perhaps the exhaustivity of indexing is inadequate to allow some of the relevant items for a particular request to be retrieved. Inaccuracy of indexing (omission of important terms or assignment of terms incorrectly) will also lead to recall or precision failures. The characteristics of the vocabulary affect the indexing process as much as they affect the searching process. An indexer can only adequately represent the concepts occurring in a document if there are appropriate specific terms available for him to use. Lack of specificity in the vocabulary will usually cause precision failures but can also lead to recall failures. Further, the vocabulary must be capable to a certain extent of showing the syntax of the terms assigned in indexing and thereby avoiding at least some of the precision failures that would be caused by false coordinations or incorrect term relationships. The more precoordinate the vocabulary, the less the need for additional devices to show relationships between terms (e.g., links, roles, subheadings).

Finally, before the results of a search are submitted to the requester, the analyst may screen the output and eliminate items that appear to be irrelevant with the object of improving the precision of the search to the end user. How successful this screening operation is (i.e., how much precision can be improved without having too serious an effect on recall) depends primarily upon the accuracy of the analyst's interpretation of the requester's requirements. Secondly, the success of the screening will be affected by the quality of the document surrogate from which the analyst is working.

Of course, these various sources of failure are cumulative. For a particular search conducted in a retrieval system, some of the relevant documents may be missed by the very fact that the user's request statement is too restrictive and inadvertently excludes certain items. Others may be missed due to poor search strategy, vocabulary inadequacies, indexing policy, and indexer omissions. Finally, the analyst may eliminate some more relevant items in his screening process. With so many possible sources of loss, it is little wonder that systems do not on the average operate very close to 100% recall. A similar cumulative effect occurs to prevent us obtaining 100% precision.

The factors illustrated in Figure 4 are the major sources of failure in all retrieval systems. In certain types of systems some of the factors are eliminated or considerably reduced in significance, but then other factors assume increased importance. For example, in a system in which the requester conducts his own search without the use of a system intermediary (e.g., an on-line system, a card catalog, or a published index), one important source of error, the analyst's interpretation of the requester's need, is eliminated. However, in these systems we are more likely to get a large number of failures due to the inability of the user to think of all possible approaches to retrieval. In a natural-language searching system, lack of specificity in the vocabulary is not a problem but ambiguous and spurious relationships between terms certainly are.

Through failure analysis the evaluation program determines which are the principal causes of failure in our particular system. When these are known, system modifications can hopefully be made that will reduce these failures in the future.

Improving the System

An evaluation program is diagnostic and therapeutic. It is *not* conducted as an intellectual exercise. The cost of conducting an evaluation program (not negligible in the case of a large system) can only be justified in terms of improved system performance resulting from the investigation.

Having conducted an evaluation program, average recall and precision achieved by the system can be determined. That is, the individual performance figures of the test searches can be averaged to arrive at over-all average performance figures, say 82% recall at 14% precision or 60% recall at 35% precision. Hopefully, by variations in search strategy within the group of test searches, a series of performance points can be derived to plot an average performance curve for the system. Such an average performance curve will look very much like that of Figure 1.

The average performance curve shows the range of system operation, *on the average*, at the present time. By variations in strategy, a searcher can range, *on the average*, up and down this performance curve. However, averages are misleading. In addition to plotting this curve the individual performance points must also be plotted in the form of a scatter diagram, as shown in very simplified form in Figure 5. Here, Curve *A* represents the present average performance curve and each *X* marks an individual performance point. Note that few, if any, of the individual performance figures fall exactly on the average performance curve. In fact, the individual results scatter widely. There are some very good results (top right-hand corner), some very bad results (bottom left-hand corner), some high recall—low precision results, some high precision—low recall results, and some middle-of-the-road results. When all of these various results are averaged out, average performance figures and an average performance curve can be derived.

The most important element in the evaluation program is to distinguish successes from failures. By determining "what makes a good search good" and "what makes a

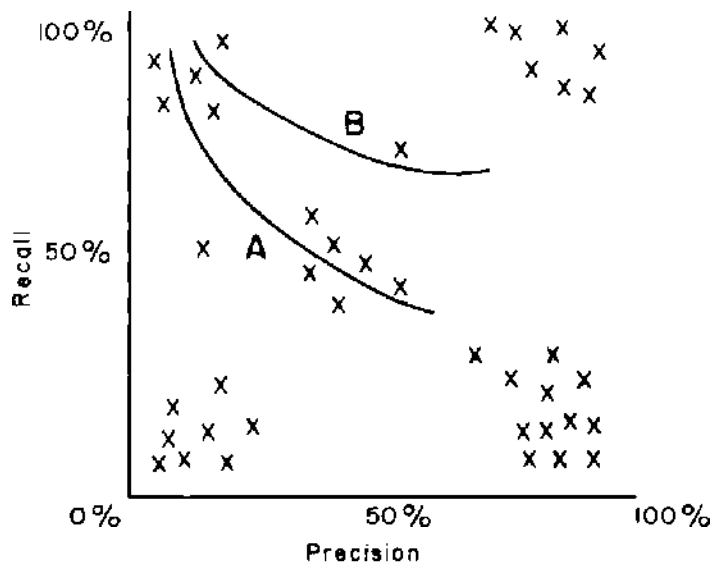


FIGURE 5. Scatter diagram of search results.

bad search bad" the evaluator can identify major system problems and suggest possible solutions. If, in the future, some of the searches that presently perform badly are turned into good searches, the average performance level of the system can be raised; that is, the average performance curve can be pushed up to a higher point (closer to the ideal but unattainable top right-hand corner of the plot) as illustrated by Curve B in Figure 5.

In determining major sources of system weakness, failure analyses will certainly be used. Thorough use will also be made of the performance figures. These performance figures (which are *not* used to compare the performance of one system with a completely different system having different documents, requests, and users) are used to compare the performance of the system under varying conditions or modes of operation. The corpus of test searches will be divided a number of different ways in order that the performance figures will reveal whether or not there appear to be significant differences in performance under alternative operating conditions. For example, does the system operate, on the average, better in certain subject areas than in others? Does it operate better for certain user groups than for others? Is there a particular mode of interaction in which the system appears to function most effectively (e.g., personal visit of requester to center as opposed to mailing of requests)? Of course, the performance figures indicate that certain things are happening in the system but they do not indicate *why* these things occur. This requires intellectual analysis and interpretation. In fact, system evaluation of this type may be regarded as a form of pattern analysis, the patterns being formed by the performance figures and by the failure analysis.

Having conducted the evaluation and examined the results, the evaluator should be able to point clearly to the major weaknesses of the system and to make rec-

ommendations on steps that need to be taken to improve future performance. It is impossible, in an article of this kind, to generalize on what these steps will be. Lancaster (6), following his evaluation of MEDLARS, was able to make specific recommendations on how the system might be improved. These recommendations related to indexing policy, user-system interaction, vocabulary control, search procedures, and personnel matters. In general, changes made at the *output* end of the retrieval process (i.e., at the request stage—in interaction and search procedures) can have immediate effect in improving the system whereas changes made to the indexing procedures and to the index language are not likely to take effect for a much longer time, especially in very large systems.

Quality Control

While a large-scale evaluation program, of the type outlined above, can tell us a great deal about the present characteristics of a system, and thus allow us to make appropriate improvements, it cannot tell us everything about the system. Such an evaluation indicates performance level and characteristics at a particular point in time. Ideally, a system should be evaluated on a continuous basis in order to identify specific failures and problem areas as they arise, and system modifications should be made wherever these appear justified. A large information processing operation will need to establish a program for continuously monitoring system performance in this way—in other words, a continuous quality control program. In continuous quality control it is impossible to evaluate and analyze every search in the detail possible in a one-time study. However, performance indicators for each search conducted should be sought. The user will be asked to complete a brief search appraisal form, recording degree of satisfaction with the results, telling us how many of the retrieved items are relevant to his needs (thus providing a precision ratio) and estimating, from his own knowledge of the literature, how much of the relevant literature may have been missed. This last estimate may be completely unreliable as an indicator of the recall of the search. A list of known relevant documents supplied by the user before his search is conducted is more satisfactory. The proportion of these retrieved can then be used as our recall estimate (always, of course, confirming that the nonretrieved items are actually in the data base). Better still, this estimate can be made before the search results are sent out. Thus, if a particular search appears from this recall estimate to have widely missed the mark, it can be rejected and a revised strategy can be prepared. This is *preventive* quality control—an attempt to avoid releasing unsatisfactory products.

In a monitoring operation of this type relatively crude recall estimates can be tolerated (the precision figures are supplied by the user himself, after the search, and thus should be reliable) because the whole purpose of the program is to identify those searches that have produced unsatisfactory results. If these are identified before the results are sent out, so much the better. However, if failures are discovered after the fact, an analysis must be conducted to determine why the failures occurred.

Thus, through continued failure analysis, system feedback can be regularly provided in order to improve indexing policy and procedures, searching techniques, vocabulary, and mode of interaction with the user. This is the *diagnostic* and *therapeutic* aspect of quality control which is essential if the system is to remain responsive to the needs of its user population.

Cost-Effectiveness and Cost-Benefits Evaluation

Earlier, three possible levels of evaluation, *effectiveness*, *cost-effectiveness*, and *cost-benefits*, were mentioned. So far this article has been restricted largely to a discussion of effectiveness. *Cost-effectiveness* refers to the relationship between level of performance (effectiveness) and the costs involved in achieving this level. There may be several alternative methods that could be used to obtain a particular performance level and these can be costed. *Cost-benefits* refers to the relationship between the benefits of a particular product or service and the costs of providing it. Generally speaking, benefits are more difficult to measure than performance (effectiveness) except that, in a commercial sense, benefits equate with return on investment. The expression *cost/performance/benefits* refers to the entire interrelationship between costs, performance (level of effectiveness), and benefits.

The *cost* of an information service can be measured in terms of input of resources (funds). Under costs both the costs that are relatively fixed (e.g., equipment purchase or rental, developmental costs, costs involved in acquisition and indexing of the present data base) and the costs that are relatively variable need to be considered. Variable costs are of two kinds:

1. The variable cost that is a function of the number of transactions. For example, if the number of retrospective searches conducted is increased from 1,000 per year to 1,500 per year, the cost *per search* may be reduced by x dollars.
2. The variable cost that is a function of alternative modes of operating the system. For example, the cost of retrospective searching can be varied by varying the mode of interaction with the user (personal visit, mail, telephone), by varying the mode of interaction with the data base (e.g., from off-line batch processing to on-line interactive search), by adding or eliminating a screening operation, or by changing the professional level of personnel conducting the searches.

A cost-effectiveness analysis seeks to increase the value received (effectiveness) for the resources expended (cost). The cost-effectiveness of an information system can be improved by either:

1. Maintaining the present performance level (say in terms of recall, precision, and response time) while reducing the costs of operating the system.
2. Holding operating costs constant while raising the average performance level.

Through the diagnostic procedures described earlier in this article, major system weaknesses can be identified and appropriate corrective action can be taken. If these

weaknesses can be corrected without additional cost to the system, the cost-effectiveness of the services provided is improved. In cost-effectiveness analysis, possible alternative methods of operating the system (or a subsystem thereof), costs of these alternatives, and criteria for ranking the alternatives in order of desirability are determined and the most promising operating mode is selected. The criteria provide a method of weighing estimated costs against estimated effectiveness. A useful measure of cost-effectiveness is the unit-cost per relevant item retrieved. This unit cost can be used to compare the efficiency of various alternative methods of searching a data base. Procedure A is more cost-effective than Procedure B if the cost of retrieving each relevant citation in A is less than the cost of retrieving each relevant citation in B.

As previously mentioned, system *benefits* are usually difficult to express and to measure. Possible criteria for measuring the *benefits* of an information system include:

1. Cost savings in using this system as compared with costs of finding needed information elsewhere.
2. Avoidance of loss of productivity (of, for example, engineers) that would result if information sources were not readily available.
3. Improved decision-making or reduction in the level of personnel required to make decisions.
4. Avoidance of duplication or waste of engineering or research effort on projects that have either been done before or that have been proved infeasible by earlier investigators.
5. Stimulation of invention (a serendipity factor).

For example, an industrial current awareness service might easily justify itself economically by suggesting possible new products, new applications for existing products, possible markets for industrial waste, or less expensive methods of fabrication.

Criteria 1 and 2 have been discussed by Mueller (12) and 3 by McDonough (13). Martyn (14) has presented impressive figures on the cost of unintentional duplication of scientific research in the United Kingdom. Revealing figures are also available on savings of research time resulting from data dissemination through the Information Exchange Groups of the National Institutes of Health (15). Examples of new products, or new applications of existing ones, developed as a result of stimulus from information services, are cited by Arthur D. Little, Inc. in a program evaluation of the State Technical Services (16). Similar examples are documented in the records of the Small Business Administration. Under certain other conditions, further direct benefits of an information system can be measured. For example, presumably a Poison Information Center can be justified in terms of reduced mortality or morbidity resulting from having this service available.

Other Performance Measures

In Figure 2 the familiar 2×2 table plotting user relevance judgment against system relevance prediction was presented. In an evaluation of a particular search, or

group of searches, the appropriate values in such a table are determined. Once these values, or estimates of them, are obtained, the results of a search can be expressed in a number of different ways. One way is to use the twin variable measures of *recall ratio* and *precision ratio*. Most investigators have used these two measures although sometimes with different names. The recall ratio has been variously called *hit rate*, *sensitivity*, and *conditional probability of a hit*, while the precision ratio is sometimes referred to as a *relevance ratio*. Other investigators have used or suggested other parameters to express the results of a search, including *fallout* (number of nonrelevant items retrieved over total number of nonrelevant items in the collection, sometimes referred to as *discard* or the *conditional probability of a false-drop*), *noise factor* (proportion of retrieved documents that are not relevant, the complement of the precision ratio), *conditional probability of a miss* (proportion of relevant documents that are not retrieved, the complement of the recall ratio), and *specificity* (proportion of nonrelevant documents that are not retrieved, also called *conditional probability of a correct rejection*). Another useful parameter is the *generality number*, which expresses the number of documents relevant to a particular request over the total number of documents in the collection. The higher the generality number the greater the density of relevant documents to total collection and, generally speaking, the greater this density the easier the search tends to be.

For most practical purposes the recall ratio and the precision ratio are perfectly adequate parameters for expressing the results of a search. However, the use of these parameters alone does have certain limitations and there are situations in which we might want to use other parameters to supplement or replace these ratios. For example, in evaluating the results of a ranked output Salton (17) has sometimes used the modified variables of *rank recall* and *log precision* or *normalized recall* and *normalized precision*. Another possible measure is the *expected search length* advocated by Cooper (18). The *expected search length* is a measure of the number of irrelevant documents the user would be expected to search, on the average, before finding the number of relevant documents he needs. It is a measure of how well the system divided up the collection into "probably relevant" and "probably not." In the evaluation of on-line systems, also, precision in the conventional sense may be less useful as a performance measure than it is in the evaluation of batch-processing systems. In testing on-line systems the amount of effort expended during the actual conduct of the search is significant. The results of an on-line search may best be expressed in terms of search time required to obtain a particular recall ratio or in terms of the previously mentioned unit cost per relevant citation retrieved.

The various possible parameters for expressing the results of a search have been compared by Cleverdon and Keen (19), by Robertson (20), and by Swets (21). Robertson and Swets both prefer measures taking account of recall and fallout rather than recall and precision. Robertson's principal reason is that recall and fallout are independent of *generality* and are therefore more meaningful if a comparison of systems is wanted; precision, on the other hand, is heavily dependent upon *generality*. This argument is valid in attempting some intersystem comparisons but not very important in evaluating the performance of a single operating system. Swets proposes an "operating characteristics" curve with recall ratio on the ordinate and fallout on

the abscissa. He prefers this combination over the recall-precision combination on the grounds that it displays all quantities of the 2×2 table whereas recall and precision do not. The remaining quantities of the table ("misses" and "correct rejections") are complements of the two used by Swets. Swets claims that by using his "relative operating characteristic," a single number suffices for the index of effectiveness because it is sufficient to generate the entire curve. The single figure of merit will vary from 50 for a curve that follows the positive diagonal, representing equal hit and false drop proportions or no discrimination, to 100 for a curve that follows the extreme left and top coordinates of the graph, representing a hit proportion of 1.0 at a false drop proportion of 0.0, a perfect discrimination.

A plot of one performance measure against another is a *twin variable measure* whereas a single figure of merit, as used by Swets, is a *composite measure*. Other composite measures have been used or suggested by Brookes (22), Rocchio (23), and Goffman and Newill (24).

The History of Evaluation

The literature on evaluation of information systems is voluminous and still growing. The major bibliography, by Henderson (25), incorporating reports up to 1966, contains 324 items. More recent evaluation studies are reviewed regularly in the *Annual Review of Information Science*. While the literature is now extensive, almost all is of recent origin. Of the 324 items in Henderson's bibliography only 36 were published earlier than 1960, the earliest publication being dated 1953. Although the literature of library science is full of system comparisons (e.g., dictionary versus classified catalog, Decimal Classification versus Library of Congress), virtually no objective evaluation of systems was conducted before the 1950s.

Probably the first evaluation study of any note was that conducted by Documentation Inc. in 1953 and reported later by Gull (26). This was a comparison between the Uniterm system and an alphabetical subject catalog prepared by ASTIA (Armed Services Technical Information Agency). The study was based on a corpus of 15,000 documents indexed using both procedures and tested on the basis of ninety-eight requests submitted by ASTIA users. The results were completely inconclusive: retrieved documents were never submitted to the actual requesters for relevance assessment and the evaluation team could not agree in their own judgments of relevance of documents to requests. In 1954, Cleverdon and Thorne (27) conducted a small test of the Uniterm system which, while not particularly conclusive in itself, laid foundations for the very significant Cranfield studies that were to follow. In 1960 Swanson (28) reported a comparison of conventional subject indexing with computer searching of full document texts. The investigation was based on 100 articles in nuclear physics and fifty requests. Also in 1960, Schuller (29), at the Netherlands Ministry of Defense, reported a test in which the efficiency of the Uniterm system was compared with that of UDC. No significant difference was found between the performance of the two systems.

The first really major evaluation study was the well-known Cranfield Project, the initial phase of which (Cranfield I) was begun in 1957 and fully reported in 1962 (30). Cranfield I attempted to compare the performance of four index languages: UDC, alphabetical subject catalog, Uniterms, and a special faceted classification. The study was a large one, involving 18,000 documents and 1,200 search topics. The twin measures of recall ratio and precision ratio (originally called a *relevance ratio*), previously mentioned by Perry and Kent (31), assumed major significance for the first time in the Cranfield experiments. Within the comparison of the four systems, many other performance variables were studied, including type of document, indexing time, qualifications of the indexers, and the number of index terms assigned. The results of Cranfield I indicated surprisingly little difference in the performance of the four systems tested. Human errors in indexing and searching were more serious than errors due to file organization. It was concluded that file organization is relatively unimportant in the performance of information retrieval systems. The specificity of the vocabulary and the exhaustivity of the indexing are much more important factors affecting performance. The results of the Cranfield experiments stimulated much discussion and controversy, including critical reviews by Swanson (32) and Richmond (33).

Cranfield I was an extremely important study on two counts. First, it showed clearly which factors importantly affect the performance of retrieval systems and which do not. Second, it developed for the first time methodologies that could be applied successfully to evaluation of experimental, prototype, and fully operating information systems.

The techniques of system evaluation developed at Cranfield were applied by the research team to evaluate an operating retrieval system at the English Electric Company. Later, more refined techniques were applied to compare the performance of a manual index, based on a faceted classification, with the performance of an early computer-based retrieval system, the Index of Metallurgical Literature developed by Western Reserve University for the American Society for Metals (34). In this study the technique of failure analysis was fully developed for the first time.

Johanningsmeir and Lancaster applied Cranfield-type techniques to the evaluation of a prototype retrieval system, SHARP, at the Bureau of Ships (35). This study cast serious doubts on the cost-effectiveness of role indicators in information retrieval systems. These devices were found to improve precision but generally caused a drastic recall loss and added significantly to system costs. Similar findings were made in evaluations conducted by Sinnett (36) (Air Force Materials Laboratory), by Montague (37) (du Pont), and, much later, by Mullison et al. (38).

The National Science Foundation, which funded the Cranfield studies, supported two investigations of criteria for evaluation of information retrieval systems, one conducted by Bourne et al. (39) and the other by Hertz (40). The final reports of these investigations were published in 1961 and 1962, respectively. NSF also, in 1964, sponsored an important conference "to review the work on testing and evaluation of document searching systems and procedures and to consider promising directions for future work in this area." A study by Snyder et al. (41), Human Sciences

Research Inc., also sponsored by NSF, critically reviewed previous experimental designs in evaluation studies and made recommendations as to how these designs could be improved in the future.

The second stage of the Cranfield studies began in 1963 and was fully reported in 1966 (9,19). The major objective of Cranfield II was to investigate the components of index languages and the effects of these various components on the performance of retrieval systems. In Cranfield II these various index language devices were each evaluated in terms of their effect on the recall and precision of a retrieval system. Altogether twenty-nine index languages (consisting of various combinations of the several devices) were evaluated, using a test collection of 1,400 documents (mainly in the field of aerodynamics) and 221 test searches. The results of Cranfield II were rather unexpected because, taking both recall and precision into account, the index languages performing best were those which used uncontrolled single words (i.e., natural-language systems, such as Uniterms, based on words occurring in document texts).

Extensive investigations of mechanized and semimechanized systems have been conducted by Westat Research Inc. for the U.S. Patent Office, one of the most interesting being a study of an indexing system at the file development stage, reported by King and McDonnell (42) in 1965. Salton (17) has fully evaluated the various searching options offered by SMART, a system based on the processing of abstracts in natural language form. A limited comparison of SMART with MEDLARS has also been conducted (43). At the Cambridge Language Research Unit, Sparck-Jones and Jackson (44) have conducted evaluations of the retrieval performance of a system based on term classes ("clumps") automatically generated on the basis of statistical associations between terms. Other studies of systems based on statistical term associations have been reported by Giuliano and Jones (45) and by Vaswani and Cameron (46).

The Comparative Systems Laboratory at Case Western Reserve University, established in 1963, has conducted a series of experiments on various indexing procedures, vocabularies, and searching strategies. The final report of these studies appeared in 1968 (47).

The Central Information Reference and Control (CIRC) system operated by the Foreign Technology Division, Wright-Patterson Air Force Base, was evaluated by Taulbee et al. and reported in 1967 (48). By far the largest evaluation of an operating system was that performed by Lancaster on MEDLARS in the period 1966-1968 (6). The study involved the derivation of performance figures and conduct of detailed failure analyses for a sample of 300 real searches conducted in 1966-1967.

The studies mentioned are a selection of evaluations of retrospective search systems conducted in the period 1953-1970. The survey is not complete but the major investigations at least have been highlighted. Some evaluation work, using similar procedures, has also been conducted on systems for the selective dissemination of information (SDI). Some interesting evaluations of SDI systems have taken place in England, conducted by Aitchison at the Institution of Electrical Engineers and by Kent at the United Kingdom Chemical Information Service.

In the evaluation of an information system we must obtain relevance assessments on various documents in relation to various information demands of users. This fact has caused considerable discussion and controversy on the meaning of "relevance," who should judge relevance, and the factors affecting relevance judgments. Cuadra and Katter (49) studied a relevance judgment as a preferential discriminatory response and attempted to identify factors that introduce significant variations in this discriminatory response. The variables studied were: people (judges), documents, request statements, judgment conditions, form of system response, and judgmental attitudes (toward intended use of documents). The investigators concluded that relevance scores assigned by judges to documents can be manipulated by giving different instructions to the judges. For example, it is possible to raise or lower scores by telling judges *how* documents are to be used. Relevance scores are artifacts of particular environments and should not be viewed as absolute numbers. While this does not invalidate studies in which a given group of judges makes relevance decisions for a specific system, it does cast doubt on the validity of comparative evaluations of systems or subsystems in which the attitudes of the judges are not carefully controlled.

Rees and Schultz (50) conducted a somewhat similar study in which, in a particular research environment, four independent variables affecting relevance decisions were investigated: the judgmental groups, the stages of a research project, the documents themselves, and representations of them. Perhaps the most interesting finding of this study was that, while the judgmental groups (medical experts, medical scientists, medical students, medical librarians) differed greatly in the absolute relevance values assigned to documents (on an eleven-point scale), there was a high correlation between the groups as to the *relative* positioning (i.e., ranking) of the documents. A similar finding was made by Lesk and Salton (51). In their study, conducted within the environment of Salton's SMART system, four sets of judgments were compared. A series of forty-eight requests was searched against a file of 1,268 abstracts, in documentation and library science, using the various search options that the SMART system allows. Although the over-all consistency of relevance agreement between the groups was not particularly high, the *relative* performance of the various retrieval methods was unaffected by changes in the relevance decisions; that is, all four sets of decisions caused the same ranking of alternative search procedures.

The application of evaluation procedures to printed indexes and abstracts journals has been much neglected. Only the aspects of coverage and overlap (duplication) have received general attention. Recent studies of the *Bibliography of Agriculture*, undertaken by Bourne (52,53), are good examples of this type of investigation. Martyn and Slater (54) have conducted one of the very few studies of printed indexes that go beyond the factor of coverage to consider the "findability" (recall) of citations. In 1969-1970 there was evidence of renewed interest in evaluation of printed indexes, with relevant contributions being made by Davison and Matthews (55), Jahoda and Stursa (56), Virgo (57), and Carroll (58).

The widespread interest in evaluation of information retrieval systems, particularly mechanized systems, appears to have stimulated a concern for the evaluation of library services in general, another area sadly neglected before the 1960s. There is

now increasing evidence of the application to library service of evaluation techniques and qualitative procedures derived primarily from the fields of operations research and industrial engineering. Morse (59), in a book published in 1969, describes the application of operations research techniques to the quantitative evaluation of the effectiveness of library functions, including such problems as estimation of circulation demand, book retirement, and book duplication policies. The final report of a study on the evaluation of the operations of Army Technical Libraries was published by Wessel and Moore, also in 1969 (60). The study concentrates particularly on the application of management techniques, correlation analysis, and utility analysis to library problems. Another major study on the objective testing and measurement of library service was conducted by Orr et al. (61) and fully reported in 1968. The Orr methodologic tools have been applied to the evaluation of the document delivery capabilities of libraries, interlibrary loan service, and basic reference service, and to the preparation of inventories of library service.

Conclusion

Various evaluations so far conducted have demonstrated:

1. That thorough evaluation and analytical techniques contribute more than any other procedures to knowledge of the factors that importantly affect the performance of information retrieval systems. MEDLARS, for example, has been studied in depth, but many of the findings are relevant to the performance of information retrieval systems in general.
2. That evaluation techniques have matured beyond the laboratory environment and can now be applied practically to performance evaluation of experimental, prototype, and fully operational systems. Even extremely large systems can be evaluated effectively by relatively straightforward pragmatic methods and, in fact, it is now possible to move in the direction of continuous quality control procedures for information systems.
3. That evaluations of operating systems are essentially diagnostic studies that locate system weaknesses and permit corrective action to upgrade system performance. On the basis of a thorough evaluation program, changes that will improve effectiveness or cost-effectiveness of the system studied can be expected.

The importance of performance evaluation applied to information retrieval systems is becoming widely recognized. Nevertheless, although a large body of evaluation literature exists, much of it is theoretical, speculative, or philosophical in nature. Only a very small number of evaluations of actual operating systems have been conducted so far. Of the large national information systems only MEDLARS has exposed itself to a rigorous evaluation program. Fortunately, the situation may be changing. In particular, it appears likely that funding agencies will become more insistent that evaluation techniques be applied to information programs to measure their performance, from the viewpoints of both effectiveness and cost-effectiveness, as a means of justifying continued expenditures of substantial funds. The need for evaluation and testing received its strongest endorsement in the important SATCOM report (62) of 1969, which makes the following firm recommendation:

All agencies which either operate or sponsor the operation of major scientific and technical information programs should take steps to incorporate into their services on a continuous and systematic basis some appropriate method of performance evaluation. Provision should be made for using such evaluation measurements as a basis for modification and improvement of the services.

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EWART, WILLIAM

William Ewart (1798–1869), parliamentary pioneer of British municipal libraries, was born in Liverpool on May 1, 1798. He was a son of William Ewart (1763–1823), a wealthy self-made American, East Indian, and general commission merchant, of Scottish extraction, whose friendship with another local merchant, John Gladstone, caused the latter to name one of his own sons after him. The younger Ewart was educated at Eton and Christ Church, Oxford, and read for the Bar after spending two years on “grand tour” in France, Italy, Austria, and Germany. He entered Parliament as one of the members for the “rotten borough” of Bletchingley and, thanks to his share of the family fortune, was able to make his membership of the House of Commons (still an entirely unpaid vocation) his life’s work. He subsequently represented Liverpool from 1830 to 1837, Wigan from 1839 to 1841, and Dumfries, in his family’s native Scotland, from 1841 until his retirement from the House of Commons in 1868.

Ewart was a Parliamentary Radical and never held government office. But the private member in the early nineteenth century House of Commons had much more opportunity to make and change laws than is the case today, and his record was impressive. He was a life-long opponent of capital punishment and, although unable to secure its complete abolition, his Acts of 1832 and 1835 substantially reduced its applicability to offences against property. His Act of 1834 ended the use of the gibbet and that of 1836 authorized for the first time full legal representation for those accused of felonies. Ewart was also largely responsible at the end of his career for the appointment of the 1864–1867 Royal Commission on capital punishment.

Ewart was a fairly orthodox free-trader and pacifist of the Manchester School, concentrating, however, much more on the sugar duties than on the Corn Laws. It is also interesting to remember, in view of the recent British decision to adopt the metric system, that it was Ewart’s Act of 1864 which first legalized its use. But it was his work as an educational reformer which makes him of special interest to librarians. His radical zeal for the ending of monopolies made him a stern critic of the Royal Academy; this interest led him on to the improvement of art and technical education and to the public provision of schools and museums. By the middle 1840s he had thought out a full program of educational reform which he pressed on mostly unreceptive Whig and Tory governments. It was clear enough to Ewart, although not to many much later politicians, that a better educated people would need public libraries; by 1845 his mind was moving toward them. Government and Opposition leaders were apathetic or hostile and Ewart decided to begin with a Select Committee, a method of initiating reform which had proved remarkably successful during the preceding 20 years. He got his committee and, leaning heavily on his chief witness and library adviser, Edward Edwards (q.v.), secured the first English Public Libraries Act in 1850.

The Libraries Act of 1850, modest though it seems by modern standards, had the overwhelming advantage that it gave town councils powers to establish and maintain

libraries open to the public. Granted those powers were severely restricted; the rate (local tax) maximum was absurdly low; rate-income could not be spent on books (gifts were to be relied on instead); and the powers themselves could only be assumed after local referenda. But buildings could be acquired or erected and staff salaries could be paid. Ewart's amending Act of 1855 authorized the purchase of books and other library materials and raised the rate limit to one penny in the pound, a level at which it remained, save for a few local exceptions, until 1919. By 1855 Ewart had in fact provided the essential basis on which later generations of local authorities, local and national benefactors, and librarians and their staffs could build. And build they did, although very slowly, and mostly in the industrial midlands and north until the flood of Carnegie grants at the end of the nineteenth century encouraged truly national development. Ewart's third Public Libraries Act of 1866 was much less important. It certainly facilitated and simplified the local adoption of the earlier Acts but otherwise it has to be regarded as a mixed blessing since, while authorizing limited cooperation between neighboring authorities, it also enabled small parishes to begin their own services, irrespective of their financial ability to support them adequately.

In 1829 Ewart married his cousin, Mary Anne Lee, the well-to-do daughter of George Augustus Lee, Manchester cotton-spinner and brother of the remarkable sisters who were once as well known as successful schoolmistresses as successful authors. Mrs. Ewart died in 1837, leaving her husband five young children. Two died in 1842; to the remaining three Ewart was for his lifetime the best of Victorian fathers. He seems indeed to have enjoyed little social life outside his own family, but occasional guests such as William Barnes and Mrs. Gaskell came to stay at his country house near Devizes in Wiltshire. Ewart died there in January 1869, and is buried in the neighboring churchyard of Bishop's Cannings.

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EXCERPTA MEDICA

Much water has gone over the dam since the days in 1945 when three Dutch physicians, held as hostages in the same internment camp, first discussed the possibility of organizing a comprehensive medical information service which would screen, evaluate, classify, index, abstract into English, and disseminate the world's biomedical literature. The need was obvious, since except for the German *Zentralblätter* series, the Russian-language *Referativnye Zhurnaly*, and a few specialized services sponsored by various governments and scientific societies, the harassed physician

and biomedical researcher had nowhere to turn for guidance in digesting the rising stream of medical information. On the other hand, the magnitude of this task, performed without government funds in a small European country where English is not the mother tongue, was such as to stagger the imagination.

Be that as it may, Excerpta Medica was created after the war and began in 1947–1948 with the publication of a series of 15 monthly abstracting journals, relying largely on volunteer abstractors, each with its own part-time editorial staff. This series was designed to cover both the basic biomedical sciences (anatomy, biochemistry, embryology, microbiology, pharmacology, physiology, etc.) and the most important clinical specialties, thus providing a source of ready information on all basic research and clinical findings reported in any language, anywhere in the world.

During the next decade Excerpta Medica led an often hand-to-mouth existence from its two rooms above a shoe store in central Amsterdam. Using old-fashioned techniques and a limited staff, whose salaries sometimes had to be paid by the editors, the foundation nevertheless succeeded in producing monthly abstract bulletins which came to be highly regarded by medical specialists around the world. It even began a slow process of expansion, adding special sections on cancer, public health, and cardiovascular diseases in 1953, 1955, and 1957, respectively, and jumping to 20 sections in 1958. This was still, however, a collection of autonomous abstract bulletins rather than a biomedical information system in the true sense.

With the advent of Sputnik and the increased interest in non-English scientific literature in the Western world, the financial problems of the foundation were eased somewhat by grants from the United States government for the abstracting of Soviet and Japanese publications. This was followed during 1961–1964 by grants from the U.S. Public Health Service and then from Euratom for the publication of three additional sections. It was not until the Weinberg Report and the thalidomide tragedy, however, that it became clear that a loosely connected series of manually published and often superficially indexed abstract bulletins would not suffice in the modern world. The answer obviously lay in automation, and it is to the computer engineers that the directors of Excerpta Medica turned in 1965–1966 with the goal of providing rapid access to the world's burgeoning biomedical literature on the basis of an integrated, uniformly indexed and classified, electronic data bank from which the monthly abstract bulletins could be obtained as a by-product. The following pages will be devoted to the results of this pioneering effort in the design of a biomedical information storage, retrieval, and publication system.

Organization and Structure

During the past 5 years, Excerpta Medica has grown to an organization occupying some eight buildings in downtown Amsterdam, a computer center in the suburbs, and sales and public relation offices in the major capitals of the world. The number of regular monthly abstract bulletins has grown to thirty-nine, publishing material gleaned from more than 3,400 regularly screened biomedical periodicals with the is-

TABLE I
Size and Scope of Excerpta Medica

Excerpta Medica Staff	
Professional staff members in all biomedical fields	80
Additional editorial staff	200
Biomedical specialists serving on editorial boards	700
Biomedical specialist abstractors	4,000
Production specialists, administrative personnel, system analysts, computer programmers, computer technicians	200
Information stored, retrieved, and published	
Biomedical journals screened	3,400
Journal issues screened annually	20,000
Citations of articles stored and retrieved annually	250,000
Original abstracts prepared and stored annually	100,000
Abstracts published annually	160,000
Pages microfilmed annually	2,000,000
Pages in microfilm archives (since 1960)	20,000,000
Number of monthly abstract journals published	39
Categories in classification system	3,500
Preferred terms in the Master List of Medical Indexing Terms	125,000

sistance of some 500 full-time and several thousand part-time staff members and volunteers. Some data on the present size of Excerpta Medica and the scope of its activities are shown in Table 1.

This expansion in the operations of the Excerpta Medica Foundation has had an inevitable effect on the legal structure of the firm and its daughter organizations. Now the foundation is the scientific center while the publishing activities are integrated in Elsevier's Associated Scientific Publishers. The implementation of its research program and the coordination of its international operations are under the general management of a Board of Directors, one of whom, a neurosurgeon who has gradually come to devote full time to the activities of Excerpta, has the title of General Director and provides the day-to-day guidance for the editorial and publishing activities of the Excerpta Medica group of companies. Responsibility for the over-all scientific policy of Excerpta Medica rests with a Board of Chief Editors containing leading representatives of the international medical community from several countries; the three Dutch representatives on this board work closely with the General Director and the two full-time Executive Chief Editors to direct the work of the various editorial departments.

The scientific policy of each abstracting journal is subject to the guidance of an International Editorial Board composed of the world's leading authorities in the particular specialty. These boards also call the attention of the managing editors to new primary publications in their country, advise on linguistic and terminological problems, and assist in the recruitment of medical specialists for the volunteer abstracting staff. These international editorial boards enjoy the participation of over 700 physicians and scientists. Each abstracting journal also has one or more managing and in-

dex editors, clinicians and researchers resident in the Amsterdam area, who are responsible for the selection and processing of the literature in their medical specialty. The scientific editors are assisted by a full-time staff of copy and technical editors, medical translators and linguistic supervisors, proofreaders, production specialists, system analysts, computer programmers and technicians, keypunch operators, and administrative personnel, as well as by the far-flung international group of volunteer abstractors.

For legal reasons the foundation places the product of its intellectual labor at the disposal of its affiliated publishing company, *Medische Referaten N.V.* (Dutch for Medical Abstracts), which has recently joined the combine *Associated Scientific Publishers*, a subsidiary of the *Elsevier Publishing Company*. The daughter organizations such as *Infonet*, *Eltrac*, *Dynaflow*, *Digityp*, and *Rescona Engineering*, which arose out of *Excerpta Medica's* needs for automation, systems development, and the design of new electronic equipment and which gradually acquired an independent life of their own, with their own clients and research programs, are actually a joint venture with another combine of Dutch publishing companies called *VNU*.

Products and Activities

Some of the activities carried on by the many subdivisions of the *Excerpta Medica* Foundation are listed for reference in Table 2.

There are currently thirty-nine titles in *Excerpta Medica's* regular series of monthly, English-language, computer-produced abstract bulletins (see Table 3), each covering a particular biomedical specialty. The abstracts in each issue are arranged according to a detailed decimal classification system and each issue has both author and subject indexes, cumulated annually. The information for these monthly bulle-

TABLE 2
Activities of *Excerpta Medica*

Medical information services
39 monthly abstract bulletins
20 S.D.I. bulletins
Drug Literature Index and Adverse Reactions Titles
Retrospective annotated bibliographies
Computer searches and S.D.I. services
Book publishing division
Congress proceedings
Symposia
Monographs
Reference works
Translation bureau
Congress organizing division
Audiovisual group
Audiomedicus cassettes

TABLE 3
Abstract Journals Published Monthly by Excerpta Medica

Anatomy, Anthropology, Embryology and Histology
Anesthesiology
Arthritis and Rheumatism
Microbiology: Bacteriology, Mycology and Parasitology
Biochemistry
Biophysics, Bio-engineering and Medical Instrumentation
Cancer
Cardiovascular Diseases and Cardiovascular Surgery
Chest Diseases, Thoracic Surgery and Tuberculosis
Dermatology and Venereology
Developmental Biology and Teratology
Endocrinology
Environmental Health
Gastroenterology
Gerontology and Geriatrics
Health Economics
Hematology
Human Genetics
Immunology, Serology and Transplantation
Internal Medicine
Neurology and Neurosurgery
Nuclear Medicine
Obstetrics and Gynecology
Occupational Health and Industrial Medicine
Ophthalmology
Orthopedic Surgery
Otorhinolaryngology
General Pathology and Pathological Anatomy
Pediatrics
Pharmacology and Toxicology
Physiology
Plastic Surgery
Psychiatry
Public Health, Social Medicine and Hygiene
Radiology
Rehabilitation and Physical Medicine
Surgery
Urology and Nephrology
Virology

tins is obtained by screening over 3,400 biomedical periodicals, yielding approximately 100 issues per working day or 250,000 articles per year for the foundation's data bank. Each of these abstract journals includes not only material from periodicals devoted to the pertinent specialty, but also relevant information from general medical journals, books, and publications dealing with other biomedical and related disciplines.

Only practicing specialists in the respective fields are engaged in each step required to prepare, edit, supervise, classify, and index the scientific content of each

abstracting journal. In view of the ever-increasing specialization and the rapidly expanding scope of the various biomedical specialties, it seems clear that reports prepared by specialists should be evaluated, abstracted, and indexed by specialists with similar professional qualifications if the scientific significance of the original material is not to be distorted or lost.

Taken together, these thirty-nine abstract bulletins or "sections" provide more or less complete coverage of what Excerpta Medica has defined as the biomedical area, i.e., human medicine and related disciplines and those aspects of the basic biological sciences with some relevance to human medicine. This generally excludes veterinary medicine, although many veterinary journals are screened for articles on comparative pathology and epidemiology, and although a section on *Experimental Animals* is in the planning stage. It also excludes nursing, dentistry to the extent that this refers to the filling of carious teeth and fitting of prostheses, psychology, and such paramedical professions as podiatry, optometry, and chiropractic.

There are also two sections which go considerably beyond the scope of coverage as defined above, namely, *Health Economics* and *Environmental Health*, both published with the financial support of the Netherlands government. Whereas the first of these delves into the financial aspects of health care, public health policies, and hospital management, the second covers all aspects (biological, chemical, economic, legal, medical, sociological, and technological) of air, water, and soil pollution, noise hindrance, and radioactivity. Some fifty hospital management and financial journals have been added to the biomedical collection to provide additional material for *Health Economics*, while *Environmental Health* is based on the cooperative screening of Excerpta Medica, the Royal Netherlands Academy of Sciences, the Agricultural Institute PUDOC at Wageningen, and the University of Technology at Delft; this cooperative effort provides coverage of health-related material in some 20,000 periodicals.

In addition to the computer-produced abstract journals of the regular series, Excerpta Medica produces some twenty "special services" or abstract bulletins and bibliographies designed to cover only the very best literature in more highly specialized subject areas such as atherosclerosis, audiology, edema, fertility control, gram-negative infections, hemodialysis, migraine, muscular dystrophy, obesity, and vaginopathy. These sponsored services appear 2-6 times a year and contain only abstracts of special interest to the professional field covered. Sponsoring agencies are usually pharmaceutical companies, scientific societies, or government institutions; some are published in several languages simultaneously. Utilizing the searching capabilities of the computerized data bank, this department also produces retrospective bibliographies and annual collections of abstracts on topics such as the scintillation camera.

Drug Literature Service

One of the most valuable and comprehensive sections of Excerpta Medica's computerized data bank is the drug literature service or Drugdoc, a service designed to

include all significant information on the biological effects of chemical compounds, particularly drugs and potential drugs. The input into this service is derived from the screening of not only the 3,400 biomedical journals regularly screened for Excerpta Medica, but also some 200 specially selected chemical and pharmaceutical journals. It includes original articles, preliminary notes, short communications, reviews, editorials, letters to the editor, and even abstracts of published papers presented at congresses which describe the effects of drugs, related compounds, and naturally occurring exogenously administered substances on biological substrates (human or animal tissues or organ systems, bacteria, tissue cultures, cells, etc.). The input also includes articles describing the chemical synthesis, structural analysis, or assay of compounds either known to have biological activity or suspected of having such activity on the basis of their chemical structure. Some of the specific types of substances included are therapeutic agents of all types except radiation, vitamins, hormones, or enzymes if used for therapeutic or experimental purposes, blood or plasma substitutes, antisera, toxoids and vaccines, contrast media and other diagnostic agents, allergens and antigens, disinfectants, pesticides, carcinogens, pharmaceutical vehicles, and prosthetic materials.

This service is specially characterized by its magnitude (about 50,000 articles per year or 20% of the entire data bank), the speed with which the information is processed for computer input (classifications and index entries on the tapes within 8 weeks after receipt of the original article), and the depth of indexing from three different points of view: pharmacological, medical, and chemical. Retrieval of this information is on the basis of a classification system with 190 subcategories, indexes containing generic, chemical, and trade names as well as manufacturers' names and code designations, medical indexing terms (indications, contraindications, and adverse reactions), authors, journal title or Coden, year of publication, language, country of origin, the chemical structure (Wiswesser Line Notation), and item-index numbers describing the nature of the article, routes of administration, geographic concepts, and the names of the experimental animals.

Although Drugdoc is primarily intended as a computer tape service, a somewhat simplified version containing all the citations and permitting retrieval via the drug classification, generic name, author's index, and a monthly list of "new drugs" is available in printed form under the title *Drug Literature Index*. This index appeared monthly during 1971 and cumulative indexes have been published for 1969 and 1970, each containing some 30,000 items.

A special by-product of Drugdoc is the monthly publication *Adverse Reactions Titles*, an indexed bibliography of articles dealing with drug side-effects. This is one of the few Excerpta Medica publications which does not contain abstracts, although many of the articles listed are abstracted later for other sections. Retrieval is via the authors' names, a pharmacological classification system, and the type of rotated index of medical and chemical terms also found in the other Excerpta Medica journals.

Book Division

More than 15 years ago, Excerpta Medica began to broaden its information activities by reporting, in the form of both abstracts and complete transcripts, the presentations made at major international medical congresses and symposia. Papers presented at more than 200 congresses and symposia held in countries throughout the world, including some organized by Excerpta Medica, have now appeared in the International Congress Series. A total of twenty-three such volumes was published in 1970.

In addition to the publication of congress volumes, Excerpta Medica has extended its activities to the publication of selected monographs, textbooks, and handbooks prepared by internationally recognized authorities. Among the significant contributions in 1971 and 1972 are the *Textbook of Coronary Care*, Volume IV of *Drug Induced Diseases*, the 7th edition of *Side Effects of Drugs*, Volume II of *Essays on Tropical Dermatology*, *Problems in Pediatric Urology*, and the 5th edition of *Pharmacological and Chemical Synonyms*.

Audiovisual and Linguistic Services

The solution of many of the crucial problems in contemporary medicine requires a multidisciplinary orientation and multiprofessional teamwork. New advances in any branch of medicine may unexpectedly offer the clinician the necessary clue to come to grips with the cause, treatment, or prevention of complex syndromes. In an effort to solve this communication problem, Excerpta Medica has developed a broad background of experience in the organization and management of medical symposia and congresses. These meetings are arranged as panel discussions or invited audience participation sessions involving clinicians, medical researchers, and other scientists, and constitute an integral part of Excerpta Medica's biomedical information services.

In order to accelerate the dissemination of significant basic research and clinical findings to physicians everywhere, various media may be utilized, including published proceedings, recordings and tape cassettes, films, and closed-circuit television. Excerpta Medica is experimenting with all of these approaches, and stands ready to arrange and produce informative programs employing any or all of the above media.

The linguistic problems encountered by Excerpta Medica in its efforts to abstract the world's biomedical literature into English are aggravated by two factors: (1) the location of the editorial offices in a small European country where English is not the mother tongue, and (2) the fact that, contrary to popular belief, the use of English in the world scientific community is no longer increasing but reached a peak in 1920, after which its relative importance began to decline due to the increasing use of Spanish, Russian, Japanese, and other languages of the "third world." To help solve this problem, Excerpta Medica established a translation service which originally concentrated on fulfilling internal needs but now also does translations for third parties,

from and into all languages and in all biomedical and related subjects. About 70% of the several million words translated annually are translated into English. A characteristic feature of this service is that all work is finally supervised, both scientifically and linguistically, by someone with a native knowledge of the target language. In the case of the abstracts for Excerpta Medica publications, these supervisors are generally physicians of English or American extraction living in the Amsterdam area.

Computer Tape Services

With the advent of its computerized data bank containing the relevant data from approximately 250,000 articles per year, it became possible for Excerpta Medica to offer retrospective searching and S.D.I. (selective dissemination of information) services and to compile specific bibliographies on demand. An increasing number of institutions are now subscribing to such services and receiving, on a weekly basis, either printed S.D.I.'s and searches or updating tapes for their own computer facilities. These magnetic tapes may contain all of the new information entering the system or only selected portions of it, such as particular sections of interest (Drugdoc, for example, is essentially an S.D.I. service on section 37), classified citations with or without index terms and abstracts, cumulated author or subject indexes, or the input for the future issues of the abstract journals, 2 months in advance of publication. Excerpta Medica's thesaurus and classification system are also available in tape form (Malimet and Emclass).

Although able to provide custom searches on biomedical topics, Excerpta Medica does not envisage a role as a biomedical information center serving the individual physician or research scientist. Rather, it looks upon itself as a producer of biomedical information which is then distributed on a wholesale basis to information centers in other countries. Such franchise arrangements have now been entered into with representatives in the United States, England, Germany, Belgium, Switzerland, and Japan. In the United States, for example, magnetic tape and retrieval services based on the Excerpta Medica data bank are provided by the 3i Company, Information Interscience Inc., 2101 Walnut Street, Philadelphia, Pennsylvania 19103. The systems engineers and programmers of this company have developed an efficient set of programs for the processing of information received from Excerpta Medica on IBM equipment.

Other Automation Services

As shown in Table 4, the daughter organizations which arose gradually out of Excerpta Medica's need for systems design, programming, and the development of advanced electronic equipment for its own automated storage and retrieval system have an extensive research program which goes far beyond the field of medicine and biology. These subsidiaries, which can be thought of in general as the Infonet Group,

TABLE 4
Excerpta Medica Daughter Organizations

Infonet Systems Division
Literature documentation systems
Hospital systems
Library systems
Newspaper and typesetting systems
Administrative and Educational systems
Thesaurus development
Terminal systems
Computer network software
Infonet Electronics
Automated system components
Off-line and on-line stations
Interfaces and coupling hardware
Cybernetic research
Eltrac Data Processing Division
On-line computer facilities
Information systems operation
Dynaflow Applied Mechanics Division
Heat transfer software
Fluid dynamics
Digityp
Automated graphic systems
Electronic typesetting

carry the responsibility for maintaining the Excerpta Medica computer center and for the continuous improvement and updating of the Excerpta Medica information storage and retrieval system. Subscribers to Excerpta Medica's tape services can also take advantage of the talents of the Infonet Group for help in programming the storage and retrieval of the information received from Excerpta Medica in the system of the subscriber.

Excerpta Medica's Automated System

The computerized system for the storage and retrieval of biomedical information which Excerpta Medica, together with the engineers of the Infonet Group, has developed and put into operation during the past 5 years has two principal (and to some extent contradictory) goals:

1. Computer processing and publication of approximately 150,000 abstracts in thirty-nine monthly journals, arranged on the basis of a classification system with approximately 3,500 polyhierarchically linked categories, with computer-processed author and subject indexes which are cumulated annually.
2. Computer storage and retrieval, with random access capability, of approximately 250,000 citations, 100,000 abstracts, and the relevant classification numbers, primary and secondary subject index terms, item index numbers, and language and country codes, both retrospectively and as S.D.I. profiles.

The hardware and software required for the realization of these goals are described in detail on the following pages.

In determining the most suitable computer system for Excerpta Medica's operation, primary consideration was given to the external memory capacities and auxiliary storage devices of all existing computer systems and types—magnetic tape, disk, CRAM card, data cell, etc.—with a view to establishing a system with a "random access" search capability, and with a central processor of reasonable speed. The total Excerpta Medica information input into the system was estimated to be in the region of 200,000,000 characters or "symbols" annually.

To meet these primary objectives, National Cash Register computer systems were selected. Excerpta Medica's system comprises the following components:

Central processor	NCR 315-501 Rod Memory Computer
On-line memory	20k NCR 316/504
Batch memory	20k NCR 316/505
Magnetic tape unit	33kc
With controller	NCR 334/131
Magnetic tape unit	3 × NCR 344/132
CRAM units	4 × CRAM 5, NCR 353/5
Switching computer	NCR 321/3
Adapter cages	2

Since the input and output connections between the central processor and the external memory are realized in hardware, the actual memory capacity of the configuration is 40k.

The NCR 315-501 Rod Memory Computer is capable of performing random, sequential, real-time, and remote inquiry processing. It also provides for the remote linking of teletype or other terminals for on-line processing and remote inquiry. The computer has a basic cycle time of 800 nanoseconds; 32 index-registers; 32 jump-registers; 40,000, 120,000, or 160,000 characters of cylindrical thin-film memory; a magnetic tape speed of 33 KC; and a printing speed of 1000 lines/minute. The processor also has built-in floating point hardware and facilities for special real-time instructions; magnetic tape controllers provide complete read/write/compute simultaneity. The system will handle most machine- or problem-oriented programming languages in use today.

Up to eight magnetic tape units may be used on-line without a controller and up to sixteen with a controller. The unit provides for a tape transport speed of 120 inches/second, 200 or 556 bits/inch, and a transfer rate of 24,000 or 66,666 characters/second.

The paper-tape input unit reads 600 characters per second in any code on 5, 7, or 8 channel tape. Input may also be accomplished via the Micro-Image Card Reader, up to four of which, sorting under processor control or independently off-line, may be multiplexed. Finally, an almost unlimited number of remote inquiry and other on-line devices can provide input to the system via up to 100 terminals which communicate directly with the processor memory under the control of the switching computer.

The NCR 353-5 Card Random Access Memory (CRAM) file provides high-speed random or sequential processing of the data. Data recording is done on 3.65 x 14-inch Mylar magnetic cards, each containing 144 recording tracks with a recording density of 936 bits/inch and a resultant capacity of 1500 6-bit alpha-numeric characters. The removable cartridge or CRAM-deck houses 384 cards, providing a total storage capacity of 82,944,000 6-bit alpha-numeric characters or 124,416,000 4-bit digits. Approximately two such decks are required to store each year of Excerpta Medica.

Any card from a cartridge can be dropped to read/write position within 125 milliseconds, providing throughput of 5 cards/second. Data is transferred to the processor at the rate of 50,800 alpha-numeric characters/second. A cartridge can be removed for off-line storage and replaced by another in less than a minute. Since up to sixteen CRAM handlers may be connected to the processor, the system has an on-line file capacity of over 1,327,104,000 characters.

The software components of the Excerpta Medica computer system include the following:

1. A systems supervisor which controls the legitimacy of newly input classification numbers, indexing entries, language and country codes, and various elements of the citation. This system also checks on the presence or absence of certain types of information and the length of elements such as the journal abbreviation and the Coden code; its most important component, responsible for controlling the indexing input, is based on the thesaurus of biomedical indexing terms (MALIMET) and includes a computer program (MALICHECK) which controls the logical consistency of the synonyms and cross references in the thesaurus.
2. Various programs interlinking the hardware components of the configuration, input and output routines, and retrieval operations for either retrospective searching or S.D.I. services.
3. Programs for the on-line use of the data bank, permitting simultaneous processing of information and searching of previously stored information.
4. A publishing subsystem providing for the compilation of the citations and abstracts in the data bank, assignment of abstract and page numbers, make-up of the final pages, and compilation of the author and subject indexes for each monthly journal, resulting in a magnetic tape which can be used to drive the Digiset.

In order to facilitate the retrieval and publication of information from the data bank, all information related to a particular item is stored in the data bank under a sequentially assigned production number in three different levels. The first level, or "quick retrieval file," is a sequential file containing all of the information which can be expressed in coded terms of fixed length, i.e., the year of entry, Coden code, classification and item-index numbers, and the numbers representing the primary indexing terms. A search in this file is rapid even in the absence of an inverted file, but can only yield numerical information plus the address of the complete citation and abstract for this item in the second and third levels, respectively. It should be noted that authors' names, which are not of course fixed-length, are stored in the second

level with the secondary indexing information. Each year's input of information into the Excerpta Medica data bank adds approximately 7, 60, and 140 million alphanumeric characters to the first, second, and third-level files, respectively.

To describe the organization of the data bank in a more pictographic way, each year's input can be thought of as a series of magnetic cards which must be updated whenever a new item is introduced: one magnetic card represents a sequential address file listing the production numbers followed by the "addresses" of the citation, index terms, and abstract for each production number in the other files; another card contains a sequential list of production numbers, each followed by the complete citation; still another file contains random production numbers, each followed by the primary index terms in numerical form, item index numbers, and the address of the secondary indexing information in another random index file; and a final file consists of random production numbers each followed by an abstract.

MALIMET or Master List of Medical Indexing Terms

Most drugs and diseases are described in the literature under several different synonyms. A Russian and a French psychiatrist, for example, could never be sure that, when using the same term, they are designating the same entity. The same would be true of a German and an American dermatologist. Misunderstandings arise not always as a result of any disagreement in principle, but simply for semantic reasons. This situation obviously hampers the effective retrieval of information. It is clear that important observations are lost simply because they are indexed under different synonyms.

Synonyms account for nearly half of the medical terminology in any language. Some of the terms used are obsolete, many are incorrect, and others are little used except in specific geographic areas or by particular schools of thought. For instance, *Candida albicans* is discussed in the literature under more than 170 synonyms. Every clinician has been confronted at one time or another with the large number of synonyms for such conditions as the Tooth-Charcot-Marie disease or Adie's syndrome. Somatosensory hallucinatory epilepsy may also be called sensory aura, somatosensory aura, psychosensory aura, or psychosensory epilepsy. Ideally, information services should list all articles on these topics under the single heading "somatosensory hallucinatory epilepsy" which is the most correct and commonly used term. Yet, when even groups of specialists find it difficult or impossible to compile comprehensive lists of synonyms, it is unrealistic to expect abstractors and indexers to make such decisions.

Apart from synonyms there are, of course, the problems created by the different ways in which a combination of the same words may be used for indexing purposes. The problem arises when an adjective is part of a current medical concept. For example, "brain abscess" is frequently indexed under "abscess, brain." The complications are increased with more complex word forms such as "cervical disk hernia" or "cervical slipped disk." When it is realized that "cervical" refers to a region of the

spinal column and that "disk" may also be written "disc." it is obvious that a very large number of alternative indexing terms results, all with the same meaning. If the lack of standard terminology in any one language causes difficulty, it is an even greater problem to equate synonyms in two or more languages. Little if any attention has been given to this problem. To illustrate its magnitude, consider the disorder "myelofibrosis," which has been given at least twelve different names in English, at least thirteen in German, and at least thirty-one in French. A translator faced with a German article entitled "Generalisierte aleukämische Myelose" might well index it under "generalized aleukemic myelosis," not knowing the correct translation to be "myelofibrosis." Another translator might believe the French term "panmyelose hyperplastique chronique" to be translatable into "chronic hyperplastic panmyelosis." In both examples, new English synonyms for myelofibrosis would have been created. Once such neologisms are introduced, they become more and more frequently used. In this way, the number of confusing synonyms is being continually multiplied, making effective information retrieval even more difficult.

The most direct approach to the solution of this problem is the compilation of a thesaurus of preferred medical terms which automatically excludes synonyms and undesirable word forms. To make automated storage and retrieval possible, Excerpta Medica has compiled such a thesaurus (MALIMET) which automatically translates synonymous index entries into a standardized list of preferred terms while rejecting misspellings and possibly misleading concepts such as "ventricle" (which may refer either to the brain or to the heart). The effective use of computers in medical documentation is conceivable only on the basis of such an authority file.

As early as 1963 the Board of Chief Editors decided to try to do something about the existing chaos in medical terminology and the resultant inconsistencies in the Excerpta Medica subject indexes. Fortunately, they probably did not realize the magnitude of the task or they might never have begun. Taking the 1962 cumulative annual indexes as the starting point, they began to discuss with the responsible editors the how and why of each entry and each cross reference. This resulted, within a reasonable time, in a number of small thesauri, one for each discipline of medicine. The problems really began when an attempt was made to integrate these various lists into one over-all thesaurus. It soon became apparent that the same term meant different things to different specialists, and that many of their cross references were contradictory.

While these editorial problems were being solved in a series of meetings with the specialist-editors, a new, technical, problem developed. In the initial stages the operation could be controlled by human hand and memory. Very soon punched cards and conventional IBM equipment became necessary; but even so it was not possible to control the rapidly expanding number of terms and cross references. The logical next step was therefore to write a computer program to control the thesaurus input.

The nomenclature resulting from this terminological research project comprised some 25,000 preferred terms and possibly 50,000 synonyms and alternate word forms. With this as a starting point the indexing entries suggested daily by the various index editors began to be checked against this growing authority file. While rec-

ognized synonyms were automatically translated into preferred terms, any term not recognized was printed out on a weekly "error list" which was then referred to a team of medical specialists, qualified and experienced in the current terminologies of all medical disciplines. These specialists processed each "error," either by correcting an actual typographical error or by introducing new synonyms and preferred terms into the thesaurus. In this way the number of preferred terms has grown to approximately 125,000 and the number of synonyms to about twice that. This process is still continuing so that the thesaurus will probably reach a final total of about 500,000 terms; the only type of preferred term still being added in significant numbers, however, are new drug names.

As stored on CRAM cards, MALIMET consists essentially of two files, an input file and an output file. The former is a combined alphabetical listing of preferred terms and synonyms, each preferred term being followed by both the pertinent synonyms and the preferred term number (used to store the information in the computer memory), while the synonyms refer only to the number of the corresponding preferred term. Any recognizable term which is offered to the computer, whether during indexing or searching, is therefore translated into the appropriate preferred term number by this file. The output file, on the other hand, is a numerical file which translates the preferred term numbers into preferred terms in alphabetical form. Since the primary purpose of MALIMET was to control the input for the monthly subject indexes of the Excerpta Medica sections, rather than to provide a theoretical breakdown of the biological and medical sciences, the amount of hierarchical structure in this thesaurus is small. There are, however, a certain number of cross references between related terms and from broader terms to narrower terms (e.g., from "tranquilizer" to the specific tranquilizers), a degree of hierarchical structure which is still in process of amplification.

Classification and Indexing

Classification and indexing may be said to represent the essence of any information storage and retrieval system, being the most important handles by means of which the citations and abstracts may be retrieved. If the indexer and the searcher were always the same person, this would present little difficulty, but the problem is precisely that the minds of the indexer and searcher, even when both are medical specialists, often run in different channels. In order to give the searcher a somewhat better chance, Excerpta Medica has developed a retrieval system which works on three different levels: the subject index, the classification system, and the item index. Whereas the classification system and item index are a priori, fixed or semi-fixed systems into which the articles must be fitted, the subject index, which provides the most specific retrieval capability, is a free, a posteriori system which operates by means of two sublevels: the primary terms and the secondary terms. All indexing at Excerpta Medica is done by medical specialists, the goal being to provide access on either a broad or a highly specific basis according to the needs of the user.

PHYSIOLOGY

-
1. GENERAL ASPECTS
 - 1.1. History
 - 1.2. Techniques and apparatus
 - 1.3. Biomathematics and Biophysics
 2. CELL PHYSIOLOGY
 - 2.1. Membrane
 - 2.1.1. Permeability
 - 2.1.2. Electric phenomena
 - 2.2. Organelles
 3. SMOOTH MUSCLE
 4. DIGESTION
 - 4.1. Mouth
 - 4.1.1. Mastication
 - 4.1.2. Salivation
 - 4.1.3. Deglutition
 - 4.2. Esophagus
 - 4.3. Stomach
 - 4.3.1. Motility
 - 4.3.2. Secretion
 - 4.3.3. Absorption
 - 4.3.4. Regulation
 - 4.4. Small intestine
 - 4.4.1. Motility
 - 4.4.2. Secretion
 - 4.4.3. Absorption
 - 4.5. Colon
 - 4.5.1. Motility
 - 4.5.2. Absorption
 - 4.6. Defecation
 - 4.7. Pancreas secretion
 - 4.8. Bile secretion and bile tract
 5. LIVER
 6. RESPIRATION
 - 6.1. Function tests
 - 6.2. Mechanics of breathing
 - 6.2.1. Breathing cycle
 - 6.2.2. Lung volume
 - 6.2.3. Lung ventilation
 - 6.3. Gas exchange and transportation
 - 6.3.1. Lung gas diffusion
 - 6.3.2. Gas transport
 - 6.3.3. Tissue gas exchange
 - 6.3.4. Hypoxia
 - 6.3.5. Hypobaric oxygen
 - 6.3.6. Gas determination
 - 6.4. Regulation
 - 6.4.1. Nervous regulation
 - 6.4.2. Chemical regulation
 7. CIRCULATION
 - 7.1. Techniques of investigation
 - 7.2. Circulation tests
 - 7.3. Hemodynamics
 - 7.4. Heart
 - 7.4.1. Muscle
 - 7.4.2. Conducting system
 - 7.4.3. Valves and sounds
 - 7.4.4. Electric activity
 - 7.4.5. Ballistocardiography
 - 7.4.6. Volume and pressure
 - 7.4.7. Output
 - 7.5. Systemic circulation
 - 7.5.1. Arterial system
 - 7.5.2. Capillary system
 - 7.5.3. Venous system
 - 7.5.4. Lymphatic system
 - 7.6. Lung circulation
 - 7.7. Organ circulations
 - 7.7.1. Heart
 - 7.7.2. Kidney
 - 7.7.3. Liver
 - 7.7.4. Digestive tract
 - 7.7.5. Nervous system
 - 7.7.6. Peripheral circulation
 - 7.8. Regulation
 - 7.8.1. Lung circulation
 - 7.8.2. Heart output
 - 7.8.3. Heart rate
 - 7.8.4. Blood pressure
 - 7.8.5. Coronary flow
 - 7.8.6. Brain flow
 - 7.8.7. Renal flow
 - 7.8.8. Peripheral flow
 8. BODY FLUIDS
 - 8.1. Blood plasma and serum
 - 8.1.1. Volume and osmoregulation
 - 8.1.2. Coagulation and fibrinolysis
 - 8.1.3. Formed elements
 - 8.1.4. Hemopoiesis
 - 8.1.5. Blood brain barrier
 - 8.1.6. Blood CSF barrier
 - 8.2. Cerebrospinal fluid
 - 8.3. Lymph
 9. METABOLISM
 - 9.1. Energy metabolism
 - 9.2. Metabolism of organs and cells
 - 9.3. Regulation
 10. THERMOREGULATION
 - 10.1. Chemical regulation
 - 10.2. Physical regulation
 - 10.3. Acclimatization
 - 10.4. Induced hypothermia
 11. EXCRETION
 - 11.1. Kidney function
 - 11.1.1. Function tests
 - 11.1.2. Glomerulus function
 - 11.1.3. Tubulus function
 - 11.1.4. Regulation
 - 11.2. Sweating
 12. URINARY BLADDER AND MICTURITION
 13. NEUROPHYSIOLOGY
 - 13.1. Techniques of investigation
 - 13.2. Neuron
 - 13.2.1. Conduction
 - 13.2.2. Synapse
 - 13.2.3. Electric phenomena
 - 13.3. Reflex systems
 - 13.4. Motor functions
 - 13.5. Central sensory mechanism
 - 13.6. Psychophysiology
 - 13.6.1. Perception
 - 13.6.2. Conditioning and learning
 - 13.6.3. Emotion, motivation and behavior
 - 13.6.4. Consciousness
 - 13.7. Neuroendocrinology
 - 13.8. Neurosecretion
 - 13.9. Autonomic nervous system
 - 13.9.1. Cholinergic system
 - 13.9.2. Adrenergic system
 - 13.10. Electric activity
 14. RECEPTORS
 - 14.1. Visual
 - 14.1.1. Optics
 - 14.1.2. Retina
 - 14.1.3. Motility
 - 14.2. Auditory
 - 14.2.1. Middle ear
 - 14.2.2. Cochlea
 - 14.3. Vestibular
 - 14.4. Gustatory
 - 14.5. Olfactory
 - 14.6. Skin
 - 14.7. Muscle and tendons
 - 14.8. Blood vessels
 15. LOCOMOTOR SYSTEM
 - 15.1. Muscles
 - 15.1.1. Neuromuscular transmission
 - 15.1.2. Contraction
 - 15.1.3. Elastic activity
 - 15.2. Bone, joint and tendons
 16. PHONATION
 17. REPRODUCTION
 - 17.1. Male reproductive system
 - 17.2. Female reproductive system
 - 17.3. Placenta, pregnancy
 - 17.4. Lactation
 18. FETUS AND NEWBORN
 19. SKIN
 20. RETICULOENDOTHELIAL SYSTEM
 21. AVIATION AND SPACE PHYSIOLOGY
 22. ALTITUDE PHYSIOLOGY
 23. WORK AND SPORT
 24. GERONTOLOGY
 25. ENDOCRINOLOGY
 26. INTERACTION OF FUNCTIONS
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FIGURE 1. Example of Excerpta Medica classification system.

The editors of each section of Excerpta Medica have developed a detailed classification system with a possible depth of up to four decimals so that the various subdivisions of all forty-some sections total about 3,500 "pigeonholes" into one or more of which any article can be placed. These various classifications are pragmatic in nature, being designed to divide up the literature into a large number of more or less equal piles rather than to provide a logical breakdown of the field. The system is open-ended so that new subclassifications can be created at any time, and is poly-hierarchical in that the classification of each section is independent of the rest. A max-

imum of ten different classification numbers can be assigned to any article within each section; of these, the first determines where the abstract will appear in the monthly booklet, but all are equally valuable for retrieval purposes. Retrieval by means of classification number is a very powerful tool in all cases in which the search question coincides even partially with a subcategory. An example of such a classification system, this being the one for physiology, is shown in Figure 1. Since physiology is Section 2 in the Excerpta Medica series, it can be said that 2.2, for example, is cellular physiology and that 2.11.1.3 is renal tubular function.

The item index is a list of terms representing preselected concepts of a general nature which are not appropriate for use as primary indexing terms since they would not normally be used to look up an article in an index, but which add relevant information which may increase the specificity of retrieval. These are similar to the secondary terms of the subject index, which are not thesaurus controlled and are therefore not too suitable for computer searching. The item index is used only for computer storage and retrieval and does not appear in the monthly booklets. The sixty or so numbers currently used in the item index include terms such as "review," "child," "in vitro culture," "clinical study," "ultrastructure," and a list of geographic areas and experimental animals. Up to ten of these numbers may be assigned to an article. In addition, space is reserved among the 999 numbers of the item index for additional concepts to meet specific indexing requirements of individual subscribers.

The goal of subject indexing at Excerpta Medica is to index as specifically as possible, much more specifically than would be possible with a limited number of preselected terms, and to make maximal use of the computer while keeping the intellectual work in the hands of the medical specialist. The special feature of the Excerpta Medica system which distinguishes it from most of the other computer-produced indexes is that two different levels are assigned to the various subject headings used to index a document. First, an unlimited number of primary indexing terms can be assigned, denoting the principal concepts that will lead to the most effective retrieval, either manually or by computer. These primary terms are checked against the computerized thesaurus or MALIMET, so that the indexer can use any term that comes to mind and this will be automatically translated into the standardized preferred term before publication. In addition, the indexer can assign a number of secondary terms describing the nature of the document or particular investigation in more detail. These terms are not checked against MALIMET and are therefore not too useful for computer retrieval, but taken in conjunction with the primary terms they represent a kind of mini-abstract, often containing quantitative information, which gives an accurate idea of the content of the article. It is in order to make some of these secondary terms automatically retrievable that the item index was later developed. In fact, a program is now in development that will assign item index numbers automatically to the 900 most important secondary concepts on the basis of a thesaurus of secondary terms.

When the subject index is printed in the monthly abstract bulletins, only the primary terms assigned to a particular document are rotated and appear in their proper alphabetical position in the index, followed each time by the other primary terms

and then by the secondary terms. Since the secondary terms are not rotated, this results in a less bulky and more functional index than is usually the case. For example, a document indexed by means of the primary terms "cerebral cortex," "nerve cell," and "noise" and the secondary terms "morphologic changes" and "rat" would appear in the subject index three times:

Cerebral cortex, nerve cell, noise, morphologic changes, rat, 325
Nerve cell, cerebral cortex, noise, morphologic changes, rat, 325
Noise, cerebral cortex, nerve cell, morphologic changes, rat, 325

This document would also be assigned item index No. 733 for "rat."

Updating the Data Bank

The processing of new periodical literature for input into the Excerpta Medica data bank begins at the library of the Royal Netherlands Academy of Sciences, where Excerpta Medica personnel record the 20,000 or so individual journal issues received each year, take care that no issues are missed, and handle the correspondence necessary to add new titles to the collection. Approximately half of all the periodicals received by Excerpta Medica are supplied gratis by the publishers, and another quarter are received on an exchange basis. At the academy each issue of each incoming journal is also microfilmed from cover to cover and stored in the form of microfiche, this being made necessary by the fact that the actual journals are "consumed" during the process of indexing and abstracting. Approximately 100 journal issues are brought to the editorial offices of Excerpta Medica each working day.

Here, the journals are first screened by a team of medical, pharmacological, and chemical assignment editors who are responsible for directing each article to the attention of the appropriate specialist section editors. They make this provisional assignment, based on the title and summary of the article and if necessary on the affiliation of the authors, by writing the appropriate section number or numbers next to the article in the table of contents. By so doing they provide what can be thought of as the first decimal of the classification of each article. During the following 5-day period, the journals are then made available to all of the Excerpta Medica editors, who look through them in order to refine the provisional assignment and select the best articles for their "special services" or S.D.I. journals.

The goal of the next stage is to prepare the citation of each new article for input into the computer as rapidly as possible, permitting retrieval on the basis of author, section number, and other elements of the citation even before the article is fully indexed and classified. For this purpose the appropriate field codes are assigned to the various bibliographic elements identifying each article, according to the following chart:

- (a) English-language title.
- (b) Original title if in a printable orthography (and not in English).

- (c) Authors' names (up to four).
- (d) Authors' institutional affiliation or address.
- (e) Abbreviated journal title.
- (f) Year of publication.
- (g) Volume, issue, and page numbers.
- (h) Coden code of the journal (expanded to indicate the country of publication and the type of journal).
- (k) A 4-letter code for the language of publication.
- (m) A 3-letter code for the country of residence of the authors.
- (p) The section numbers to which the article has been assigned.

It will be noted that every complete citation must have an English title. This means that although English-language journals can be routed directly to the coding department, other journals must first go at least to a linguistic supervisor (if the journal prints an English table of contents) and in many cases to a translator before the citation can be processed.

The citation information is then punched onto paper tape by means of Flexowriters, the paper tape is converted to magnetic tape, and this is read into the computer. The computer provides an immediate print-out of each day's input, which is keyed by page, line, and word number and returned to the proofreading department along with the original journals. Any necessary corrections are then made directly in the computer memory by means of a correction program, after which the citations are permanently input and automatically assigned a sequential production number.

On a weekly basis the computer prints out a multipart index-abstract form for each new citation received during the week. Each page of this form, consisting of a single abstract form and one index form for each section to which the article has been assigned, contains the production number and the complete citation of the article. The journals are then torn apart and each set of forms is matched with the corresponding journal article, after which the articles are routed to the editors of the interested Excerpta Medica sections. Any articles for the special services journals are photocopied and processed independently.

Each article, with its corresponding index-abstract forms, is first routed to the managing editor of the first section to which it has been assigned. He must do two things: (1) decide whether or not he wishes to publish an abstract of the article in his section (he may also decide to store merely an indexed citation in the data bank), and (2) classify the article into one or more of the subcategories of his section. The article is then passed on to the index editor of the same section (often a different person), who assigns the primary and secondary subject-index entries and the item-index numbers; this work is done on the basis of the entire article but from the point of view of the subject specialist. As soon as the article has been classified and indexed by a particular section, this form is torn off and sent to keypunching for computer input, thus increasing the retrieval potential for that article while it is still being processed by other section editors. When the article has been classified and indexed by all interested sections, so that all the indexing forms have been torn off and sent to keypunching, the article with the remaining abstract form is returned to the first section editor who indicated that he wanted to publish an abstract. At this

point, however, a fully indexed and classified citation is already available on magnetic tape or as output in response to a search question.

Abstracting

The managing editor of the primary section to which a particular article has been assigned may arrange for the preparation of the abstract in one of several ways: (1) he may prepare the abstract himself, on the basis of the summary or by encircling portions of the original article; (2) he may send portions of the article for translation into English and then prepare an abstract; or (3) he may send the article to one of Excerpta Medica's 4,000 volunteer abstractors, medical specialists who are located in almost every country of the world. In many cases the final abstract will still have to be translated and/or edited by a linguistic supervisor. Eventually the entire abstract is also keypunched and fed into the data bank, from which it can be retrieved either in response to a search request or for publication in a monthly abstract bulletin. Although the classification and indexing are done individually for each section, the same abstract which has been prepared for the primary section is used, with a few exceptions, for the other interested sections. As soon as sufficient abstracts have been accumulated in a particular section to meet the monthly quota, the computer automatically composes the pages of the abstract bulletin, assigns the abstract numbers and page numbers, compiles the author and subject indexes, and produces a magnetic tape which can be used to drive the Digiset photoelectronic typesetter.

Search Strategy

Search profiles for either retrospective retrieval or S.D.I. services can theoretically be written in terms of any of the elements of the citation, plus of course the primary index terms and item index numbers. Most commonly, however, profiles will consist of a combination of classification numbers and index entries, with an author's name in some cases. The item index is very useful for increasing the specificity of a search on the basis of certain secondary concepts, such as the type of article or study or the experimental animal used. Questions can be put in terms of the usual parameters of Boolean logic, using "and," "or," as well as "not" connectors. In most cases, due to the high specificity of Excerpta Medica indexing, several "or" terms and very few "and" terms will be used; "not" terms are dangerous to use in view of the automatic loss of interdisciplinary or review articles dealing with several subjects simultaneously.

Under normal circumstances the classification system (often of more than one section in combination) is used for the more general questions while the subject index is used for the most specific retrieval. The high specificity of the subject index means that a general question is sometimes more difficult to formulate than a specific one (unless it coincides with a classification subcategory); however, a combination

of one or more classification numbers with one or more index terms can be very powerful. For example, literature on the side effects of oral contraceptives is currently being retrieved by means of classification No. 37.9.3 (for oral contraceptives in Drugdoc) plus No. 38 (for Adverse Reactions Titles, which does not have a subcategory for oral contraceptives). Similarly, literature on the use of radioisotopes in the study of the coronary blood flow is being retrieved by a combination of classification Nos. 2.7.7.1 (circulation of the heart in physiology) and 37.19.10 (radioactive isotopes in Drugdoc), while that on the enzyme histochemistry of the placenta is being retrieved by a combination of "placenta" with classification Nos. 1.4.1.4 (histochemistry) or 29.2.10 (methods of analysis of enzymes in the biochemistry section), and that on the physical capacity of patients with ischemic heart disease is being retrieved by a combination of classification No. 18.6 (coronary heart disease) with the terms "physical capacity" or "work capacity." On the other hand, as many as twenty different terms have to be used to retrieve all literature on amphetamines, and as many as forty different permutations and combinations must be used to retrieve literature on a general subject such as "myeloma proteins."

Within the Drugdoc service, substructure searches can also be done by means of either the Wiswesser Line Notation or a fragmentation code which can be compared to that of the "Dokumentationsring." These files are kept separate in Excerpta Medica's own data bank so that a substructure search results first in the preferred term numbers corresponding to the generic names of the drugs which fit the chemical structure; these are then utilized to search the main data bank for the literature references.

Future Developments

When one considers the ever-increasing flow of biomedical information and the unnecessary duplication of scientific effort caused by lack of familiarity with the published literature, not to mention publication delays and the urgent need for rapid information on, for example, the results of clinical drug trials and possible adverse effects, it is clear that the trend of the future must be toward increasing automation of the input, storage, retrieval, and dissemination of scientific data. Eventually this will almost certainly involve the replacement of the conventional journal format by a system for direct input of raw data into a central computer memory, with S.D.I. and retrospective searching services performed on-line via multiple terminals. On a more mundane and immediate level, work is in progress on the direct input of bibliographical data into the computer memory and the on-line processing of retrieval profiles, replacing the paper-tape procedure. Increasing use will be made of computer-controlled typesetting methods and techniques designed to permit multiple utilization of a single keyboarding operation for simultaneous storage and publication.

Excerpta Medica is also engaged in various projects involving not only the effective storage and retrieval of information but also the feasibility of developing whole information networks that would link different computer systems with on-line access

via multiple time-sharing terminals of various specifications: keyboards, line-printers, and visual display.

Excerpta Medica was awarded a grant by the Netherlands government in 1968 to explore the possibilities of linking its NCR system to the IBM-360 system of the University of Leyden. The final objective of the project was to develop a combined system with multiple terminals which allow random access to the data banks; the design of the terminal system would give the user the direct capability of browsing through and holding a dialog with the Classification and Master List files in order to formulate his search requirements more accurately. This on-line coupling has recently been achieved, and two prototypes are now being used.

Another project, still in the developmental stage, is to set up a countrywide, automated archive for the five laboratories of pathological anatomy in the Netherlands. The advantages of such an automated archive would be the use of on-line terminals in lieu of the existing manual or mechanical retrieval systems and more substantial progress in the standardization of the different coding systems used in each local laboratory, by automated conversion of these coding systems into a preferred one (SNOP) for storage and retrieval purposes. This system, when fully operational, could be expanded to other information procedures in hospitals such as medical record files. A detailed plan has indeed been prepared to examine all the numerous technological implications of an integrated hospitals system, and research is being undertaken on the transmission of automated information within hospitals and the creation of a national hospital network linked by computer terminals.

The same basic principles are being applied to a research project in the library field which envisages the development of an integrated central catalog for the university and general libraries in the Netherlands, linked by a telecommunications network to the State Library in The Hague.

ROBERT R. BLANKEN

EXCHANGE OF PUBLICATIONS

The exchange of publications between libraries, learned societies, institutions, and governments has flourished as a means of (1) acquiring publications which are not for sale or not distributed in the usual book-trade channels; (2) obtaining government publications on a regular basis; and (3) using to best advantage the duplicates of a library, as well as its own publications or those of the parent organization, by offering them in return for publications not represented in the library's collections.

The history of exchanges of publications is varied and extensive. In 1694 the Royal Library of France exchanged some of its duplicates for new English and German publications, and in 1697 received 149 Chinese books "in return for which the King gave a selection from all his engravings" (1). In order to exchange their own

publications, the Universities of Lund, Abo, and Greifswald, in the 1740s, established a "Commercium Literarium" which served as a model for later exchanges involving other universities. In 1817, Jena, Breslau, and Marburg founded the German Akademischer Tauschverein, which by 1823 included eighteen German universities; later, universities in Sweden, Switzerland, Belgium, and the Netherlands were admitted. By 1882 the number of participants had increased to sixty-eight. In the United States the American Philosophical Society in Philadelphia began to exchange its publications for those of European learned societies in the eighteenth century. Shortly after its founding the society observed the transit of Venus with equipment furnished by the Royal Society in London because weather conditions in Europe did not permit observation there. The results of the observation were published in the Philosophical Society's *Transactions* in 1771, and copies were sent on exchange to other scientific societies in the United States and abroad. The American Academy of Arts and Sciences in Boston initiated exchanges of its works with other institutions early in the nineteenth century (2).

Formal exchanges of sets of public documents between governments are generally termed *official* exchanges; informal arrangements involving the interchange of all types of publications among learned associations and institutions are deemed to be *unofficial*. In a Resolution of June 19, 1834, the U.S. Congress made the first provision in this country for the regular supply of government publications for use in official exchanges by placing at the disposal of the Joint Committee on the Library of Congress twenty-five copies of every U.S. Government publication (3). In January 1837 the committee authorized the librarian of Congress to exchange public documents with the French government. It was, however, a French magician and sleight-of-hand artist, Alexander Vattemare, who focused attention on the possibilities inherent in the exchange of publications. During the course of his travels in Europe he visited the great libraries and museums and was fascinated by the large numbers of duplicates in their storerooms. These items, he felt, should be redistributed to aid in the spread of learning. From 1830 he worked to arrange exchanges between European institutions, and he came to the United States in 1839 in furtherance of his mission. His efforts over the years stimulated some American state governments and municipalities to adopt various plans of exchange and even won the interest of the U.S. Congress.

Vattemare proposed to Congress a plan for the international exchange of library duplicates, with the Library of Congress acting as a central exchange agency for the United States. The Congress in a Joint Resolution approved on July 20, 1840 (4), not only authorized the librarian of Congress to exchange duplicates but also provided that fifty copies of every document printed by order of either House be made available for exchange with foreign countries. An Act of June 26, 1848 (5), authorized the Joint Committee on the Library to appoint agents in other countries as necessary "to carry into effect the donation and exchange of such documents and other publications as have been, or shall be placed at their disposal for the purpose," and directed that all books transmitted by such agents be admitted duty free. Although the library had previously received some documents in complete sets from the

French ambassador, the committee within a few years was disappointed that no complete sets of official documents were received through the agency that Vattemarc had established in Paris and on August 31, 1852 (6), the Act of 1848 was repealed. Joint Resolution Number Five of January 28, 1857 (7), transferred the international exchange functions from the Library of Congress to the Department of State.

While the exchange of official publications lagged in this period, the International Exchange Service of the Smithsonian Institution came into being; its initial mission was to handle the exchanges of the Smithsonian's own publications. The first of these, a monograph on the ancient monuments of the Mississippi Valley, was published in 1848 and distributed in 1849. After a system of agents in other countries had been established to handle the Smithsonian's own exchanges, it was found that other exchanges could be handled through the same facilities at little extra expense. Other institutions were therefore invited to make use of these agencies without charge. By 1854 no duties were charged by any government on publications being shipped to or from the Smithsonian.

These three elements of the present-day official exchanges of the U.S. Government—the provision of documents, a transmitting agency, and a depository for receipt of documents of other governments—were brought together in the Congressional Resolution of March 2, 1867 (8) supplemented by the Resolution of July 25, 1868 (9). Fifty copies of Congressional documents and publications issued by any department or bureau of the government were made available for exchange “through the agency of the Smithsonian Institution, for such works published. . . by foreign governments. . . ; said works to be deposited in the Library of Congress.” The number of copies of government documents authorized for use in exchange by the Library of Congress by the 1867 Resolution was later increased by the Acts of March 2, 1901 (10); March 3, 1925 (11); and, in 1936, by 44 USC 1718 and 1719 (formerly 44 USC 139 and 139a), to 125 copies for international exchange.

With the establishment in the United States of a system for the exchange of official publications, it became apparent to librarians, scholars, and government officials in many countries that agencies similar to the International Exchange Service were needed in other countries to provide facilities for the receipt and transmittal of documents. A major effort in this direction was made when the International Congress of Geographical Sciences, meeting at Paris in 1875, considered the problems involved in the exchange of publications. As a result of the proposals of this Congress exchange services were established by 1880 in France, Portugal, Switzerland, Russia, and Belgium.

In 1886 two conventions were concluded by eight nations at Brussels which provided for (1) exchange bureaus to be established in each signatory nation to handle the exchange of official documents and to transmit the publications between “the learned bodies and literary and scientific societies, etc. of the contracting states”; and (2) the immediate exchange of official journals as well as parliamentary annals and documents. Both conventions were signed at Brussels on March 15, 1886, by the representatives of the United States, Belgium, Brazil, Italy, Portugal, Serbia, and Spain, and Switzerland signed the first; both were later adhered to by the govern-

ments of Uruguay, Czechoslovakia, Poland, Rumania, the Dominican Republic, Latvia, Danzig, China, Egypt, and Hungary, and two nations later adhered to the first convention—Argentina and Paraguay. In accordance with the first Brussels Convention, the International Exchange Service now functions only as an agency for the transmission of publications. The service does not take the initiative in arranging new exchanges; negotiations for the exchange of official publications of the United States Government are handled by the Exchange and Gift Division of the Library of Congress. Although the United States signed both Brussels Conventions, it was not until the passage of a Joint Resolution of March 4, 1909 (12), that copies of the daily issues of the *Congressional Record* were provided to be sent to other countries in exchange for “their parliamentary record or like publications.”

Since the turn of the century other governments which enter into agreements with the United States for the exchange of official publications have been offered either a full set of U.S. Government publications (approximately 12,000 pieces each year) or a partial set (approximately 2,000 pieces annually) consisting of the annual reports of federal agencies and other of the most important publications of the Executive departments, the Congress, and the Judiciary (13).

Bilateral or Executive Agreements, negotiated on behalf of the Library of Congress by the Department of State in the form of notes exchanged with the Foreign Offices of other countries, have been used to supplement the Brussels Conventions since the first such agreement was concluded with Peru in October 1936. The movement toward such bilateral arrangements was given impetus by the Convention on the Interchange of Publications, signed at the Inter-American Conference for the Maintenance of Peace in Buenos Aires on December 23, 1936, by the representatives of the United States and twenty Latin American nations. Nearly fifty such agreements are now in effect. This type of dual-nation arrangement is specifically sanctioned by the Convention Concerning the Exchange of Official Publications and Government Documents between States adopted by the General Conference of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) at Paris, December 3, 1958. This convention entered into force with respect to the United States on June 9, 1968.

Another agreement adopted by UNESCO in 1958 and effective for the United States in 1968, the Convention Concerning the International Exchange of Publications, encourages exchange “between both governmental bodies and non-governmental institutions of an educational, scientific and technical, or cultural nature, which are non-profit-making in character. . . .” Through its Exchange and Gift Division, the Library of Congress operates the largest exchange program of this type in the United States. In addition to administering the official exchanges of sets of government publications with other nations, the library also maintains more than 23,000 unofficial exchange arrangements with educational institutions, learned societies, and government agencies in nearly all countries throughout the world. The latter are negotiated directly with the potential exchange partners by the Exchange and Gift Division and do not stem from conventions or executive agreements.

The principles of these unofficial exchanges are followed, in whole or in part, by

most other institutions which employ exchange as a means of acquisitions. There may be one or a combination of types of exchange:

A. Piece-for-piece exchange, with which can be grouped the subscription-for-subscription exchange for serials, in which publications are exchanged for others of nearly the same value and character, i.e., book-for-book, pamphlet-for-pamphlet. Exchange is usually the only means of acquiring periodicals (especially foreign ones) which are not sold or which dealers will not handle because of the insignificant profit margin involved. In nearly all cases the periodicals are the publications of the exchange partners; the books may be their own publications or duplicates.

B. Priced exchange, in which each partner agrees to supply publications of a set monetary value to the other in a stated period of time, thus necessitating a certain amount of bookkeeping by each institution to insure that the exchanges are balanced at the end of the period. When these involve the purchase of new, commercially issued publications for use in the exchange, close cooperation is required between the exchange and the order departments. Both have to plan at the beginning of each year to insure that funds will be available for this type of activity. Continued liaison is required to obtain the books requested and to dispatch them as soon as possible to the exchange partner. Because of the additional work involved, most libraries try to avoid the priced-exchange method, acceding to it only when it is insisted upon by exchange partners, most often those in areas where there is difficulty in obtaining hard currency for purchasing American publications.

C. The "open" exchange, in which there is little or no accounting of the monetary value of the materials involved. The philosophy of such an arrangement, usually determined at the negotiating stage, is that if each partner supplies the other with one copy of all its publications or certain specially designated ones (and perhaps also with occasional duplicates), the exchange over a period of time will tend to be balanced. In this type of exchange, as well as in the piece-for-piece exchange, efforts are made to strike an approximate balance.

In proposing an exchange, an institution not only requests the publications that the exchange partner may normally be expected to issue (catalogs, annual reports, bibliographies) but solicits information about other available publications, including duplicates, and asks whether or not the duplicates are listed. The institution proposing an exchange also gives the same information concerning the publications it has to offer and sends sample issues of the serial titles it has at its disposal. If it has publications of its own or can make available those issued by a parent body, lists of these titles are supplied. In its first letter the proposing institution usually gives as many details as possible concerning the operation of its exchange program and states whether or not it can occasionally purchase a specific title for its exchange partners. The special areas of interest of the exchange partner are also elicited and recorded, so that in future correspondence a small number of duplicates can be offered in those subject fields or even (where this procedure has been indicated to be acceptable) appropriate duplicates can be sent without first offering them.

During periods when funds for purchasing materials are adequate, the exchange of duplicates tends to be regarded as old-fashioned, cumbersome, or costly. In stringent times more effort and ingenuity is extended in exploiting these materials. For exam-

ple, an extensive listing of duplicates prepared for only one exchange partner is rarely justifiable, but lists of items available in multiple copies can easily be distributed to many institutions. Also quite common is the list of books in one subject field, which can be offered to many organizations with a common interest, forewarning all that requests will be honored in the order of their receipt. Materials not thus used in the traditional type of exchange may often be exchanged with a second-hand dealer in return for other items in his stock or obtainable through him.

In initiating an exchange and in responding to certain inquiries, individual letters are usually required, but forms may be used in requesting most publications, acknowledging their receipt, announcing particular shipments, or informing a requestor that a publication is no longer available. (The last is best combined with a reply offering other items.) A file or record sheet or card is kept for each exchange with all pertinent information in as brief a form as possible: (1) name and address of exchange partner and of individual who handles exchanges; (2) type of exchange; (3) subject areas of interest; (4) serials regularly sent and received; and (5) information on sendings and receipts, for which the number of pieces in a shipment will usually suffice. In the priced exchanges it is necessary to record the monetary value of each shipment. It is essential that these records be reviewed regularly and that whatever action is necessary to be taken to insure that all exchanges are kept alive and active.

Logically, exchange should be a function of an acquisitions department, but it is sometimes handled in the reference department, in an administrative office or, if a narrowly limited program, in the serials department. Exchanges and gifts are more often allied in one program since both involve materials obtained without direct cost. Moreover, since there is often difficulty in distinguishing between gift and exchange sources it is preferable that both be handled in a combined operation.

Various organizations have been formed to centralize or to facilitate the exchange of duplicates. The United States Book Exchange (USBE), the successor to the American Book Center for War Devastated Libraries, was established in 1948 and serves as a clearinghouse among libraries for duplicate materials. Duplicates received from its members are credited to their accounts; the member libraries may select items wanted from lists or directly from the USBE stock, paying a service charge for each piece selected. The Exchange of the Medical Library Association receives from cooperating member libraries lists of duplicates which it circulates, and it subsequently informs the holding library where to send the various items. The American Association of Law Libraries Exchange maintains a record of the duplicates of its members and of the items wanted by them; it matches slips in both categories and informs members whenever the possibility of an exchange exists. Under the aegis of the Serials Section of the Resources and Technical Services Division of the American Library Association, the Duplicates Exchange Union encourages its member libraries to publish lists of duplicates. The American Theological Library Association's activities in this area are limited to the exchange of periodicals. The British National Book Centre, a department of the National Central Library in London, each month sends to foreign libraries one list of surplus books and periodicals on scientific and technical subjects and one on other subjects. The material offered is free,

but priority in filling the requests received is given to libraries which offer in return publications issued in their respective countries or duplicates which they will reserve for 6 months for the center.

UNESCO promotes international exchanges as part of its mission and publishes two useful aids in conducting an exchange program: the *UNESCO Handbook on the International Exchange of Publications* and the *UNESCO Bulletin for Libraries*, both of which list offers by specific institutions. *The World of Learning*, *The Europa Year Book*, and other directories are helpful in listing possible exchange partners, addresses, and sometimes publications.

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EXHIBITS, LIBRARY

During the 25 centuries of library history certain characteristic functions have developed within the institutions. The more common ones are the acquisition and cataloging of books, the creation of reference-research collections of books and other materials as an aid to inquiry, the circulation of library materials for use beyond the library walls, and the making ready of bibliographical aids for scholars. A more recent development has been the establishment of microresearch facilities, including films and cards, along with the proper readers to visually reproduce materials necessary for modern scholarship, but which often in the past were difficult to obtain by the average library. A more neglected function, often ignored by many libraries, is that of library exhibit work. It is perhaps the least explored of library activities, but when it functions with a degree of seriousness it is important enough to be called the art of the library exhibit.

There is some confusion and ambiguity inherent in the term "exhibit," for there are at least three kinds of library exhibit. These may be identified by applying simple and descriptive captions: the commercial type, the museum type, and the literary type. The nonliterary kind of exhibit is most common because it is the easiest to put together, and is exemplified by the commercial type with placards and pictures on display. The museum-type exhibit is generally represented by objects on display, accompanied by descriptive cards. Both the commercial and museum category of exhibits fall into the literary class of exhibits when they use scholarly annotations to accompany their materials, but it is obvious that such overlapping depends upon the descriptive information which the exhibitor supplies with his visual display. The literary exhibit with carefully prepared commentary falls into a special class of its own.

This third class of exhibits is a kind which librarians strive to achieve when conditions are right, such as having the resources ready at an appropriate time to fit an occasion, together with an enthusiasm for the project. A literary exhibit is more than a

display of related objects; it is rather a studious effort to present to an interested body of people certain books, manuscripts, letters, and relevant materials in order to demonstrate the work of an individual, or a group of people, or a period of history through organized bibliographical means. Sometimes the work of the author, the artist, the musician, or the scholar is the focus of interest in the exhibit; sometimes the genre is more important than any single author, and the short story, the novel, the play, or the poem is stressed. Or, an exhibit may be devoted to the communication arts; the newspaper, magazine, radio, and television. Or it may feature library reference works—the dictionary, encyclopædia, the Bible, the almanac, and so on—in order perhaps to demonstrate not only the books as reference sources but also to show historical changes and bibliographical variations over the years through successive editions and reprintings.

It is reasonable to assume that where exhibit work is a regular function in a library there are present both the resources and the personnel to keep the program operating. Libraries with special collections have an advantage in material resources, and together with imaginative librarians make a congenial climate for exhibit work. These favored institutions are usually the large public libraries, the established academic libraries, and a number of private libraries. Most of these institutions operate on flexible budgets, often aided by generous donations and liberal endowments by individuals and corporations, and have the financial advantage of obtaining desirable items and collections when they appear on the market through private sale or public auction. They are also able to borrow rare and needed materials for their own exhibit program, for they are in a position to reciprocate loans, and have the facilities to insure safety and care of the materials on loan to them—a consideration to be taken into account by any institution lending rare and unique items.

There is a shortage of trained exhibits librarians as there is a shortage of specialists in other fields, and the absence of practitioners is so universal that most libraries are unaware of the dearth. Few, if any, libraries advertise for an exhibits librarian as they would for a cataloger, reference librarian, circulation librarian, or acquisitions librarian. This was once true also of bibliographers, documents librarians, and audiovisual librarians, but all of these trained personnel are now sought by libraries when expanding services indicate the need.

The exhibits librarian is therefore not an official position in most libraries, and when it does exist in a functional sense, the work of the exhibits librarian is combined with other duties. Often the curator of a special collection is the exhibits librarian; sometimes the head librarian performs the exhibit work. But perhaps the most frequent practitioner is the children's collection librarian in the public and school libraries or in any other library with a juvenile section. Children's books, because of their colorful illustrations, artistic design, and imaginative formats, are both natural and logical materials for exhibits.

Since it is evident that exhibits librarians are not in abundance, at least in official capacity, it may be interesting to explore the qualifications that would contribute to the making of an exhibits librarian. Ideally, of course, he should be a scholar in some field with both the ability and the patience for research. This would especially

apply to working in a library with subject collections in such areas as literature, languages, history, art, or science. In his nature the exhibits librarian should combine a consciousness of the historical past with the historical present, and not be lacking in vision toward the future. A knowledge of dates is of inordinate significance, for it is here that he will recognize important anniversaries and commemorative events and never be lacking in ideas for interesting exhibits. The exhibits librarian is an artist in several ways, for besides having the creative ability to construct an exhibit with a logical plan, accompanying his books and materials with explanatory notes when needed, he also has the artistic touch to make his work unobtrusive in the exhibit itself, exemplifying the principle of *ars est celare artem*. In short, he is a specialist in library work who, when he performs his task faithfully, has a talent for creating timely interest in the resources about him.

Taking into consideration both the shortage of exhibits librarians and the need for them in libraries of today and the future, the question in order is how to remedy the problem and insure a reserve of exhibits personnel for their role in the libraries of tomorrow. There are two answers which suggest themselves after some reflection on the matter. The first approach is to train librarians by having them work with the exhibits personnel of the libraries actively engaged in exhibit schedules. By the same method library students still in training could spend an apprenticeship period with professional exhibits personnel, learning exhibit techniques on the job while earning a degree in library science. Although this may be regarded as the pragmatic approach and therefore too practical for professional training, nevertheless there is a merit in a system which combines observation with experience. The main drawback is, unfortunately, not in the method outlined but in the possible small number of cooperating libraries, since there are not many public, academic, and private libraries which do extensive exhibit work.

The other approach to the problem points to the library schools themselves. An advantage in offering courses in library exhibit technique at school would be that students interested in the subject would take the courses and those who were only curious would have the option to take the course and if taken, will doubtless benefit later in their library career. If library schools inaugurated exhibit technique courses in the library science curriculum, there is no doubt they would have a problem of finding teaching personnel to present the courses, and initially would have to depend upon exhibits personnel from the larger libraries. Part of the teaching problem could be circumvented by using a laboratory method of instruction in which each student in the course would create exhibits with the available resources of the library school in combination with the library furniture, the exhibit cases, and other exhibit appurtenances as an essential part of the course project. In an ideal sense the most satisfactory procedure to train exhibits librarians would be a combination of the two approaches just mentioned—the apprenticeship training under professional exhibits librarians in libraries with established programs, and the enrollment in library exhibit technique in library schools where theory and practice are given together.

The most important materials that make up an exhibit are of course the articles which go into the exhibit: the books, pamphlets, illustrations, souvenirs, objets d'art,

etc. However, no matter how well the exhibit is conceived and then assembled and supplemented by appropriate annotations, it will not be successful unless it is presented in the proper library exhibit furniture. Therefore the means of containing the display deserves careful consideration.

The largest and most useful pieces of exhibit furniture are the display cases, also called museum cases because of their common use by museums to display articles of interest and value. Two kinds of cases are easily recognizable by library visitors—the horizontal and the vertical cases. The horizontal is a table-type case, frequently flat on top but occasionally found with a sloping top formed by the two halves of glass meeting at the center and making a slight peak effect. This horizontal case usually has a hollow space of oblong dimensions enclosed on four sides by glass, although sometimes the sides are opaque and only the top is of glass. The vertical or upright case is generally constructed like a bookcase with shelves and glass doors. Sometimes all the sides are of glass, and this is common in the type which stands in the center of the room or at some distance from the walls. The shelves are most frequently made of glass, and are usually movable and adjustable to whatever space is needed between shelves by means of brackets which fit into notches at the rear of the case. A feasible innovation, it would seem, might be transparent plastic shelves to replace the dangerous breakable glass shelves now in use. From time to time there is seen in some of the larger and older libraries the vertical-type case with glass doors reinforced by metal screenwork. These cases serve as repositories for rare and valuable holdings and are not intended for exhibit purposes, since viewability has been sacrificed to security.

Increasingly in modern library buildings provision is made in the original plans for an exhibits area. This may be found in the entrance lobby, in an alcove close to the entrance, or in a special exhibition room. In such instances specially designed cases are often built into the walls or into islands to be viewed from all sides. Specifically designed interior lighting and ventilation are essential in such installations.

Another common article of furniture used in libraries for quick displays rather than for exhibits is the book trough. The trough resembles the table-type case since it has a hollow center which is sometimes divided in the middle by an upright board. The board is sometimes covered with cork and looks like a bulletin board. The book trough is left uncovered, is useful for casual displays where the material is of limited value, and is frequently filled with new books to catch the eye of the library patron. Also used by librarians as an exhibit auxiliary to the other furniture are plain tables, counters, and desks; but like the trough the drawback is that materials on display are without safeguard from theft and dust, therefore limiting their use and value as display pieces. It is obvious by now that the library which intends to conduct an active exhibit schedule has as a choice of display furniture the horizontal table-type case or the vertical upright case. For small libraries the cost of an exhibit case is very important, and since both the table-type case and the upright bookcase type are expensive, the decision to purchase must be carefully considered. When there is a choice of buying one or the other, the librarian must examine the library holdings and also the architecture of the exhibit area to see which is the more suitable in-

vestment. Both types of cases are satisfactory for displaying rare books, manuscripts, special editions, and valuable nonbook articles such as stamps, coins, chinaware, heirlooms, and hobby collections.

In addition to the larger articles of furniture, there are many smaller appurtenances which contribute significantly to the art of the exhibit. If for a moment the exhibit case may be imagined as a small theater, then it is easier to visualize the entire concept of the library exhibit, and therefore better understand the part in it of the small objects of an exhibit. Suppose the exhibit in the case, the books, pictures, and other objects, is similar to a scene on the stage of a theater with all the dramatic personae present, then with a little more imagination allow the bookends, angle boards, sign holders, glass weights, and the ribbons for holding pages down to be compared to the stage props, such as lamps, mirrors, portraits on the wall, candlesticks, vases, and all the other devices used in stagecraft to create the desired illusion. In the exhibit these small articles all have a purpose: the bookends to keep a book in place; the angle board to present the desired degree of vision to the viewer; the sign holders to hold the annotations; the glass weights to hold down a page without hiding the page; and the acid-free ribbon to hold open a page without damaging the book.

In retrospect all that has preceded is prelude to the essential work of creating the exhibit itself. The concept of exhibits from the earliest libraries to date, the differentiation of the kinds of exhibits, the personal qualifications of the exhibits librarian, the shortage of exhibit personnel, and the importance of exhibit furniture and appurtenances, all have been discussed in brief. Assuming that all or most conditions are suitable for making an exhibit—the material resources ready, the exhibit case empty and waiting, and the librarian anxious to begin—then the drama of the library exhibit unravels. To achieve this point of readiness the librarian has used imagination and has some concept in the direction of innovation. In libraries with poor material resources human ingenuity is often strained but its presence means the difference between success and failure in exhibit work as well as other library activities.

The variety of exhibits is limited only by the quality of imagination and versatility of the librarians. The kind of library—children's, public, school, private, governmental, and academic—provides the initial stimulus to the exhibits librarian. However, library resources and the quality and speciality of the collections, more often than anything else, provide the inspiration for an exhibit. Sometimes it is not a question of resources or the imagination of the librarian which makes assembling an exhibit a problem. Frequently it is the matter of decision on the exhibits librarian's part over what will interest or not interest the patrons of the library that poses the main question. For example, if the exhibits librarian in an academic institution knows that the library has an excellent collection of children's books which includes works illustrated by Arthur Rackham, Kate Greenaway, A. B. Frost, E. H. Shepherd, and others, will this insure that the exhibit receives a favorable response from the academic community? Or if a middle-size public library has come into possession of a notable John Steinbeck collection through the generous gift of a local citizen, can the librarian in charge of exhibits expect an enthusiastic reception to an exhibit on a distin-

guished writer of fiction if the town is more interested in politics, farming, or television shows? In both these instances the exhibits librarian must speculate about the response but in any event should make the exhibit for the sheer pleasure of creating an interesting and unusual exhibit. There are many occasions in which he may celebrate a timely and popular event by other kinds of exhibits, but the infrequent exhibit which is created for the esthetic effect, or to delight the eye with exceptional items of interest, must never be neglected at the expense of the ordinary kind of display.

The culmination of library exhibit technique lies both in the fulfillment of creating the exhibit and supplementing the exhibit with a catalog as a guide to the material on display. Good exhibits are often unaccompanied by catalogs, but it is the catalog which gives the crowning touch. The making of a catalog is not difficult. It may be expensive if the paper, print, format, length, and illustrations, of which it is comprised are exceptional, but a catalog may be an inexpensive product in a simple mimeograph style, as a folded booklet or as a flat broadside, with staples to secure the pages. The making of the catalog can be simultaneous with the creation of the exhibit, for as the librarian writes his annotations to his books and other material he may transfer the same annotations to his first catalog draft in a notebook or on sheets of paper. These may later be rewritten for the printer if there is going to be a printed catalog, or simply given to the mimeographer for recopying the needed number. Exhibit catalogs are not only guides to the exhibit for the visitor but are also bibliographical aids to the student and scholar. The exhibit catalog also serves the person unable to see the exhibit by supplying all the essential information in printed form. A well-made catalog is an accomplishment requiring time, labor, skill, and frequently research on the part of the exhibits librarian. A good catalog combined with a good exhibit illustrates the art of the literary exhibit. And a well-compiled catalog is more than a souvenir—it is a valuable bibliographical reference, limited only by the scope and purpose of the exhibit.

There are other phases of library exhibit work that have not been discussed but which nevertheless are important. All of them have a common relationship in that they arise from practicing the art of the library exhibit.

On occasion the library that has planned an important exhibit will consider the feasibility of borrowing a work (or several works) in order to enhance the interest of the exhibit and to make it as complete as possible. The item needed may be a rare or valuable book found in only a few other libraries. To obtain this book the borrowing library will write to the institution which is known to have a copy, hoping that there will be no further problem other than receiving it in time for the opening date of the exhibit. The would-be borrowing library may be a renowned and respected one, or it may be some small, unknown academic or public library, but to the lending institution the same critical questions arise about the decision to honor the borrower's request. If the book is sent, will it be in safe hands in its temporary home? Does the borrowing library have temperature regulation, humidity control, and safe lighting, and when the exhibit is over will the book be returned in the same condition it enjoyed in the original library? Obviously there are no guarantees, only promises from

the hopeful borrower, and probably at best misgivings on the part of the obliging lender. Very few small libraries, except those architecturally planned for exhibits, can borrow and give the assurance to the lending library that its material will be safe and certain of the best care during the exhibit period. There are also the further precautions, each necessary and obligatory of the borrower: insurance and transportation costs by express service of all valuable works, acknowledgment of receiving the goods, the condition upon receipt, and notification of the expected date of return of the material. In the case of very rare material the unpacking on receiving and the re-packing on returning assume important proportions. It is very likely that only a few of the great research libraries have the facilities to properly care for rare and expensive works on loan from other libraries. At the same time, because they have both the experience in interlibrary loans of valuable material and a reputation to uphold, these same libraries find borrowing an easier process in the precarious practice of acquiring through loan. As lenders these more fortunate institutions must suffer the same anxieties as the other libraries, but it is this interchange of borrowing and lending which teaches the morality of care for the belongings of others.

Libraries that intend to conduct exhibit programs over the years must, not only for the protection of their own possessions but those of others, strive toward fulfilling certain necessary conditions. The exhibit cases should be as dustproof as possible; the light, both inside and outside the cases, must have a minimum glare and heat; the exhibit area should have a temperature regulation that will approximate the human comfort requirement and have a humidity control that will prevent both excessive dryness or dampness. There are certain simple precautions to be observed after an exhibit has been on display a while, especially if the material is very valuable due to rarity, age, or uniqueness. Book pages should be turned occasionally to prevent fading and curling; pages of a manuscript are better preserved if first mounted and the corners secured by triangular inserts; pages of books can best be kept open by use of acid-free ribbons, either of the textile or plastic kind, and small glass pieces of different weights are also very useful in holding down the pages of books.

A good exhibit is a pleasure to make and when it generates interest there is a satisfaction, but even the best loses its attraction if kept too long. The wise exhibits librarian will remove his exhibit at the right time and have another one ready to replace it as soon as possible, knowing that exhibit work is infinite in scope and continuous in practice.

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DONALD TANASOCA

EXHIBITS ROUND TABLE

Exhibits Round Table (ERT) was organized as the result of a need for better exhibit communications between librarians and exhibitors. Its first newsletter was published in September 1954 and in it was stated the Round Table presented "The best opportunity to promote and foster better relations between exhibitors and state, regional and national library associations."

Up to this time there was no official group representing interests of those who were interested in better library exhibits.

The 1954 Newsletter continues:

The group of more than 100 exhibitors and librarians assembled at the (first) meeting and voted to establish the Exhibits Round Table, formation of which was approved by ALA Council at its meeting in Minneapolis on Monday, June 21, 1954.

An executive committee of six exhibitors and six librarians was elected: (exhibitors) Dave Busse (A. C. McClurg Co.), Donald Dickenson (Gaylord), Harry Armson (Demco), John Rowe, (Encyclopaedia Britannica), Robert Sibert (New Method Book Bindery), Edward Wambach (Albert Whitman Co.); (librarians) Andre Neilsen, Elizabeth Burr, Dorothy Hiatt, Donald Kohlstedt, Ford Rockwell and Francis St. John. At an organization meeting held immediately afterward, Harry Armson of Demco Library Supplies was elected chairman (president) and Edward Wambach of Albert Whitman & Co., treasurer.

The exhibits are an integral part of the ALA Conference Week. Many librarians say the best part about the conference is the 500 or more exhibit booths of all the new books, products, and services available for librarians to visit.

The Exhibits Round Table is an official part of the American Library Association, and membership in ALA and ERT provides the exhibitor with complete membership recognition on the part of the ALA. The national office of the ERT is at the American Library Association headquarters, 50 E. Huron St., Chicago.

The ERT has a board of directors, staff of officers, and a number of standing committees. The members meet each year at the annual conference; the board meets twice a year at the annual conference and the midwinter meeting.

Some of the outstanding work and projects of the ERT are:

An Exhibits Procedures Manual.

An annual banquet for exhibitors and librarians.

An annual cash award for a worthy library work or project.

A free package wrapping service at the annual conference. (Functions in collaboration with a U.S. Post Office to enable delegates to mail materials picked up in exhibits to their home.)

An endeavor to improve exhibits at the ALA annual conference. (The award of a citation for the best single and best multiple booth.)

A survey committee which evaluates state, regional, and national meetings.

A Newsletter.

A calendar of conference dates for exhibitors' convenience.

A number of librarians and personnel of library supply companies, publishers, etc. give freely of their time to assure the important facet (exhibits) of library conferences and meetings does not become "lost" or relegated to a secondary role in conference planning and presentation.

The current membership is composed of about 100 commercial companies; 175 individuals, librarians, and exhibitors; and about 60 institutions, libraries, etc.

JOHN E. WALL

EXPANSIVE CLASSIFICATION

See also *Cutter, Charles Ammi*

Introduction

Expansive classification (EC) was devised by Charles Ammi Cutter during his years at the Boston Athenaeum. EC was first described by Cutter in 1879 in an article entitled "Classification on the Shelves" (1) and further described in 1882 in a pamphlet on how to use the shelf classification of the library of the Boston Athenaeum (2). Thelma Eaton describes the beginning of EC.

When Charles Ammi Cutter became librarian of the Boston Athenaeum that library used fixed location for shelf arrangement. Cutter did not attempt to change this until he had completed a dictionary catalogue. He had intended to use Dewey's classification as printed but upon examination he decided to

modify it by adopting a larger base using the letters of the alphabet to designate classes, and by establishing a system of book numbers based on author entry (3).

Cutter's nephew, William Parker Cutter, points out the reason for further development of EC.

The original notation comprised some features which appeared to stand in the way of its general acceptance, and the author devised another notation (not however changing the classification), which was applied to the Cary Library at Lexington, Mass. There were so many requests from persons interested in other libraries to have the Athenaeum classification, with the Lexington notation, adapted to their needs, that Mr. Cutter was led to prepare a scheme applicable to libraries of every size from the village library in its earlier stages to the national library of a million volumes (4).

EC consists of seven separate enumerative classifications with provisions for the use of synthetic devices such as form facets and place facets. The first six classification tables were published in 1891–1893 (5) while the seventh classification table was published in parts between 1896 and 1911 (6). In 1897 Cutter described the seven classification tables which make up EC.

It consists of seven tables of classification of progressive fulness, designed to meet the needs of a library at its successive stages of growth. The first table has few classes and no subdivisions. It is meant for a very small collection of books. The second has more classes and some subdivisions, but retains all the old classes with their previous marks. This is intended for the small collection, when it has swelled so much that it must be broken up into more parts. Now, the books which are put into the new classes must, of course, have new marks; but those in the old ones remain as they are—their marks need no change. In this way we go on, gradually increasing the number of classes and sub-classes, and yet in each transition from the simpler to the more complex scheme preserving all the old notation; so that there is only the absolutely necessary amount of alteration. It is as if an indestructible suit of clothes were made to grow with the growth of the youth who wears them. He would not have to go to a tailor now and then to get a new suit. So the rapidly-growing library does not have to get an entire rearrangement every ten or fifteen years, with entirely new class-marks. Passing through the third, fourth, fifth, and sixth, it comes finally to the seventh, which is full and minute enough for the British Museum, with a capacity of increase that would accommodate the British Museum raised to the tenth power; for there might be an eighth and a ninth and a tenth table, if need be. From this adaptation to growth comes the name *expansive* (7).

It should be noted that EC does not always naturally expand without notational change from the first to the seventh classification. (It is, of course, unlikely that any library would expand from the use of the first to the seventh classification either.) For example, if one classes a book on corporal punishment of children in school such as *Caning the Pupil: A Manual for Teachers* in all seven classifications of EC, the following would result:

1st and 2nd classification:	H	Social sciences (including Sociology)
3rd classification:	I	Sociology
4th classification:	I	Sociology
	IK	Education
5th classification:	IK	Education
6th classification:	IK	Education
	IP	Pedagogics
7th classification:	IP	Pedagogics
	IPD	Discipline
	IPDC	Corporal punishment

In transferring from the 2nd to the 3rd classification, the notation changes from H to I. In transferring from the 5th to 6th classification, the notation changes from IK to IP. All other changes are simply additive.

The Classification

THE FIRST CLASSIFICATION

The "First Classification," subtitled "For a very small Library," consists of seven main classes with one subclass:

A	Works of reference and works of a general character covering several classes
B	Philosophy and Religion
E	Historical sciences
H	Social sciences
L	Sciences and Arts, both Useful and Fine
X	Language
Y	Literature
YF	Fiction

THE SECOND CLASSIFICATION

The "Second Classification, For a Library that has grown larger," contains fourteen classes. Class E, the Historical sciences, is expanded into Class E, Biography; Class F, History; and Class G, Geography and Travels. Both Classes F and G contain geographical subdivisions. Class L, Sciences and Arts, both Useful and Fine, is expanded into six classes: Class L, Physical sciences; Class M, Natural history; Class Q, Medicine; Class R, Useful arts; Class V, Recreative arts, Sports and games, Theatre, Music; and Class W, Fine arts:

A	Works of reference and works of general character covering several classes
B	Philosophy and Religion
E	Biography
F	History
G	Geography and Travels

H	Social sciences
L	Physical sciences
M	Natural history
Q	Medicine
R	Useful arts
V	Recreative arts, Sports and games, Theatre, Music
W	Fine arts
X	Language
Y	Literature
YF	Fiction

THE THIRD CLASSIFICATION

Twenty-five classes comprise the "Third Classification." Class B, Philosophy and Religion, is expanded into three classes and one subclass: Class B, Philosophy; subclass BR, Religion and Religions (except the Christian and Jewish); Class C, Christian and Jewish religions; and Class D, Ecclesiastical history. Classes F and G are further subdivided geographically. Class H, Social sciences, is expanded into four classes: Class H, Social sciences; Class I, Sociology; Class J, Government, Politics; and Class K, Legislation, Law, Woman, Societies. Class L, Physical sciences, is redefined as Science in general, and Physical sciences. Class M, Natural history, is expanded into three classes: Class M, Natural history in general, Microscopy, Geology, Biology; Class N, Botany; and Class O, Zoology. Class R, Useful arts, is expanded into four classes: Class R, Useful arts in general, Metric arts, Extractive and Productive arts, Chemical and Electrical arts, Domestic economy; Class S, Engineering and Building; Class T, Manufactures and Handicrafts; and Class U, Defensive and Preservative arts. Class Y, Literature, is expanded into two classes; Class Y, Literature; and Class Z, Book arts:

A	Works of reference and works of a general character covering several classes.
B	Philosophy
BR	Religion and Religions (except the Christian and Jewish)
C	Christian and Jewish religions
D	Ecclesiastical history
E	Biography
F	History and subjects allied
G	Geography and Travels
H	Social sciences
I	Sociology
J	Government, Politics
K	Legislation, Law, Woman, Societies
L	Science in general, and Physical sciences
M	Natural history in general, Microscopy, Geology, Biology
N	Botany
O	Zoology
Q	Medicine
R	Useful arts in general, Metric arts, Extractive and Productive arts, Chemical and Electrical arts, Domestic economy

S	Engineering and Building
T	Manufactures and Handicrafts
U	Defensive and Preservative arts
V	Recreative arts: Sports, Theatre, Music
W	Fine arts
X	Language
Y	Literature
YF	Fiction
Z	Book arts

THE FOURTH, FIFTH, AND SIXTH CLASSIFICATIONS

Twelve classes are subdivided for the first time in the "Fourth Classification." The remainder are all subdivided in the "Fifth Classification" with the addition of Class P for Vertebrates in Zoology. The following is a general outline of the "Sixth Classification:"

A	General works
AD	Dictionaries
AE	Encyclopedias
AI	Indexes
AM	Museums
AP	Periodicals
AQ	Quotations
AR	Reference Books
AS	Societies
B	Philosophy
BG	Metaphysics
BH	Logic
BI	Psychology
BM	Moral philosophy, Ethics
BR	Religion
BS	Natural theology
BT	Religions
C	Christianity and Judaism
CA	Judaism
CB	Bible
CC	Christianity
CE	Apologetical theology
CF	Doctrinal theology
CK	Ethical theology
CP	Ecclesiastical polity
CR	Ritual theology
CX	Pastoral theology
D	Ecclesiastical history
E	Biography
F	History
FC	Chronology
FD	Philosophy of history
FE	History of civilization and culture

	FF	Antiquities, Manners and Customs
	FI	Inscriptions
	FN	Numismatics
	FS	Chivalry
	FT	Knightly orders
	FV	Heraldry
	FW	Peerages, Nobility
G	Geography and travels	
	GE	Mathematical geography
	GS	Surveys
	GZ	Maps
H	Social sciences	
	HB	Statistics
	HC	Economics, Political economy
	I	Demotics, Sociology
	IB	Crime
	IK	Education
	J	Civics, Political science
	K	Legislation
	KL	Law
	KV	Trials
	KW	Woman
	KX	Societies
L	Sciences and arts	
	LA	Sciences (Natural)
	LB	Mathematics
	LH	Physics, Natural philosophy
	LO	Chemistry
	LR	Astronomy
	M	Natural history
	MB	Microscopy
	MC	Geology
	MD	Mineralogy
	MG	Physiography
	MQ	Paleontology
	MV	Biology
	N	Botany
	O	Zoology
	P	Vertebrates
	PW	Anthropology and Ethnology
Q	Medicine	
R	Useful arts, Technology	
	RC	Metric arts
	RCZ	Extractive arts
	RD	Mining
	RF	Metallurgy
	RG	Agriculture
	RJ	Animalculture
	RP	Animal products

RQ	Chemical technology
RT	Electric arts
RY	Domestic economy
	Constructive arts
S	Engineering
SG	Building
SJ	Sanitary engineering
SL	Hydraulic engineering
ST	Arts of transportation
SV	Railroads
T	Fabricative arts
U	Art of war
UM	Nautical arts
V	Athletic and Recreative arts
VT	Theatre
Fine Arts	
VV	Music
W	Art, Fine arts
WD	Plastic arts
WE	Landscape gardening
WF	Architecture
WJ	Sculpture
WL	Arts of design
WM	Drawing
WP	Painting
WQ	Engraving
WR	Photography
WS	Decorative arts
Arts of communication by language	
X	English language
X11	Language in general
XX	Oratory
Y	English and American literature
YD	Drama
YF	Fiction
YJ	Juvenile literature
YP	Poetry
Y11	Literature in general
Z	Book Arts
ZA	Authorship
ZD	Writing
ZH	Printing
ZK	Binding
ZL	Publishing and Bookselling
ZN	Private libraries
ZP	Public libraries
ZT	Bibliography
ZY	Literary history

An extensive list of author marks for Greek and Roman authors is given following the sixth classification. For example:

Socrates	S35
Solon	S4
Sophocles	S5
Sophon	S52
Soranus	S53
Soterichus	S55

THE SEVENTH CLASSIFICATION

The "Seventh Classification" is developed in far more detail than the sixth classification; however, the basic outline remains the same. The extensive enumeration of the seventh classification may be observed in the following example. The natural order or natural sequence of classes and facets may be noted in this example:

ZH	Printing
ZH1	Collections of lives of printers
ZH10	Printers' marks
ZH10A	Specimens and facsimiles of the work of single printers
to	
ZH10Z	(for collections see ZH11); Marks of single printers
ZH11-5	Dictionaries of the history of printing
ZH11	History of printing in general
ZH12	Origin of printing
ZH121	Celebrations of the discovery of printing
	Incunabula and block-books. <i>See</i> ZI, ZJ
ZH13	Local history of printing
to	
ZH99	Printing departments in libraries. <i>See</i> ZQX
ZHA	Material
ZHB	Paper, etc.; Water marks
ZHC	Ink
ZHD	Type, Type founding
ZHE	Specimen books
ZHF	Stereotyping and electrotyping
ZHG	Nature printing
ZHH	Logotypes
ZHJ	Composition, Type-setting
ZHK	Type-setting and type-distributing machines
ZHL	Type-founding-and-setting machines
ZHM	Proof-reading
ZHN	Imposition and locking-up
ZHP	Presses and Press-work
ZHQ	Printing of engravings
ZHR	Color printing
ZHS	Drying and folding
ZHT	Printing for the blind
ZHU	Machines for paging, numbering, addressing, etc.
ZHV	Stencils, Stamps, Rubber type
ZHW	Type-writing
ZHX	X-ray printing

The seventh classification was published in eighteen parts between 1896 and 1911 with additional revisions and corrections issued later. In this expansion Cutter used experts to develop various sections. Not all of the parts have separate indexes and there is no general index. Class A, General works, does not appear to have been changed in the seventh classification from its revision in the sixth classification. Class B, Philosophy, contains eighteen pages including an index in the seventh classification; in addition there is a separate alternative arrangement for philosophy including an expanded psychology section. Cutter was assisted by H. N. Gardiner of Smith College in the preparation of this alternative arrangement of seventeen pages with no index. The class for religion, BR–D, is represented in a separate part of sixty-seven pages including an index. The historical sciences, E–G, is a fourth part of sixty-eight pages including an index. The Social sciences, H–K, consist of 110 pages with an index. The section for international law, JX, was prepared by Theodore F. Dwight, a former librarian of the U.S. Department of State. The subclasses for law, KA–KV, were prepared by G. E. Wire for the Worcester County Law Library. Wire used the whole of class K for law although Cutter had previously reserved in the early classifications the subclasses KW for women, KX for children, and KY for societies. As a result Cutter provided two possible notations for law: his notation of KA–KV and Wire's for KA–KZ. Cutter recommended that Wire's notation be used for law libraries. Classes LB–LN for mathematics and physics were prepared by Richard Bliss, librarian of the Redwood Library of Newport, Rhode Island. This part consists of seventy-nine pages with no index. Astronomy, LR, was also prepared by Richard Bliss. It consists of eighteen pages with no index. Of this part Cutter stated, "I have made slight changes and fitted a notation." Class M for Natural history was also prepared by Richard Bliss and consists of fifty pages with no index. Subclass MV, biology, is nineteen pages in length with no index and was also prepared by Richard Bliss. Botany (N), Zoology (O–P), and Anthropology (PW–PZ) were all prepared by Richard Bliss, contain no indexes, and consist of twenty-nine, eighty-eight, and thirty-six pages, respectively. Class Q, Medicine, was the work of G. E. Wire, medical librarian of the Newberry Library. As in the case of class K for law which was also prepared by Dr. Wire, both Wire's notation and Cutter's notations are supplied. This Part is forty-five pages long with an index. The incomplete technology sections, R–T, are sixty-six pages long with no index. The manufactures section of technology TK–TW is the missing section in this part just as the subclass for chemistry, LO, is missing in the science schedules. The combative and preservative arts, U, were elaborated by F. K. Walter from the unpublished outline of Cutter. This part is twenty-four pages long and has no index. The recreative arts, V–VS, are twenty-six pages long and include an index. The expressive arts, VT–VZ, are nineteen pages long with no index. Class W, Art, is forty pages in length with an index. Classes X–Z, covering languages, literature and book arts, are 143 pages long including an index. Many of the pages for this section are in a second edition. In addition this section includes an alternative order for classes Y and Z, tables of divisions for use under any language, an extensive list of languages, four possible orders for the literature notation, a form list for collections of literature, and special developments for Shakespeare, Dante, Goethe, and Moliere.

FORM AND PLACE FACETS

Besides the use of the seven classifications, there are two major synthetic devices which may be employed. These are the form facets and place facets. The form subdivisions are introduced by a decimal point or period placed above the line. There are only nine of these numbers:

- 1 Theory of the subject
- 2 Bibliography of the subject
- 3 Biography of the subject, i.e., lives of persons connected with it
- 4 History of the subject
- 5 Dictionaries of the subject
- 6 Hand-books, etc., of the subject
- 7 Periodicals limited to the subject
- 8 Societies devoted to the subject
- 9 Collections of works on the subject by several authors

Geographical subdivision is accomplished by means of the "Local List." The Local list is an extensive list of geographical places arranged by continent and country and expanded in a decimal fashion. For example the beginning of the local list for Canada is:

80	America
81	North America
82	Canada
821	British Columbia
822	Northwest Territory
8225	Athabasca
823	Alberta
8235	Saskatchewan

These numbers may be applied whenever it is desirable to subdivide a subject geographically.

BISCOE DATE-LETTERS

Other synthetic, mnemonic devices which may be used are Biscoe Date-Letters. These were devised by W. S. Biscoe and were called by Cutter "an ingenious set of date-abbreviations." They are included in the appendix to the first six classifications of the Expansive Classification as well as in many editions of the Dewey Decimal Classification. The following is an extract of these chronological devices:

A	Antiquity, B.C.
B	A.D.-999
C	1000-1499
D	1500-1599
E	1600-1699
F	1700-1799

G	1800-1809
H	1810-1819
I	1820-1829
J	1830-1839
K	1840-1849
L	1850-1859

Cutter provides a detailed expansion of the A (Antiquity) into twenty-six subdivisions such as:

Aa	Beginning to 2000
Ab	1999-1000
Ac	999-900
Ad	899-800
	etc.

In using these tables the date-letter is substituted for as many digits as possible. For example the discovery of America would be "C492" or the battle of Gettysburg "M3." These are chronological devices which are one means of providing hospitality in array in the notation of the Expansive Classification. They may be used whenever chronological arrangement is desirable. Their expansion by decade in the nineteenth and twentieth centuries is of questionable value as their natural notational expansion ends with Z 1990-1999.

CUTTER AUTHOR-MARKS

A final device which was developed to be used with the notation of the Expansive Classification is the Cutter Author-Mark or simply the Cutter number. This is the only part of the classification which is still widely used today. Between 1891 and 1893 Cutter devised his two-figure tables in a single alphabet of all consonants except the letter S, followed by an alphabet of vowels and the letter S. These two-figure tables were expanded to three-figure tables by both Cutter and Kate F. Sanborn. She expanded the two-figure tables to three-figure tables for vowels and the letter S in 1892 and for consonants in 1895. However, she did not use Cutter's two-figure tables as the basis for her tables, so between 1899 and 1901 Cutter expanded his own two-figure tables to three-figure tables. As a result there are three different Cutter tables: the two-figure Cutter tables, the three-figure Cutter-Sanborn tables, and the three-figure Cutter tables. In addition, the use of any numerical interpolation of the alphabet is often called "Cutter numbers" and the act of using such numbers is called "Cutting."

The purpose of Cutter numbers is to allow alphabetical subdivision under individual classification numbers or categories such as fiction or biography. Cutter numbers are most commonly used to order material by the author's surname; however, in some instances they are used to alphabetize material by subject as in the case of biography. Although technically Cutter numbers may be a part of the notation used to create hospitality in array, they are usually considered to be part of the book number

and not part of the class number. In all events they are simply alphabetical devices. They may be used with any classification scheme in which alphabetical subdivision of subjects or the works of authors is desired.

Usually the Cutter number consists of the first letter (or letters) of the author's surname (or the subject) followed by the appropriate number (or numbers) from the Cutter table. For example, the English poet John Donne would receive the following Cutter number using the Cutter two-figure table: D71. This would be derived by locating the author's surname in the table. In this case the table shows:

Doll	69	Foh
Dom	71	Folg
Doo	72	Foll

Donne is between "Dom" and "Doo." The instructions included with the table call for choosing the preceding number rather than the following number. Hence the Cutter number from the two-figure table is "D71." The Cutter-Sanborn three-figure table shows for this surname:

Donk	684	Fonti
Donn	685	Fontr
Donner	686	Foo

The Cutter number from the Cutter-Sanborn three-figure table is "D685" as Donne is between "Donn" and "Donner," and "685" is the preceding number. If the Cutter three-figure table is consulted, the natural expansion of the Cutter two-figure table may be observed.

Donk	718	Folk
Donnet	719	Folke
Doo	72	Foll

In this case the Cutter number would be "D718."

These three examples demonstrate that the Cutter three-figure table is an expansion of the Cutter two-figure table while the Cutter-Sanborn three-figure table is not. These examples also demonstrate the normal three-column display used in Cutter tables. In these particular cases the letters "D" and "F" share a single column of numbers. This format was used in all editions of the Cutter tables until 1969 when Paul K. Swanson of the Forbes Library, Northampton, Massachusetts, and Mrs. Ester M. Swift, editor of the H. R. Hunting Company (the distributor of the Cutter tables) revised this format. The Swanson-Swift revision rearranges the tables into a single alphabet of two columns—one of the letters and the other of the numbers. The individual letter and figure combinations have not been changed. This format appears to be easier to use and has been applied to all three versions of the Cutter tables. (*C. A. Cutter's Two-Figure Author Table*, Swanson-Swift revision, Hunting, Chicopee, Massachusetts, 1969; *C. A. Cutter's Three-Figure Author Table*, Swan-

son-Swift revision, Huntting, Chicopee, Massachusetts, 1969; *Cutter-Sanborn Three-Figure Author Table*, Swanson-Swift revision, Huntting, Chicopee, Massachusetts, 1969.) Examples of other editions of the Cutter tables including foreign adaptations may be found in the bibliography for this article.

Criticism

GENERAL EVALUATIONS

Although Cutter's EC is practically extinct today, it is often praised and lauded. In 1959 Thelma Eaton wrote, "*Expansive Classification* was a good classification, a classifier's classification it is true but easy for patrons to use" (8). E. C. Richardson has written:

It is distinguished as being the most logical and modern in its nomenclature of the recent systems. It applies a consistent alphabetical notation in a manner which is an advance on all such attempts previously made. It is coming into use in a good many American libraries, and when the final expansion is finished and provided with an index will undoubtedly be more used still. The painstaking intelligence of subdivision and the full description of exact meaning of what is intended to be included under the subdivision are of the highest order, both of scholarship and method. The author's unsparing industry and unwearied enthusiasm for his scientific aim and the welfare of libraries have produced a really scientific (though of course not perfect or final) work of high value, the appreciation of which on the part of others is all the more cordial because of the modesty and unaffected altruism of its author (9).

British classificationist W. C. Berwick Sayers writes:

The modest volume containing the First Six Classifications is a model of the simple statement to which I wish we could all attain in writing of classification. It proceeds in the manner of an essay from table to table with introductory explanations, clear indications of the compass of terms where this seems useful, and examples of the application of class-marks. If my suggestion that to lay two schemes side by side and to study them comparatively will clarify our understanding of both is correct, the assertion I made many years ago, that the scheme has all the virtues we have premised in a good classification of elucidation and suggestion in relation to other schemes, will not seem altogether vague. I asserted further that "it answers the soundest canons of construction in a remarkable degree" (10).

Henry Evelyn Bliss, the creator of the Bibliographical Classification, disagrees with both Richardson and Sayers. He states,

The first statement seems too sweeping, while too vague to criticise; but the last statement is positive. We deny it positively, and this denial rests on all that we have written in our chapter of criticism. The remarkable thing is that this classification should have been regarded as sound or scientific or practical. What is meant by these attributes? They are merited tribute, not discerning criticism (11).

Yet Bliss goes on to write,

here lies the library classification that has embodied *some* valid principles and has served as a stepping-stone to the future. Those principles, tho imperfectly embodied, have been in a sense prophetic, and they have aided to redeem the problem from the "subject-index illusion." High respect and gratitude are due from those who have followed (12).

THE SCHEDULES

For its time EC is a very specific system with many exhaustive classes. Cutter wrote of this feature:

The seventh classification was tested before printing by actually classifying 150,000 volumes, and I afterwards found, by careful comparison of one section (social sciences) with the books on the shelves of the British Museum, that a careful selected library of that size contains very nearly all the subjects that the immense museum has. If I remember right, all my search gave me but one new subject-heading (13).

But as Bliss points out, "Scientific detail does not make a scientific system" (14).

Another important feature of the classification is the sequence and coordination of the classes. Cutter states of this:

The expansive classification follows the evolutionary idea throughout, in natural history putting the parts of each subject in the order which that theory assigns to their appearance in creation. Its science proceeds from the molecular to the molar, from number and space, through matter and force, to matter and life; its botany going up from cryptograms to phanerograms; its zoology from the protozoa to the primates, ending with anthropology. The book arts follow the history of the book from its production (by authorship, writing, printing, and binding), through its distribution (by publishing and bookselling), to its storage and use in libraries public and private, ending with its description, that is, bibliography, suitably divided into general, national, subject, and selective (13).

In this respect also, Bliss has criticisms:

The scheme divides serially into four main divisions: Philosophy, History, Science, and Art. But these divisions, while basic and valid, should each parallel the whole series of subject graded by speciality, as we have shown; and this should imply a cross-classification. Tho the order of the main classes was indeed logical and philosophic, it was not correctly scientific even for the science of its decade, and the less so for the present. It logically carries out to unscientific conclusions the division of science from philosophy, which has been found untenable and impractical in handling the problems, the studies, and the books (11).

In short, Bliss feels that EC does not meet the educational and scientific consensus of even the late nineteenth century.

NOTATION

The brevity of the notation is due largely to the length of the base. William P. Cutter points this out:

The use of the letter notation results in simplicity. The single letters of the alphabet furnish 26 great subdivisions; the addition of a second letter allows each of these to be again divided into 26 or 702 in all; the third letter furnishes 26 divisions of each of these, or a grand total of 14,304; finally, the fourth letter furnishes 367,280 total subdivisions. To allow of such minute subdivision on a decimal system requires six figures (15).

In addition it may be noted that the use of the common facets for form divisions and geographical divisions further increases the power of EC's notation. These may be interpreted as discernible facet indicators. "Figures are used only either to indicate form subdivisions (where the digits 1 to 9 are used), or geographical subdivision (where the numbers 11-99 are used). These subdivisions by numerals are common to all classes, even the most minute, and cannot be mistaken for subject divisions" (15). However, it must be recognized that in some expansions of the notation letters are used as further subdivisions of the Local List. New York City may be represented as 851N or 851A. The second notation demonstrates that New York City is the chief city in New York State.

Another possible criticism of the notation is that it is not consistently hierarchical. This may be seen in the preceding examples of tables. Bliss says of this, "Sometimes the more general subject thus has a longer mark than subjects logically subordinate to it: the general sub-science, Mechanics, has the mark LHE, while the special subject, Dynamics of a Particle, has LI" (16).

There are two other criticisms of EC that should be noted. First, there is no general index to the seventh classification. Even the index to the first six classifications compiled by Harriet E. Green is of little use with the seventh because of the extensive revisions in the seventh classification. Second, the typography of all seven classifications is difficult to use. A great many sizes and styles of type are used to distinguish different aspects of the classification. Many of these distinctions are not obvious to the user. Also, there is a pattern of interchanging lower-case letters and small capitals.

Use and Influence

At the turn of the century EC was used in many American libraries. The University of Wisconsin library adopted EC in 1893 and continued to use it until 1953. Many other libraries using EC reclassified to another system earlier than Wisconsin. Writing in 1959, Thelma Eaton surveys the use of EC by American libraries:

At the time of the 1893 report, eighteen of the 127 large libraries (libraries with collections of 25,000 volumes or more) were using Cutter's classification.

Several of the reporting libraries were in the process of adopting the sixth classification which had just been completed. Others reported that they had adopted the scheme as planned for the Boston Athenaeum and had been using it for a number of years. Only one library expressed dissatisfaction with the scheme; the Peabody (Massachusetts) Institute of Technology would have preferred a simpler scheme. Unfortunately there is no record of the number of libraries with less than 25,000 volumes that were using the *Expansive Classification*, but some early experimental applications were made in the public library of Winchester, Massachusetts, and it is believed that other small libraries in that state adopted the scheme. The A.L.A. survey of 1920-22 reported that twenty of the 1243 public and semi-public libraries included in the survey used Cutter's classification. The same survey stated that only four of the 261 college and university libraries had adopted the scheme. These figures are obviously incomplete since replies to the questionnaire used in the 1953 survey accounted for at least thirteen college and university libraries which were still using *Expansive Classification* as late as 1925. In a biography of his uncle, which W. P. Cutter published in 1931, is a statement that a total of at least one hundred libraries were using the scheme at the date of writing the biography. The libraries are not listed but we assume that his is an approximately correct figure for the period. Since libraries were unlikely to change from another scheme to Cutter's in the period between 1924 and 1931 it must be assumed that the twenty-four public and academic libraries reported by the A.L.A. survey must represent incomplete returns. The 1953 survey of college and university libraries found the *Expansive Classification* in only four of the 744 libraries reporting. The 1955 survey of public libraries, with collections of 25,000 volumes or more, found Cutter's scheme used, in whole or in part, by fifteen of the 863 libraries. As there was no record for libraries with less than 25,000 volumes in 1893 so there is no record for the smaller public libraries sixty years later (17).

In 1972 it may be rightly assumed that EC is not used in any large libraries and probably not used at all. As Arthur Maltby wrote in 1967, ". . . it has been steadily abandoned by those libraries using it in the United States today, because it is now obvious that it will never be finished or brought up to date" (18).

Although EC is not in use today, its influence on other classification systems and classification theory is noteworthy. Maltby says, "Its influence on both the Congress classification and on Bliss' own system has been strong" (18). The influence of EC on Bliss has been previously mentioned in the criticism section of this article. The influence of EC on the Library of Congress classification may be directly seen in the development of the bibliography and library science class of LC, *Class Z: Bibliography and Library Science*. Further EC served as the basis for the general outline of classes of LC (19). (See *Library of Congress Classification*.)

Cutter's concept of evolutionary order, his use of synthetic devices, especially the Local List, and his attempts to use clear facet indicators in his notation are important contributions to classification theory. EC does represent the most detailed enumerative classification system of the late nineteenth century. Its importance lies both in its detail as well as its contributions to other systems and to classification theory.

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JOHN PHILLIP IMMROTH

EXPORTATION AND IMPORTATION OF BOOKS AND PERIODICALS

International trade in books and periodicals has grown rapidly since World War II. Extrapolation of United States Government and UNESCO statistics indicate that world trade in these products reached a new high of approximately \$800 million in 1970. Although constituting less than 1% of total international transactions in all manufactured products, foreign trade in books and periodicals has an impact far beyond the currency generated by the world's printers and publishers. These publications convey the world's knowledge, culture, and ideas; their transmission across national boundaries influences the affairs of men and countries. Pragmatically, books and periodicals are termed "export promotive:" for example, United States-published technical books and trade magazines that are purchased by overseas readers provide a receptive climate for the exports of many United States manufactured products.

The rapid growth of book publishing within the developed countries of the world has stimulated the expansion of book exports and imports. If books are indeed one measure of a country's civilization, it is evident from the available statistics that the international transfer of these measures of culture and knowledge are increasing at an unprecedented rate.

In 1968, the most recent year for which detailed information is available, book exports of twenty industrialized countries totaled \$575 million—more than double 1963s estimated export volume of \$214 million. Table 1 shows the trade in book exports of seven major publishing countries in 1968. These seven countries account for

TABLE 1. Exports of Books of Major Publishing Countries, to Selected Markets, 1968
(In thousands of dollars)^a

Selected markets	United States		United Kingdom		West Germany		Spain	Italy	Japan
	United States	United Kingdom	France	Germany	Spain	Italy			
North America, total ^d	63,424	29,493	14,528	11,877	3,348	4,322	5,247		
Canada	63,424	5,317	10,088	860	158	739	166		
United States	^b	24,176	4,440	11,017	3,190	3,583	5,081		
South America, total ^d	7,934	1,068	2,452	1,077	28,722	565	382		
Mexico	2,222	336	627	172	5,266	168	139		
Colombia	235	67	97	29	3,387	9	°		
Venezuela	416	146	162	84	4,685	228	16		
Peru	377	42	52	53	1,664	6	3		
Chile	1,025	104	212	126	4,392	8	7		
Brazil	3,059	134	528	389	1,164	64	137		
Uruguay	5	8	58	14	802	1	1		
Argentina	595	231	716	210	7,362	81	79		
Europe, total ^d	31,495	9,086	27,455	49,065	2,510	17,037	2,204		
Sweden	507	704	159	919	122	417	27		
Finland	59	124	37	372	°	599	1		
United Kingdom	16,213	^b	1,534	3,381	678	2,818	1,348		
Ireland	246	2,642	16	29	°	3	49		
Netherlands	2,734	1,998	1,234	4,191	151	1,196	260		
Belgium-Luxembourg	845	450	12,152	2,097	°	396	59		
France	608	586	^b	4,377	340	6,909	101		
West Germany	2,016	1,344	1,185	^b	640	1,728	173		
Austria	55	93	67	12,364	°	65	3		
Switzerland	598	268	8,246	18,450	211	2,309	25		
Spain	501	331	1,235	518	^b	597	13		
Italy	7,113	546	1,590	2,367	368	^b	145		
Asia, total ^d	38,794	29,167	2,341	3,143	°	448	3,320		
Lebanon	126	221	1,570	37	°	4	67		
India	855	2,168	13	93	°	7	516		
Malaysia-Singapore	402	1,907	2	5	°	3	175		
Philippines	2,840	450	2	6	°	5	330		
Republic of Korea	568	25	15	14	°	1	874		
Hong Kong	253	1,287	6	11	°	1	204		
Japan	22,307	1,739	622	2,017	°	53	^b		
Australia	10,113	17,785	96	675	°	347	963		
New Zealand	1,330	3,585	15	285	°	27	191		
Africa, total ^d	3,146	6,138	5,375	481	°	513	77		
Morocco	1	2	1,413	3	°	°	°		
Algeria	8	3	3,870	9	°	392	°		
Nigeria	82	1,840	9	12	°	11	1		
Republic of South Africa	3,055	4,293	83	457	°	110	76		
Total, all countries	151,623	38,125	65,047	70,264	38,989	24,168	15,765		

^a Market Share Report on SITC No. 892.11.2—Books, Bureau of International Commerce, U.S. Department of Commerce. U.S. exports derived from data supplied by the Bureau of the Census. ^b Not applicable. ^c Not available. ^d Includes only the countries listed under each heading. ^e Less than \$1,000.

TABLE 2
United States Exports of Books, 1969

	Totals (\$)	Textbooks, workbooks, and standardized tests (\$)	Technical, scientific, and professional books (\$)	Bibles, testaments, and religious books (\$)	Dictionaries (\$)	Encyclo- pedias (\$)	All other books, not elsewhere classified (\$)
North America, total	76,982,251	22,630,993	11,392,373	2,126,587	934,482	6,804,760	33,093,056
Canada	72,325,007	21,353,726	11,194,968	1,354,136	773,655	5,495,969	32,152,553
Mexico	2,346,653	533,813	103,862	371,943	91,524	870,747	374,764
Guatemala	153,521	62,635	2,892	39,385	5,780	24,710	18,119
British Honduras	20,100	17,419		2,681			
El Salvador	60,930	20,445	3,904	12,403	2,632	8,800	12,746
Honduras	112,669	19,956	15,568	15,917	9,180	30,000	22,048
Nicaragua	76,995	35,054	1,485	4,800	3,040	26,100	6,516
Costa Rica	76,315	18,765	6,488	6,554		32,221	12,287
Panama	583,746	271,298	37,233	80,271	23,532	114,238	57,174
Bermuda	110,448	24,232	1,650	1,156		2,950	80,460
Bahamas	262,925	49,338	6,606	40,553	2,209	18,862	145,357
Jamaica	285,608	51,124	7,121	68,108	10,664	95,064	53,527
Haiti	18,620	5,952		10,933			1,735
Dominican Republic	310,630	143,418	4,963	30,872	11,416	60,045	59,912
Lecward and Windward Islands	25,611	2,050		16,071			7,490
Barbados	76,273	1,987	643	10,596			63,047
Trinidad	106,683	14,658	3,235	53,604	850	21,050	13,286
Netherlands Antilles	23,411	5,123	1,755	3,908		4,000	8,625
French West Indies	6,106			2,696			3,410
South America, total	7,364,870	556,125	459,590	1,407,258	1,021,456	2,727,106	1,193,335
Colombia	624,840	117,035	46,551	130,669	135,184	41,190	154,211
Venezuela	1,006,716	182,034	71,853	84,121	103,907	277,938	286,863
Guyana	19,228	5,729	2,492	6,755			4,252
Surinam	14,084	1,100	8,600	3,914			470
French Guiana	522			522			
Ecuador	23,208	6,265		10,465			6,478

Peru	645,436	81,611	38,621	135,737	71,873	269,644	47,950
Bolivia	30,938	3,530	13,262				14,146
Chile	741,782	45,373	70,508	107,748	17,978	475,227	24,948
Brazil	2,802,025	69,389	133,551	791,646	585,520	1,010,739	211,180
Paraguay	2,406	2,406					
Uruguay	7,830	2,582	1,436	3,812			
Argentina	1,445,855	39,071	72,716	131,869	106,994	652,368	442,837
Europe, total	32,711,947	8,244,964	7,402,159	1,164,887	406,510	5,281,315	10,212,112
Iceland	17,231	1,310	4,296				11,625
Sweden	480,696	97,928	106,311	22,528	5,048	146,968	101,913
Norway	142,538	42,532	13,014	6,322	1,005	330	79,335
Finland	24,660	2,314	9,199	204			12,943
Denmark	217,974	28,404	33,471	12,935	5,040	5,340	132,784
United Kingdom	16,835,890	6,217,343	4,958,958	391,209	109,766	531,986	4,626,628
Ireland	114,720	23,531	9,578	55,862	1,805	9,600	14,344
Netherlands	2,833,038	796,418	884,260	34,399	8,015	1,394	1,108,552
Belgium	769,463	116,478	130,072	43,209	30,000	296,528	153,176
France	595,733	76,792	130,880	196,199	8,000	53,586	130,276
West Germany	2,461,897	605,184	741,799	74,704	92,856	360,167	587,187
East Germany	79,633	75,000	4,633				
Austria	33,645	1,526	8,651	2,741			20,727
Czechoslovakia	7,062		4,312				2,750
Hungary	2,381		2,381				
Switzerland	624,009	49,912	182,996	20,130	15,140	46,835	308,996
Poland	11,172		600		9,572		1,000
U.S.S.R.	2,100						2,100
Spain	619,667	24,404	18,054	160,145	28,648	221,710	166,706
Portugal	157,541	1,914	1,154		4,500	112,545	37,428
Malta	1,355	755					600
Italy	5,922,547	54,983	109,292	141,450	42,190	2,907,006	2,667,626
Yugoslavia	3,736		2,436				1,300
Greece	209,231	19,475	29,370	2,400	14,775	106,225	36,986
Rumania	5,336	200					5,136
Turkey	497,492	8,561	16,442		24,400	446,095	1,994
Cyprus	41,200			450	5,750	35,000	

(continued)

	Textbooks, workbooks and standardized tests (\$)				Technical, scientific, and professional books (\$)	Bibles, testaments and religious books (\$)	Dictionaries (\$)	Encyclo- pedias (\$)	All other books, not elsewhere classified (\$)
Totals (\$)									
Asia, total	43,260,084	4,659,394	4,803,330	1,121,685	737,684	24,725,541	7,212,450		
Syria	11,541	1,713	9,828						
Lebanon	126,948	42,113	13,840	1,936	1,440	12,879	54,740		
Iraq	50,525	13,614	35,911				1,000		
Iran	128,742	58,669	34,850				21,812		
Israel	714,198	33,232	83,066	230,780	11,760	55,638	299,722		
Jordan	12,893	1,000	10,237				1,656		
Kuwait	65,823	15,149	25,374		8,500	15,500	1,300		
Saudi Arabia	125,975	62,371	12,678		2,181	2,671	46,074		
Arabia Peninsula States, n.e.c.	10,506	9,192					1,314		
Aden	500		500						
Bahrain	200						200		
Afghanistan	8,241	6,941	1,300						
India	1,709,775	520,779	281,593		8,152	136,530	760,367		
Pakistan	236,012	104,218	52,782		2,203	11,836	64,513		
Nepal	568	568							
Ceylon	13,609	4,222	578			5,709	3,100		
Burma	85,155	27,447	35,369			540	21,799		
Thailand	906,709	90,816	86,032		4,751	404,902	289,988		
South Vietnam	309,864	215,677	38,894			29,960	24,173		
Malaysia	266,336	61,470	22,183			119,510	53,447		
Singapore	314,274	26,472	50,257		13,766	117,726	78,526		
Indonesia	386,019	50,189	18,409		14,418	289,018	11,835		
Philippines	3,918,124	1,247,083	484,956		42,932	969,734	932,678		
Republic of Korea	744,456	102,076	143,841			425,631	58,328		
Hong Kong	267,558	26,162	21,650		6,976	121,612	80,958		
Taiwan	40,914	3,940	26,929		2,066	775	6,514		
Japan	23,152,784	434,534	1,515,377	44,415	415,250	19,961,910	781,298		
Nansei and Nanpo Islands, n.e.c.	11,152	4,376		3,547			3,229		
Australia	8,696,581	1,279,267	1,714,715	485,347	117,181	1,935,477	3,164,594		
New Guinea	10,860	1,933	5,394	3,333		200			
New Zealand	833,377	150,495	69,517	41,696	47,530	83,610	440,529		
British West Pacific Islands	24,215	6,396		6,451		708	10,660		
French Pacific Islands	3,579	748					2,831		
	70,071	52,539	7,970		1,050	1,653	4,666		

Africa, total	5,821,947	743,270	582,393	456,606	247,011	2,832,487	960,180
Morocco	8,636	1,126	1,010				6,500
Algeria	5,332	2,406	600				2,326
Tunisia	4,910	4,910					
Libya	38,447	17,677	11,190				9,580
Egypt	209,369	102,880	57,751	1,500		5,684	41,554
Sudan	30,477		30,477				
Cameroon	10,253	2,256		7,997			
Senegal	294			294			
Sierra Leone	11,581	6,079		5,248			254
Ivory Coast	2,588		1,482	592			514
Ghana	102,752	31,795	13,897	21,736	258	19,633	15,433
Togo	838			838			
Nigeria	165,401	43,693	12,579	96,703			12,426
Central African Republic	620			620			
Gabon	678			678			
Western Africa, n.e.c.	5,050	2,364		2,686			
Angola	1,088,846	2,640	59,530	65,300	42,200	815,000	104,176
Liberia	146,856	94,309	26,227	3,125	324	1,577	21,294
Congo	9,443	861	840	7,742			
Burundi and Rwanda	224	224					
Somali Republic	4,257	1,812	1,500				945
Ethiopia	114,487	59,834	30,000	11,719	1,000		11,934
Uganda	10,734	9,234	1,000				500
Kenya	50,896	10,823	7,389	20,291			12,393
Tanzania	19,165	17,348	754				1,063
Mauritius and Dependencies	3,232	955					2,277
Mozambique	184,749	308	16,841	6,600	12,000	133,000	16,000
Malagasy Republic	2,887	214		2,673			
Republic of South Africa	3,530,103	306,724	307,253	176,061	191,229	1,857,593	691,243
Zambia	31,904	8,643	1,813	14,512			6,936
Rhodesia	11,333	3,000	260	7,673			400
Malawi	13,173	11,155		2,018			
Southern Africa, n.e.c.	2,432						2,432
Total, all countries	166,141,099	36,834,746	24,639,845	6,277,023	3,347,143	42,371,209	52,671,133

approximately two-thirds of the world's trade in books. The average annual rate of book export growth over the 5 year 1963–1968 span came to just under 22% per year. This increase in the international trade in books is all the more remarkable in view of the current chaotic structure of international copyright, the continuance of trade barriers to books, and signs of an increase in the piracy of intellectual property.

Virtually all major nations have a sizeable international trade in books, but works in the English language are by far the most popularly traded item. The products of authors and publishers in either the United Kingdom or the United States account for more than 40% of all exported books. The United States is the dominant figure in the international book market; total United States exports reached \$175 million in 1970, while United States book imports in the same year came to \$92 million.

Few countries break down their foreign trade in books according to specific, market-oriented classifications. The United States is an exception, and the data in Table 2 provide a convenient tabulation of total United States book exports to all countries in 1969. The table identifies 126 countries that received at least \$200 worth of United States books in that year. As noted in Table 2, the principal markets for United States books were Canada (particularly sales of textbooks and professional books), Japan (encyclopedias), the United Kingdom (textbooks and professional books), Australia, and Italy. Each of these countries purchased at least \$5 million worth of United States books in 1969.

Although the United States is the leading book exporter in terms of total dollar volume, the immense size of the domestic United States book market absorbs about 92% of all United States published books. Thus United States book exports of \$175 million in 1970 represented no more than 8% of the total of all United States books published in that year. In contrast, several countries allocate up to one-half of their entire annual book production to the international marketplace. Spain is perhaps the prime example of such planning. Spanish book exports of \$39 million in 1968 represented 51% of that country's total book sales of \$76 million for the year. One of every two books published in Spain in 1968 was exported—mostly to the countries of Latin America.

The relationship of book exports to total book sales for selected countries is shown in Table 3.

The physical distribution of book exports is generally accomplished in one of three ways: (1) individual book or small parcel shipments direct from the publisher to the foreign purchaser; (2) large bulk shipments of books, usually valued in excess of \$200, from an individual publisher to either a local foreign distributor or the publisher's foreign subsidiary; or (3) the publisher engages an international book distributor to be responsible for the publisher's entire international marketing function. The publisher, particularly of trade books, is usually inclined to rely on an established international distributor for the initial sale of his books overseas. It may well occur, however, that strong sales to a particular geographic area encourages the publisher to establish a local subsidiary abroad to service that particular market.

Table 1 identifies not only the seven major book exporting nations, but also indi-

TABLE 3
Book Exports Related to Total Book Sales in Selected Countries^a

Country	1968 book exports (in million \$)	Book exports as a per cent of total sales
Spain	39.0	51
United Kingdom	88.1	26
France	65.0	21
West Germany	70.3	10
United States	151.6	7
Italy	24.2	7
Japan	15.8	3

^a U.S. Department of Commerce, *Market Share Report on SITC 892.11,2—Books*.

cates the principal markets for book imports. With few exceptions the major book exporting countries are likely to be the leading book importers as well. Some major countries which import more books than they export are Australia, Canada, India, and Japan. The United States imports more books than any other country; during 1970 the United States purchased over \$92 million in books (see Table 4) from foreign countries. Table 5 lists those countries which sold over \$1 million in books to the United States in 1970.

The growth of both United States book exports and imports for the years 1935 to 1970 are illustrated in Figure 1. The United States growth pattern is not unlike those of most major publishing countries. International trade in books has accelerated since 1955.

As articles of importation, books continue to face both tariff and nontariff barriers in many countries of the world. The Florence Agreement, a UNESCO-sponsored instrument providing for the removal of tariffs and other obstacles to the importation of books, newspapers, periodicals, and selected other educational, scientific, or cultural materials, has been effective in eliminating duties on these articles. However, the agreement has faced certain problems: (1) some major importing nations, such as Canada, have yet to sign the Agreement, and (2) tariffs have been less of an import barrier to the trade of books and periodicals than other obstacles including currency and exchange restrictions, border taxes and surcharges, and problems of censorship. The protectionist tendencies and limited monetary resources of the world's lesser developed countries frequently force these countries to adopt such obstacles, but to assume that the world's poorer countries have a monopoly on nontariff barriers would be a mistake. The United States, for example, forbids the importation of more than 1,500 copies of a United States-authored work unless the book was printed and bound within the geographic confine of the United States. In 1970 the U.S. Department of Commerce examined nontariff barriers in fifty-three major book importing countries. Table 6 ranks the most common barriers to book imports and indicates the frequency with which such barriers were cited.

TABLE 4
United States Book Trade With All Countries, 1935-1970 (Dollars) ^a

Year	Imports	Exports
1970	92,022,837	174,936,928
1969	78,352,540	166,141,099
1968	68,391,884	151,623,195
1967	69,241,912	143,193,226
1966	59,738,609	120,803,303
1965	46,852,971	99,322,588
1964	42,999,284	88,642,210
1963	37,836,951	77,746,675
1962	31,904,301	65,113,619
1961	24,063,249	56,966,054
1960	20,749,821	51,232,037
1959	17,444,326	44,707,626
1958	14,867,540	39,003,227
1957	13,471,094	36,576,036
1956	11,355,353	30,871,227
1955	8,727,534	21,628,222
1954	8,461,097	25,378,455
1953	8,195,346	23,911,986
1952	8,460,531	20,490,736
1951	7,074,654	18,821,732
1950	7,153,793	16,100,785
1949	6,523,830	20,427,531
1948	5,644,285	20,271,324
1947	4,387,025	24,294,851
1946	3,700,529	19,406,151
1945	1,930,863	12,035,736
1944	1,595,805	8,913,049
1943	1,375,057	7,020,325
1942	1,331,417	5,080,131
1941	1,811,944	4,907,879
1940	2,444,786	4,495,950
1939	3,251,485	5,010,456
1938	3,574,102	5,543,646
1937	3,804,694	5,514,063
1936	3,465,554	4,297,136
1935	3,697,852	4,052,680

^a Bureau of the Census, U.S. Department of Commerce.

Despite the persistence of barriers to book importation, the Florence Agreement remains the publisher's principal weapon in the war on trade obstacles. There are growing signs that UNESCO intends to strengthen the Florence Agreement through the inclusion of articles designed to reduce or prohibit barriers such as currency or exchange controls. This admirable goal would further encourage the flow of books and periodicals, and bring the exchange of knowledge and ideas closer to the peoples of all countries.

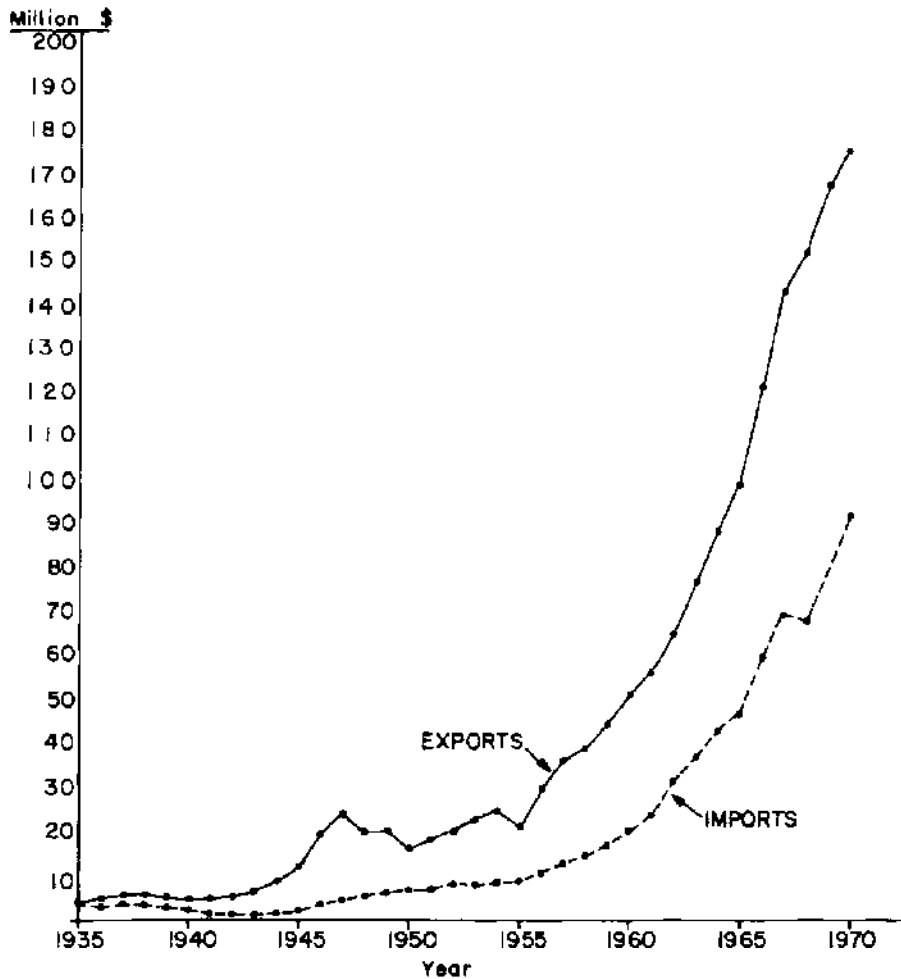


FIGURE 1. *United States foreign trade in books, 1935-1970.* (Source: Bureau of the Census, U.S. Department of Commerce.)

Rising levels of income and education, coupled with increased interest in the events and societies of other countries, have brought about a surge in the foreign trade of periodicals. The current volume of international periodical exports is estimated to be in the vicinity of \$300 million, although no accurate statistics are available. Newspaper and periodical exports are grouped together by the statistical collecting agencies, including the United Nations; thus world trade in periodicals must be estimated from the combined newspaper/periodical data.

On the basis of just such estimates it appears that international exports of periodicals expanded at the rate of 9.5% in the period 1964-1968. Table 7 shows the exports of newspapers and periodicals by seven major periodical publishing countries to twenty-one principal markets. In order to ascertain what per cent of this volume is attributable solely to periodicals, statistics relating to United States newspaper and periodical exports may be instructive. The United States Government's Bureau of the Census maintains separate data for newspaper and periodical exports and imports; thus of the \$83 million in total United States newspaper and periodical exports shown in Table 7 periodical exports alone account for 96% or \$80 million of

TABLE 5
Major Book-Exporting Countries to United States in 1970^a

Country	Total U.S. book imports (\$)	U.S. book imports, non-English language (\$)
United Kingdom	33,919,226	152,995
Netherlands	8,871,190	1,509,314
Japan	7,883,459	309,460
West Germany	7,242,679	2,610,998
Italy	6,690,372	398,144
Canada	5,355,159	132,186
France	4,120,552	1,326,308
Switzerland	4,102,388	134,783
Spain	3,598,730	2,312,397
Mexico	1,537,761	1,350,654
Total, all countries	92,022,837	11,802,707

^a Bureau of the Census, U.S. Department of Commerce.

this total volume. While the relationship of United States periodical exports to United States newspaper exports may be higher than that relationship encountered in other countries, it is evident that upwards of 90% of the individual export values shown in Table 7 represent shipments of periodicals.

While the foreign trade in books is roughly double the international trade in periodicals, a comparison of Tables 1 and 7 reveals some significant items. France, West Germany, and the United States are among the four leading book and periodical publishing countries. The United Kingdom, ranking second in book exports in 1968 with \$88 million in shipments, drops to fifth place among periodical exporting countries with 1968 newspaper and periodical exports of \$27 million. Italy, sixth in world book exports (\$24 million), ranks fourth in newspaper and periodical exports (\$42 million).

The United States is the world's leading exporter of magazines. Data for 1970 indicate that United States periodical exports climbed to \$84 million, a gain of 6%

TABLE 6
Common Barriers to Book Imports^a

Import barrier	Frequency of mention
Turnover taxes	46
Exchange controls	20
Licenses	13
Import regulations	10
Exchange permits	8
Counsular invoice required	4
Censorship	2

^a Bureau of Domestic Commerce, U.S. Department of Commerce.

TABLE 7
Exports of Newspapers and Periodicals by Major Publishing Countries to Selected Markets,
1968 (in thousands of dollars) ^a

Selected markets	United States	West Germany	France	Italy	United Kingdom	Belgium and Luxembourg	Netherlands
Canada	53,207	565	3,945	170	807	97	211
United States	^b	2,912	2,112	370	1,028	25	1,090
Mexico	2,922	107	76	60	6	"	1
Venezuela	2,141	182	61	143	8	"	1
Brazil	386	671	223	355	41	"	7
Sweden	547	827	353	69	296	1	299
Norway	171	281	205	4	243	"	8
Denmark	151	857	266	35	230	1	12
United Kingdom	4,455	1,298	1,878	3,168	^b	38	644
Ireland	46	4	163	^c	4,647	1	54
Netherlands	1,255	3,420	1,141	509	664	3,464	^b
Belgium-Luxembourg	328	3,249	12,489	863	538	^b	6,254
France	946	3,001	^b	27,767	1,098	22,495	166
West Germany	1,043	^b	1,395	2,649	1,383	145	1,697
Austria	41	11,045	261	130	101	2	21
Switzerland	632	9,255	7,224	3,762	575	221	132
Spain	47	849	2,490	286	752	12	90
Italy	364	3,258	2,424	^b	472	14	115
Australia	2,111	314	82	162	6,303	^d	17
New Zealand	636	30	6	23	1,800	"	2
Republic of South Africa	852	400	416	126	2,430	"	44
Total, all countries	81,013	48,569	47,734	42,282	27,496	26,602	11,172

^a *Market Share Report on SITC No. 892.2—Newspapers & Periodicals*, U.S. Department of Commerce. U.S. exports derived from data supplied by the Bureau of the Census.

^b Not applicable.

^c Not available.

^d Less than \$1,000.

over 1969. Canada is the principal market for United States periodicals; in 1970 Canadian purchases of United States magazines came to \$56 million or exactly two-thirds of the value of total United States periodical exports. Table 8 lists United States exports of magazines to seventeen major markets in 1970.

Unlike United States book exports, shipments of periodicals are not classified by broad subject category, e.g., business, consumer, general interest, and newsweeklies. There is a general consensus that certain types of United States periodicals are meeting increased foreign demand. For example, United States publishers of business magazines have not been unaware of the international business world's growing interest in United States management skills and technical expertise; demand for United

TABLE 8
United States Periodical Exports to Seventeen Major Markets, 1970^a

Country	U.S. periodical exports (\$)
Canada	56,163,310
United Kingdom	4,412,327
Australia	3,402,765
Mexico	2,705,841
Venezuela	2,166,388
Japan	1,201,783
West Germany	1,187,918
Netherlands	1,056,789
Panama	1,045,165
Republic of South Africa	836,608
France	733,369
New Zealand	718,316
Colombia	649,286
Argentina	640,496
Peru	554,519
Uruguay	527,743
Belgium-Luxembourg	512,049
Total, all countries	83,674,422

^a Bureau of the Census, U.S. Department of Commerce.

States publications concentrating in these areas are reaching new circulation levels. Latin America is proving to be a strong market for women's and general interest periodicals. And United States newsweekly magazines have received growing acceptance from virtually all countries interested in the events and activities of the American population.

While coming under the general free trade tenets of the aforementioned Florence Agreement, imported periodicals face many of the same trade barriers as those encountered by the importer of books. There are, however, some additional difficulties confronting publishers of periodicals. The timeliness of a periodical is important to many of its readers. Thus delays in delivery to a foreign market are of far more consequence to a periodical publisher than to a publisher of books. Postal and transportation costs are an additional factor; these expenses are major items to periodical publishers and it is difficult to price the imported magazine high enough to cover these costs yet maintain a price level that remains within the means of the audience towards which the magazine is directed. Use of lighter-weight, "air mail" printing paper for those editions mailed abroad help to reduce this important distribution cost.

The United States ranks fifth among periodical importing countries; the top four—in order of ranking—are France, Canada, Belgium, and Switzerland. Table 9 shows total United States periodical imports for 1970 and twelve principal supplying countries.

Imports of magazines to the United States have jumped in the last 3 years: to \$17

TABLE 9
Periodical Imports to United States in 1970*

Country	U.S. periodical imports (\$)
United Kingdom	7,381,779
Mexico	2,837,922
Canada	2,477,015
Japan	937,570
France	764,657
Venezuela	719,745
Netherlands	433,446
Italy	344,835
West Germany	320,426
Switzerland	184,109
Lebanon	150,239
Israel	148,960
Total, all countries	16,894,647

* Bureau of the Census, U.S. Department of Commerce.

million in 1970 from \$4 million in 1967. As noted in Table 9, above half of this import volume comes from the United Kingdom.

The expansion of knowledge, and the need for its dissemination in a concise, timely format, has given impetus to international periodical publishing. The quest for more efficient methods of distribution and the possibility of greater access to air freight transportation—at lower costs—are foremost considerations in the minds of many publishers. One possibility to solving these problems rests with the continued development of micropublishing. The mailing of microfiche, which would contain all the editorial material—and advertisements—of the printed periodical may well have an important place in the periodical publishing community of the future.

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WILLIAM S. LOFQUIST

EXTENSION WORK, PUBLIC LIBRARY

The advent of the electric light (1879) was probably the greatest single contribution to the extension of library service. The artificially longer day made possible the pursuit of reading and with that the need for reading materials. But the pattern of public library service was fixed when the first major public library, the Boston Public Library (1851), established that the book, like fire and police protection, stopped at the city limits. The governing factor then, and now, was funding. It was the genius, Melvil Dewey, who developed the means of providing reading materials to those beyond city lines. In 1891, Mr. Dewey persuaded the New York State Legislature to create and fund a system of traveling libraries.

When librarians decided that the use of the library should be encouraged and the user made welcome, the extension of library service began. Prior to this traumatic change in attitude, the librarian's role was that of collector, cataloger, and custodian.

Library extension is that informal service which continues in the spirit expressed in the annual report of the Washington County Library, Hagerstown, Maryland, for 1901-1902. There Miss Mary Titcomb wrote: "Before we rest content, every home in the county must be the recipient of its benefits. To this end we need more branches, home libraries for clusters of homes remote from any rural centers, closer relations with schools and more particularly work with children."

The goal of extension work has never been in doubt. In 1911, James L. Gillis, California State Librarian expressed it as well as it has ever been expressed: "The only result that counts is service to all." The basic problems of extension work involves these elements: the governmental unit for financial support, the enabling legislation, the assignment of the responsibility for providing service, the delivery of the service, and the audience. There is one element that cannot be legislated, yet has contributed most to extension service: the inclination and energies of those involved.

The state library or its counterpart is the oldest agency providing specific library extension activities. This agency dates from the early 1890s though formal designations varied. In addition to the state library as such, there were state library commissions, library divisions of state departments of education, and state university extension divisions. Their charge ranged from a responsibility for providing direct services to individuals to the development of both public and school library service. The state library has not been superseded as the prime mover in extension service. In 1954, Julia Bennett Armistead wrote "The state library must take the initiative in promoting state-wide planning and the development of all types of library service in cooperation with library associations and other interested groups. The state library stimulates cooperative and coordinated library systems that result in improved facilities and services for all citizens of the state."

The formation of county libraries for public library extension followed on the heels of New York State's traveling libraries. Ohio first made county libraries a legal

possibility in 1898 with Maryland only months behind. Where state library extension activities began with traveling libraries, it was legislation authorizing and funding county libraries that resulted in deposit stations though neither the state library or county library limited its activities to one form of extension service.

In 1903, Oregon authorized a tax levy for county library service. The County Court of Multnomah County, Oregon, levied a tax and contracted with the Library Association of Portland. Of its early beginnings in implementing this contract, the 40th Annual Report of the Portland Library Association epitomizes county library service and its problems of that time in saying:

Advertisement was at once made through the daily papers of the resources of the library and asking citizens of the county to visit it and become members. This was soon followed by a personal letter from the librarian to each postmaster in the county explaining the library privileges and enclosing a notice to be placed in the post office, also applications for membership to be filled out and returned. But our responsibility did not end there. The county is large and sparsely settled, many of the communities lying off the line of the railroad or river, and the high-roads during the wet season being difficult to travel, it was evidently a case of Mahomet and the mountain. During the summer, the librarian visited a number of county villages with the result that late in October, a box of 50 books was sent to Bridalveil and placed in the offices of Dr. E. O. Dutio, who kindly volunteered his services as librarian. The box was made with a shelf through the middle to be used as a case if necessary. Early in November a similar box was sent to another community and installed in a reading room over the post office. This little library soon had eighty members and a second box of books was added. The services in all county stations is voluntary, undertaken for the good of the community and like all work taken in that spirit, it cannot be irksome, but a sincere pleasure.

It was in California that the great movement toward county rural library service took place. Generally, that service followed the example of the Sacramento Public Library and the Board of Supervisors of the County of Sacramento following contractual arrangements between the two. The system and its plan of service was briefly outlined as follows:

All residents of the county are to have use of the public library under the same conditions, rules and regulations that govern city residents.

Deposit stations will be maintained at suitable points in the county, each station being supplied with a collection of fifty or more books.

A system of weekly exchanges will be arranged between the main library and the stations, the expense of carriage to be paid from the county extension fund.

Collections at the stations will be exchanged wholly or partially as the demand requires.

All books in the circulating department of the library together with new books bought for the purpose, will be considered in making up collections.

If possible, with the means supplied, the opportunity will be offered to the district schools to open direct relations with the library.

In operation, the county library will be managed as a part of the city library system.

The system will be administered liberally and aims to make the entire resources of the public library, present and future, available to every county reader, as promptly as distance and means will allow and at no expense to him.

Having legal authority to levy a library tax or to appropriate funds for establishing and maintaining a county library, the alternative to the contract was to begin an entirely new library. The difference lies only in the fact that a policy group, a library board, had to be established, a staff acquired and a center for administration, the collection housed, reference services provided and, perhaps, reading rooms found or built. After these things were accomplished, there followed the matter of providing library service to farm and village dweller.

Service by contract implies the extension of complete service by an existing library to any area willing to pay for it. Limited contractual service may provide only a certain type specifically requested, such as films or reference work. The simplest form of contract is the best and will include statements regarding:

- (1) Parties executing the contract.
- (2) Purposes and objectives of the contract.
- (3) Mutual responsibilities safeguarding each other's interests.
- (4) Financial agreements.
- (5) Conditions under which contracts may be terminated.

The regional library was the next step in extending library services. It was in 1931 in Michigan that the first permissive regional library law was passed. Similar legislation was passed in British Columbia in 1938 and in the next 2 years South Carolina and Nebraska followed suit. By 1936 regional libraries were promoted to keep community branches fresh and alive by frequent exchange of books through a pooling of book resources over a large area.

By and large the states established regional libraries, sometimes by contractual arrangement and sometimes by gentleman's agreement. If state employed personnel were not provided, then state funds for personnel and other requirements were in varying amounts.

New York's regional service goals included a few specifics for an inclusive program:

- (1) All citizens of New York should be able to get easily as many books and other library materials as they will use.
- (2) All citizens of the State of New York should be able to get answers to reasonable requests for information submitted through local libraries.
- (3) All children both in and out of school should be able to get well-selected library materials.
- (4) All citizens of New York should have the services of professionally trained librarians available as needed.
- (5) The State of New York should supplement and strengthen, not supplant, existing library service and should encourage the extension of library service to unserved areas by reasonable local effort.

The State of Pennsylvania's regional plan is based upon the designation of points of library strength as district libraries so that the reader in the suburban city, the

smaller town, and the rural area would have open to him the same resources available to his city cousin. This plan provides for direct service to individuals in the district through existing local libraries and to the extent that an individual makes personal use of the central facility. The Pennsylvania Plan requires that the district library center:

- (1) Provide for development of resources in reference and subject collections.
- (2) Provide for direct reference and information service.
- (3) Provide for an interlibrary loan system.
- (4) Provide for cooperative book selection.
- (5) Provide for meetings of librarians and trustees.
- (6) Provide a plan for informing the public of the district library services available to them.
- (7) Provide for field advisory service to existing libraries and to those areas wishing to establish a public library.

Gretchen Knief Schenk, in her book *County and Regional Library Development (I)*, made several points concerning regional libraries:

Regional libraries and systems carry the basic idea of library extension to its logical conclusion: that service of good quality should be available to all people. Library extension is an urban as well as a rural problem.

The newer pattern of service includes:

1. Community libraries, branches, stations, deposits, bookmobile routes all serviced by a central agency or clearing house.
2. A stable local reference stock and pooled materials of all other types, circulated among members of the library system.
3. Modern methods of communication between all parts of the system by telephone, teletype, trucks, cars and so forth.
4. Area wide uniform registration card and borrowing privileges.
5. Cooperative selection of materials.
6. Central processing including repairing and discarding.
7. Professional service in reference, cataloguing, administration and special group activities available to all member units.
8. Trustees' conferences, advisory visits by field staff and institutes—particularly for federated systems.
9. State agency sharing in planning, promotion and financial assistance, the amount depending on the needs of the library systems.

Thus the pattern of library extension follows a fairly logical sequence. Following the city, village, township, and school district library organization, the independent county system was the next step in extending service. Contracts were developed so that the existing library might serve those living beyond its arbitrary boundaries. These two ideas were next combined in the establishment of joint city-county libraries. The sequence then is joint city-county libraries to county to regional, with financial support coming from either several levels of government or only a few.

The Tennessee Valley Authority (TVA) was the first governmental agency to include library service in its plan for construction project personnel. The goal was adequate library facilities as an aid to morale and efficiency. The plan was predicated on the active cooperation and support of the local community. Originally, TVA con-

tracted with the state library extension agencies and local libraries to furnish library service in the construction areas. TVA contributed most when employee demands were heaviest. As construction was completed and TVA moved on, local money moved in though on a generally low per capita support.

Private money provided for regional and county library experiments in the early 1930s. The Carnegie Corporation of New York provided a grant for intensive regional field work in the south. The Julius Rosenwald fund set up county library demonstrations in Tennessee, South Carolina, Alabama, Mississippi, North Carolina, Texas, and Louisiana.

The United States Federal Emergency Relief Administration came into being in 1933, followed by the Works Progress Administration which later became the Works Projects Administration (WPA). While these agencies were established to provide employment to large numbers of the unemployed people, the WPA included library service in its preferred projects for needy women, professional, and white collar workers. An important feature of the WPA program was an emphasis on areawide library service at the county or regional level. Included in the program were elements such as:

1. Providing workers to assist established libraries in expanding their service.
2. Establishing local libraries or reading rooms in communities previously without a local library.
3. Extending library service to entire counties by bookmobile and deposit service from a county headquarters.

In South Carolina the WPA served somewhat in the capacity of a state library due to the absence of such an agency at that time. Most of the states had taken advantage of WPA participation by the time the program ended in 1942.

The Library Services Act (LSA) of 1956 made the extension of library service to rural America a matter of national concern. When LSA became the Library Services and Construction Act (LSCA), that concern became the extension of library service to all citizens of the United States no matter where they lived. Funds under these acts were and are administered by the various state agencies. The state agencies undertook to carry out the goal of the American Library Association's Library Extension Board as expressed in 1936: "The provision of public library service to the unserved and the improvement of public library service to those having inadequate service."

The inner city is the most recent concern of those engaged in the extension of library service. Insofar as the inner city resident regards prevailing library service as irrelevant or has felt he is not recognized by the traditional public library, he is inadequately served or not served at all. Efforts to reach the inner city have been funded from several sources including LSCA, the Office of Economic Opportunity and its various agencies, the U.S. Department of Housing and Urban Development and its agencies, and private foundations. New patterns of extending service are developing as librarians and library boards work with and listen to the voice of the inner city.

No matter how organized or what the source of supply, all library extension work

is concerned with the delivery of service and is limited only by ingenuity. The methods have ranged from a backpack and horseback to boat and plane. In the north country dog sleds have been used while trucks and the mails have been most universally used.

The traveling library was the beginning. They were special collections loaned on a long-term basis, collections varying in size from 25 to 1,000 volumes loaned to public libraries, schools, and other institutions. In turn, these books were loaned to individuals. These "libraries" were also sent to prisons, hospitals, home demonstration clubs, parent-teacher's associations, church groups, business and professional clubs, camps, colleges, and universities.

The traveling library was so widely used that specifications for the wooden cases in which they were shipped and often housed upon arrival were detailed. For example, the recommended case had hardwood ends and sides while the tops and bottoms could be of softwood and the whole held together by screws, stove bolts, and cleats.

The traveling library has been both a general collection and a special collection. Modern examples are exhibits of new children's books furnished by publishers to be used in selecting books for purchase and to familiarize parents and teachers with current children's books.

Special traveling collections frequently are a mixture of books, films, sound recordings, slides, and film strips. Such collections might be devoted to art and arts and crafts with slides on the history of art. Basic reference collections go to small public libraries and subject collections for parents, young adults, high school classes, librarians, and large-type books for the visually handicapped.

Under LSCA, traveling libraries were loaned to new rural public library systems, to local libraries in counties having no county library, and to aid in the development of multicounty systems.

In 1965, the University Extension Library in Winnipeg, Manitoba, was promoting books for isolated areas by means of mail and express. Postpaid parcels of from one to six books each are sent to individuals, and traveling library cartons or boxes of books are sent to communities, camps, settlements, and one-room schools.

The North Central Regional Library in Douglas County, Washington, conducted an experiment in providing nothing but "mail-order" library service to a large and sparsely populated rural area. Book catalogs in newspaper format were mailed to each home in the area. Residents ordered books by filling out a coupon in the catalog and mailing it to the nearest regional library. The requested material was delivered by mail and could be returned either by mail or to any regional library.

The mail-order catalog included 2,000 popular adult and juvenile book titles with annotations. The catalog carried occasional articles and was illustrated. Forms were provided for requesting subject materials, for asking reference questions, and for opinions concerning the service. There were three editions of the catalog per year. Books were identified in numerical sequence and reader interest headings rather than standard subject headings were used. This service was aimed particularly at shut-ins and low income families.

The same idea was advanced by Dr. Lowell A. Martin when he recommended a

mail-order catalog of 10,000 titles to be used on a statewide basis in Pennsylvania.

The package library was in part a traveling library and in part a mail-order service. Package libraries generally consisted of various kinds of printed and typed materials pertaining to a particular subject and have been widely used in adult education efforts. A Wisconsin study of package library service showed that use by women's clubs clearly dominated.

The East Meadow (New York) Public Library managed to confuse the issue of Mahomet and the mountain when it decided to provide free bus service to the library for those unable to come by their own means. It provided four half-hour routes, meaning that a person could be in the library for as little as ½ hour before taking the next bus back. Busses ran after school for 4 hours plus a 7-hour schedule on Saturday. The audience for this service was primarily upper elementary school children, and the cost of the service was quite modest.

Extension work in much the same pattern will continue as it has since its beginnings. The terms and the materials change somewhat. Stations and deposit stations sometimes become reading centers or there is sidewalk library service by small vans. The paperback has made possible an even more informal approach to extension service by virtue of the lower costs involved. As for the methods of extension work, it seems that it remains only for succeeding generations of librarians to discover them anew.

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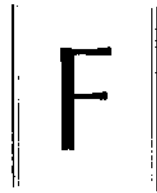
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FACET ANALYSIS

The term "facet analysis" was first introduced into discussions of bibliographical classification by S. R. Ranganathan to denote the technique of separating the various elements of complex subjects in relation to a set of abstract fundamental concepts. The *Colon Classification* (1,2) is the only example of a general classification scheme covering the whole of knowledge that is entirely based on facet principles, but many other special schemes have been made using this technique, and a simple account of the methodology was presented to the Washington Conference on Scientific Information in 1958 (3). Ranganathan has expounded the theory and practice in many writings; the basic theoretical work is the *Prolegomena to Library Classification*, of which the third edition has recently appeared (4), and advances in his research are regularly reported in the Indian journal *Library Science with a Slant to Documentation*. Perhaps the best introductions to his work, however, remain a paper to the British Society for Visiting Scientists given in 1948 (5) and a monograph prepared for the Library Research Monograph series of the University Library in Copenhagen (6). In the latter, Ranganathan defines facet analysis as "the mental process by which the possible trains of characteristics which can form the basis of classification of a subject are enumerated and the exact measure in which the attributes concerned are incident in the subject are determined. Facets are inherent in the subject." B. C. Vickery, in a contribution for the Classification Research Group (q.v.), writes that "a faceted classification is a schedule of standard terms to be used in the subject description of documents" (7), and he has shown the relation of facet analysis to the general analysis of information in his article *Analysis of Information* (q.v.)

Classification, both the word and the process, begins with the Greeks, who used it for the purpose of forming definitions of *things*. For Plato, to know things meant to place them in their correct class according to their permanent, ideal form, or essence, and Aristotle in his *Logic* analyzed in detail the processes by means of which

one could identify things by starting with a group or class of objects, and then eliminating all members of the class except the one aimed at, by enumerating specific properties not possessed by the others. Thus by starting with the class, or *genus*, one could arrive at the individual, or *species* by enumerating properties which stated differences between one species and another. This form of division is still best seen in the so-called "classificatory sciences," especially Zoology and Botany, in which the genera may be divided into the individual animals and plants; we may start with a class such as vertebrates, and by the division on the basis of successive characteristics we arrive at a chain of subclasses such as mammals—primates—anthropoid apes—chimpanzees. This sort of classificatory process proved of great value for the development of these sciences, and the description of individual species is still of value today. We can, for example, profit by the description of individual libraries and information services, studying their similarities and differences in order to arrive at a more general theory of what these organizations should be like under ideal conditions.

One of the most important aspects of the achievement of Melvil Dewey in the Decimal Classification was to show how the use of the decimal fraction notation could provide a systematic sequence of subjects which mirrored this form of classification, and which would therefore arrange books or other documents, such as index cards, in a pattern which would be readily recognized by the specialist in any subject as corresponding to the way in which he thought about his subject. But the literature of specialist subjects in all fields, including the "classificatory sciences," is no longer mainly a literature of description of individual species, as it was to a great extent in the nineteenth century. The field of knowledge has advanced in complexity, and specialist writing now consists much more of the discussion of the relations and interconnections subsisting between entities than of mere descriptions of the entities themselves. We need, therefore, a scheme of categories of terms which will do more than imitate the genus-species relation.

Dewey had already realized that this problem existed, and provided for a certain element of synthesis as well as analysis in his schedules. He knew that any subject might in principle at least be subdivided geographically, but rather than enumerating a complete geographical table under each subject, he introduced the technique of adding on the schedule from the class 900, inserting a zero in front of the 9 to indicate that this was the point at which a new aspect (or facet) of the subject was about to be introduced. This process was carried much further by the International Federation for Documentation (q.v.) in its revisions of the Universal Decimal Classification, and in his Bibliographic Classification, H. E. Bliss used the systematic auxiliary schedules to carry out the classificatory process which he called "composite specification."

All of these schemes, however, failed to provide a systematic basis for the use of synthesis in classifying a complex subject, and the inevitable result is a mixture of subjects in the same array, arrived at by applying different characteristics of division in one series instead of one at a time. In the Dewey Decimal Classification, for example, we find arrays like this:

370	Education
370.1	Theory
370.7	Study
370.71	Meetings
370.72	Conferences
370.73	Teachers' Colleges
370.732	Courses and programs

It is obvious that "Courses and programs" are not *species*, that is special types, of "Teachers' Colleges," and that "Teachers' Colleges" themselves are not *species* of "Study"; on the other hand, "Conferences" might reasonably be called *species* of "Meetings." The true nature of the various hierarchies are not demonstrated; all terms are enumerated as if the genus-species relation were the only one, and all subdivisions were examples of it.

The aim of the writer of a document is to study phenomena in the round; he observes all the aspects of a given entity; its appearance, its structure, and the interrelationships and interactions that exist between one entity or group of entities and another. He tries to describe a universe that is dynamic and not static, and this means that it is not sufficient to rely any longer on schemes of classification that attempt to force all types of relation into a pattern that actually exhibits only the generic relation.

Perhaps the simplest way of illustrating this is to consider a technology. The aim of a technology is to take some material or object, such as a piece of steel or aluminum, or a measure of some substance, and then to work upon it in order to change it into something else. We apply an activity or operation to the entity or raw material, and turn it into another entity—the end product. Thus we have two types of entity terms (raw material and end product) and the operation terms (which might be stamping, extruding, heating, and so on).

The purpose of facet analysis is to provide a framework within which all these various types of terms can be accommodated, together with rules for their combination as required by the literature. It uses the term "analysis" to replace the older term "division" because division implies the breaking up of a single entity, but analysis has a wider connotation and may be applied to the study of complexes as well as of entities. A facet can be said to be all the classes produced when a subject is divided by one and only one characteristic. Classes in a scheme of classification are represented by words or terms, and a facet is therefore a list of terms in which each term stands in the same relation to the subject of which it is a part. A facet may consist of entity terms, such as elements in chemistry, or crops in agriculture; forms of entities, such as solid, liquid, gas; operations made on entities, such as combustion, forging, harvesting; tools for operations, such as presses, X-rays for therapy, microscopes; states of being, such as health and disease.

In applying facet analysis to a subject, the first step is to examine a representative sample of the literature and enumerate the subject of each article, book, or abstract. It soon becomes clear that the terms encountered may be grouped together in sets according to their relation to the subject and to each other, that they represent, in

fact, the various aspects of the subject, each of which can be studied apart from the others, at least conceptually, even though in practice it may well be impossible to separate them into groups of static entities apart from the phenomena in which they are observed. Consider the following subjects from journal articles in the field of occupational safety and health:

- The lighting of underground roadways in coal mines.
- The protection of workers against ionizing radiations.
- The examination and testing of dust masks.
- Dermatologic aspects of the chromate problem.
- Guarding of machines used by blind workers.
- Registration of accidents in nuclear reactors.

From these, and other subjects like them, one can easily deduce the following facets:

- Classes of workers (blind, etc.)
- Industries (where hazards exist: coal mines, reactors)
- Sources of hazards (things causing danger: dust, chromates, radiation, machines)
- Accidents and diseases (results of hazards: dermatitis)
- Prevention (masks, guarding)
- Administration (registration, etc.)

It can readily be seen now that the basic difference between a faceted classification and a merely enumerative one is that here the terms are itemized as elementary terms and are not combined into complexes for insertion in the schedules of the scheme. For classifying documents, terms are used mainly in a postcoordinate manner, since they are not precoordinated in the schedules, except insofar as a generic hierarchy may still legitimately be inserted into a facet. In a faceted scheme for education, we can find, in the "Educand" facet, the following sequence:

- Exceptional children
 - Handicapped children
 - Physically handicapped children
 - Blind
 - Deaf
 - Brain-injured

Terms signifying other aspects, such as curriculum subjects or teaching methods, will likewise be enumerated only as elementary terms in separate facets, and any combination of elementary terms that may appear in the literature can therefore be catered for as it arises.

One particular kind of facet is called a differential facet. This is a facet of a class in which the terms are secondary to another facet and may differ according to the term to which they are attached in the primary facet. If we look at the subject "Food Technology," for example, we can enumerate the various groups of foodstuffs in the primary facet: meat products, dairy products, vegetable products, and so on; in the

“Process or Operations” facet, the types of process vary according to the food group. The operations for processing dairy or cereal products are different from those used in processing meat or fish products. Thus although the name of the facet may be a general term such as “Process” or “Operation,” the individual terms in the facet will fall into several separate groups depending on the term in the product facet to which they apply.

In order to find a sound theoretical basis for the choice and sequence of facets in a scheme, Ranganathan advanced the solution of relating facets to a set of fundamental abstract notions which he called time, space, energy, matter, and personality. Every facet of a basic class is regarded as a concrete manifestation of one of these. The time facet is for chronological division, the space facet for geographical division; these are clear, and are to be found in virtually every classification scheme. Energy and matter, illustrated in a technology by raw material and process, are not so easily identified in some other subjects in the social sciences and humanities for example. Personality, if interpreted as the end product in a technology, or the educand in education, can be seen to be a recognizable entity with an identity that is unique and clearly separable from other entities, but it has certainly caused more difficulty and controversy than any of Ranganathan’s other fundamental categories. Nevertheless, for him it is the most important of the categories, since it is the personality facet that contains the terms that give the class itself its own identity in the field of knowledge.

It is clear that many compound subjects found in the literature will display more than three basic facets, excluding space and time, which normally will only appear once. To meet this situation, Ranganathan introduced the idea of levels and rounds of facets. In Class I, Botany, of the Colon Classification, the individual plants are classified into natural groups as the First Level Personality; for example:

- 1 Cryptogamia
- 2 Thallophyta
- 22 Algae, seaweeds
- 23 Fungi
- 237 Basidiomycete
- 2375 Mushroom
- 5 Phanerogamia
- 7 Monocotyledon
- 8 Dicotyledon

But parts of plants are also personality terms, and are placed as Second Level Personality in the same facet as the plants themselves, that is, before the appearance of any other facet. For example:

- 1 Basic and regional
- 13 Root
- 14 Stem
- 16 Flower

The two levels of the personality facet are joined by a comma. Thus the notation

symbol for the plant gentian is I 8516 and the symbol for the flower of the gentian is I 8516.16; the preceding comma enables us to distinguish between the 16 which indicates the division gentian of the group *Dicotyledons* and the 16 which indicates the part flower, and which could be added in the same way to the symbol for any other plant.

Rounds of facets are necessary because each type of term may appear more than once in a compound subject. In a technology we may very well find the tool specified which carries out a certain operation on a certain raw material in order to produce a certain end product. A tool is an entity and in the context of the manufacture of the tool it would appear as the primary personality. But it is not primary in the context of using it for the production of another entity; that entity is the primary personality because that is the entity on which primary attention is focused. Similarly, in the class agriculture, fertilizers are regarded as personality terms, but agriculture is not concerned with the production but with the use of fertilizers. The crop is the primary focus of attention in agriculture and is therefore the First Round Personality facet. This facet is followed by an operation or energy facet which contains, among others, these terms:

- 1 Soil
- 2 Manure
- 4 Disease
- 7 Harvesting

The symbol which introduces an energy term is the colon. Thus the notation for the crop turnip is J 332, and the symbol for the subject, the manuring of turnips is J 332 : 2. After this, the different kinds of fertilizer that may be used for the manuring of turnips are listed as the Second Round Personality facet. Ranganathan has postulated that there are no subdivisions, or second levels, of any energy term, so that Second Round Personality terms do not require any indicating symbol but may run straight on after the symbol for the appropriate Energy term:

- 1 Green manure
- 2 Farm
- 4 Fertilizer
- 41 Nitrogenous
- 42 Phosphatic

The combined symbol for "the use of phosphatic fertilizer in the manuring of turnips" is therefore J 332 : 242. A full explanation of the notation is given by Ranganathan in his Rutgers seminar (2).

There is no doubt at all that these fundamental facets are useful in some subjects and particularly in science and technology. It has been successful as a checking device for subject analysis in the *British National Bibliography* and

in the classification of "the cultivation of turnips" is as been given by Ranganathan.

It is very easy to identify in the notation facets which have been used with the Decimal Classification and the alphabetical index.

in the *British Technology Index* (q.v.). It is very useful to have in mind some generalized idea of the structure of subjects when either constructing a classification scheme or when classifying documents. Unfortunately, it is not so easy to see the application in the Social Sciences or the Humanities, and the Classification Research Group and other research workers, particularly on the Continent, have tended to follow a more pragmatic approach and, while using facet analysis, to give the facets a more precise name limited to the subject field being classified. Examples are given by Vickery in another Rutgers seminar (8); whether the technique is allied to the notion of fundamental categories or not, however, it certainly provides the most powerful tool yet devised for the analysis of subjects, both for classifying documents and for search strategy in information retrieval.

There are some who seem to think that the arrival of computers has relieved librarians and information officers of the necessity to perform this operation; that all that will be required in the future is for clerical workers to file text into the machine in the natural language of authors and file requests in the natural language of users, and take for granted that these two varieties of natural language will match. Operating experience (with perhaps the exception of stores that are so small as to be insignificant for real-life purposes) shows the contrary; and most machine-based systems now are provided with some form of vocabulary control, usually in the form of a "thesaurus." Although many of the early thesauri were no more than what had hitherto been called by librarians "subject headings lists," it has lately been realized that the efficiency of these lists, both for input and search strategy, is greatly increased if there is, in addition to the alphabetical list, a second list of the same terms arranged into categories. In one case these have been called "facets" (9), and the superiority of this Barhydt-Schmidt thesaurus of educational terms over the alphabetic thesaurus issued by the U.S. Office of Education is so marked that the latter has included in its second edition a rough and not very ready approximation to a set of categories called "descriptor groups."

The most effective combinations to date have been those produced by D. Soergel for a chemical company in Germany, and by Jean Aitchison as a new version of the faceted classification scheme compiled for the English Electric Co., and described in Vickery's Rutgers seminar (8). The new version has been called a Thesaurofacet (10), and Jean Aitchison has also published a simplified account of the technique (11). She has used the faceted structure to present a pattern of the most basic relationships subsisting between the phenomena denoted by the terms in the system and has complemented this by introducing all the other manifold relationships that may appear in the actual literature into the thesaurus, which now acts as both an entry vocabulary to the system for precisely-named terms and a detailed and highly structured alphabetical index to the faceted classification. The characteristic features of each technique have been exploited to achieve a very complete pair of structured vocabularies with the maximum of economy: relations which are more satisfactorily displayed in one list are not repeated in the other. The two lists are linked by the notation of the classification scheme.

Thesaurus Entry		
		CWJ
Jets		
RT	Jet condensers Jet dispersal valves Jet dispersers Jet pumps Jet rectifiers Nozzles	
NT(A)	Jets (Hovercraft) Plasma jets	REJ EXQ
Classification Schedule		

CWJ	Jets
CWK	Jet streams
CWL	Plumes
CWM	Wall jets
CWO	Couette flow
CWP	Jet mixing
CWQ	Propulsive jets
EXP	Plasma experimental apparatus
EXQ	Plasma jets
EXR	Plasma guns
EXT	Plasma arcs
REI	Hovercraft components
REJ	Jets (Hovercraft)

Information science, unlike information theory, is concerned with meaning and communication as well as with the transfer of messages. Communication means conveying the meaning of a message so that the recipient is able to fit it into the pattern of ideas that already exists in his mind. Library systems should be so formed that they can do this; they should attempt to correspond with the structure of reality which writers attempt to describe so that the system of terms in the writer's mind may be inserted into a matrix that can be used in turn as a pattern for matching with the system of terms in a user's mind. It should be a lattice system able to form the same relations as those existing in the infinitely varied phenomena of Nature, and not a single hierarchy, however "logical," such as those on which the traditional library classification schemes are based. Facet analysis provides such a lattice system. It corresponds to the way in which specialists think about their subjects and has therefore a vital role to play in modern library and information services, including those which make use of the most sophisticated of machines.

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FACTOR ANALYSIS

Science strives for parsimony, the reduction of the complex to the simple. The scientist tries to uncover the simple relationships that underlie the complex phenomena that he observes. In the information sciences, where the complex entity called the human either directly or indirectly intersects with an information system, an observed user behavior can be elicited by any of a number of stimuli, or a given stimuli can elicit a number of behaviors. In these situations the question naturally arises as to which stimulus variables were the most important in producing the behavior under study.

In classification theory the goal is to describe the contents of a document or a file of documents by a set of agreed-upon symbols recognizable to all. It is important to describe all of the aspects of the document or file and not omit any because each aspect may serve as an entry point for retrieval purposes at a future time. If a thesaurus or a computer-stored dictionary were to be used to list all of the potential descriptors of a file of documents in some specialized area, one would expect to find thousands of terms. The use of all the terms on the list would be cumbersome and uneconomical since many are synonyms and overlap to varying degrees; some are even antonyms.

In both of these situations and in like situations which may confront scientists studying information environments and the behavior of both man and machines operating in them, parsimony is a requisite. Many measurements are made on many objects or persons. Many descriptors reflecting many aspects are assigned to the documents in a file.

It may be possible, in studying the intercorrelations, that a single measurement can represent a cluster of terms. When a single measurement or a single term represents a set of measurements or a cluster of terms, that measurement or term identifies an underlying factor. The surrogate measurement or term need not be one of the

original measurements or terms. In most applications it is not. Factors are generally latent and not directly observable. However, they can be used to reproduce the original observation with a high degree of accuracy. Thus the task of describing a document by having one term represent a group of terms can greatly simplify the task. Likewise, if a characteristic of a system's indexers is to be studied and a number of measurements are to be made on a number of persons, the task can be simplified if a few measurements can efficaciously represent many measurements. For example, if the indexer characteristic to be studied is "perception" and twenty instruments are available to measure this trait, it would be useful if the same information could be gathered (about the results of the application of the twenty instruments) from three or four synthetic measurements. Rather than having the information in twenty dimensions, it would be in three or four synthetic dimensions that contain all the information derivable from the original twenty instruments. If the derived factors can be given semantic definition, a powerful tool is available to describe the characteristics of documents, files, and information systems users.

The techniques for factor analyzing multivariate data have been available since the turn of the century. The concept and the basic technique were presented by Spearman (1) in 1904 in a paper, published in a psychology journal, titled "General Intelligence Objectively Determined and Measured." It was not until the advent of the computer, which made the manipulation of large data matrices practical, that the techniques began to find wider applications. Prior to 1960 factor analysis had been applied primarily to psychological research, but during the 1960s it began to find its way into business (marketing research), the social and behavioral sciences, and the information sciences.

Historically disciplines begin as philosophical speculation, for example, the current speculation about the phenomenon of information. Gradually through research these speculations are hardened into a science. Two manifestations of the hardening into a science are the development of statistical techniques and the generation of models which help to relate and explain the discovered facts in a meaningful way. Most of the newer disciplines, with little hesitation, adapted models and statistical techniques from the older, established disciplines. This is particularly true of the behavioral sciences. They adapted the statistical techniques and models developed to study "population" distributions observed in the physical sciences, and especially in agronomy and biology. Borrowing, however, as is usually the case, carries with it subtle penalties. Extensive borrowing from the physical sciences had the disadvantage of fixating the models and techniques of the behavioral sciences on bivariate analysis. This fixation began to diminish in the early 1960s when the core storage capacity of the computer began to increase dramatically and it became economically feasible to manipulate large data matrices. There had been a long-standing need in the information and behavioral sciences for techniques that could handle multiple independent and dependent variables. Now, with the dissipation of these two constraints, multivariate techniques begin and continue to be applied more and more in the information field. Multivariate techniques seem to be suitable for studying information systems and their users because system designers, implementors, and

users all contribute to the variances found in the observed data. The human element within information systems and environs requires complex models to adequately explain the phenomenon. Analyzing the effects of one or two variables singly or in pairs has not proven effective in studying complex phenomena. Multivariate techniques have the potential to overcome such shortcomings. This article discusses one of the multivariate techniques as it has been applied in the field of information science, reviews existing applications, and suggests new directions in which the technique may be useful.

Cattell (2) discussed the context of factor analysis in the application of the scientific method. In the classical application of the scientific method, a single dependent variable changes in response to a controlled change in a single independent variable in what has been traditionally called a univariate (one-variable) analysis. By contrast, in multivariate analysis a number of variables are observed simultaneously without temporal constraints. While univariate analysis generally involves experimental manipulation, multivariate analysis can be applied in situations where the important variables cannot be controlled in a laboratory setting, but are observed in their natural setting. Control is the key word in univariate analysis; all potential sources of variance are scrutinized. The experimenter attempts to keep everything constant in the laboratory setting except the independent and dependent variables. Variance that cannot be controlled is termed error. Multivariate analysis seldom tries to control anything. Rather, it monitors the happenings of many variables simultaneously which would otherwise have been unknown sources of error variance in a univariate analysis.

The difference between factor analysis and the analysis of variance also lies in differing strategies in application of the scientific method. The experimenter tests (or produces) his hypothesis on a single variable (or even two) in the analysis of variance. He has an a priori hunch as to the important variable in the study. However, if he is confronted with a bewildering array of variables, he may have difficulty in singling out the single variable (either manifest or latent) that is contributing most significantly to the variance. The results of an analysis of variance will indicate to the researcher only that a significant relationship exists. Additional analyses must be done to discover what is the degree of the relationship. However, factor analysis derives the degree of relationship from an analysis of the interrelationships of all the variables.

Cattell points out that factor analysis in most cases should precede controlled experimentation and subsequent analysis of variance. For example, in the relationship between relevancy and information retrieval, relevancy is generally represented as a single variable (the relevancy decision of the user, or a relevancy judge). Perhaps a factor analysis can be performed first to see if a factor pattern arises that corresponds to the concept of relevancy. Then additional experimental laboratory work can be designed to find the pattern of weighted variables that most accurately estimates the latent dimensions of relevancy.

Cattell was one of the first to see the power of factor analysis in producing hypotheses more readily and testing them more convincingly than could be done

with univariate analyses. The emergence of a factor suggests more to the researcher than the observance of lawful behavior, or regularity of covariance, in a single pair of variables. Reentering a study with hypotheses corresponding to factors found in a factor analysis permits a more searching test of the hypotheses. The reason is that for a given hypothesis to be verified, a whole pattern of variables has to behave in the manner predicted by it, and not just a single variable (2, pp. 514–516).

More formally then, factor analysis is a set of statistical techniques for reducing the number of dimensions in a set of observed data by compacting its form. At the same time the dimensions (axes if plotted in Cartesian coordinates) can be rotated in various ways. Rotation has a kaleidoscopic effect of a changing emphasis of the different properties of the data depending upon the type and amount of the rotation. First one property is emphasized, then another. The importance of certain properties in explaining the variances in the data wax and wane relative to each other as the axes are rotated.

Factor analysis takes a set of observed responses of individuals on a set of variables and forms a linear combination of a smaller number of nonobservable, synthetic variables which are called factors. Factors can also be nonlinear functions. In practice factor analysis is generally limited to examining the linear functional relationships between the factors and the observed responses. It is conceivable that a linear combination of these synthetic variables (factors) are responsible for any linear dependence that may exist between the sets of variables.

Factor analysis differs from multiple correlation/multiple regression techniques* and multiple discriminant functions in a fundamental way. In the latter two techniques, a criterion variable or a criterion group is arbitrarily chosen, a priori. Such is not the case with factor analysis. Structural considerations of the data are used in factor analytic techniques to reduce a large number of observed variables to a smaller number of synthetic variables, each of which is weighted according to its relative importance to each discovered factor. Thus, instead of merely seeking relationships among known variables or determining the extent to which a set of variables agrees with new data, factor analytic techniques can be used as a means of exploring data structures, of generating new hypotheses about relationships in the variables, and of achieving scientific parsimony.

Cluster analysis is a label that has been given to a set of techniques which attempt to identify from a number of categorized or measured variables those which belong together or cluster "naturally" along one or more dimensions. Members of a group are more like each other than they are like members in any other group. The variables form natural groups and, like factor analysis, there was no a priori knowledge as to which variable belongs to which group.

The simplest multivariate data structure would have three variables (dimensions). Combinatorial analysis tells us that there are six permutations of three variables

*Frequently considered a single technique with the terms used interchangeably. While theoretically and fundamentally different, multiple correlation and multiple regression do contain common components, one or more being frequently sought in the same analysis.

taken two at a time; that is, we can form ${}_3P_2$ or six pairs from three variables, A , B , and C , if AB is considered to be different from BA , and so on. In studying information users and their environments, a researcher may have multivariate data consisting of (1) a number of users, (2) measurements made in several information environments, and (3) measurements made on several different occasions. From data of these types there are six basic correlational matrices and six subsequent factor analytic techniques that can be derived. Moreover, if a factor analytic study was being done on four dimensions, there would be ${}_4P_2 = 12$ factor analytic techniques that could possibly be used. There is a factor analytic technique that will correspond to each type of correlation matrix that can be formed from multivariate data. The six most common techniques that are found in the literature have been labeled O, P, Q, R, S, and T (3). The three-dimensional matrix has the most utility for the bulk of "real world" research in the information field. There is nothing sacrosanct, however, about three-dimensional models. Their popularity resides in the fact that most researchers find it very difficult to visualize and work in hyperspaces of more than three dimensions.

Illustrated in Figure 1 as axes in a three-dimensional space are three common components in a multivariate study—subjects, tests, and occasions.

If the scores on all tests were correlated using subjects as replications and holding occasions constant, the analysis would be labeled an R-type. This would be equivalent to pairing off and correlating all the rows in the front, vertical layer of Figure 1. Correlating Test 1 and Test 2, using subjects as replications, and holding occasions constant is illustrated in Figure 2.

If subjects, however, had been correlated using tests as replications and occasions had been held constant, the analysis would have been a Q-type (see Figure 3).

Input data for a factor analysis are generally stored in matrix (tabular) form. That is, a two-dimensional table is formed such that each of its elements can be uniquely identified by a pair of subscripts. The first subscript, by convention, identifies the row of the table; the second subscript, the column. Also, because of the

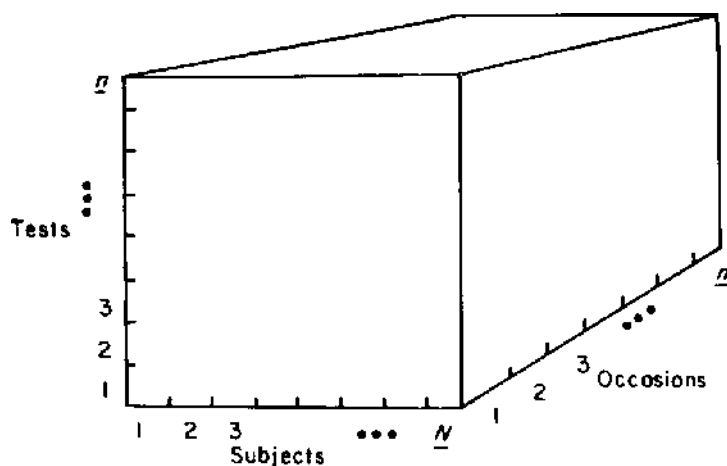


FIGURE 1. Three-dimensional data structure.

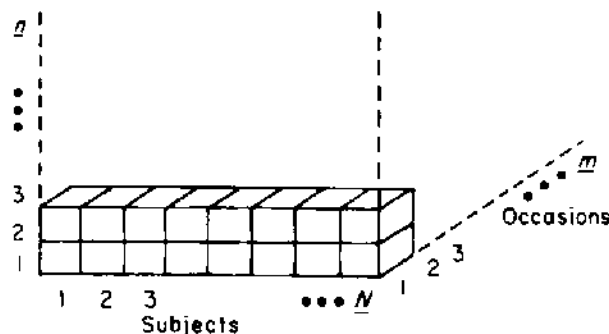


FIGURE 2. R-Type analysis.

psychological antecedents of factor analytic techniques, the individuals being observed are frequently called subjects, the measuring instruments are called tests, and the test results or the treatment results are called scores. In Figure 4 the first subscript identifies the test, the second the individual. Factor analytic techniques investigate such tables of measurements and seek to simplify or reduce the size of the matrix needed to carry all the information that is contained in the data.

The principle of parsimony requires the researcher to ask whether the table of measures could be represented by a smaller number of variables and still faithfully represent the original data. One way would be to construct a new table of measures having considerably fewer variables than the original. This could be done by forming linear combinations of the form

$$Y = w_1X_{A1} + w_2X_{B1} + w_3X_{C1} + \dots \tag{1}$$

These new scores can also be stored in matrix form as shown in Figure 5.

If the data contain only three factors, there will only be three rows in the matrix, thus considerably reducing the number of variables in the matrix. Replacing the

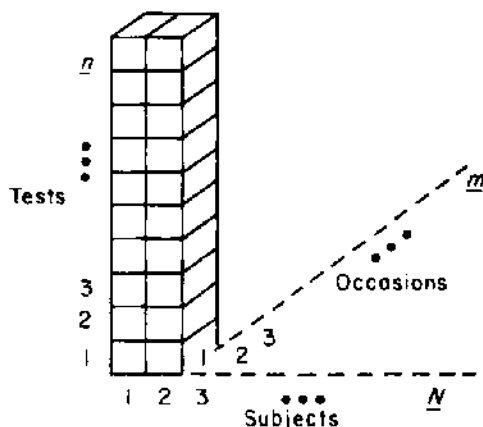


FIGURE 3. Q-Type analysis.

Tests	Subjects				
	1	2	3	...	<i>n</i>
A	X_{A1}	X_{A2}	X_{A3}	...	X_{An}
B	X_{B1}	X_{B2}	X_{B3}	...	X_{Bn}
C	X_{C1}	X_{C2}	X_{C3}	...	X_{Cn}
⋮	⋮	⋮	⋮	⋮	⋮
<i>N</i>	X_{N1}	X_{N2}	X_{N3}	...	X_{Nn}

FIGURE 4. X_{A1} represents Subject "1's" score on Test A, X_{A2} is Subject "2's" score on Test A, X_{B1} is Subject "1's" score on Test B, etc.

large number of rows representing tests in the matrix shown in Figure 4 with the smaller numbers of rows representing new composite dimensions that are synthetic, unobservable, and uncorrelated, and represented by rows in Figure 5, is the principle objective of factor analysis. If the original test scores or measures overlap each other, there will be few synthetic dimensions resulting from a factor analysis. However, the matrix in Figure 5 still contains all the information possessed by the original matrix (see Figure 4). In this article, Greek symbols are used to represent the synthetic dimensions to distinguish them from the dimensions measured by the original tests.

Each individual will have a score, called a factor score, on each of the synthetic dimensions. While this score is not directly observable, it can be obtained from the original measurements by knowing the interrelationships that exist among them. The factor analyst maps many test scores for Individual "1" represented by X_{A1} , X_{B1} , X_{C1} , etc. into a few factor scores for Individual "1" represented by $X_{\alpha 1}$, $X_{\beta 1}$, $X_{\gamma 1}$, etc. Scores for Individual "2", X_{A2} , X_{B2} , X_{C2} etc. are mapped into $X_{\alpha 2}$, $X_{\beta 2}$, $X_{\gamma 2}$, etc. Each individual will have a set of factor scores which can be reconstituted back into the original scores by summing various proportions of the synthetic scores. These proportions are constant for all individuals and are called factor loadings. Like Pearson product-moment correlation coefficients, they may range between -1 and $+1$, and indicate the correlation of each synthetic factor to the original observed scores. In this sense factor loadings are correlation coefficients.

Each linear combination can be summed into a factor score. There will be a

Factors	Subjects				
	1	2	3	...	<i>n</i>
α	$Y_{\alpha 1}$	$Y_{\alpha 2}$	$Y_{\alpha 3}$	...	$Y_{\alpha n}$
β	$Y_{\beta 1}$	$Y_{\beta 2}$	$Y_{\beta 3}$	...	$Y_{\beta n}$
γ	$Y_{\gamma 1}$	$Y_{\gamma 2}$	$Y_{\gamma 3}$	...	$Y_{\gamma n}$

FIGURE 5.

factor score for each factor produced from the data. Equation (1) may be generalized to the following for the m factors on Individual i :

$$Y_{mi} = w_{m1}X_{Ai} + w_{m2}X_{Bi} + w_{m3}X_{Ci} + \dots \quad (2)$$

Therefore, in reconstructing Individual i 's original score on Test A, a weighted (proportionalized) linear combination of his factor scores is formed. The original score for Individual 1 on Test A, X_{A1} , can be reconstructed from his factor scores, $X_{\alpha 1}$, $X_{\beta 1}$, $X_{\gamma 1}$, etc. Thus

$$X_{A1} = w_1X_{\alpha 1} + w_2X_{\beta 1} + w_3X_{\gamma 1} + \dots \quad (3)$$

In short, if two instruments are used to measure the same phenomenon, the resultant measures can be combined mathematically. However, if they are not measuring the same thing, the results cannot be combined. Factor analysis can be used to tell us which measures were made on the same phenomena and thus can be combined and studied together. This helps to reduce the number of variables the scientist must handle. It also brings to the surface those unobservable dimensions or properties that underlie the measures. An example would be human intelligence. Such factors as verbal and numerical abilities, abstract and spatial reasoning, and memory are latent dimensions that have been found to comprise measures of intelligence.

Suppose we decide to use factor analytic techniques to derive an automated document classification system for a specialized information center handling materials dealing with literature related to toxicology. It is also decided to use the first and last paragraphs of a random sample of the documents in the file as the basis for the analysis. In all, 1,000 first and last paragraphs are keypunched for machine processing. Existing computer programs are used to select all the key words appearing in this text. Words with the same root are usually combined and a single key word is selected to represent the class of terms. This may reduce the list to a manageable 150 key words. Next a computer program can be used to record the terms in a 150×150 term correlation matrix, a part of which is illustrated in Table 1. The correlation coefficients in this matrix are computed as a function of the cooccurrence of a given pair of terms in the same document.

A matrix is a convenient way to store, for future retrieval, a large number of numerical values. Recall that correlation coefficients range from +1 to -1. Therefore a perfect correlation, represented by +1, indicates that every time one given key word occurs, a second given key word has always occurred with it in the same document. A zero correlation means that one cannot predict, better than chance, the occurrence of the first. A negative correlation coefficient, on the other hand, indicates that if a given key word occurs, the second key word is not likely to occur in the same document.

We can now ask two questions about the data stored in this matrix as correlation

TABLE 1
A Portion of the Correlation Matrix (Term vs. Term)

	12 chlor- propham	32 protein	73 metab- olism	96 cyanide	126 mito- chondria	128 cell
12 chlorpropham		.29	.27	.03	.04	.01
32 protein	.29	Group α	.26	.04	.05	.03
73 metabolism	.27	.26		.06	.07	.04
96 cyanide	.03	.04	.06		.20	.21
126 mitochondria	.04	.05	.07	.20	Group β	.18
128 cell	.01	.03	.04	.21	.18	

coefficients. First, how many synthetic component variables (factors) are there? Second, what are the factors?

The first question can be answered by looking at the correlation matrix. There appear to be two factors—two groups of key words—that are sharing something in common: that the key words in the first group and the key words in the second group tend to appear in the same document. The two groups of correlation coefficients are grouped and labeled α and β in Table 1. We see that chlorpropham correlates with protein, .29; protein with metabolism, .26; and chlorpropham with metabolism, .27. Thus the key words chlorpropham, protein, and metabolism tend to appear in the same document and appear to be used in discussing something in common. It should also be noted that the key words in Group α , while somewhat intercorrelated themselves, are not to any great extent correlated with the key words in Group β . Likewise, the key words in Group β are also somewhat intercorrelated, but are not correlated to any extent with the key words in Group α . What the three key words are representing in Group α is apparently not the same as what is represented in Group β . There appear to be two groups or factors in this simplified and hypothetical matrix.

The second question (What are these factors?) is the difficult part of a factor analysis. In trying to interpret the factors, we are trying to name a class to which the key words belong. The key words in Group α seem to relate to the effects of a toxic agent on the rate of functioning of a living body. Group β seems to relate to the effects of a toxic agent on the rate of chemical changes in living cells. We name the first factor body function (BF) and the second cellular change (CC). It should be emphasized here that a factor analysis does not give a final answer or a final classification system, but rather, it brings to the surface structural relationships among the variables which may help in finding a solution or in developing a classification system. What does factor analysis offer in this respect?

One of the desired outcomes of a factor analysis is a table of coefficients that expresses the relationship between the key words and the underlying factors. This table of coefficients is called a factor matrix and is illustrated in Table 2. There are several methods available to reduce the data in a correlation matrix to a factor matrix. These methods are described in texts on multivariate analyses, and computer programs are generally available at computing facilities for the interested researcher. The values recorded in Table 2 are called factor loadings. Factor loadings are interpreted as correlation coefficients; they can take on any value on a continuous scale between +1 and -1. They express the correlation between the key word and the factor.

TABLE 2
Factor Matrix of Data from Correlation Matrix

		BF	CC	EM	h^2
12	chlorpropham	.55	.00	.01	.30
32	protein	.53	.03	.10	.29
73	metabolism	.49	.08	-.06	.25
96	cyanide	.05	.46	.04	.22
126	mitochondria	.08	.42	-.02	.18
128	cell	.01	.44	.07	.19

For example, metabolism loads (correlates) fairly high on factor BF, very low positively on factor CC, and very low negatively on factor EM. The entries in the table under the heading h^2 are called communalities. They are found by squaring each factor loading and summing across the row. Thus the communality of key word mitochondria is $(.08)^2 + (.42)^2 + (-.02)^2 = .18$. Communality is the proportion of the total variance in a measure of the frequency of occurrence of a key word that is shared by these three factors.

It should now be clear that the purpose of factor analysis is to decompose a data matrix (in this case a correlation matrix) into a factor matrix with reduced dimensionality. If the original correlation was a 150×150 square matrix, the resultant factor analysis may be a 150×10 rectangular matrix. However, the original correlation matrix can be reproduced by multiplying each row of Table 2 by every other row. For example, multiplying row chlorpropham by row protein gives $(.55)(.53) + (.00)(.03) + (.01)(.10) = .29$; row protein by row cell gives $(.53)(.01) + (.03)(.44) + (.10)(.07) = .03$; and so on to fill in all the cells of the original correlation matrix.

A geometric interpretation of factor analysis is the one that is generally accepted as the easiest to present and to be understood. This is accomplished by treating the entries in Table 2 as coordinates and plotting them in a n -dimensional space (where n is the number of factors). The reference axes of the space in Figure 6 are the two previously named factors, BF and CC. These are drawn at right angles to each other.

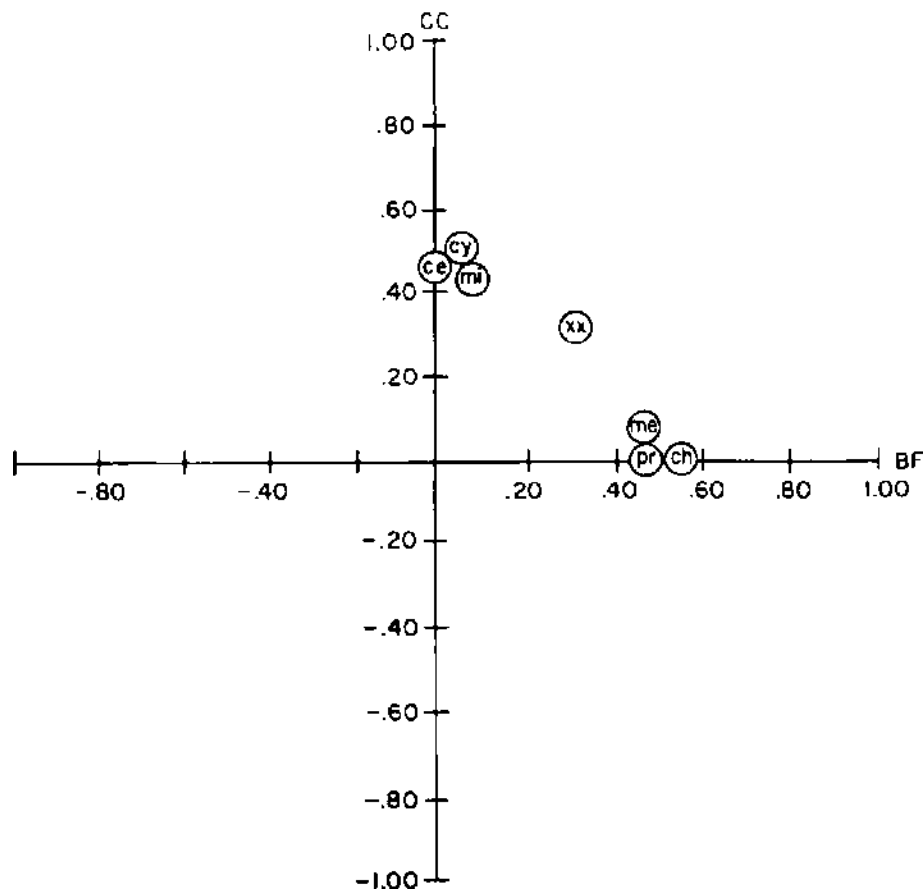


FIGURE 6.

The loadings for the factors BF and CC recorded in Table 2 for each key word are paired to form the location coordinates of that key word in the factor space. For example, for the key word protein, the loadings are (.53, .03). The location is .53 units along the BF axis and .03 units in the CC direction. This point has been located in Figure 6 along with the location of the other key words. A circle around the first two letters of the key word marks its location.

An examination of the factor structure of Figure 6 shows a relatively higher loading on one factor, but not on the other, for each of the key words. This indicates that they are all relatively "pure" measures of their retrospective factors. A key word that is not a pure measure of a factor is shown in Figure 6 by the circled letters xx. The coordinates (.37, .32) indicate that the key word loads about as high on one factor as it does on the other.

One can expect that in most factor analytic studies there will be more than two or three factors. Some published studies report ten or twelve or more factors. Certainly a two-dimensional graphical representation of such a factor structure would not be possible. At best the factors would have to be plotted two or three at a time and generalizations made to the *n*-dimensions.

Unrotated factor matrices may be extremely difficult (or even impossible) to interpret. Thurstone (4, pp. 508, 509) felt that, for an adequate interpretation, factor matrices had to be rotated. His reasoning was that there is an infinite number of reference axes that can be used to reconstruct any given correlation matrix, therefore, in a sense, the original factor matrix was arbitrary (4, p. 93). This position was supported by Cattell (2, p. 66). Factor structures must be rotated to provide the researcher with meaningful information about his variables in n -dimensional space. One desires the most correct way to view the variables and their relationships to each other. What is the real underlying structure of the data that is being examined?

Thurstone introduced the principle of simple structure in the rotation of factors. The ideal would be for a variable to load very high on one factor and very low or not at all on all other factors. Another hypothetical example is given in Table 3 for illustrative purposes.

TABLE 3
Unrotated and Rotated Factors Matrices: Hypothetical File Structure Problem

Unrotated factors			Rotated factors		
Points	α	β	Points	I	II
ch	.47	-.30	ch	.58	.01
pr	.46	-.27	pr	.55	.06
me	.49	-.26	me	.56	.10
cy	.44	.58	cy	.08	.67
mi	.44	.50	mi	-.03	.55
ce	.31	.51	ce	.11	.59

In Figure 7 the original axes α_0 and β_0 have been rotated orthogonally (the angle between the two axes remains at 90° throughout the rotation) to positions α_1 and β_1 . Orthogonal rotation insures that the two factors remain statistically independent (uncorrelated). Oblique rotations in which the angle between the two axes is deliberately changed to something other than 90° are favored by some researchers. While an oblique rotation produces a better fit of the factors to the data, statistical independence is lost. Care must be taken in interpreting correlated factors and in comparing factor structures from one study to another, if the factors have been subjected to an oblique rotation. A number of rotational methods have been developed and are discussed by Thurstone (4), Cattell (2), Harmon (5), and Horst (6). Computer programs have been written for the most frequently used methods of rotation and are available to interested researchers at most computer facilities.

There are useful applications of factor analysis in information science. Borko has done a series of automated document classification studies in which he applied factor analytic techniques to derive classification categories for a set of documents. Tradi-

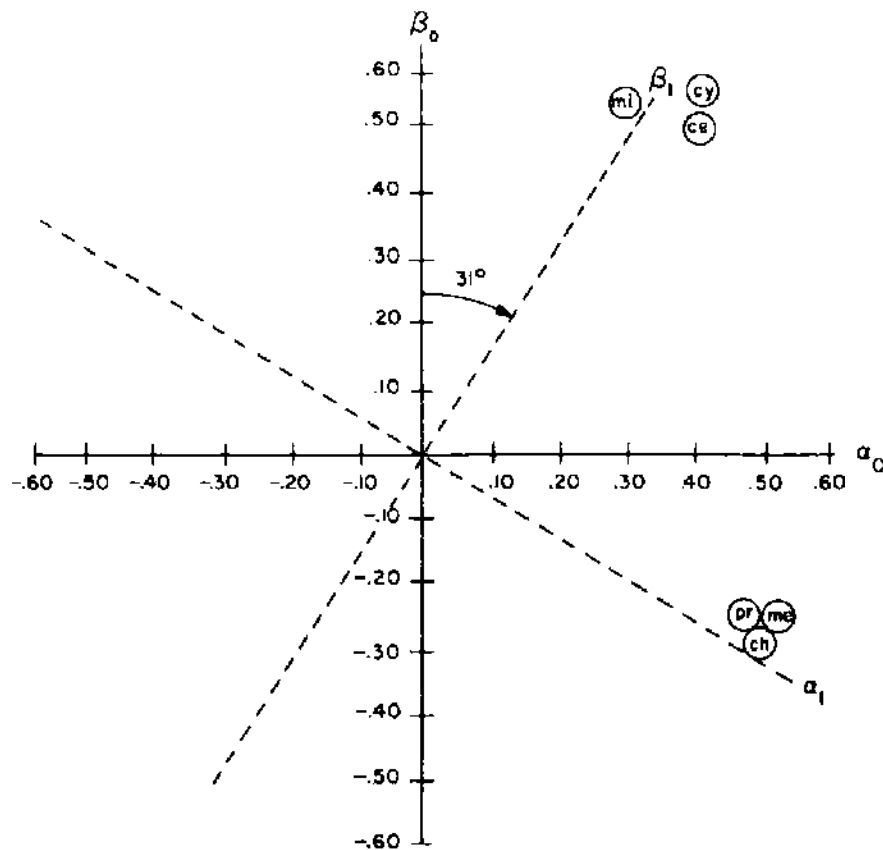


FIGURE 7.

tionally, documents have been subjectively classified into categories by libraries after an interpretation of their content. Automated classification systems objectively sort documents on the basis of an analysis of the actual words contained in the documents. By treating words as symbols which represent ideas, automated systems can classify documents by noting the similarities and differences in the text vocabulary. One of the mathematical techniques available on the computer for deriving classification systems is factor analysis.

Borko (7) first suggested factor analysis for objectively deriving classification systems. Next, Borko and Bernick (8) demonstrated its feasibility. Then Borko (9) was able to show factor analytically derived classification categories are both reliable and valid; reliable in that the same factors turned up with successive sampling from the same population; valid in that the factors satisfactorily described the content of the documents. Borko cautions that while factor analytic classification categories are reasonably reliable and valid, this applies only to the document collection to which the analysis was applied, whether to the total collection or a sample from it. Because of the changing character of most document collections, a periodic repeating of the factor analysis is required to identify the latent changes in the data base and to create or modify the classification categories. This is the

type of task that computers handle quickly and efficiently. One way that the problem of reclassification of documents can be solved after the classification categories have been revised is by using a factor score prediction equation. As new factors emerge from changing characteristics of the document file, the prediction equations can be used to assign new factor scores to the old documents on the new factors.

The importance of factor analysis as an analytical tool can be best appreciated by information scientists working on the problem of automating growing (nonstatic) document files. In such files, factor analytically derived classification schemes can provide the mechanism for effecting the rapid change required to keep the system flexible and responsive even with changing inputs.

Factor analysis has also been employed in identifying the unifying concepts in information science curricula and for studying the content of journals considered relevant to an academic area. Hoyt, Dexter, Zunde, et al. at the Georgia Institute of Technology have been employing factor analysis to identify the basic concepts present in information science curricula at academic institutions in the United States. These institutions operationally defined information science and offered programs in it. Catalog descriptions of 811 courses taught at fifty-seven institutions in 1968 were analyzed. Computer processing reduced the descriptions to a list of 154 key words which served as an input to a factor analysis. The resulting factors were taken by Dexter (10) to be indicative of the curricula of information science that year. Longitudinal comparisons with factor analyses of course descriptions of other years are posited as capable of detecting curriculum trends. Newly emerging factors or even changes in the factor scores are therefore indicative of an evolving curriculum. Courses not relevant to any factor could represent new areas just coming into existence in the field, or old areas fading from the curriculum.

Interestingly, Belzer et al. (11), as part of the Curriculum Committee of the Special Interest Group/Education in Information Science of the American Society of Information Science, were unsuccessful in applying factor analytic techniques in their attempt to determine the scope and characteristics of information science programs in the United States and Canada. A total of forty-five schools provided the Curriculum Committee with information about 185 courses and 242 topics in information science. Application of conventional factor analytic and clustering techniques resulted in one large factor that included all of the topics in the analysis. Belzer's group attributed the clustering into one huge fact or to the extensive overlap of topics within the courses. They observed that most courses were of an introductory nature and, as such, covered a wide range of topics in a superficial way. The extensive overlap in topics resulted in very high correlation coefficients in the topic by course correlation matrix. When one variable correlates highly with every other variable in a data matrix, it is unlikely that factor analytic methods will produce anything other than one large factor that includes everything.

Another useful application of a factor analysis was Van Cott and Zavala's (12) study of the periodic literature in the field of physics. Their objective was to define the inherent structure within that discipline. Using factor analytic techniques, they were able to cluster physics journals into groups having more in common with each

other than with journals in other groups. The usefulness of defining such relatively homogeneous topical or content areas is that, given an understanding of the basic, underlying structure of a discipline, the task of designing more effective systems for publishing, indexing or classifying, storing, and retrieving information should be facilitated. Van Cott and Zavala's study served to demonstrate that the latent structure of the periodical literature of a science could be extracted by employing factor analytic techniques.

This article has tried to point out the two main purposes of factor analytic studies. The first is exploratory in nature in that it attempts to identify the hidden, underlying dimensions in the structure of measured data, and to reduce the number of variables required to understand the data. The second is to test hypotheses about the relationships among a large number of intercorrelated variables. Factor analysis has been employed to examine the basic structure of information files, the periodic literature of a science, and the curriculum of information science.

With the increasing need to know more about information environments and information users operating in those environments, additional applications for factor analysis may be found. Factor analysis could be used to cluster information system users for subsequent classification and segmentation. It could also be used to isolate information environmental variables that show the greatest promise for further analysis. For example, a researcher may have identified twenty or so variables he feels are related to the effectiveness of visual displays of data (size, shape, color, and contrast, to name a few) in stimulating readership. Factor analytic techniques may reduce the large number of variables to three or four factors which may account for all the intercorrelations among the original variables. The scores of the individuals in the sample on the resultant factors may be subjected to further analysis. Economies are achieved by reducing the large number of variables to a more manageable level. The linear combinations of original variables share something in common and that something itself is a variable. The researcher tries to give the new variable a name; in a sense, he constructs a hypothetical entity. He is now obligated to test its reality. This can be done by devising systematic ways of measuring it and correlating the resulting measures with other theoretical measures related to it. Factor analysis serves as a tool for accomplishing this end.

Because of the multifaceted nature of the variables involved in studying the phenomenon of information, information users, and the environment at the interface of the two, any research in these areas could well be preceded by factor analytic explorations of the variables involved. To talk about the relationships of the user's information needs to his relevancy judgment of the information is easy; but to examine the relationship using unitary measures of the variables is not good research. User information needs, like relevancy judgments, are multidimensional variables.

A paragraph from Thurstone's book, *The Measurement of Values* (13, p. 8) will serve as a cogent summarization of this article on factor analysis:

All scientific work has this in common, that we try to comprehend nature in the most parsimonious manner. An explanation of a set of phenomena or a set of experimental observations gain acceptance only in so far as it gives us intellectual

control or comprehension of a relatively wide variety of phenomena in terms of a limited number of concepts. The principle of parsimony is intuitive for anyone who has even slight aptitude for science. The fundamental motivation for science is the craving for the simplest possible comprehension of nature, and it finds satisfaction in the discovery of the simplifying uniformities that we call scientific laws.

Because it employs the principle of parsimony, factor analysis can be a very useful research tool in the study of information users and information environments. It is widely applicable, straightforward, and a worthy exemplar of scientific methods.

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DONALD L. SHIREY

FARMINGTON PLAN

The Farmington Plan is a voluntary agreement under which some sixty American libraries, as a means of increasing the nation's total resources for research, have accepted special responsibilities for collecting. Ideally, if it could be extended to all types of publication issued in all countries and if it were fully effective, it would insure that at least one copy of each new foreign publication that might reasonably be expected to interest a research worker in the United States would be acquired by an American library, promptly listed in the National Union Catalog, and made avail-

able by inter-library loan or photographic reproduction. The plan is sponsored by the Association of Research Libraries (ARL). Its name comes from the town in Connecticut where the Executive Committee of the Librarian's Council of the Library of Congress, meeting to discuss proposals for national planning in bibliography and collecting, authorized the appointment of a special committee to prepare a specialization agreement covering current book production. This was on October 9, 1942; it was not until 1948 that the plan began operation, covering the publications of only three countries during its first year.

Participants, in addition to fifty university libraries, include the Library of Congress, National Agriculture Library, and National Library of Medicine; the New York Public Library; the Brooklyn, Denver, and Detroit Public Libraries; and the American Philosophical Society, Linda Hall, and Newberry Libraries.

There have always been participating libraries that were not members of ARL and members of the association having no Farmington Plan responsibilities. Management and administration of the plan, however, are in the hands of ARL and its Foreign Acquisitions Committee (formerly Farmington Plan Committee), which has regional subcommittees for Africa, Eastern Europe, the Far East, Latin America, the Middle East, South Asia, Southeast Asia, and Western Europe. Since 1963 the Farmington Plan Office, which handles questions, complaints, etc. of libraries and dealers, has been located at ARL headquarters in Washington, D.C.

It has always been assumed that no single method of allocation, acquisition, or distribution would be universally satisfactory. The Farmington Plan has sometimes mistakenly been identified with the first of the two procedures described below because this was the only procedure in effect during the first 3 years of the plan's operation; it should be emphasized that the first "subject responsibility" arrangement applies to publications of only sixteen countries, while the alternative "country responsibility" plan applies to more than 120.

For the publications of thirteen western European nations (Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland) and of Australia, New Zealand, and South Africa, materials are allocated on the basis of a single list of subject responsibilities. A dealer (the Farmington Plan Agent) for each country seeks to obtain a copy of each new book published in his country that falls within the scope of the plan, determines the subject of the book, and sends it to the library responsible for that subject. The subject allocations, based on the Library of Congress classification, are fully listed and defined in the *Farmington Plan Handbook*.

Under the second procedure, which has been extended to much of the rest of the world, each country is the responsibility of a single library which attempts to cover new publications of that country, making its own arrangements for acquisition.

Participating libraries undertake to supply catalog cards for Farmington Plan receipts to the National Union Catalog and to make the books available to other libraries on their usual terms for loan or photographic reproduction.

No specific categories of material have been excluded from the collecting responsibilities that are undertaken by a library accepting a "country" responsibility; such

a library is expected to try to acquire everything "that might reasonably be expected to interest a research worker" in the United States. For the sixteen "subject responsibility" countries, however, dealers have been instructed not to supply almanacs, Bibles, calendars, juvenile literature, reprints, sheet maps, sheet music, textbooks, and works translated from one modern language into another. Theses and series issued by societies or academic institutions have been excluded because copies supplied by dealers would in many cases duplicate those acquired under exchange agreements. Government documents and periodicals are also excluded, except that the dealer is to supply a sample copy of each new periodical.

Specialization in collecting was by no means a novel idea at the time the Farmington Plan was formulated. Subject specialization had been developed on a national basis in Germany by the *Notgemeinschaft der Deutschen Wissenschaft* following World War I. In the United States, local specialization agreements in Chicago and New York date from the 1890s; the American Library Institute had approved a plan for cooperation by specialization in 1916, and the Bibliography Committee of the American Library Association had advocated an adaptation of this during the 1920s.

The outbreak of World War II helped to revive interest in possibilities of this kind. It made many European libraries inaccessible to American scholars and threatened the destruction of these libraries; when scholars working on national defense projects called for materials that could not be supplied, American librarians had a particularly strong incentive for strengthening collections. Archibald MacLeish, who became librarian of Congress on October 1, 1939, a month after the war began in Europe, made it clear that suggestions would be welcomed and that he strongly supported library cooperation.

On November 23, 1940, the Conference of Eastern College Librarians endorsed a proposal by Julian P. Boyd (Princeton) that a division of library cooperation be established at the Library of Congress to centralize the work of coordinating the acquisition policies of libraries, determine the nature and extent of library holdings, and plan for augmenting these resources. The division in question began work during 1941 and its director, Herbert A. Kellar, consulted librarians throughout the country. Relevant meetings during this period included a Conference on Library Specialization, sponsored by the American Library Association Board on Resources of American Libraries (New York, May 13-14, 1941) and a Meeting on Cooperative Enterprises called by the President of the American Library Association (Milwaukee, June 26, 1942). Keyes D. Metcalf, director of the Harvard University Library, presided at the latter meeting, which authorized the appointment of a committee to consider methods by which at least a single copy of each worthwhile book that is published would be acquired by an American library; as it turned out, the functions of this committee were taken over by the Metcalf-Boyd-MacLeish committee (later to be known as the Farmington Plan Committee), which was appointed by Wilmarth S. Lewis, chairman of the Executive Committee of the Librarian's Council of the Library of Congress following the meeting of the Executive Committee at his home in Farmington, Connecticut, on October 9, 1942.

This meeting at Farmington considered a proposal by Mr. Boyd for establishing a national institute of bibliography. There were differences of opinion on many features of this comprehensive and ambitious plan; much of the discussion dealt with the classified national union catalog that was one of its features. The decision to appoint a committee to work on a specialization agreement covering current book production was taken because this idea was more generally acceptable than other elements of the project.

Within 2 months the Metcalf-Boyd-MacLeish Committee had revised an initial draft submitted by Mr. Metcalf and had distributed copies of its *Proposal for a Division of Responsibility Among American Libraries in the Acquisition and Recording of Library Materials* to more than 120 individuals, including representatives of all nineteen organizations then participating in the Council of National Library Organizations. There were modifications as a result of suggestions received at this time and at later dates, but the *Proposal* of 1942 is not fundamentally different from the Farmington Plan that began operation in 1948.

Early in 1943 a revision of the *Proposal* was approved by the Council of National Library Associations, the American Library Association, and ARL; but efforts to obtain a foundation grant to support preliminary studies and to launch the project were unsuccessful. In March 1944 an article by Keyes D. Metcalf and Edwin E. Williams describing the proposal was published in *College & Research Libraries* (5, 105-109). At its meeting of March 1, 1944, ARL adopted the Metcalf-Boyd-MacLeish Committee as its own and authorized such preliminary studies as could be carried out without a foundation grant. Results of these studies were published in the October 1945 issue of the *Library Quarterly* (15, 313-323) as "Research Library Acquisitions from Eight Countries" by Edwin E. Williams.

It should be noted that the Library of Congress Mission to Europe, which distributed more than 800,000 volumes to American libraries during 1946-1948, was closely related intellectually, though not administratively, to the Farmington Plan. It drew upon preliminary studies made for the plan, involved most of the same individuals, and demonstrated how current foreign publications could be distributed on a subject-allocation basis.

There was extended discussion of the plan at meetings of ARL during 1947. Proposals for a regional approach and for centralization of all receipts at the Library of Congress were debated; but the final decision on November 28 was to proceed as originally recommended, covering publications of France, Sweden, and Switzerland for 1948. For this first year only, all receipts were sent to the New York Public Library for classification and forwarding to the participating libraries. A grant from the Carnegie Corporation of New York, approved on January 15, 1948, covered expenses for 3 years, including foreign travel by John Fall in 1948 and by Mr. Metcalf in 1950 to consult with dealers and make arrangements for extension of the plan to additional countries (of which six were added in 1949, three in 1950, and five in 1951).

Mr. Fall was in charge of the Farmington Plan Office until 1951 when it was transferred from the New York Public Library to Harvard where it was directed by

Edwin E. Williams until its transfer to headquarters of the ARL in 1963. Keyes D. Metcalf, who clearly did more than any other individual to bring the plan into existence, was succeeded as chairman of the Farmington Plan Committee in 1954 by Robert B. Downs (Illinois); Robert Vosper (UCLA) served as chairman for 1962; and Louis Kaplan (Wisconsin) was chairman for 1963–1966. Philip J. McNiff (Boston Public Library) became chairman in 1967 and was also the first chairman of the ARL Foreign Acquisitions Committee, which was appointed in 1969 and took over the functions of the Farmington Plan Committee during the following year.

The procedure of assigning to a single library responsibility for collecting all current publications of a country began in 1951 when Harvard undertook the assignment for Ireland, and was extended during the following years; there were seventy-nine such assignments by 1953 and 123 by 1961.

A grant from the Council on Library Resources enabled ARL to have a survey made during 1958 by Robert Vosper and Robert L. Talmadge. Their *Farmington Plan Survey . . . Final Report* [286 pp.] is available in microfilm from the University of Kansas Library, and an abridgement was issued as *Occasional Paper No. 77* of the University of Illinois Graduate School of Library Science. In accordance with one of the surveyors' recommendations, ARL established regional subcommittees for areas not already covered by such committees, each of which was given "responsibility for development of plans for the selection, acquisition, and distribution of materials in its own area, subject to review by the Farmington Plan (now Foreign Acquisitions) Committee." So-called "secondary assignments," under which a library places blanket orders with Farmington Plan agents for subjects or countries not assigned to it, were recommended by the survey and have increased in number to some extent since 1958. Another recommendation was that the procedures in Western Europe "should be modified . . . looking toward a more flexible and decentralized selection and procurement pattern," but participating libraries have not in fact sought to institute the modifications that were authorized by approval of this recommendation. ARL, as the surveyors urged it to do, has continued to emphasize the need for acquisitions programs of national scope, and has developed increasingly effective cooperation with scholarly organizations. It has not succeeded, however, in financing the activity as generously as had been hoped, nor has it yet—to judge by Congressional appropriations—fully convinced the "appropriate governmental agencies" that "an effectively coordinated national program for world-wide coverage is an expensive but urgent undertaking, and that adequate assistance . . . is in the national interest."

The past decade has, however, produced two projects that may be regarded as significant steps toward the objective of federally supported worldwide coverage.

One of these dates from 1962, when appropriations authorized by an amendment to Public Law 480 (of 1954) enabled the Library of Congress to begin to use foreign currencies from the sale of surplus agricultural commodities for buying and distributing to American libraries current books, periodicals, and related materials. This "P.L. 480 Program" has covered the publications of only eight countries (Ceylon, India, Indonesia, Israel, Nepal, Pakistan, the United Arab Republic, and Yugo-

slavia), and the recent phasing out of the program for Israel demonstrates that there is no assurance of permanence; but between 1 and 2 million items per year have been distributed to the participating libraries, which number from twelve to twenty-five per country. Since 1968 the Center for Research Libraries has received sets of current acquisitions from six of the "P.L. 480" countries.

The second significant project, authorized by Title II-C of the Higher Education Act of 1965, is the National Program for Acquisitions and Cataloging, which is designed to enable the Library of Congress to acquire and catalog immediately all current monographs and monographic series of research value published throughout the world and to disseminate cataloging data as rapidly as possible. In 1968 an amendment to the Act authorized the Library of Congress to "pay administrative costs of cooperative arrangements for acquiring library materials . . . not readily available outside the country of origin, for institutions of higher education or combinations thereof for library purposes, or for other public or private nonprofit research libraries." Inadequate appropriations have made it impossible to proceed along these lines; likewise it has not yet been possible to deposit at the Center for Research Libraries a copy of each acquisition under the National Program for Acquisitions and Cataloging, a procedure which would build up a national lending collection in Chicago and might well justify discontinuance of the Farmington Plan, which has been creating a decentralized national collection.

There have always been those who are convinced that the Farmington Plan is bringing a great amount of trash into American libraries, while others maintain that it is far less inclusive than would be desirable. These criticisms would appear to be inevitable as long as some observers believe that the great majority of books are not worth preserving anywhere, while others urge that American scholars should be assured of access to practically everything that has been printed.

As it stands, the Farmington Plan is creating a research collection that is widely decentralized; each of the sixty participating libraries houses different segments of the whole. There have always been advocates of centralization. At the outset, ARL nearly decided to make the Library of Congress the repository for all Farmington Plan receipts. During recent years there has been strong support for proposals that the Center for Research Libraries be developed as the national lending library and that federal appropriations enable it to take over the collecting responsibilities now accepted by the sixty Farmington Plan participants. This would make it simpler to locate recent foreign publications, and centralization of responsibility should facilitate better service than can be expected from sixty institutions, each of which has primary obligations to its own community rather than to the nation.

There has been inconclusive debate regarding costs and savings attributable to the plan. It is difficult to estimate the cost of participation because this calls for an estimate of how much a library would have bought in the area of its Farmington Plan responsibilities had it not been participating. Libraries have normally accepted assignments for subjects or countries in which they were particularly interested, so it is often the cost of "marginal" materials only that can clearly be attributed to partici-

pation. The plan has sometimes been advocated as a means of saving money on the ground that—given the collecting responsibilities undertaken by its fellow participants—each library, in the fields not assigned to it, can safely buy more selectively than would have been prudent in the absence of this specialization agreement. Clearly, however, it would be very difficult to demonstrate that this has happened.

It is difficult also to determine how effective the plan has been. Receipts have been studied but appraisal of receipts involves judgments regarding what is worth collecting—on which, as has been observed above, there are widely divergent views. Studies that were made in the course of the Vosper-Talmadge survey indicated that, of a random sample of Farmington Plan receipts, 38.5% were held only by the library to which they had come under the plan, with an additional 14.5% held only by that library and the Library of Congress. Two thirds of the unique items, it was ascertained, would probably not have been acquired if the plan were not in existence, and more than half of these—12.5% of all receipts—were appraised as desirable items; 9% of all receipts, however, were regarded as of dubious value. It was evident that coverage had not been uniform and that more systematic monitoring of receipts would be desirable, but there is no evidence that the survey has led to improved monitoring, which remains a responsibility of individual participants.

It has never seemed practicable to compile statistics of Farmington Plan receipts from the countries assigned to individual libraries. Statistics based on copies of invoices supplied by dealers to the Farmington Plan Office were published for the subject-allocation countries but were discontinued after 1965. Receipts for that year from the fourteen countries then covered on the subject-allocation basis amounted to 22,419 volumes costing \$107,438.

Farmington Plan Handbook by Edwin E. Williams (v + 170 pp.) was published by ARL in 1953. A revised and abridged edition (141 pp.) appeared in 1961. The latter does not supplant the 1953 edition for historical purposes since it does not reproduce a detailed account of the plan's background and its history to 1953, a bibliography of eighty-nine items published prior to 1953, or a ten-page discussion of questions and possibilities. The revised edition provides 8-year supplements to the history and bibliography, gives an account of the Vosper-Talmadge survey, and includes lists of countries and agents, categories of material excluded, and responsibilities of participating libraries.

Foreign Acquisitions Newsletter is now the title of the official Farmington Plan periodical issued by ARL. It began with No. 1 (March 29, 1949) as *Farmington Plan Letter*. The title was changed to *Farmington Plan Newsletter* with No. 18 (November 1963), and the current title was adopted with No. 32 (October 1970). Nos. 1–17 were prepared by Edwin E. Williams and signed by him or by the chairman of the Farmington Plan Committee; No. 18 and following have been edited by Lloyd W. Griffin of the University of Wisconsin Library. (Nos. 1–18, having gone out of print, were reproduced and are available from University Microfilms.) Issues have appeared regularly in May and October each year since 1964.

The *Newsletter* should be consulted for changes subsequent to the 1961 edition of

the *Handbook*. In addition, each issue now provides a comprehensive survey of current developments in foreign acquisitions; news of the Farmington Plan as such has become a feature of secondary importance.

Even though they exclude news notes and incidental references to the plan in reports and articles, the bibliographies in the two editions of the *Handbook* and in the *Newsletter* (No. 16 and following) list more than 140 publications on the Farmington Plan.

EDWIN E. WILLIAMS

FEDERAÇÃO BRASILEIRA DE ASSOCIAÇÕES DE BIBLIOTECÁRIOS (FEBAB)

The Brazilian Federation of Library Associations (Federação Brasileira de Associações de Bibliotecários, FEBAB) was created by a resolution of the Second Brazilian Congress for Librarianship and Documentation on July 26, 1959, in Salvador, Bahia. FEBAB was actively promoted and in a relatively short time it consisted of fourteen member associations. The member associations, which maintain their administrative and economic autonomy, are:

Associação Paulista de Bibliotecários
Associação Profissional de Bibliotecários de Pernambuco
Associação dos Bibliotecários da Guanabara
Associação Riograndense de Bibliotecários
Associação Profissional de Bibliotecários da Bahia
Associação de Bibliotecários Municipais de São Paulo
Associação dos Bibliotecários de Minas Gerais
Associação dos Bibliotecários do Distrito Federal
Associação Campineira de Bibliotecários
Associação dos Bibliotecários do Ceará
Associação dos Bibliotecários São-carlenses
Associação Paraense de Bibliotecários
Associação Bibliotecária do Paraná
Associação Amazonense de Bibliotecários

The administrative structure of FEBAB is divided into four executive parts—a council, a directorate, a fiscal council, and permanent commissions.

The council consists of the presidents from the affiliated associations; the directorate includes a president, a vice-president, a first and second secretary, a first and second treasurer, and a librarian. The fiscal council is composed of three members from the council and is responsible for an annual examination and accounting of the financial affairs of FEBAB; the permanent commissions comprise several groups of special librarians that include biomedical, technical, juridical, and agricultural libraries.

The main objectives of FEBAB, a gathering of all library associations in the country, are the strengthening of the profession in the technical, cultural, social, and economic areas; solution of library problems on a regional and national level; offering comprehensive assistance to the affiliated associations; serving as a documentation and information center for library science activities in general, thereby seeking to improve the cultural and technical level of librarianship; and fostering the development of Brazilian libraries.

Goals Achieved

A major accomplishment resulting from the federation of library association activities has been the regulation of the library profession. To conform with the regulation, Brazilian universities include courses of study for library science in their curricula.

In 1963, the Ministry of Education and Culture, implementing Law No. 4084, established a minimum curriculum to be administered by the eighteen schools of library science in the country. An important segment was a fixed standard for the curriculum and the duration of the courses. After the basic 12 years of schooling are completed, 3 years of further study are required.

Federal Law No. 4084, of June 30, 1962, was regulated by Decree No. 56, 725, of August 16, 1965. This legislation permitted the founding of a Federal Council for Librarianship, with headquarters in the city of Brasilia. Ten regional councils were established to supervise the profession on a national basis.

Another important achievement was recognition by governmental officials of the need for all libraries to be directed by trained professional personnel. This had been the practice only for university libraries. Public libraries in particular were not operated by professionals. After a trying struggle, government officials became convinced of the need for professional librarians. The National Library has been under the direction of a professional since April 1971.

Members of the FEBAB Directorate

President, Laura Garcia Moreno Russo; Vice President, Antonio Gabriel; Secretary General, Elza Lyrio Mello; First Secretary, Benilda José de Souza; Second Secretary, Esmeralda Maria de Aragão; First Treasurer, Maria Alice de Toledo Leite; Second Treasurer, Nara Maldonado de Carvalho; Lobbyist, Adelia Leite Coelho; Librarian, Áurea Beatriz Siqueira.

Brazilian Congresses for Librarianship and Documentation

I Congress, 1954, in Pernambuco; II Congress, 1959, in Bahia; III Congress, 1961, in Paraná; IV Congress, 1963, in Ceará; V Congress, 1967, in Sao Paulo; VI Congress, 1971, in Minas Gerais.

Headquarters

Since 1969 FEBAB has had its headquarters at Rua Avanhandava, 40. cj 110, São Paulo.

LAURA GARCIA MORENO RUSSO

FEDERAL COMMUNICATIONS COMMISSION

Telecommunication has become a part of our daily life. By cutting time and distance, it benefits us as individuals and as nations. Its continuing developments provide many new ways to communicate and obtain information.

The Federal Communications Commission (FCC) is an independent federal agency responsible for regulating interstate and foreign communications by radio, television, wire, cable, and satellite. It was created by Congress under the Communications Act of 1934 to unify wire, cable, and radio communication regulation which was divided among the Department of Commerce; Post Office Department; Interstate Commerce Commission, and the Federal Radio Commission. The commission jurisdiction, according to the Communication Act, applies to all fifty states in addition to Guam, Puerto Rico, and the Virgin Islands.

The FCC is headed by seven commissions who are appointed by the President of the United States and are approved by the Senate. No more than four commissioners can be members of the same political party. The commissioners' regular term is 7 years and the president names one of them to serve as chairman.

The FCC is mainly the custodian of the nation's airwaves which are used for many communication purposes. This radio space belongs to the people and Congress requires the commission to see that it is used in the public interest. Consequently, the FCC supervises all radio operations (radio is used here in an all-inclusive sense and refers to television service as well as other broadcasting and nonbroadcasting uses) except that of the federal government.

The commission allots radio bands to different radio services and assigns the specific frequencies (individual channels) on which stations operate. In addition, the FCC licenses all nonfederal radio stations and the operators of their transmitters.

It should be noted that though the FCC is involved in radio and television broadcasting, it is prohibited from censoring programs. Consequently, it cannot put a particular program on or off the air. The commission does, however, review a station's over-all operation, usually at renewal time, to see if it is meeting its public interest obligations. It requires station licensees to seek out and serve the programming needs of their communities and otherwise live up to the promises they made when they applied to use the public airwaves. It also decides on station sales and has rules limiting the number of stations assigned to the same owner.

In its regulations of broadcasting the FCC has jurisdiction over AM and FM radio, UHF and VHF television, both commercial and educational. It also regulates aviation, ship, amateur, and various forms of business and citizens radio services.

Community antenna television is also regulated by the commission. Systems are required to notify the commission when they plan to begin operation; must carry, and not duplicate, all local signals; and may be required to show that their operation will not have an adverse impact on the local broadcasting stations. Systems with more than 3,500 subscribers must, since April 1971, originate programs. Television networks, however, may not own CATV systems. On the other hand, local television stations may not own CATV systems within their market, and telephone companies or their subsidiaries may not own systems within their local service area.

In international matters the FCC is responsible for domestic administration of the telecommunications provisions of treaties and international agreements. Under State Department auspices the commission participates in international conferences concerned with communications matters. It licenses radio and cable circuits from the United States to foreign points and regulates operating companies. It also licenses radio stations on American planes and ships in international services.

In the field of national defense the FCC supervises the Emergency Broadcast System (EBS) organized to alert and instruct the public in the event of enemy attack. In the meantime, EBS units are used in the fifty states to broadcast weather warnings and may also be used in local emergencies.

The commission is required, by the Communication Act, to "study new uses for radio; provide for experimental uses of frequencies; and generally encourage the larger and more effective use of radio in the public interest." In this respect the FCC cooperates with the government and commercial research and development groups, and maintains a laboratory at Laurel, Maryland. It also carries out policy studies in order to provide information on complex questions facing the commission.

WILLIAM Z. NASRI

FEDERAL LIBRARIES

See also Armed Forces Libraries; Library of Congress; National Agricultural Library; National Library of Medicine

Federal Libraries in the United States

The federal government is served by nearly 2,700 separate libraries of every type and description. Most of the libraries are mission oriented and all have unique acquisition requirements. There are seven types of libraries, ranging in size and sophistication, which serve the many committees, agencies, departments, courts, and other formal organizational entities:

1. *National libraries* serve broad public as well as agency mission-oriented requirements.
2. *Presidential libraries* specialize in the official records, memorabilia, literature, and other materials concerning the affairs of a specific president of the United States.
3. *General libraries* provide service to meet the cultural, informational, educational, and recreational needs of those attached to a military or public information service agency.
4. *Academic libraries* include those intended to serve the faculty and students in colleges, universities, vocational, graduate, and postgraduate schools. The Service Academy libraries are included in this group.
5. *Elementary and secondary schools* on military bases and on Indian reservations usually are served by school libraries.
6. *Special or technical libraries* support mission plans with library and information services.
7. *Institutional libraries* are located within penal correctional institutions as well as in hospitals.

No exact inventory of all libraries has ever been implemented. Only five attempts have been made to identify all, or part of, the universe. In 1876, the first general report about Federal libraries appeared as "Libraries of the Federal Government," Chapter X of *Public Libraries in the United States of America (1)*. The study identified eighty significant collections holding more than 700,000 books and pamphlets (see Table 1), and explained that:

They have grown out of the exigencies of . . . administration. Before the government was removed from Philadelphia to Washington, members of Congress and the executive officers of the several departments were obliged to avail themselves of the courtesy of a proprietary library. The new Capitol offered no such facilities. The Library of Congress was therefore begun, and has grown, as needs required, until it now numbers over 300,000 volumes and 60,000 pamphlets.

As the business of administration increased, and its cares were divided by the creation of new departments, a reference library for each was found necessary for the proper conduct of business. In like manner, it became essential from time to time to form libraries in a number of the bureaus of the departments. With three or four exceptions, these libraries have been formed with reference to the special duties devolving on the respective bureaus.

It is interesting to note that three libraries were cited being established in 1789: The Department of State, The First Auditor's Office, and The House of Representatives. T. F. Dwight, then Librarian of the State Department, noted that the library's foundation:

. . . may be dated from the resolution of Congress of September 23, 1789, which made it the "duty of the Secretary of State to procure, from time to time, such of the statutes of the several States as may not be in his office."

This resolution was the first authorization of a collection of books by the Congress of the United States.

An 1897 report titled *Statistics of Libraries and Library Legislation in the United States* also included data regarding federal libraries. In 1959 The Brookings Institution sponsored a study of federal libraries. However, only 479—a fraction of the total—libraries responded to the questionnaire. Of these, 279 were located at military posts. No data was collected from academic, judicial, and nondepartmental libraries.

In 1968, Dr. Frank Schick, then affiliated with the University of Wisconsin at Milwaukee, surveyed 508 technical libraries. He had a response of 358 reportable survey forms released as *A Survey of Special Libraries Serving the Federal Government* (2).

The most recent and most comprehensive survey was implemented during 1970/1971 by the System Development Corporation at the request of the Federal Library Committee, with funds provided by the U.S. Office of Education. Under the direction of Barbara Evans Markuson, the study developed a broad base from which to view all Federal libraries.

The study surveyed more than 2,000 libraries—excluding the three national libraries. A response in excess of 60% was realized. It was determined that 52% of the respondents could be classed as representative of technical or special libraries, 34% as public, 17% as school, 3% as academic, and 2% as archival or depository. Collections were reported ranging from 300 to 10,000,000 items. The median size reported was 16,500 items.

Types of materials held by the libraries were identified and ranked. In descending order the listing showed books, serials, technical reports, government documents, phonograph records, tapes, and pamphlets.

Total expenditure figures indicate that the surveyed libraries expended a total of \$15,414,998 on materials, \$37,361,777 on personnel, \$2,261,139 on equipment, \$4,923,959 on contracts, and \$1,578,344 on miscellaneous items. The average federal library spent less than \$30,000, each year, with two-thirds of that amount diverted to personnel costs.

Staff details indicate a minimum commitment to personnel. The median shows one professional and two clerks in each library.

Sixty-one per cent of all libraries were noted as located within the continental United States, 22% in foreign countries, 14% in the metropolitan Washington, D.C. area, and 3% in the noncontinental United States.

On June 26, 1970, the U.S. Office of Management and Budget approved implementation of a *National Plan for Federal Library Statistics*. The plan will be tested during 1971/1972 and implemented during 1972/1973. It has been designed to permit:

The development of factual data for use in planning and administering individual federal library programs.

The provision of data necessary for over-all planning by federal agencies or inter-agency bodies.

The provision of data compatible with that collected from libraries from outside the government so that over-all figures on the status and development of library service in the United States may be compiled.

TABLE 1
Federal Libraries Holding in Excess of 300 Volumes in 1876^a

Place	Name	Date established	Volumes
Sitka, Alaska	Post Library	1868	596
Camp McDowell, Arizona	Post Library	1867	300
Fort Whipple, Arizona	Regimental Library	1868	328
Angel Island, California	Post Library	1869	776
Point San Jose, California	Company and Post Library	1869	580
San Francisco, California	Military Library	1873	900
San Francisco, California	United States Mint		300
Fort Randall, Dakota	Post Library		750
Fort Sully, Dakota	Post Library		745
Wilmington, Delaware	U.S. District Court	1846	893
Washington, D.C.	Adjutant-General's Office		1,700
Washington, D.C.	Attorney-General's Office	1853	12,000
Washington, D.C.	Bureau of Education	1868	4,522
Washington, D.C.	Bureau of Medicine and Surgery		1,000
Washington, D.C.	Bureau of Navigation		1,250
Washington, D.C.	Bureau of Ordnance	1838	2,200
Washington, D.C.	Bureau of Statistics	1866	6,000
Washington, D.C.	Department of Agriculture	1860	7,000
Washington, D.C.	Department of State	1789	29,000
Washington, D.C.	Department of the Interior	1850	5,589
Washington, D.C.	Executive Mansion	1810	1,453
Washington, D.C.	First Auditor's Office	1789	2,000
Washington, D.C.	Government Hospital for the Insane	1855	1,400
Washington, D.C.	House of Representatives	1789	125,000
Washington, D.C.	Howard University	1869	10,000
Washington, D.C.	Hydrographer's Office	1867	7,000
Washington, D.C.	Land Office		500
Washington, D.C.	Library of Congress	1802	300,000
Washington, D.C.	Light-House Board	1852	1,500
Washington, D.C.	Marine Barracks	1852	1,500
Washington, D.C.	Navy Department		4,000
Washington, D.C.	Patent-Office	1839	23,000
Washington, D.C.	Post Office Department	1862	6,301
Washington, D.C.	Signal-Office, U.S. Army	1861	2,900
Washington, D.C.	Soldiers' Home	1850	2,500
Washington, D.C.	Solicitor of the Treasury	1843	6,000
Washington, D.C.	Supervising Architect's Office	1858	250
Washington, D.C.	Surgeon-General's Office	1865	40,000
Washington, D.C.	Treasury Department	1803	8,440
Washington, D.C.	U.S. Coast Survey	1832	6,000
Washington, D.C.	U.S. Naval Observatory	1845	7,000
Washington, D.C.	United States Senate	1852	25,000
Washington, D.C.	War Department	1832	13,000

(continued)

TABLE I (continued)

Place	Name	Date established	Volumes
Pensacola, Florida	U.S. Navy Yard	1864	650
Savannah, Georgia	U.S. Military Post and Company Library		450
Rock Island, Illinois	United States Arsenal	1870	454
Camp Supply, Indian T	Post Library		530
Fort Sill, Indian T	Post Library	1868	560
Fort Dodge, Kansas	Post Library	1869	406
Fort Hays, Kansas	Post Library		300
Lancaster, Kentucky	Library, Company E, Sixteenth Infantry		500
Annapolis, Maryland	U.S. Naval Academy	1845	17,678
Boston, Massachusetts	Post Library, Fort Warren		1,450
Watertown, Massachusetts	United States Arsenal	1867	353
Fort Brady, Michigan	Post Library		349
Fort Wayne, Michigan	Post Library		1,200
Jackson, Mississippi	Post Library	1869	
Jackson, Mississippi	Camp Library	1872	484
St. Louis, Missouri	Cavalry Depot, St. Louis Barracks	1871	800
Ft. McPherson, Nebraska	Company Libraries, Third U.S. Cavalry		562
Omaha, Nebraska	Company Libraries, Twenty-third Infantry and Second Cavalry		1,231
Fort Bayard, New Mexico	Post Library	1866	385
Fort Hamilton, New York	Battery C, Third Artillery		1,500
Fort Hamilton, New York	Military Post Library		1,150
Madison Barracks, New York	Military Post Library	1816	840
New York, New York	Depot General Recruiting Service, at Fort Columbia	1842	2,556
Plattsburgh, New York	Post Library, Plattsburgh Barracks	1866	520
West Point, New York	U.S. Military Academy	1812	25,000
West Troy, New York	Watervliet Arsenal	1840	618
Willet's Point, New York	Battalion Library in New York Harbor		2,300
Philadelphia, Pennsylvania	United States Mint	1793	900
Fort Adams, Rhode Island	Post Library		450
Nashville, Tennessee	Regimental Library	1866	480
Fort Clark, Texas	Post Library		625
Fort Concho, Texas	Post Library	1873	311
Fort Davis, Texas	Post & Regimental Library	1867	1,150
Fort Quitman, Texas	Post Library	1870	300
Ringgold Barracks, Texas	Post Library	1865	456
Fort Monroe, Virginia	Post Library	1865	2,000

* Compiled from data included in U.S. Office of Education, *Public Libraries in the U.S.A.*, Department of Interior, Washington, D.C., 1876.

The provision of data about federal libraries which professional organizations and individual researchers may use when conducting library studies so that federal libraries will be considered in their conclusions and recommendations.

For the first time the entire universe of federal libraries will be identified and examined in some detail.

THE NATIONAL LIBRARIES

The Continental Congress convened at Philadelphia during the Revolutionary period. It had no central library or other source of information. Even following the adoption of the Constitution in 1789, no immediate need was seen for developing a library capability.

However, on April 24, 1800, an Act of Congress approved an appropriation of \$5,000 for the acquisition of "necessary" books. From that date the Library of Congress developed into one of the most significant libraries in the United States and the world.

In its functions as the national library, the Library of Congress serves the public both directly and indirectly. Its services to the Congress of the United States, to other government agencies, and to the state, municipal, research, and other libraries of every state are national services which are reflected in the work of agencies and organizations serving the public.

On June 30, 1970, the collections totaled more than 15,258,000 books and pamphlets, 125,000 bound newspapers, 29,936,000 manuscripts, 3,315,000 maps, 3,335,000 items of music, 3,136,000 photographic negatives, 285,000 audio items, 647,000 microform items, and 1,194,000 braille items. The total collection exceeded 58,000,000 items.

Funds obligated by the library in fiscal 1970 totaled \$62,284,248, of which \$47,268,880 were from congressional appropriations, \$11,048,522 transferred from other government agencies, and \$3,966,846 from gifts and other sources. In two operations the library produces income which is returned to the U.S. Treasury; net receipts for copyright services were \$1,956,441 in fiscal 1970, and net receipts from sales of printed catalog cards and technical publications were \$6,942,720.

The Library of the Surgeon General's Office, United States Army, was established in 1836. It was later known as the Army Medical Library and the Armed Forces Medical Library. In 1956 the National Library of Medicine emerged as the successor to the original army medical library.

The National Library of Medicine holds in excess of 1,300,000 books, journals, theses, photographs, and other items relating to biomedicine and the health sciences. An active service program reaches researchers, practitioners, educators, and the general public. Libraries with similar interests throughout the country are serviced through interlibrary loan and through the Medical Literature Analysis and Retrieval System (MEDLARS).

The National Agricultural Library, established in 1860, operates on a budget in excess of \$2,000,000 and serves a definite national purpose. The 1,500,000 item li-

library first printed catalog cards in 1899, distributed photographic copies of interlibrary loan material, and established the first major documentation center.

In June 1967, the Librarian of Congress and the Directors of the National Library of Medicine and the National Agricultural Library announced their intention to work toward the development of compatibility in technical and other procedures and services of the three institutions insofar as this could be achieved in terms of the national libraries' individual statutory obligations. They announced the formation of the U.S. National Libraries Task Force as the vehicle for guiding the cooperative program toward this broad goal. Work is currently underway on development of compatible serial listing data.

On October 31, 1969, the federal government employed 3,447 professional librarians, 3,289 clerical technicians, and 722 technical information specialists to staff its libraries.

Librarians must either hold a graduate degree or have passed an equivalency examination.

Most federal libraries operate in an independent manner responsible to the section of the responsible agency concerned with administration. There is usually no central agency responsibility for administration. Exceptions to this general pattern may be found in the Veterans Administration, elements of the military services, and in other isolated executive branch cases.

All federal libraries performing work utilizing appropriated funds are required to be authorized by a specific statute or through interpretation of a general statute. There is no one specific charter for federal library operations. This has caused great inconsistency in operations and procedure.

Statutes and regulations exist which address: operating functions; maintenance and security; publications and personnel. These are identified in *Guide to Laws and Regulations on Federal Libraries (3)*.

FEDERAL LIBRARY COMMITTEE

The concept of coordinated federal library activity extends back many years. Indeed, the Federal Library Committee (FLC) of today owes its existence to the efforts of many dedicated librarians.

In 1896, Melvil Dewey suggested to the Joint Committee on the Library of the House of Representatives and of the Senate, that they create a board to examine possibilities in the "development and consolidation of Federal library and cultural collections and services." John Russell Young, Librarian of Congress, suggested in 1898 that "the entire library work of the Government should be carried on under some sort of general cooperation." The American Library Association pursued the idea in 1935 and 1937 studies.

In 1940, the Committee on Federal Libraries of the District of Columbia Library Association began to study the concept of a Federal Library Council. The committee developed a draft Executive Order that would establish such a group. The proposed Federal Library Council was to address such areas as organization, procurement,

bibliographic programs, and cooperative studies. No formal action was implemented.

Throughout the 1940s and early 1950s, cooperative ventures were considered, examined, and discarded. In 1959, however, Luther Evans undertook a survey of federal libraries under the sponsorship of The Brookings Institution. The survey, *Federal Departmental Libraries* (4), published in 1963, specifically urged establishment of a Federal Library Council.

The Library of Congress and the Office of Management and Budget (then Bureau of the Budget) agreed to organize a cooperative body based upon the suggestions in the Luther Evans study. On March 11, 1965, the establishment of the Federal Library Committee was announced in Library of Congress Press Release No. 65-21:

The Library of Congress, with the cooperation of Bureau of the Budget, has taken the initiative in establishing a Federal Library Committee to improve coordination and planning among research libraries of the Federal Government, so that common problems may be identified, solutions sought, and services to the Government and the Nation improved. In formulating the purposes and tasks of the Federal Library Committee, the Library of Congress has had the assistance of a planning committee representing Federal libraries and the Bureau of the Budget.

The committee consists of 18 members. Twelve are permanent members, representing the Library of Congress, the National Agricultural Library, the National Library of Medicine, and each of the executive departments. Six are members serving 2-year terms, who represent six independent Federal agencies selected, on a rotating basis, by the permanent members of the committee. Representatives of the Executive departments are designated by their respective Secretaries and the rotating members of their agency heads.

The 12 permanent members of the Federal Library Committee are L. Quincy Mumford, Librarian of Congress, who will serve as Chairman; Foster E. Mohrhardt, Director of the National Agricultural Library, who will represent the Department of Agriculture as well as NAL; Dr. Martin M. Cummings, Director of the National Library of Medicine; and the following representatives of Executive departments: Wanda Mae Johnson, Chief Librarian, Department of Commerce; R. A. Winnacker, Historian, Department of Defense; Kanardy L. Taylor, Librarian, Department of Health, Education, and Welfare; Paul Howard, Librarian, Department of the Interior; Marvin P. Hogan, Librarian, Department of Justice; Margaret F. Brickett, Librarian, Department of Labor; Geneva C. Chancey, Post Office Department; Fred W. Shipman, Librarian, Department of State; and Lillian C. McLaurin, Chief, Library Division, Treasury Department.

The six independent agencies selected for 1965-67 membership of the committee and their representatives are: Edward J. Brunenkant, Director, Division of Technical Information, Atomic Energy Commission; Mrs. Elaine Woodruff, Librarian, Civil Service Commission; Wilmer H. Baatz, Chief, Library and Information Retrieval Staff, Federal Aviation Agency; Mrs. Elsa S. Freeman, Librarian, Housing and Home Finance Agency; Melvin S. Day, Director, Scientific and Technical Information Division, National Aeronautics and Space Administration; and Henry J. Gartland, Director of Library Service, Veterans Administration.

William T. Knox, Technical Assistant to the Director, will serve as the official observer of the Office of Science and Technology, Executive Office of the President; and Ruth Fine, Librarian of the Bureau of the Budget, will be the official observer for the Bureau. Federal librarians and other officials not on the committee

will be asked by the Chairman to serve on working groups, to prepare reports, and to attend committee meetings to participate in discussions. From time to time, the Chairman will also convene librarians from all agencies to consider common problems.

The committee will consider on a Government-wide basis policies and problems relating to Federal libraries. The committee's studies will result in the recommendation of policies and other measures to utilize the resources of Federal libraries in the most effective way possible to meet the expanding national needs for information.

The first meeting of the full committee is planned for 10 A.M. on Tuesday, March 23, in the Library of Congress.

The Federal Library Committee, upon deliberation, determined that its efforts might well be directed toward the purpose of concentrating the intellectual resources present in the Federal library and library related information community:

To achieve better utilization of library resources and facilities.

To provide more effective planning, development, and operation of federal libraries.

To promote an optimum exchange of experience, skill, and resources.

Further, six functional approaches were authorized:

To consider policies and problems relating to federal libraries.

To evaluate existing federal library programs and resources.

To determine priorities among library issues requiring attention.

To examine the organization and policies for acquiring, preserving, and making information available.

To study the need for and potential of technological innovation in library practices.

To study library budgeting and staffing problems, including the recruiting, education, training, and remuneration of librarians.

Funding support was solicited and obtained from the Council on Library Resources in June 1965. A total of \$97,650 was appropriated to maintain activity for a 3-year period. In 1969, Federal Library Committee support was assumed by the Library of Congress and placed under the Office of the Librarian of Congress.

To achieve the three noted goals and to facilitate implementation of the six functional approaches, a Secretariat was established and a Task Force/Sub-Committee/Work Group operating method was organized. Work groups include:

Task Force on Acquisition of Library Materials and Correlation of Federal Library Resources. To review and report upon acquisition and retention policies of federal libraries, to evaluate holdings which may be appropriate for inclusion

in a correlated program, to investigate and report upon problems related to the correlation of federal library collections with other information activities, and to recommend programs and methods of correlating research collections of federal libraries with other resources both within and without the Federal establishment.

Task Force on Automation of Library Operations. To review and report upon the status of automation in federal libraries, to encourage development of compatible automation systems where feasible, to furnish guidance to federal administrators and librarians on automation problems in libraries, and to provide liaison between federal libraries and other groups interested in the application of automatic data processing to information and document retrieval.

Task Force on Interlibrary Loan Arrangement for Federal Libraries. To establish a code of practice for interlibrary loans between federal libraries with a view toward improving services and furthering the effective use of federal library collections.

Task Force on Library Education. To enrich the resources for education for librarians and library technicians in ways designed to increase the number of persons entering the job market with capability for work in federal libraries and to foster career development of federal library personnel.

Task Force on Mission of Federal Libraries and Standards for Federal Library Service. To review and analyze existing statements of mission and functions, to develop at appropriate levels general statements of federal library functions and patterns for individual statements of mission, to establish the basic elements upon which standards of federal library service should be built, to draft guidelines, for administrators, related to the establishment and evaluation of library service, and to serve as liaison between federal libraries and other groups interested in evaluating library service.

Task Force on Physical Facilities of Federal Libraries. To investigate the problems related to provision of adequate physical facilities for federal library service including location, space, building, remodeling, lighting, and equipment, and to establish guidelines to assist librarians and administrators in their solution.

Task Force on Procurement Procedures in Federal Libraries. To review and compile the laws and regulations related to procurement and disposal of library materials for federal libraries; to review existing procurement practices; to recommend revisions in law, regulations, or practice which will facilitate the procurement of library materials and contribute to the economy and efficiency of federal libraries.

Task Force on Public Relations. The occasion for establishing this group was a request to cooperate with the D.C. Committee on National Library Week. However, early in its deliberations, the group decided that its function should be broadened to include all activities concerned with inducing the clientele to use federal library services and to create good-will toward federal libraries.

Task Force on Recruiting of Personnel in Federal Libraries. To plan and develop a continuing program for increasing the supply of highly qualified librarians entering the federal service at all levels, based on an evaluation of immediate and long-range needs; to promote the coordination of existing programs where feasible; to facilitate the internal movement of library personnel within the federal service.

Task Force on Role of Libraries in Information Systems. To consider the current role of federal libraries in relation to other related elements of government information activities, to evaluate the adequacy of these present relationships, to review the factors giving rise to the existing patterns, and to determine the components of a fully integrated total library and information system.

Sub-Committee on Guidelines for Interpreting CSC Classification Standards.

Sub-Committee on Procurement Problems.

Sub-Committee on Program Planning and Budgeting. To assist the chairman and executive secretary in coordinating the action programs of the committee, in reviewing financial needs of various task forces and research projects, and in discovering and recommending sources of funds to support the work of the committee.

In carrying out its mission the sub-committee will receive reports from task forces and other units of the FLC. It will take into account work being done by other federal bodies, by professional associations, by academic institutions, and by individuals. It will attempt to provide both internal and external coordination for the work of the committee and for its funding.

Sub-Committee on Statistical Programs. To develop the collection of data standardized for federal libraries and information centers and compatible with those collected from outside the government.

Map Library Work Group. To review and report upon the status of automation in federal map and chart libraries, and to encourage development of compatible automation systems where feasible; to furnish guidance to federal administrators and librarians on automation problems in map and chart libraries; and to provide liaison between federal map and chart libraries and other groups interested in the application of automatic data processing to information and document retrieval in the fields of cartographic and related geophysical data and in other automation-related problems.

Some success has been realized. New areas are being examined. For example, in 1970 and 1971 several programs were initiated with good initial results.

EXECUTIVE ADVISORY COMMITTEE

In an attempt to build a broad participatory base, an Executive Advisory Committee was charged with responsibility to develop policy recommendations in all areas of program planning and the acquisition and allocation of fiscal resources. It offers policy guidance and counsel to the Chairman and Executive Secretary of the Federal Library Committee. Membership totals seven, with four individuals serving 1-year terms and three holding 2-year appointments. John Sherrod, Director, National Agricultural Library, served as chairman for a term extending through June 1972. The group met for the first time in May 1970 and has established a monthly meeting schedule.

Positive committee action resulting from EAC recommendations included:

1. The approval of a dual FLC meeting program: Informative meetings will be briefing sessions on particular topics open to interested committee members and

other persons having an interest in the subject scheduled for presentation. Action meetings will be concerned with discussion and voting on specific proposals for action recommended by the Executive Advisory Committee and/or by any member of the Federal Library Committee.

2. The Task Force on Acquisition of Library Materials and Correlation of Federal Library Resources was requested to review its charge to "evaluate holdings which may be appropriate for inclusion in a correlated program, to investigate and report upon problems related to the correlation of federal library collections with other information activities, and to recommend programs and methods of correlating research collections of federal libraries with other resources both within and without the Federal establishment," and make recommendations for appropriate future action.
3. An informative meeting on libraries and library programs in the Department of Defense was held at Maxwell Air Force Base, Alabama.
4. A summer orientation workshop for disadvantaged young people assigned to federal agency libraries was scheduled at Federal City College.
5. FLC assumed an active role in the recruitment of personnel for federal library and information science positions.

On January 22, 1971, the President announced his intention to reorganize seven executive departments and several independent agencies into four. On February 9, 1971, Federal Library Committee representatives met with Office of Management and Budget officials to discuss how the federal library/information community might cooperate with the phased restructuring effort.

It was agreed that Phase 1 activity, the drafting of legislation, was outside the scope of the FLC concern. However, full involvement in Phase 2, the development of guidelines for the placement of libraries and information services in the proposed restructuring, and Phase 3, implementation, were certainly areas in which FLC assistance could prove useful.

A cooperative Federal Library Committee/Committee on Scientific and Technical Information (COSATI) eleven-member work group was established by the FLC chairman. It was agreed that operating libraries throughout the government need to interrelate with information services to the end that information transfer, in its broadest sense, is conducted at the highest level of efficiency. Plans call for an examination of the problems in connection with the President's plan, and the supply of specific answers to the questions about the most effective way to reorganize and relate executive libraries and information services, with models and guidelines developed for restructuring such library/information systems. A 12-month preliminary work schedule is anticipated.

This opportunity to design extensive and sophisticated model library systems for certain implementation is unparalleled within the federal environment. Work will take many months. The results should serve as a guide to the library planning community.

The Federal Library Committee is still in its infancy. Agency representatives are just beginning to appreciate the benefits to be received from cooperative action. Experimentation, coupled with the usual success and failure experiences, should demonstrate the value to be derived from coordinated work efforts.

The Mission of Federal Libraries

The need for a broad statement of the mission of the federal library was identified by the Federal Library Committee in 1965. It was believed that such a statement would assist in the effort designed to develop standards for the strengthening of service, space, and financial support.

A Task Force on the Federal Library Mission was established, under the direction of Scott Adams (then Deputy Librarian, National Library of Medicine), to prepare a draft mission for consideration. Such a draft was submitted to the Federal Library Committee on April 27, 1966. A revision was presented on September 28, 1966. A final draft was approved on October 26, 1966, upon the motion of Dr. Martin C. Cummings, Director, National Library of Medicine.

The Federal Library Mission was then brought before, and accepted by, first level administrative officers of agencies in the Executive branch on April 13, 1967. This was achieved with the assistance of the Office of Management and Organization, Office of Management and Budget (then Bureau of the Budget).

The Federal Library Mission is now considered a basic policy paper. Its guidelines are accepted as standards by which to evaluate all federal library collections and services.

The text of the statement follows.

THE FEDERAL LIBRARY MISSION: A STATEMENT OF PRINCIPLES AND GUIDELINES, OCTOBER 1966

Introduction

All Federal agencies require information to operate effectively. Managerial decisions and professional expertise necessary to successful accomplishment of agency missions depend on an informed staff. The increased complexity of Government, the accelerated growth of knowledge, and the explosion of documentation have focused attention on the need to increase effectiveness of all mechanisms providing information services to Federal agencies among which Federal libraries are of special importance.

The most urgent library problem confronting Federal agencies is identical with that confronting non-Federal institutions, i.e., the problem of providing library service adequate to meet urgent growing demands. The gravity of this problem was recognized by the President when on September 2, 1966 he issued Executive Order No. 11301, creating a National Advisory Commission on Libraries to "evaluate policies, programs, and practices," affecting the nation's libraries.

The key elements of the problem include:

1. A staggering increase in production of information accompanied by an overwhelming demand for access to all types of information;
2. The growing complexity of our civilization, the increasing educational level of our population, and its changing cultural characteristics which have created and will continue to create new and heavier demands upon Government and upon educational and research institutions such as libraries;
3. Cumulative deficiencies in library resources, staff, and services which are not equal to present and anticipated demands;
4. The development of new data processing techniques which are revolutionizing information handling and are placing new pressures on libraries.

Essential to the solution of this urgent problem is a clear understanding within Federal agencies of (1) the services Federal libraries can provide to support missions of their agencies, and (2) the resources the libraries must have to develop those services. The statement of library mission that follows and the appended guidelines are a basis for attacking the problem.

The Federal Library Mission

1. *Definition and Scope*

Federal libraries support the missions and programs of their agencies principally by providing bibliographically related information services. To achieve this objective they have at least four basic responsibilities.

- a. To collect and organize pertinent recorded information, in whatever form required, to meet managerial, research, educational, informational, and other program responsibilities;
- b. To provide ready access to their materials and to assist users in locating required information;
- c. To disseminate pertinent information from their collections on a selective basis;
- d. To make their collections and services known to present and potential users.

2. *Library Functions*

To discharge these basic responsibilities, Federal libraries perform a range of tasks including assistance to users through literature searching, reference service, bibliographic work, professional guidance to readers, lending and borrowing materials, and by supporting these services through selecting, acquiring, cataloging, indexing, and abstracting pertinent materials. The effective performance of these functions requires continuing appraisal of the information needs of the agency.

3. *Relation to Federal Community*

The collections of Federal libraries constitute an important resource for providing information needed in daily operation of the Government, and in the conduct of agency research programs. Inter-library lending, inter-agency reference assistance, cooperative cataloging, literature searching, and other forms of cooperation are essential to full and efficient use of this resource.

4. *Relation to Research Community and the General Public*

Increasingly, a community of interest has developed among Federal and non-Federal library users. Federal libraries support those missions of their agencies that relate to non-Governmental groups by extending their library services to other libraries, research institutions, and the general public.

Guidelines for Adequate Federal Library Service

Government agencies* require library services fully responsive to their research and other information needs. This can only be achieved through increased administrative attention, guidance, and support. Agency management should see that its library managerial policies are consistent with the foregoing statement of the Federal Library Mission. The Guidelines which follow provide Government agencies a means for strengthening their library management, resources, and services. Implementation of these guidelines demands intensive program planning and development.

* The word *agency* is used to cover not only separately organized units of the Federal Government, but also where appropriate, subordinate units thereof. The word *library* is used to cover not only a department library, but a library system, or libraries serving subordinate units.

The Guidelines are arranged in three closely related categories: Organization and Management; Library Resources; and Library Services.

A. Organization and Management

Sound organizational and management practices are necessary to insure that agency libraries provide adequate service, responsive to agency needs. Basic to the effectiveness of these practices, however, are full communication and understanding of program goals, a competent library staff, and adequate administrative support for library improvement.

The following practices are recommended:

1. Each agency should formulate a written policy stating its library's mission and its place in the organizational structure. This should be reviewed at regular intervals or at least not less than every five years.
 - a. Each Federal library should maintain current operation manuals that explain the agency's mission to the library staff and that establish procedures to serve that mission.
 - b. To insure responsiveness to user needs, each agency should locate its library or libraries organizationally where they can maintain most effective communication with agency program and planning officials.
2. Each agency should see that its library program is professionally administered and that the library staff is sufficient in number and adequately trained to fulfill library responsibilities.
3. Agencies should budget for library needs in the same manner as for the needs of other professional services which support agency missions. In doing so, the following factors should be considered:
 - a. The full range of services the library must provide in support of the agency mission;
 - b. Increased effectiveness of agency management and professional activity to be achieved by using the specialized services provided by the library;
 - c. The extent and nature of specialized agency research activities requiring library services;
 - d. The range of subject areas the library must cover to fulfill its mission;
 - e. The availability of other pertinent information resources and the expenditures required to exploit them in support of the agency mission.
4. The agency should require pertinent reports from its libraries including up-to-date statistical records of library operations, services, and resources upon which sound management and policy decisions can be made. The libraries should make such reports compatible with other library reporting practices currently being developed by the Office of Education.

B. Library Resources

Basic physical resources of a library consist of recorded information such as, but not limited to: books, documents, periodicals, serials, technical reports, dissertations, pamphlets, manuscripts, films, micro texts, slides, audio discs or tapes, computer tapes, maps and photos, and the necessary related equipment.

The following guidelines are designed to assure that Government libraries have adequate resources organized for optimum accessibility.

1. The agency should require its library to provide, in sufficient quantity, those resources necessary to carry out the agency's mission. In addition to reference materials, these resources should include the indexes and bibliographic tools required to identify pertinent literature available in other libraries.
2. The agency should require from its libraries a carefully developed, written acquisition policy based upon the agency's mission and related library re-

sponsibility. The policy should include scope, coverage, and retention guidelines.

3. Each library should develop a policy statement governing the organization of its resources by means of cataloging, indexing, abstracting, and other bibliographic procedures which may include use of machine techniques. The statement should define the scope, coverage, and form of the catalog and its relation to other pertinent bibliographic tools. The agency should require its library to cooperate in, and make the fullest practical use of, centralized cataloging and indexing services.

C. Library Services

Library services comprise those which involve knowledge of, and interpretation and exploitation of, the collections and their bibliographic apparatus and those which involve lending materials, directional assistance, and record keeping. Where the services enumerated below are not provided, the agency, with assistance from its library, should re-examine the library program in relation to current information needs, and develop a modern program of library services including:

1. Providing factual information responsive to specific inquiries, including when appropriate, the selection and synthesis of information from various sources and directing the inquirers' attention to related information beyond the immediate scope of the query;
2. Providing an organized program for selective dissemination of information based on systematic analysis of agency and staff information needs through interest profiles and program analysis;
3. Compiling comprehensive or selective bibliographies selected for specific purposes and produced either on the initiative of the library or upon request. Such bibliographies may be current or retrospective and should, when appropriate, include annotations or abstracts;
4. Performing literature searches for the purpose of documenting and producing state-of-the-art reviews;
5. Providing professional guidance to readers in the use of library collections and bibliographic resources, and acquainting them with other information sources such as individual subject specialists, information centers, and research organizations;
6. Lending library materials or photo-copying when appropriate;
7. Borrowing, for official use, materials from other Federal or private libraries;
8. Systematically providing information about agency library resources, services, and programs to encourage maximum use of these facilities.

In addition to these services, each agency should define the extent of library service it is willing to provide to other agencies as part of a cooperative network of Federal library resources.

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FEDERATION OF AMERICAN SOCIETIES FOR EXPERIMENTAL BIOLOGY

The Federation of American Societies for Experimental Biology (FASEB) was formed in 1912 by the American Physiological Society (founded 1887), the American Society of Biological Chemists (founded 1906), and the American Society for Pharmacology and Experimental Therapeutics (founded 1908). The American Society for Experimental Pathology (founded 1913) joined the federation in 1914; the American Institute of Nutrition (founded 1928) in 1940; and the American Association of Immunologists (founded 1913) in 1942.

The purposes of the federation (as set forth in its constitution) are:

To bring together investigators in biological and medical sciences represented by the member Societies; to disseminate information on the results of biological research through publications and scientific meetings; and to serve in other capacities in which the member Societies can function more efficiently as a group than as individual units.

The total membership of the six constituent societies is approximately 11,000 and comprises the principal developers and dispensers of new knowledge in biomedical disciplines in the United States, Canada, and over forty-five foreign countries.

The office of editorial and information services publishes for the federation the bi-monthly *Federation Proceedings*, official publication of FASEB with a circulation of nearly 15,000, which contains summaries of the research reports presented at the annual meeting and papers from the federation general session and symposia (1). Other seminars and conference reports are published on recommendation of the editorial board. The March–April issue of *Federation Proceedings* each year contains abstracts of about 3,000 papers given at the annual meeting; it is provided with KWIC and author indexes. From 1963 to 1966, translation supplements to *Federation Proceedings* were included (2). These contained selected and specially-translated articles from the Russian-language biomedical literature. A total of 1,270 complete translations and 1,739 title entries appeared.

From time to time, symposia concerning the problems biomedical scientists have with their literature have been published in *Federation Proceedings* (3,4). Other publications from the office are the annual meeting programs and the publications of international scientific congresses for which FASEB is the manager.

The office also publishes for member societies the *Journal of Nutrition* and the *American Journal of Clinical Nutrition*. Starting in 1971 the office began to publish the *Journal of Lipid Research* for Lipid Research, Inc.

For over a decade the federation has been the home of the Biological Handbooks Project (5). The objective of the project is to make available, in the form of a series of reference volumes, the information a busy scientist may require outside his particular sphere of knowledge. Generally the data would be difficult to locate among the

millions of papers in technical journals, and among the hundreds of thousands of books, monographs, and special reports.

The data for each table in a biological handbook are selected and contributed by an outstanding authority on the subject. The tables are then critically reviewed by eminent scientists of equal competence. Thus the user is provided with expertly selected and carefully evaluated data. Consistency, insofar as possible, in tabular format makes the volumes easy to use; the appending of literature citations to each table permits referral to the original article; and thorough indexing and cross referencing make the information in a handbook readily accessible. The FASEB Office of Biological Handbooks has attempted to provide the scientific community with a series of useful reference handbooks which meet the highest standards of professional accuracy.

Handbooks on the following topics have been published under FASEB auspices: *Blood and Other Body Fluids* (1961); *Growth, Including Reproduction and Morphological Development* (1962); *Biology Data Book* (1964); *Environmental Biology* (1966); *Metabolism* (1968); and *Respiration and Circulation* (1971).

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KARL F. HEUMANN

FEEDBACK

The concept of feedback awaited the development of machines capable of being programed to take advantage of their own output to affect performance in the future although it could have been identified at any point in the history of man's search for understanding of himself. Human beings utilize feedback constantly in a way that can be explained by referring to the machines that are now utilized for tasks where feedback is an essential element. There are two kinds of feedback employed: closed loop, in which the machine is directly affected by its output, and open loop, in which the machine is pre-set according to determinations of what

the output is known, or conjectured, to be. The difference can be exemplified by traffic-light timings. In the open loop system, the timing is not varied except as studies are made of the flow of traffic; at any one setting, the traffic-light timing is fixed and predictable. In the closed loop system, the output of devices that measure the amount of traffic affects the timing, increasing or decreasing the period as required to provide a smooth flow with the longest wait in the direction of least traffic. The difference can be seen in two different library operations of public service. The open loop system is identifiable at the circulation desk where the amount of time required to charge out a book is determined by factors beyond the control of the clerk in charge. He will nevertheless work faster as more people need service at the same time and relax his speed as the queue becomes shorter, but usually adopting the system in effect pre-sets the time lapse required to provide service to each patron. The reference librarian, however, is in a closed loop situation constantly stacking questions and answering them in the order of the difficulty of acquiring information. Those that are merely directional can be dealt with quickly, those that require search require more time, and those that need a kind of protracted dialog as various sources are considered by patron and librarian need the most time of all, but the latter does not require the continual attention of the librarian and the final resolution of such a question may take place during a period when many other inquiries have been handled.

The closed-loop feedback system is most characteristic of library operations, whether manual or automated, because the output determines the future performance. All the statistic gathering of the library in one way or another represents a utilization of the feedback concept in order to fit the activities of the library or information system to the analysis of how the output of operations have been received before. Hundreds of examples can be cited of this concept in operation, even though it may not be identified as such by anyone in the library. A children's librarian, for instance, will schedule work according to the hours of local schools, providing for the greatest number of public service librarians when the school first closes and the fewest when the schools are in session. The library day ends when parents have sent their youngsters to bed. The cataloging operation in a college library will turn its attention to gift books and en bloc purchases when the faculty are enjoying a vacation and all the students are away, either graduated, not yet enrolled, or spending the time between terms elsewhere. When the faculty return and new courses are planned, the cataloging operation is geared to the influx of new books, some of them ordered on a rush basis to serve as required reading for any of several courses.

In several fields, including engineering and the social sciences, the detection of past output with the intent of adjusting future output is the purpose of determining what feedback is and how it can be most reliably utilized. Libraries have generally mixed the results of studies with other considerations so that the utilization of feedback is not so apparent as it might be. Further, feedback as an informational source is likely to be affected by delays in utilization to the point where its value may be minimal if too much time has elapsed. In the closed loop system, a pro-

portional decrease in value can be correlated directly with the lapse of time in the use of feedback information. For instance, a processing system that provides for instant cataloging of rush books is quite useless if the books are not identified as rush when first ordered. This fact may require that the whole system be altered so that the identification of a rush item is instantaneous from point of order until it is on the shelf.

A further problem in the utilization of feedback requires that it be in a form that makes its use practical. Keeping a record of the kinds of books borrowed by patrons according to the class numbers has very little value if these statistics are not translated into terms that can serve as guidelines in the book selection process. Some of the argument for automation in libraries rests on the feedback that will be made instantly available in a form that can be readily used in planning the activities of the library. Critics of automation protest that all the data gathering has relatively little effect on the operations of the library since it is in a form that demands an interpretation of which no one is capable. Unfortunately, the automation of operations has been argued on the basis of feedback as a by-product of the system when the central thrust should be toward the development of long-term objectives in which feedback on past behavior is in a form and at a time when it can best affect future performance. Such data would do much to provide the user of the library with service that seems to indicate efficiency and a desire to meet the user's needs.

A cursory examination of possible feedback resulting from the automation of library operations is enough to convince most librarians that not only long-term objectives require careful definition but also the short-term desired output from the system needs continuing control if the advantages to be derived from feedback are not to be lost in the pressure of day-to-day work. Short-term output exists in three categories: prespecified and known, variable but predetermined, and both unknown and undetermined.

A common example of the first, where the output desired is both prespecified and known, is the thermostat set at a certain temperature and controlling the heating or cooling apparatus of the library. In systems automation, the printout of books on order fits into this category. Any alteration in the printout is known in advance from the orders prepared and from the orders filled. Using this printout as feedback on the operation of the system would mean creating objectives relating to the employment of staff on purchases and on gift books as the proportion of the two means of acquisition change. When purchase orders reach x level and receipts reach y level, then staff members A and B will be assigned to en bloc purchases and to gift books. Simply counting orders entered and filled provides the feedback needed.

The second category would determine other short-term and long-term objectives because the desired output is predetermined but variable. A good example of this can be seen in the printout of circulation activities, a count of which varies in response to users but is beyond the control of the librarian. Short-term objectives would change the course of staff operations if a certain level of activity was reached.

just as the control mechanism on a spacecraft heading for the moon must make adjustments for deviations from the flight path. It could be determined that the circulation level would probably not fall below a certain figure nor rise above the highest reached before, and these levels can be correlated with the school year or other activities in an academic library. Keeping the staff busy is not the long-term goal but efficient operation of the library is, and this includes tasks that should be done when circulation is relatively inactive, such as reading the shelves or re-shelving books as the collection expands in certain areas.

Finally, the feedback that represents a desired output both unknown and undetermined, characterized by computer "learning" games such as checkers and chess, has its counterpart in library systems of information storage and retrieval, where the subject headings serving as access to a work are assumed to lead the user to that work but can only be tested by feedback that will indicate under what subject headings, or descriptors, various works have been sought and what the results were. The clear implication here is that alterations in the character of the subject indexing can be made so that performance can alter as the feedback indicates to make the whole of the material within the system more accessible in terms of the user's methods of searching. This has been completely impossible in the past, and even now, in many systems, there is no hope or expectation of changing the subject access once the entry of the information has been made. This is obviously a dangerously limited method and will represent a probably decreasing usefulness of the file as time passes. Arranging the information and its retrieval in game patterns that lead the user to formulate his inquiry more exactly and more in harmony with the system is only a part of the feedback mechanism that is useful. A concomitant necessity is arranging the subject access so that it meets the rules of the game as well by avoiding ambiguity, the dispersal of semantically related concepts, and the development of rapid response to frequently employed strategies.

When deviation from the desired output occurs, one philosophical approach would assume that this is evidence of poor planning or ineffective control. In the first example, a system that is meant to indicate what staff adjustments are to be made as books are purchased and received is obviously deficient if the model patterns of ordering have not been decided. This would be very much like making the thermostat variable from uncomfortably cool to uncomfortably hot because no information was available on what the comfortable temperature should be. A newer approach, however, assumes that a person or machine can achieve an exact desired output only by chance.

This is embodied in the cybernetic approach to the concept of feedback with its emphasis on the complexity of systems as the causal factor rather than poor planning or ineffective control. In the cybernetic approach, a rapid feedback on deviation from the target output would allow flexibility so that unexpected opportunities cannot be missed and the effects of unforeseen problems can be minimized to prevent any kind of disaster that might be represented by a failure of the system or by unexpected eventualities that might damage the operation of the library. In the example of the circulation system, it is important to have back-up procedures

prepared to signal that a data collection device has ceased to function lest all the users waiting to borrow books must wait still longer. Equally, the feedback system should give warning that either an unusually heavy load of circulation activities is building up or that an usually small load is predicted. In the reshelving of books in the library, adequate feedback devices can prevent the clogging of the circulation area on the one occasion and the sort of idle expectancy on the part of staff that results from the other.

As of the present writing, so little is known of the utilization of feedback data and the effect that planning long-term objectives with this in mind will have on library operations, that the whole of this article has to be more supposititious than good reportage would demand. There is, in fact, very little to report except that various automated systems are in operation and some attention to feedback as the key to the utilization of data and the principle of its collection may be expected fairly soon. The failures resulting from a lack of effective control have served, usually, to improve the system rather than increase knowledge.

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FELLOWSHIPS FOR LIBRARY EDUCATION

The number of scholarships and fellowships for library education has grown steadily in the United States with the establishment of new scholarships, primarily by associations and institutions, throughout the history of formal library education. Additional strength has been added to the over-all scholarship picture through the establishment of grants from the Carnegie Corporation in the 1930s and the United States government—principally through the Library Services and Construction Act and the Higher Education Act—in the 1960s.

During the two year period, 1928-1930, the Carnegie Corporation awarded \$50,200 to thirty individuals for library education. In 1931 a fellowship program was initiated through the American Library Association in which, by 1939, ninety-six ALA Fellows were awarded a total of \$134,400. The Carnegie Corporation provided the funds for awards of \$1,500 or more for persons preparing for library work, thus enabling persons who already had experience in library work to pursue a year of study and research in library problems. During the period the ALA Fellows program was in effect there were 1,110 applicants from the United States, Puerto Rico, and Canada.

The Carnegie Corporation also provided \$20,000 for the training of Negro librarians at northern universities during the 2-year interim between the closing of Hampton Institute Library School and the opening of Atlanta University. The interest of the Carnegie Corporation in the library education and training of minorities continues today with a scholarship program started in 1970-1971 at the University of Illinois Library School for culturally disadvantaged students.

Title I of the Library Services and Construction Act gives state public library agencies the opportunity to train professional staff for public library development using federal funds. Although the amount, number, and stipulations of the grants vary from state to state, in general the majority of the agencies required a signed work agreement from each recipient in which he agrees to work for 2 years after receiving a master's degree in library science from an ALA-accredited library school in a public library in that state. All states do not sponsor LSCA Title I scholarships, and the beginning of the 1970s saw a definite decrease in the number of states spon-

soring these fellowships. In the academic year 1971-1972, according to the American Library Association's booklet on *Financial Assistance for Library Education*, eight states dropped their LSCA scholarships from the previous year.

The Higher Education Act of 1965 authorized the first federal scholarship program as such and Title II-B, Library Training, provided federal fellowship funds to assist institutions of higher education in the training of persons in librarianship. In 1966, the first year grants were awarded, 62 masters, 25 postmasters, and 52 doctoral candidates received a total of \$898,941. In 1968 the highest number of masters candidates, 494, received grants (total amount awarded that year for all levels of study was \$8,016,351) and in 1969 the highest level of doctoral students, 193, received grants (total amount awarded that year for all levels of study was \$8,161,707). 1970 was the last year that grants were awarded to masters students, and the only doctoral and postmasters students receiving grants were those students already in the HEA Title II-B fellowship program. For the academic year 1971-1972, 116 continuing fellowships were awarded at the doctoral level and 6 at the postmasters level, and 20 trainees at the undergraduate level were given funds through the institute program.

The institute program of HEA Title II-B provided operational funds for institutes as well as scholarships to participants. In 1968, 2,084 participants received awards and in 1971 it was estimated that 4,496 participants would receive grants to attend institutes.

Two other federal acts, the Elementary and Secondary Education Act of 1965 and the Medical Library Assistance Act of 1965, provided funds for the education of school-media personnel and medical librarians.

In the academic year 1970-1971 Simmons College School of Library Science received a scholarship grant under the Education Professions Development Act, Part E, and was awarded five fellowships under this same act for the academic year 1971-1972.

Even during flush periods when grants were not awarded from the United States government or private foundations, library associations and institutions have provided a steady source of scholarship aid in varying amounts with different eligibilities and obligations. The funding of these scholarships comes from commercial enterprises, associations, institutions and individuals (see Table 1).

Scholarships are sponsored annually by the American Association of Law Librarians, the American Library Association, the American Theological Library Association and the American Association of Theological Schools, the Catholic Library Association, Kappa Kappa Gamma Fraternity, the Medical Library Association, the Mountain Plains Library Association, the New England Library Association, and the Special Libraries Association. Nearly all state library associations sponsor scholarships.

A number of institutions and associations offer memorial scholarships which may be granted in specific areas of library work, such as the Elva S. Smith Scholarship for work with children offered by the University of Pittsburgh. Loan funds are also sometimes named as a memorial to individuals.

TABLE 1
Memorial Scholarships Granted in the United States

Granting body	Name of award	Amount (\$)
Alabama Library Association	Rosenfeld Grant	500
Arizona State Library Association	Alice B. Good Scholarship	1000
University of Southern California	Helen E. Haines Scholarship	1500-3000
University of Denver Graduate School of Librarianship Alumni Association	Harriet E. Howe Scholarship	Half-tuition
Hartford Public Library	Caroline M. Hewins Scholarship	900
Delaware Library Association	G. Estelle Wheelless Scholarship	500
George Washington University	Rose Bibliography	Varies
Georgia Library Association	C. S. Hubbard Scholarship	1000
Emory University	Tommie Dora Barker Fellowship	1500
	Zack G. Haygood Scholarship	1000
Friends of the Library of Hawaii	Hazel McCoy Scholarship	2500
Illinois Library Association	deLafayette Reid Scholarships	500
University of Illinois	Katherine L. Sharp Fellowship	2000, tuition
	Eliza Leuhm Latzer Fellowship	1000, tuition
	Lois Wells Irwin Fellowship	1000, tuition
	S. R. and Anita R. Shapiro Fellowship	1250, tuition
Indiana School Librarians Association	Hannah Mary Horner Memorial Scholarship	500
DePauw University	Gilmore Fellowship	500
Indiana State University	Dix Memorial Scholarship	500
University of Kentucky	Haggin Fellowship	Varies
	Mildred Semmons Scholarship	750
University of Michigan	Rudolph H. Djelsness Scholarship	1000
Western Michigan University	Alice Louise LeFevre Memorial Fund	500 maximum
Minnesota Association of School Librarians	Blanche Thompson Memorial Scholarship	1000
College of St. Catherine	Sister Christina Varner Scholarship	500
University of Minnesota	Irene Fraser Jackson Memorial Fellowship	1000
	H. W. Wilson Memorial Fellowship	1000
University of Missouri	Royse Fellowship in Library Science	500
University of Nebraska	Donald Walters Miller Fellowship	1000
New Mexico Library Association and Greater Albuquerque Library Association	Marion Dorroh Memorial Scholarship	1000
Columbia University	George W. Ellis Fellowship	1800, tuition
	Lydia C. Roberts Graduate Fellowship	1800, tuition
Pratt Institute	Mary Wright Plummer Scholarship	Partial tuition
	Olive Bishop Price Fellowship in International Librarianship	5000
University of North Carolina School of Library Science and University of North Carolina Scholarship Committee	Susan Grey Akers Scholarship	500 minimum

(continued)

TABLE 1 (continued)

Granting body	Name of award	Amount (\$)
Akron Public Library	James W. Chamberlain Scholarship	600
Case Western Reserve University	Alice S. Tyler Scholarship	2000
	Martin Luther King Scholarship	2500 maximum
Cincinnati and Hamilton County Public Library	Armstrong Scholarship Grants	1000 minimum
Oklahoma State University	Robert T. Motter Library Science Scholarship	1000
University of Pittsburgh	Elva S. Smith Scholarships	Varies: full tuition minimum
University of Texas	Robert R. Douglass Scholarship Fund	500
University of Washington	William E. Henry Scholarship	500

Scholarships are also available from sources such as the Tangle Oaks Graduate Fellowships which provide grants to candidates preferably in education and librarianship.

The pattern of scholarship awards in other countries would appear to be similar to that in the United States. Sponsoring agencies consist primarily of institutions, governments, associations, and private corporations.

In Canada a listing of scholarships, bursaries, and loans for financial aid for study in the field of library science is compiled annually by the Scholarships and Awards Committee of the Education for Library Manpower Committees of the Canadian Library Association.

The American Library Association's Library Education Division publishes an annual list of scholarships entitled *Financial Assistance for Library Education* which may be ordered directly from the association. The *Bowker Annual of Library and Book Trade Information* publishes a list of scholarships and fellowships, and current information is given in the various library periodicals.

MARY D. QUINT

FIJI, LIBRARIES IN

The Fiji Islands are located over a 300 by 375 mile area of the South Pacific about 5,400 miles from Honolulu, 1,960 miles northeast of Sydney, Australia, and 1,250 miles south of the equator. The 504 islands have a total area of 7,040 square miles, 90% of this area is made up of the four larger islands; Viti Levu, upon which Suva is located; Vanua Levu; Taveru; and Kandavu. The total area of the other 500

islands of the Fiji group is only 567 square miles. The larger islands and many of the smaller ones are of volcanic origin with rugged forested peaks. All the islands are ringed with coral reefs which made them a graveyard for sailing ships in the early days.

The climate on the whole is healthful. The rainfall ranges from 120 inches on the windward side of the islands to 70 inches on the so-called dry side. The wet season extends from September through May, and it is during this period that hurricanes may occur. Temperature seldom rises above 90° but the 80% humidity is trying to Europeans.

The Fijians are Melanesians, a tall, well-proportioned, handsome people, friendly and possessed of an innate courtesy and dignity. Superb seamen and swimmers, they built the best canoes in the whole South Pacific. The Fijians had the reputation of being ferocious fighters, a reputation enhanced by their habit of eating their enemies and any wayfarer who chanced to stray into their villages. It is hard to believe that these gentle, cheerful people were cannibals less than 100 years ago.

The population is composed of some 229,000 Fijians; 284,000 East Indians, who were originally brought in to work in the sugar cane fields as indentured laborers; 11,000 Europeans; 6,000 Chinese; and other Pacific Islanders to make up a total population of about 534,000. Eighty-five per cent of the population is literate in English.

Suva, the capital with a population of 70,000, is the main trading center for the entire South Pacific and a major stop for tourists. The economy of the islands is based on sugar, tourism, gold mining, and copra in that order of importance. The sugar industry, many of the hotels, and the large trading firms are in the hands of the Australians and New Zealanders. The small shops and the service industries are operated by the Indians, and the Chinese run the restaurants and grocery stores (1).

Fiji became a British Colony in 1874 when King Cakobau formally requested Great Britain to take over the islands and the British Government approved their status as a colony. In 1970 Fiji was granted its independence. During the 1960s the British Government and the churches were actively training the indigenous people to take over positions of responsibility in the governmental, economic, and religious life of the islands. This has led to a strenuous attempt to upgrade the educational system and to provide more facilities. This in turn must be supported by better libraries.

There are several generalizations which can be applied to all the libraries of the islands. The most serious lack is that of trained librarians. The close cooperation among the heads of the various libraries plus the addition of eight trained librarians to the staff of The University of the South Pacific have done much to improve the situation in this respect. All of the libraries are carrying on in-service training for their clerical staffs, and in 1970 the chief librarian of the Library Service of Fiji established a training school for library assistants in Suva. The more promising of these are sent to Australia, New Zealand, or Hawaii for further training. Since comparatively few of the indigenous people have a secondary education, the upgrading of staffs is going forward slowly.

Another serious handicap is that the population is widely scattered in numerous

small villages, many of which are accessible only by trails or small boats. The high cost of books and periodicals, especially those from the United States, not only is a serious drain on library budgets but also puts books and periodicals beyond the financial resources of individuals. For this reason libraries are all the more important in the lives of the people.

The humid climate encourages the formation of mold on books and a voracious insect population. Librarians must be continually on the alert to protect their book-stocks.

The history of the development of library service in Fiji is characterized by a statement by D. G. Edwards, Chief Librarian, Library Service of Fiji.

Library service can be isolated into three fairly distinct periods: from the beginning to 1944, from 1944 to 1963, and from 1963 to the present time. The period to 1944 was one of spasmodic, uncoordinated trial and error development. The second period was largely a period of plans and counter-plans, of reports, discussions, and minutes. The final period, 1964 to the present time, has been more concerned with actual library service. It has seen a continuing attempt to arrive at an acceptable basic development plan (2).

There is an active cooperative effort underway to strengthen existing library resources, to make library service more widely available, and to improve the training of library staffs. It should be mentioned that for some time there have been cordial relations and close cooperation among the libraries on an informal basis. Recently this cooperation has resulted in the formation of the Libraries Advisory Committee composed of the Government Archivist, chief librarian of the Library Service of Fiji, the Suva City librarian, and the librarians of The Western Regional Library, The University of the South Pacific, and The Pacific Theological College. Additional members are drawn from the Fiji Department of Education. This committee has drawn up a plan to make the maximum use of existing library resources and also provides a vehicle to maintain liaison with other libraries. The most recent action has been the establishment of a union catalog in the library of The College of the South Pacific to which all the libraries contribute cards.

In a way, this committee is the outgrowth of an earlier project—the formation of the Western Regional Library which serves the western division of the island of Viti Levu upon which Suva is located. The western division is located on the “dry” side of the island where most of the sugar industry is located. It was established in 1964 with a grant of £25,000 (\$65,000) from the British Council. Originally located in Lautoka, headquarters for administration were moved to Suva in 1970 where it was made part of the Library Service of Fiji, a section of the Ministry of Social Services. The Library Service of Fiji has encouraged the township boards to continue to operate their own libraries in Ba, Nadi, Sigatoka, Labassa, and Levuka. The Library Service provides up to 2,000 books to these libraries and trains the staff. The boards are responsible for the buildings and employing the staff.

In addition to the services previously mentioned, the Western Regional Library at Lautoka provides reference service to these libraries and ships books in weather-

proof boxes to outlying book stations. In 1970 seventeen new bookbox stations were added, eleven of which cover the entire Yasawa and Mamanuca group of islands. The remaining six were established in rural areas serving schools, government outposts, villages, and settlements. A Postal Loan Service was set up in 1969 whereby no postage charges were made for books returned to the library. Membership in this activity was 468 in 1970 and accounted for the issue of 3,458 books. These activities are a successful method of reaching an extremely scattered population.

In 1970 the Western Regional Library circulated 105,517 books excluding the books deposited in the township libraries, book box stations, and the Postal Loan Service. The library is the recipient of a considerable number of donations of books and periodicals, and in the 1970 accessions of 8,050 volumes, 1,493 were gifts. Books (12,091) and magazines (844) not needed by the library were passed on to schools, churches, and hospitals. Registered borrowers totaled 6,474 in 1970.

The book collection of the Western Regional Library consists of 25,320 books of which 14,200 are adult books, 9,200 juvenile, and 1,920 reference. One hundred forty periodicals are currently received. The total operational budget for 1971 is \$F39,205, of which \$F17,200 is for books and periodical subscriptions. Staff is composed of two trained librarians plus one who is completing her training and six library assistants.

The Western Regional Library is engaged in an active training program to upgrade the skills of the staff. In 1970, one library assistant was sent to Hawaii to the East-West Center for a refresher course in library techniques. Another librarian continued her diploma course at the Royal Melbourne Institute of Technology and returned to Fiji in January 1971 (2).

This and other libraries in Fiji are hopeful that more books and periodicals in the vernacular can be obtained. There are very few publications in Fiji and there are not enough in Hindi to satisfy the demand (2).

The best research library in Fiji is that of the Central Archives of Fiji and the Western Pacific High Commission, and it dates its beginning from December 30, 1953. It began as a reference and back-up collection in direct support of the Central Archives in gathering official, serial, professional, and reference materials relating to the Pacific area.

The extent of governmental publications is very comprehensive. During its early years official government publications from various British Pacific territories were brought together from a number of sources and it was firmly established when arrangements were made whereby the library receives two copies of every official publication issued by the British Pacific Territories. These include, in addition to those of Fiji, American and Western Samoa, Nuie, Tonga, The Cook Islands, Pitcairn Island, The New Hebrides, and The South Pacific Commission. This collection has been augmented by documents in the original or on microfilm which have been obtained from the Colonial Office in London, the U.S. Department of State, the governmental records of Australia and New Zealand, and from libraries in all these countries. This represents the most comprehensive collection of governmental publications from the Pacific area available anywhere.

The newspapers in the collection go back to 1895 and include valuable runs of Fiji English language and vernacular newspapers. The 200 feet of manuscript material includes a wide variety of nongovernmental material ranging from private letters and journals through the archives of the Methodist Mission in Fiji and those of the Anglican Diocese in Polynesia.

The act which made the Central Archives truly a research library was the bequest of the remarkable private collection of the late Sir Alport Barker in 1956. These, some 3,000 books, were devoted to the history of Fiji and the Pacific Islands. It is very rich in voyages of the eighteenth and nineteenth centuries. As an example, there are eighteenth century editions of Bougainville's *Voyage autour du Monde*, fourteen of George Anson's journeys, and at least ten varying editions of Cook's voyages, all from the eighteenth century. In addition there are also original editions of Hakluyt (1599) and of the voyages of Portlock, Moore, and Harris.

Much of the missionary history of the South Pacific and material on the discovery, exploration, and early settlement of Australia and New Zealand are included in this remarkable collection along with works on the flora and fauna of the South Pacific.

The Sir Alport Barker gift has been augmented by the gift of the private libraries of Dr. H. S. Evans, Mr. Harold Gatty, the Pacific collections of Mr. J. S. B. Borron, of the Roman Catholic Arch-diocesan library, the eighteenth and nineteenth century historical books of the Suva City Library, and the collection of the Colonial Secretary's Office. Numerous gifts of smaller collections and individual works have further enriched this library, and it is now ranked as one of the most valuable libraries on the history of the South Pacific anywhere in the world.

The approximately 7,500 volumes (his original bequest plus later additional gifts) of the Sir Alport Barker Library are housed in an attractive, modern concrete building (this is the reference section of the archives named in honor of the donor). The archives themselves are situated in the former headquarters of the Western Pacific High Commission, a most inadequate frame building with a corrugated iron roof. Plans have been drawn for a modern building but funding appears to be far in the future. However, an overflow emergency-type building of 2,240 square feet was built for the archives in 1971. One thousand square feet will be for serials and documents and the balance for archives storage (3).

Another library which made a major contribution to library service in Fiji was the British Council Library. It had a basic reference collection and a large number of recently published books on history, technology, vocational training, sports, and fiction. It maintained a large film lending library and also pioneered in the shipping of bookboxes to outlying settlements. It gave the impetus to the formation of the Western Regional Library with a substantial money grant. Under the leadership of Mrs. Mary Thornhill, the British Council was a real force in library cooperation and development. This library fell victim to the economy moves of the British Government and was closed in 1966. The 7,000 volumes in this library were divided between the Suva City Library and the Western Regional Library. The films were sent to the Fiji Public Relations Office and the records to the Fiji Museum. The bookbox service was taken over by the Western Regional Library.

The other large library which is open to the general public is the Suva City Library. The major portion of its financial support comes from the Suva City Council and is \$F26,000. For the year 1970 the book budget was \$F13,200 and that for periodical subscriptions \$F400. The library is located on the first floor of a city building in the central part of Suva; the high-ceilinged reading rooms are attractive and well-lighted and house a collection of 36,018 volumes (December 1970) of which 22,152 are adult books. During the year 1970, 4,073 volumes were added. The collection is made up of a large fiction section plus books on vocational and technical training, history, science, political science, and sports. The rarer and more important books dealing with the South Pacific are on deposit with the Central Archives. There is a large children's section of 13,866 volumes. The books are well-selected and are kept in excellent condition. The most notable lack is of books published in the United States which are missing because of their high cost.

Mrs. H. Chute, the present librarian, is carrying on the vigorous policy of building up the library instituted by her predecessor, Mrs. Ann Arnold. The circulation has increased from 126,000 in 1966 to 218,134 in 1970 and the bookstock has more than doubled in 4 years. The circulation of children's books has continued to climb and on Saturday mornings a block long queue of children impatiently waits for the library to open. This is an important service because school libraries are either non-existent or are small collections of worn-out books. The staff is composed of one professional librarian and eleven nonprofessionals (4).

In the field of higher education there are libraries of varying size and quality. The oldest is that of the Central Medical and Nursing School which trains assistant medical and dental officers and nurses. These people are trained to become public health officers, not medical doctors. The library is a basic one and is well supplied with books on anatomy, physiology, and tropical medicine. Its use is largely restricted to the staff and students.

The Derrick Technical Institute began operation in 1964 in a modern well-equipped building. Young men and women are trained in the mechanical arts and for clerical jobs. The library is growing and contains a number of up-to-date books and periodicals. A close relationship established with The University of the South Pacific is designed to broaden the scope of technical training.

The education of indigenous priests and ministers has been the concern of various religious denominations in Fiji. Several denominations, notably the Presbyterians and Anglicans, joined together to establish The Pacific Theological College in 1966. This college provides undergraduate theological training and also postgraduate work for the active clergy. In 1970 a faculty of six is training forty students. The library of 10,000 volumes, sixty current periodical titles, and five newspapers covers all the theological fields with emphasis on the South Pacific. The annual book and periodical budget is \$F500. Unfortunately the college has recently lost its librarian and is now administered as an additional duty of a faculty member (5).

The development of The Pacific Theological College has lessened the need for the individual denominations to provide for the training of their own clergy. Therefore St. John the Baptist Theological College has practically ceased its training program.

Its collection of 9,000 volumes is being used by the students and faculty of The Pacific Theological College. There is a possibility that the books will be moved to the college library. The St. John the Baptist Library contains the standard bible commentaries, encyclopedias, works on dogma and doctrine, histories of the Anglican Church, and scholarly studies on individual books of the Bible. There is a small section of books dealing with the economic and social problems of the South Pacific and the history of the missionary effort in that area. It is to be hoped that this excellent library will be given proper care and be removed from its most inadequate quarters.

The only other theological library of any consequence is that of The Methodist Theological College. Its library was established comparatively recently and is still being developed.

The most exciting and encouraging educational development in Fiji was the establishment of The University of the South Pacific in 1967. Because of the distance from institutions of higher learning in Australia, New Zealand, and Hawaii and the expense, few young people could acquire a college education. The University of the South Pacific is designed to serve a population of just over a million located, in addition to Fiji, on the British Solomon Islands, Cook Islands, Gilbert and Ellice Islands, Republic of Nauru, New Hebrides, Niue, Tokelau Islands, Kingdom of Tonga, and the Independent State of Western Samoa.

The university is located at Laucula Bay, Suva, and is housed in the buildings of a former Royal New Zealand Air Force base. The curriculum is offered in three schools, the School of Education, the School of Social and Economic Development, and the School of Natural Resources. Cooperative arrangements have been made with the Derrick Technical Institute for the training of vocational and technical teachers, and the university provides 1-year courses in biology, physics, chemistry, English, and mathematics for students planning to enter the Fiji Schools of Agriculture and Medicine. These science courses are lacking in most of the secondary schools in the area. A close cooperative arrangement, similar to that with the Derrick Technical Institute, is hopefully projected for the Fiji School of Agriculture and the Central Medical and Nursing School. Enrollment for 1971 is 630-700 students taught by a senior faculty of eighty. The *First Development Plan* projects enrollment at 2,000 in 1975, a faculty of 105, and a library staff of fourteen professionals and forty-one nonprofessionals.

The library is presently housed in the former officers mess which can accommodate 40,000 volumes and 110 readers. A new building is planned which will be completed in early 1972. This L-shaped building of 38,000 sq. ft. (30,000 sq. ft. for the library) is stage 1 of a three-story building. It is to be complete in two additional increments. The first unit will provide 8,000 sq. ft. for the staff, seat 270 readers, and house 100,000 volumes.

The collection in 1970 was between 30,000 and 35,000 volumes and acquisitions run about 18,000 volumes per year. Six hundred and twenty periodicals are currently received. The library is a depository for United Nations publications. A South Pacific collection is being assembled to supplement that of the Central Archives. The 1971 staff is made up of eight professional librarians and twenty-six clericals. The

library has one person in training in the United Kingdom, and it is hoped that two more can be sent abroad in 1971.

The budget for 1970 was \$F92,580 which included \$F56,520 for staff salaries, \$F26,000 for books, \$F6,060 for expenses, and \$F4,000 for equipment. The 1971 budget comes to \$F101,200 plus a capital grant of \$F40,000 for books.

A start has been made on a union catalog, and all the libraries are contributing cards to The University of the South Pacific Library which is the depository. It is rumored that a library association is about to be formed (6,7).

Three other libraries, largely restricted to use by the staff of organizations, should be mentioned. These are the School of Agriculture Library and the libraries of the Geological Department and the Supreme Court.

The library situation in Fiji is beginning to fulfill my prediction in 1966 that "Fiji will become the educational center of the South Pacific." This has come about through the leadership and hard work of a number of librarians. Among those who have pioneered but are no longer in Fiji are: Ian Diamond, former Government Archivist; Mrs. Mary Thornhill of the British Council; Mrs. Ann Arnold, Suva City Librarian; and W. J. J. Pinson, Librarian of The Pacific Theological College. Ian Diamond will be especially missed for his many contributions. This list of individuals represents one of the difficulties in building up library services in Fiji; namely, the turnover of trained librarians.

However, D. G. Edwards, Chief Librarian of the Fiji Department of Social Services; Harold Holdsworth, Librarian of The University of the South Pacific; Miss Barbara Stevenson, Librarian of the Central Archives; Mrs. H. Chute, Suva City Librarian; and K. L. Jinna, Acting Chief Librarian of the Western Regional Library form a team which should continue to carry forward library development in the South Pacific.

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5. Letter from W. J. J. Pinson, former Librarian, The Pacific Theological College, dated January 12, 1971.
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In addition, personal visits were made to most of these libraries during the period June to August 1966.

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FILING

To arrange symbols in a necessary inherent order to provide a predictability that at a given spot in the order a given symbol will occur is called filing. Of all the operations in a library, filing is susceptible to the most intense mathematical study. As the foregoing definition implies, the predictability of an arrangement relies on many characteristics necessary before filing can occur, but when we have arranged material in a sequence that we recognize we are able to say that if a certain symbol exists in the arrangement, it will occur at a certain spot. Beyond this predictability there is another very important consideration, efficiency. As used here efficiency will mean obtaining maximum results at minimum cost. In terms of filing this means adding material to the arrangement at the lowest cost possible.

Symbol strings are of several different kinds and it is unimportant precisely what serial string we are discussing, whether it is the system of Arabic numerals, or the Roman alphabet, or the English alphabet. In any case we are dealing with one of the great achievements of mankind: when man first recognized that certain occurrences in nature could be symbolized by a system of symbols and these symbols arranged and rearranged according to definite laws, mathematics was invented on the basis of the enumerative characteristic of all things in nature. It is quite fitting that these numbers be called the natural numbers. The development of symbols to represent enumeration had two great achievements, realized only in the past millennium. The first of these is the understanding that the natural numbers constitute a series, the characteristic of which is sum plus one. That is, take the previous sum and add one and you achieve a series of steps that will lead to enumeration of all of nature.

The second great achievement was in the development of zero. There are in fact three different kinds of zero all represented by the same symbol in Arabic enumeration, a rather ambiguous circle often confused with the letter "O." The first zero means nothing at all, the machine is shut off, there is no operation whatever. The second zero means that the results of an operation will yield us nothing at all, or more properly that one operation when carried to its conclusion yields a cancellation of another operation carried to its conclusion. That is, $2 \times 3 + 4 - 10 = 0$. This zero is different from the zero of nothing at all in that an operation does take place and the result is a cancellation. The final zero is the one that indicates in Arabic numerals that there is no number to occupy a given spot. In Arabic enumeration each location beginning at the right indicates successively units, tens, hundreds, and so forth. This is made possible because there is a symbol to indicate that there are no units, although there are possibly tens and hundreds. Recently, with the development of computers interest has been centered on *basing* systems because the computer uses the simplest system known, the binary system. This simply arranges zeros and ones to yield any enumeration to the base 2.

Historically, enumerative systems have employed many different kinds of basing systems, all the way from the binary system to the Babylonian system of enumera-

tion to base 60. Sixty makes a very fine base because it is readily factored, $3 \times 4 \times 5$, but it is no more often employed than base 12, also easily factored. Many people have theorized that base 10 arose from the simple fact that nature provided us with an automatic counting machine, the five fingers on each hand. In fact, the Roman system of enumeration was probably base 5 and some have conjectured that the "X" representing 10 is actually 2 "V's" so positioned that one is reversed and the other poised at its apex. Actually, any system of symbols that exist in an inherent order can constitute a basing system and an enumerative string. The alphabet represents such a basing system and may be devised so that it is to the base 12 or 24 or 25 or 26. Combined with the Arabic numerals the basing system becomes very large and can be elaborated to the point where it exists to the base anything. In order to show that filing is not dependent upon language and that predictability and efficiency may be measured independent of the enumerative system, the Appendix uses a metalanguage that can be regarded either as mathematical or as the symbols of vocal sounds, an alphabet. The mathematical language has as meanings only numbers resulting from mathematical operations. In the Appendix the language is shown with the meanings attached. This metalanguage has proven most useful in developing the segment on filing that follows.

Inherent Sequences

Natural language has employed three different systems for representing the spoken language in written form. The hieroglyphics of Egypt and the pictograms of China are the simplest forms so far as representation is concerned, but they are exceedingly complicated when they must be used in a filing procedure. The fact that no predictability is possible based on the symbols themselves arises from the lack of a convention of arrangement. This is imposed, usually on the basis of some feature of the symbol, but without that general agreement that makes any arrangement possible. If Chinese pictograms actually move from left to right and top to bottom in a predictable arrangement, then a numerical equivalent could be derived from the symbol itself. Since a typewriter that will compose Chinese characters is possible (one was invented by the Chinese novelist, Lin Yutang), then it might seem that some simple enumeration is possible. Each of the keys of such a typewriter if numbered would yield Arabic numerals as readily as strokes that make up a character. However, the difficulty here is that the strokes that comprise a character may in fact be exactly the same, and the typewriter producing such strokes will yield a great amount of duplication, and some written editing is often necessary in order to make one character different from another. Enumerative sequences have been devised for Chinese characters, but each of these is quite arbitrary and does not enjoy the general acceptance that the arbitrary arrangement of any alphabet must have in order to attain the status of an enumerative sequence. For instance, the Chinese telegraph code, while completely acceptable and capable of transmis-

sion over wires, requires a code book because the arrangement is not internally consistent.

The human mind seems to give up after a certain number of symbols are memorized. The process of memorization even for the English alphabet is quite difficult and represents one of the most important achievements of children. Adults learning the alphabet find that it is exceedingly difficult to memorize and represents a real hurdle to anyone whose intelligence is somewhat less than adequate. Alphabets, however, are infinitely more usable in filing procedures than the conventional arrangement of pictograms or hieroglyphics. In between these two is the syllabary, used in such different languages as Japanese and Amharic. Syllabaries show a complete sound, a vowel plus a consonant with one symbol. Naturally, there are very many more kinds of symbols in a syllabary than there are in an alphabet. The syllabaries of ancient languages as well as modern were given a necessary sequence as an aid to memorization. It seems that the human mind works best when rote memorization is required if a definite position is given for each item to be memorized. Then the mind uses the location as a clue or key to the characters that follow. The Japanese syllabary is arranged in such a conventional system that it can serve for all purposes as an alphabet, thus providing a very large enumerative system. Efficiency depends, in one instance, on the nature of the inherent sequence. As will be shown below, acceptability, the first of the iron laws of filing, describes results from alphabets as they expand in size. But a necessary condition is always an arbitrary and widely accepted arrangement. Since all symbols are arbitrary, however they may have been derived, the arrangement is equally arbitrary. As seen in the metalanguage from one point of view, the sound represented by English "b" precedes "a." This is entirely possible and desirable in this metalanguage and exemplifies the fact that there is no natural requirement that "b" follow "a." It is simply a convention and a most useful one.

Site

Whatever material is to be filed, the location of the marks that will be used in filing is of summary importance. This location has been called the site of the filing mark, and it may be either direct (i.e., taken from the material itself) or it may be transcribed (i.e., taken from the material but rearranged in the order in which filing is to occur). There is no mysticism involved with the site, and this is not included as a part of the iron laws because it must be obvious that to file any materials one needs to have a consistent filing mark located in a spot that is easily observed. The best example of this is filing arrangements for correspondence. Letters may be filed by the date, then sender, and then an arbitrary mark added in case the sender has written more than one letter in one day. Chronology represents a simple means of filing because it is progressive, and the inherent arrangement is necessarily from the then until the now until the future then. The symbolic procedure for represent-

ing date, whether month and day and year or simply the day of the year, represents a very useful and simple method for obtaining a filing mark. The former (month, day, and year) is somewhat better because of the conventions of using a name of a month, a number for the day, and a number for the year. Because correspondents generally locate the date in the spot that is readily observed, another convention puts it in the United States in the upper right-hand corner, many business offices have found that chronological arrangement is the easiest because it is the most obvious. Other methods utilize the sender's name or the sender's location. Next to chronology, geographical arrangements are most useful because they derive from a predetermined set of symbols. When this occurs by arranging the set of symbols to be utilized, we have automatically provided a guide for a filing procedure. This means that any rules developed for the set of symbols will be equally useful for the material they arrange.

If it is necessary to file material by strings of symbols derived from the internal characteristics of the material, then rules for the transcription of these characteristics are necessary. The classic example is, of course, catalog card files for printed material. Books, for instance, fall under this rubric and the cataloging of books is a necessity not only because the material is bulky and contains the filing marks in a wide variety of arrangement, but also because the filing marks must be derived from internal features of the material. A title page does not necessarily have the items required for filing in the necessary order. As indicated elsewhere in this Encyclopedia, it is possible to arrange a temporary file of books simply by the external characteristics of binder's title. Even so it is most usual to translate the filing arrangement into a numerical sequence rather than rely on the binder's title as it appears on the book. One of the reasons for recommending binder's title is that very few books are published without at least a binder's title. The author's name may not appear on the backband of the book but the title almost always does. In the case that it does not, it may simply be posted onto the backband by transcribing it from wherever the title may be found or by creating it for that purpose. Books yield themselves to such filing arrangements just as well as anything else in which the symbol strings are derived from an alphabet with an inherent sequence. Following the rule that any symbol may be translated into any other symbol enables us to arrange the books by the numerical equivalent of their filing marks in the alphabet.

This feature of translating one symbol string into another symbol string is exceedingly useful although a most difficult problem. Unfortunately, to this day there is no standardized method of transliterating the alphabet of, for instance, Russian, Greek, and Arabic into English. Even alphabets such as those for Bengali, Thai, and Burmese cannot be readily transliterated into one another although all are derived from the same source: the Devanagari utilized for Sanskrit. Arabic has been widely used as an alphabet for a variety of languages including Malay, Turkish, Parsee, and Urdu. It is notoriously unsuited for these languages, and in fact, both Malay and Turkish are now printed in an alphabet derived from the same source as the English alphabet. Transliteration and its difficulties do not arise simply

from the alphabetic acceptability of one language for another, although this is the major factor in the Arabic alphabet, but also from the question of whether the alphabet is utilized as a means of showing the sounds of a language, with some degree of uniqueness, or has become so modified and out of step with changes in the language that the spelling is often as arbitrary as the arrangement of the alphabet itself. When phonetic spelling is possible, the speaker of a language can predict with great reliability exactly what symbol will be used to represent a sound and equally can predict a string of symbols to represent a whole sequence of sounds that may constitute a word, a phrase, or a sentence. In fact, almost no alphabet of a major language is capable of being altered as changes in vowel sounds and consonant value alter in the course of time. The dynamism of natural language affects not only the alphabet but anything derived from the alphabet. That is, filing becomes less efficient as the predictability of the alphabet becomes less possible. But given a usable alphabet arranged in necessary strings, then filing is possible and its efficiency can be determined in advance of any manual test simply on the basis of characteristics to be described below as the iron laws of filing.

Methods of Filing

There are only two different methods of filing. These are numeric (by semantic value) and alphabetic (letter by letter and word by word, which makes a space between words equivalent to a letter). Numeric filing depends upon a semantic value which the symbol represents. That is, we file 2 right after 1 but before 10 because the value of 2 is less than 10 but more than 1. This implies a certain understanding of the meaning of the symbol. As shown in the Appendix, numeric filing would require that the symbols be arranged in what is apparently not alphabetic order. But by understanding the meaning of the symbols we can easily arrange them in a very useful sequence and develop this sequence based completely on the meaning of the symbol strings. These values may be arranged either letter by letter or word by word. The Appendix shows both arrangements, and both are derived from the meaning of each word in the symbol strings. The fact that numbers may be arranged in this fashion may be surprising, but it follows that semantic filing is not possible if the filer is unable to translate the symbols into a meaning. However, alphabetic filing is possible simply on the basis of a knowledge of the alphabet without regard to the meaning. As can be seen from the examples, letter by letter filing is unnecessary with semantic methods, while word by word filing is, strictly speaking, an innovation in alphabetic filing. Because the basing system of the English alphabet utilized in the metalanguage contains 26 symbols (o is included because it is not ambiguous), there are a great number of possibilities within any filing arrangement. Cryptographers studying the characteristics of a language are able to develop probability tables so that even a rearrangement of the symbols according to some predetermined procedure does not sufficiently disguise the characteristics of a language and its use of an alphabet. Certain letters regularly

follow certain other letters. Consequently alphabetic filing tends to be compacted by the characteristics of the phonetic system of a language. Even letter by letter filing, the most natural and most readily used, has its gaps and holes that nothing can correct because one symbol may not follow another symbol. These patterns greatly reduce the amount of filing space possible within any sequence of symbols, and as a result increase the number of filing marks required so that an arrangement is possible. For instance, in the English language the letter "a" can be followed by any consonant or vowel, even another letter "a" as in the word "aardvark." The letter "b," however, can be followed only by those consonants that create a symbol string capable of pronunciation. "B" can be followed by any vowel, of course, but not by such consonants as c, d, f, g, j, k, m, n, p, q, s, t, v, x, and z. In a file these possible combinations are absent because they never occur. In seeking to find the level of acceptability in any alphabetic arrangement, care must be taken that excluded possibilities are not utilized as providing filing space. In alphabetic arrangement word by word filing tends to lengthen the symbol string because it introduces the space between words as if it were a letter of the alphabet.

As will be shown below, ambiguity results wherever a subalphabet having no inherent sequence is added. In word by word filing, it is necessary that decisions be made regarding marks of pronunciation, which have no necessary sequence although this is possible, and also an arbitrary arrangement for marks of punctuation if they are to be considered in filing. All that is lacking to provide marks of punctuation with an inherent sequence is an arbitrary arrangement, which by convention becomes acceptable to everyone. Word by word filing differs from letter by letter filing especially when no definition of a word is possible. This can be seen in various filing rules and the way they provide for abbreviations. Whether an abbreviation is to be filed as spelled out or filed on the basis of the letters that constitute the abbreviation is a matter of great consequence in the development of the filing rules. Much confusion is derived from an inability to handle these facets of alphabetic filing. Alphabetic filing may utilize any system of symbol strings, particularly numbers. In fact, as the Appendix shows, the alphabetic sequence of numbers is as acceptable as a numerical sequence of numbers. All of these factors of enumerative sequences lead us to what have been called the iron laws of filing; that is, rules derived from the nature of enumerative sequences so that if the sequence is preserved the iron law is operative. Although it might seem that the iron laws begin to rust when considered in the light of library filing, the facts are otherwise.

The Iron Laws of Filing

The first of the iron laws may be labeled the law of acceptability. In substance this is the summary of the above discussion regarding alphabet, arbitrary arrangement, conventional acceptance, extended enumeration, and predictability. The iron laws are concerned with the efficiency of filing operation and each one states what makes a filing operation relatively unproductive and relatively costly.

The law of acceptability simply states that the greater the number of filing symbols with a necessary arrangement, the more efficient the filing operations will be, other things being equal. Although a computer can readily handle and discern between symbol strings made up only of zeros and ones, the human mind becomes bogged down and develops errors when such comparisons are made. As the number of symbols with an inherent sequence increases, the filing becomes more productive and less costly in time. We may state the iron law of acceptability as a ratio between the number of symbols in an inherent sequence available for use and the arrangement of symbols in any given string. As the length of the string increases the number of symbols available becomes more important. Efficiency is directly affected when the length of the string exceeds the constant governing the number of symbols required. That is, a definite ratio exists between the number of symbols available in an inherent sequence and the number of symbols required in the strings to be filed.

The second iron law may be called *the law of clarity*. This requires that every symbol have a definite position in a sequence and that no symbol be such that it may occupy more than one position in the sequence. If the English alphabet contained a letter that could either precede or follow any other letter, then filing would become exceedingly inefficient. As indicated above, in word by word filing where marks of punctuation are considered and utilized in filing sequences, clarity is reduced because marks of punctuation have so far failed to acquire a necessary and conventionally adopted inherent sequence. The suggested sequence proceeding from the hyphen to the period assumes that the sentence is the most important part of a filing string, and that the full stop is most useful in deciding where a word or sentence terminates. However, these marks of punctuation reduce clarity to the degree that they are not accepted in the sequence offered, and efficiency is further reduced if it is not determined that the marks of punctuation will only follow certain terms.

A more commonplace example of a reduction of efficiency is the confusion that arises over whether a number is to be put into a filing arrangement in its numeric value or in its alphabetic value. This becomes more complicated when the number may be written as a number symbol or it may be spelled out as a word capable of alphabetic representation. It is commonplace to require that numbers be spelled out at the beginning of a symbol string and filed as if spelled out in any case although they may be given their numeric value if they occur in any position other than the initial word position.

The iron law of clarity operates further when initial words are given special significance, as in many filing codes, so that person, place, and thing are distinguished not by the alphabetic string of symbols but by the meaning of the word. In the classic example "London," the person precedes London, the place, which also precedes London, the thing, so that London, Jack, comes before London Bridge which follows London, the city. The iron law of clarity requires that if maximum efficiency is sought then the symbol strings must be arranged simply by the way they are represented so that London would precede London Bridge which

would precede London, Jack. This rule, the rule of clarity, is often broken and the degree of inefficiency that results is considered tolerable in view of the convenience of the user. Whether this convenience to the user is great enough to permit the efficiency to be thus reduced is a matter of concern to the individual library. It must be accepted, though, that if the use of the inherent sequence of symbols is altered to any degree, whether by the addition of marks that have no place in the sequence, by an intermingling of semantic and alphabetic filing, by interpretations requiring translation of one filing medium into another, or by alterations in the filing sequence independent of the conventions determined, efficiency is consistently reduced.

The third iron law is *the law of redundancy*. This states that as the number of symbols available are utilized in symbol strings, and these strings increase in size, the efficiency decreases. Redundancy operates with the two preceding laws so that in a small file it may not be noticed that the number of symbols in an inherent sequence is less than efficiency dictates, and the inclusion of extraneous marks is rare enough so that the decrease of efficiency resulting from this is not noticed, simply because the law of redundancy is protecting the filing arrangement. However, as the file increases and redundancy decreases, efficiency may be seriously affected. Any large file, and libraries contain the largest, has a decreasing level of efficiency simply because the protection of redundancy is so greatly reduced. For, necessarily, as redundancy decreases ambiguity increases, and this is a law that operates against efficiency. It is furthermore, a law that can be utilized in any given filing code to protect against unclear rules. It must not be thought that redundancy means use as many rules as possible. Far from it, redundancy simply states that an enormously large inherent sequence of symbols will provide many more symbols than are required for precise filing. One of the reasons for utilizing word by word filing is simply that redundancy is increased thereby, but equally word by word filing leads to the confusion cited under clarity where the meanings are filed rather than the symbol strings. The relatively small alphabet of the Hawaiian or other Polynesian languages provides relatively little redundancy and any attempt to file any of these languages will ultimately become inefficient for reasons explained by the law of acceptability. The utilization of extraneous symbols, as is sometimes seen in chemistry and mathematics, accounts for difficulties in filing that can never be completely avoided because of the law of clarity. The law of redundancy is operative in large library files to some degree because names are included that utilize letter combinations not ordinarily found in one language alone. The law of redundancy makes it necessary to increase the number of symbols available so that fewer symbols are used in determining exactly where filing should occur, but as an increase is made it must be remembered that each symbol will have its own particular location in the filing sequence so that no other symbol can occupy that location and so that it cannot occupy any other location. As redundancy decreases, ambiguity increases.

The fourth iron law is *the law of ambiguity* and is most important when filing codes are arranged. This law states that all filing procedures must be based on the enumerative sequence so that no part of the string is omitted and nothing outside

the string is included. Ambiguity is the result of a decision that cannot be proven correct according to the mathematics of the enumerative sequence. This law shows that efficiency decreases as the number of rules for filing increase and the number of exceptions to these rules increase. This is a direct result of the fact that rules of filing must do no more than account for an arrangement of the filing sequence, determine the means of increasing clarity, and take full advantage of whatever redundancy is available in the filing medium. A close inspection of filing codes will show that many increase ambiguity rather than redundancy and consequently greatly increase the difficulty of filing. The ambiguity of rules has been a matter of some mystery, but recent developments have improved our understanding of language and the way it is represented in symbol strings. A typically ambiguous rule is the one that states that "Mc," "M," and "Mac" are all to be filed as if spelled "Mac." Unstated in the rule is the fact that this applies only to proper names, and especially to the names of persons. The rule becomes ambiguous so far as the computer is concerned when it must distinguish between "Mac" as in "machine" and "Mac" in a personal name. Because "Mc" does not occur except in personal names, ambiguity is increased and redundancy is reduced by the rule that would respell this in the mind of the filer as "Mac." The telephone directory in most countries—especially in English speaking countries—file letter by letter throughout the entire symbol string without regard to distinctions between "Mac," "M," and "Mc." What is operative here is the fact that the pronunciation of all these letters is the same; however, adopting a kind of semantic reinterpretation of pronunciation would lead to enormous confusion in any file based on an alphabetic sequence. Ambiguity therefore results and efficiency is therefore reduced.

The final iron law states that as files grow more nearly equal in size they are the more efficiently interfiled. This law has been subject to considerable experimental testing, and it has been found that given both a small pack of cards to be filed in a large library catalog and a relatively large pack of cards, surprisingly enough the large pack of cards is filed in less or equal time to the small pack of cards. Obviously the rule needs considerable interpretation because many special circumstances may occur: for instance, the pack of cards may all fit into one location not occupied theretofore; the pack of cards may be widely scattered into locations seriously compacted so that the critical factor is very far from the initial filing mark. It is the critical factor that determines the validity of this law and is utilized in any test of the iron laws. The critical factor is that filing mark at which a distinction is made. In any given file, the nearer the critical factor is to the initial filing mark the more readily filing occurs, and a measurable decrease in efficiency occurs as the critical factor is found further to the right of the initial filing mark, assuming that the filing marks are read from left to right. In filing any arrangement of symbol strings it will be found that the critical factor tends to move more slowly from the initial mark as redundancy increases, and, in fact, the critical factor is the determining means for evaluating the degree of redundancy in the inherent sequence. So far as *the law of equality* is concerned, the critical factor tends to be located in the same place in both files that are to be intermixed if they are of equal size.

Derived from this law of equality, we may state with absolute conviction that as a file increases in size the critical factor tends to move progressively from the initial mark to a mark further in the file so that efficiency decreases. Obviously no library could afford to wait until it builds a second catalog of equal size with its own great catalog before filing begins, but there is good reason to advocate that filing not be done on a one by one basis, but rather a card file of new books or newly added books be developed and emptied at regular periods. Just how these five iron laws affect filing codes and how they may be used in an evaluation of filing codes is the substance of the succeeding section. Efficiency in filing, whether a computer or the human mind is involved, is a matter of great concern. No operation is so unproductive on a cost effective basis as filing, and no operation can create difficulties so great as misfiling, incomplete filing, or filing according to rules that are capable of several interpretations. In evaluating the various filing codes used by libraries it is important to keep in mind that the foregoing is a very recent development—the author's own so far as he is able to determine—and has only recently been explored by anyone other than the author.

Library Filing Rules

Included in Cutter's fourth edition of his *Rules for Dictionary Catalog* are ten pages of filing rules with copious examples. Cutter was aware of other codes of rules and includes in a footnote Linderfelt's *Eclectic Card Catalog Rules* with the remark that these are based on Dziatzko's instructions. Cutter's rules established the standard that governed cataloging and filing during the period from 1876, when the first edition was published, until very recently. Cutter has in effect been institutionalized and the problems his rules show are still with us. The first problem to be considered is the difficulty of many alphabets arranged in one alphabet.

Cutter, like all his successors, advocates arranging all entries in the English alphabet, a more important decision in the previous century than now. It was customary to use the Latin alphabet wherever possible, and Cutter includes a special note that "i" and "j," "u" and "v," are to be considered separate letters. These were the same letters in Latin that were often omitted when catalogs were filed in the Latin alphabet. A point of ambiguity arises first with the problem that alphabets in foreign languages are not necessarily arranged like the English alphabet. For instance, "ch," "ll," and "ñ" in Spanish are arranged after "c," "l," and "n," respectively; Swedish and Danish arrange special letters such as the "å" and "ø" at the end of their alphabet. English really contains no diacritical marks—neither accents nor special letters—so that the simplest English rules requires that all foreign words be filed as if they were spelled in the English alphabet. However, a great difficulty is found with German names that contain an umlaut. The umlaut replaces a small added "e" formerly placed above the letters "a," "o," and "u." In old German printing the "e" is actually preserved above these letters, but modern practice in German is to spell "ae," "oe," and "ue" as "ä," "ö," and "ü," respectively. This lack of uniformity in

spelling is reflected in the card catalog where a decision that runs counter to the one of the iron laws has to be made. A filing code derived from the iron laws of efficiency in filing would require that the entry be filed as spelled and that nothing should be added or replaced by the filer. It is fascinating to note that this problem arises only in the case of the main entry system where the main entry is generally an author entry. In title unit entry catalogs the form of the author's name as an established entry can be decided as much with attention to the filing rules as with attention to the precise name that the author uses. In fact, the only justifiable reason for establishing a form of name is to avoid problems in filing, whether they arise from a conflict of entry or from peculiarities of spelling. In a title unit entry system the rule can be established that titles are spelled as found on the title page, so that a title page in German generally includes umlauts, and a title page in English that contains a German word would generally spell the German word not with an umlaut but with "ae," "oe," or "ue" as required. The established form of a name should avoid the umlaut which cannot be considered in filing, therefore simplifying the rule.

The next rule, number 300, takes up another consistent problem in library filing. This is a supposed conflict between entry words and the nature of the dictionary catalog. Cutter and his successors have all troubled themselves with the necessity for rules when entry words are exactly alike. Cutter's example is Washington, George, the person, and Washington, D.C., the place. According to his rule the order should be person, then place, followed by subject except that for a person or place, then form, and then title. This rule violates another of the iron laws and will cause great inefficiency in filing. There is no reason to regard the catalog and its filing procedure as a means of organization beyond what the inherent sequence of the alphabet will provide. A filing code that requires classificatory intervention by the filer requires an exact understanding of that intervention by the user. The tendency of all classifications is to grow more complicated and more elaborate, so that the user is very likely going to find himself faced with intricate puzzles of arrangement.

Cutter's next rule, based in part on the difficulty of identical entry words, develops the curious rule that headings made up only of the forename are to be filed in a certain rigid order: Saints, Popes, Emperors, Kings, Princes and Noblemen, and others. The Saints are subarranged by their usual appellative, the Popes by their number, Sovereigns and Sovereign Princes in alphabetical order by country, and further arranged numerically. This rule was perpetuated in the ALA Rules until very recently, and it made library filing a particularly troublesome facet of the card catalog, both for the filer and for the user. In point of fact, there is no need to make the distinction at all. Peter, Pope, can precede Peter, Saint, without any noticeable difficulties in heaven. Again the established form of entry in names can be prepared with the idea of avoiding such problems; avoiding the problem of misarrangement and the requirement that each user know the hierarchical sequence that Cutter prefers. Cutter suggests in succeeding rules dealing with names that titles of persons are not to be considered, even though they must be included

according to the catalog code. Herein lies an explanation for the growing costs of filing in great catalogs, not nearly so troublesome a problem as it may seem. Why should the titles of authors only be included in the entry to be disregarded in filing? An established form of name implies that the cataloger is working with the final product in mind. Helpfulness such as giving added different spelling for common names (Cutter's example is Brown and Browne) will add to the bulk of the catalog without noticeably helping the user who is first to be frustrated with the hierarchical arrangement of forename and then confused by titles of individuals omitted in filing. Rule 306 brings this confusion even further by stating that forenames not generally used should be neglected in the arrangement; the example is Bret Harte. Cutter would have the full name spelled out in parenthesis after Harte, Bret, and succeeding entry codes would require that Bret Harte be listed as Francis Bret Harte. One can see the net result of confusion in catalogs that were begun about 100 years ago.

In other and more recent rules, one finds that Cutter's ideas of entry are disregarded in the rules for filing so that an entry may be elaborated for the purpose of filing but it cannot differ extensively from the name found on the title page. In reading Cutter's rules carefully one finds that there is great evidence of Cutter's scholarship but not much of his practicality. Most of his rules are very well covered by the traditional rule: file word by word and letter by letter within words, always regarding nothing as coming before something.

Another problem that arises in library filing is concerned again with entry words. The entry words that are not within the English alphabet, such as signs, symbols and numbers, are best spelled out. Even in the title unit entry system the best practice is to provide the filing word before the one found on the title page. A title that is simply a sign is best included in parenthesis before the sign itself, not after-words. A problem that arises often is the question of abbreviations: Should they be filed as if spelled out, should they be spelled out, or should they be filed as found whether abbreviated or spelled out in full? This ultimately led to the peculiarity of library filing with regard to names beginning with "Mac," sometimes spelled "M," sometimes "Mc," and sometimes "Mac." Cutter regarded "Mc" and "M" as abbreviations of "Mac" and said they were all to be filed as if spelled "Mac." This practice is not followed by the telephone directory which demands that the user know how the name is spelled. Including this rule violates another of the iron laws and is likely to cause inefficiency in the degree to which it is among other exceptions to the simple rule of filing word by word and letter by letter within words. Cutter's next rules are as much rules for entry as they are for arrangement. His example is headings for the United States. In Rule 324, Cutter points out that the purpose of the dictionary catalog is to be direct and specific even so far as entries are concerned; the practice that he recommends for the entry does not match the practice he recommends for filing. This rule has been observed in some libraries so that the word U.S. is the filing mark that begins the sequence, and the next word to be considered is underlined. It is quite true that headings for the United States that include such words as bureaus, departments, services, and so forth may be confusing and difficult to use, to the extent that in a relatively small catalog there

seems to be no arrangement whatever. A rule of filing that requires the filer to read and acknowledge the entire entry with certain inclusions and certain omissions will be found very inefficient. A close investigation of Cutter's rules for filing indicates that nothing can supplant a purposeful rule of entry that has the filing arrangement, rather than a bibliographic or legalistic nicety, as the prime consideration.

Cutter's section on the arrangement of subjects can be seen in its final results in the Library of Congress Rules of Filing. Cutter recommends first of all that subjects should not be mixed; that is, "Grace before meals," "Grace" of body, "Grace" the musical term as in grace note, and "Grace" the theological term must be four distinct headings. He goes on to point out the difficulty of making the dictionary catalog usable when a great number of entries are included under one subject heading. This has occurred in large library catalogs where such headings as U.S. and World War, 1939-1945, are subdivided and resubdivided despite the Cutter's Rule 343.

The rule deserves to be quoted completely because it is rather typical of Cutter's inability to make exact and specific rules: "343. When the titles are numerous under a subject heading divide them but avoid subdivision." To the simple-minded author of this article, the rule contains a contradiction. Even in Cutter's example the contradiction is apparent. A careful reading, however, will show that Cutter preferred not to follow his rule for a dictionary catalog but thought that a classed arrangement was somewhat more useful.

Elsewhere he mentions what is pleasing to a classifying mind, and certainly this arrangement of subdivisions of main headings that are in turn subdivided and sometimes resubdivided introduces a classificatory element that Cutter must have found pleasing and that users have probably found maddening where it has been employed. It is a perfect example of the danger of semantic filing when the value of the symbol may be variously interpreted. Semantic filing where the value is as conventional as the mark that spells the meaning, as in the case of numerals, offers no real danger. Semantic considerations in filing the subdivisions of subject headings leads to great problems. For instance, in Cutter's example bibliography is included under language and under law. These are in fact subdivisions for the entry word given in the example as name of country. That is, a user looking for material on the U.S. would find no bibliography of the U.S. government in Cutter's arrangement, but would have to look under an individual subject such as history or language or law or literature. Cutter's arrangement has history both as a division and as a subdivision, to use his terminology, of the main heading. The example given in Cutter is most clear when Cutter's classified arrangement, compared with the arrangement that would follow from his rule, is viewed with the idea of what becomes of headings under language and under literature. Epithets, for instance, are a subdivision of language, and epigrams a subdivision of literature. Rhymes is a subdivision of language but not of literature, nor is it, as one might suppose, a subdivision of poetry. Such classificatory arrangements within an alphabetical list introduce problems of searching that a library soon comes to regret. Cutter should

not be blamed too greatly because he was considering catalogs of relatively small size. He uses his examples with the understanding that catalogs of the present size, meaning those of the Boston Atheneum at the turn of the century or even the then Library of Congress, were small enough so that the classified arrangement was apparent to the user.

Other library filing codes have preserved at least some phases of Cutter's original rules, but a good chronology could be built on the number of rules that have been modified, changed, and simplified as the years have shown that catalogs of the present size will not permit the variations that Cutter found desirable. An effort to transform even the relatively simple abridged rules of the ALA into a computer program will reveal that very many steps are needed and the program is necessarily elaborated far beyond the realm of usefulness. If the computer could not reach into an entry for particular parts of the information needed, it would be impossible to arrange bibliographic detail following the rules that have been derived from Cutter. The fact that the computer is not constrained by the linearity of the card catalog has eliminated many of the problems that arose as Cutter's rules were applied. The reader is not to suppose that the author in any way denigrates Cutter's importance as a librarian and as a developer of library procedures in cataloging. Cutter's place in library history is secure, but he was never a kind of avatar whose every pronouncement was in fact derived from deity. Such filing codes as the American Library Association Rules or the Library of Congress Rules indicate that as the catalog grows and the rules for filing in the catalog need to be elaborated further, not only do the exceptions create problems in filing, but they also create problems in developing the rules. What the results are so far as the users are concerned can be imagined. In fact the dictionary catalog, with all its advantages, is highly limited in the amount of information that can be stored in this format. At a certain point the dictionary catalog begins to break apart at those entries where there are the most problems of filing. One of the great considerations that would govern dividing a dictionary catalog is the increase in the difficulty of filing.

Not only library filing but filing of all other kinds has tended toward simplification. Old rules of filing in records management tended to be much more complicated than modern rules. Modern records management is concerned with fewer and better records, and simpler and better filing arrangements. The first rule in filing is, avoid translation of files, that is, wherever possible make direct entry into the file of the original documents. Indexing and cross referencing is an expensive procedure that is most likely unnecessary. The second rule in modern records management is, file by that system that will disperse the most papers under the most entries. A file of memoranda under the names of a few people who wrote them will be exceedingly difficult to utilize. Modern records management makes use of proper names, whether geographical or the names of persons. The ultimate use of a working file is the governing consideration in establishing the method of filing. A file that will be consulted only by the name of a person, when there are very many names of persons involved, can be alphabetized very simply by those names. To attempt another way would prove to be a mistake. The classic example

is the government department that utilized a classified index to subjects for its filing of letters when the only use of the file was by the name of the person who wrote the letter. This method required three files: one, the file of record into which all the letters were placed, arranged by Dewey numbers; another, an index to subjects because the subjects were classified according to the Dewey Decimal Classification; and a cross index, most often used, into which a card had to be placed for every letter filed with the name of the individual who wrote the letter. In other words, the bemused department of the government was attempting to make a library of what was simply a correspondence file.

Filing by subject is always difficult because very few people can agree on subject matter. In establishing correspondence files, file by the name of the sender of correspondence into an organization where possible, and attach the correspondence out of the organization where it is answered by a letter, so that the file is organized by the large number of proper names outside the organization. Memoranda written by individual members of an organization should first of all follow a prescribed pattern so that the subject matter is clearly specified as well as the person to whom the memoranda was submitted and the person who wrote it. The list of subjects for memoranda should be established so that the filing can follow the subject headings of the memoranda. These should be applied by all who write memoranda by following an established list so that all the files can be gathered into one arrangement, even though kept individually in various places. Filing by numerals, as seen in the iron laws, is not simpler than filing by alphabetic characters. In fact, it is more complicated because of the limited number of symbols that may be used. Where files are maintained numerically, either the initial digits or the terminal digits can be used as the filing mark. There is much advantage when long numbers are employed in using the terminal digit, particularly if the initial numbers are standardized and tend to be repeated for great numbers of documents.

Whatever has been said of library filing, and especially the iron laws of filing, applies equally to record management. Devices have been employed to reduce the cost of searching for documents, and chief among these are rapid selector devices that will readily search through documents. In the early days of computer technology the complications of using a sequence made up of twenty-six letters that seem to be mathematically very different from the Arabic numerals forced many organizations into translation activities so that simple proper names came out as highly involved numerical arrangements. Modern computer technology can as easily utilize the binary code for an alphabetic sequence as for a numeric sequence. Numeric sequences are highly limited and of doubtful applicability except in the filing of subjects. The advantage of a numeric sequence in a subject file of records is to be found solely in its ability to substitute for the alphabet and simplify it. The simpler the arrangement, and the more carefully it is tailored to the file, the better the records management will proceed.

A kind of popularity developed, especially in the United States government, for the Dewey Decimal Classification. Great efforts were made, and succeeded, in developing classifications based on Dewey's method for the arrangement of his

classification so that large departments of the United States government could file correspondence according to a highly specific and detailed classified list. The advantage was seen that new subjects could be added without dislodging the rest of the file. However, when this scant advantage was compared with the immeasurable disadvantage of indexing and cross indexing and developing the list of headings in their classified form, the tide of popularity turned and the Dewey Decimal Classification fell into disrepute. A succeeding era then would have had all subjects arranged simply by the words employed in the heading. This, however, has its disadvantages as well, because in effect what results is a semantic value utilized as the filing mark. Even when subjects are arranged in alphabetic order, some slippage between the subject as utilized by the filer and the subject as utilized by the searcher is bound to occur. The technique to be employed is first of all to file alphabetically by large subject groupings, then number and add subdivisions to the file as necessary and file entirely by the numeric value preceding the subject heading. This rather strange admixture is possible within certain limits because the human eye can scan a few entries as readily for the content of the entry as for the arrangement of the letters involved. A numerical subarrangement is most useful, especially when the same word is repeated in the different headings used as subdivisions. The efficiency of both the filer and the searcher is the measure of success of the arrangement in evaluating any system of filing.

Consideration must be given in records management in the working of the files as to whether they accumulate matter of permanent informational value, or build-up files (i.e., files that are incomplete at any one point in time), or are simply of informational value and thus may be disposed of whenever it is considered desirable. Build-up files are best separated from permanent records and from informational records even if they are contained within the same enclosure. Similarly, information records must be disposed of systematically and frequently. Permanent records, as seen in the iron laws, tend to become more costly as they grow larger, and the critical factor in filing moves consistently to the right. The problems of records management are remarkably similar to those of libraries, and much could be gained from an interdisciplinary approach to the whole problem of records wherever and however they are kept.

Most special libraries have discovered that the record, the build-up, and the information files are pertinent to the material retained in the library, even temporarily. Massive research libraries are reluctant to dispose of anything, except when obviously replaced in better form. Consequently the files tend to be of the record, or permanent, sort and of the build-up sort. In any filing system the chief consideration is the usefulness of the document, and obviously the most disastrous mistake is the decision to remove a document that will later be needed from the file.

The Mandalay Rules

The following five rules are, so far as the author is able to discern, the simplest rules for library filing that can be adopted. Much that has been traditional in library

filing is omitted because it has proven to be unsatisfactory. The rules are based on the idea that both the filer and the user want simple rules that have no more exceptions than are needed. Second-guessing the user produces extremely complicated rules that end up by frustrating everyone. These rules will require examples that explain and elaborate the filing procedures of a library to show how decisions are made, but each decision must retain the spirit of the rule and not run in conflict to it. In any kind of filing system the first consideration is the site of the filing mark, and in library cataloging this can easily be determined because a separate record is made of material that is filed elsewhere. In records management the actual document is filed and its site must be located at the point where the greatest ease of search is possible. The Mandalay Rules are especially applicable if a title unit entry system is employed in cataloging, so that the unit entry is under title for all material and subsequent or additional cards made for each title are under entries closely governed by rules that will prevent conflict in filing and obviate contradictory rules to account for peculiarities of entry. Further, the Mandalay Rules suppose that nothing is omitted and nothing added in the sequence to be filed. This means that unit entry under the main entry system as developed in various books of rules will require that the entry line be omitted from consideration when the added entries are made. A good library will avoid filing an added entry for an author anywhere except in an alphabetic sequence that will bring the added author's name in direct relationship with the title with which his name is associated. In fact, it is quite incorrect to go from added entry to main entry and then to title in the filing sequence. It has been supposed by various authors that subject headings should be arranged first by the marks of punctuation and then by the author used as the main entry in the various entries under a given subject. This is a highly doubtful method of arranging material; useful in certain circumstances, but totally worthless in others. That is, a subject heading generally relates more closely to the title than to the author, unless the author is as much associated with the subject as the subject heading. Because no perfect system is available, the advantages to be gained from title unit entry, not only in the process of cataloging but in its results, would seem to make the main entry system rather more a traditional procedure than a practical advantage. The five Mandalay Rules are as follows:

1. *File word by word and letter by letter within words, always regarding something as coming after nothing.* This rule follows traditional library filing and gives the space between words the value of a letter; that is, to be considered first before any other filing begins. For example, "a" followed by nothing is to come before "ab" simply because "b" is something and the space after "a" is nothing. The rule is relatively easily followed and all the other rules are to a degree explanations of this rule.

2. *Signs and symbols are to be spelled out in the language of the entry if the symbol is the first word in the entry. Numbers within an entry are filed in numerical order.* A book with the title "7 journées de mai" would be entered as /Sept/7 journées de mai so that filers and users may find it readily. This is preferable to establishing a rule that has to be interpreted by filers and often by users as they

look for entries in a catalog. If the symbol is not the entry word, it may be included and arranged in semantic order if a number. This rule is obviously more a rule of entry than of filing, except for the second sentence. A library should not include symbols in its subject headings and it should make the filing marks clear to the user and to the filer.

3. *Abbreviations are not to be included in the catalog if any other form of the name exists and is in common usage.* Where no other form of the name exists or is not in common usage, abbreviations are to be filed as if each letter were a complete word. Acronyms are to be considered a word and filed as if they were words. This rule, along with the following rule, may have exceptions depending on the preferences of a library, but it is generally unwise to take an abbreviation from a title page and enter material under that abbreviation when the name as spelled out already exists in the catalog. Acronyms present a special problem, and from the author's standpoint UNESCO is a better entry than United Nations Educational, Scientific, and Cultural Organization.

4. *Disregard all marks of punctuation.* This rule may be amended, depending upon the preferences of a library, so that one mark of punctuation may be considered, especially the dash in subject headings. This will permit the subdivisions of a subject heading to be kept with the main heading. However, to include more than one mark of punctuation as an exception is to invite problems of arrangement predictable from the iron laws. The dash in subject headings, especially if the subject headings are identifiable by other means, is a useful mark of punctuation that can readily be distinguished from all other marks of punctuation and remains the sole mark of punctuation considered in filing. Where subject headings are not readily distinguished from other entries, such as titles, a problem might arise. But the practice of all libraries for many years has been to put subject headings in red, or in capital letters, or spelled out with other marks of punctuation used for titles, for instance, quotation marks. This seems a simpler method of establishing a difference between titles and subject headings, and in a library in which these rules are derived and employed, titles in quotation marks very readily distinguish the material from subject headings. In a title unit entry system the problem is minimal.

5. *Matter not to be considered in filing should be omitted from the entry, and no matter that may govern filing should appear except in the alphabet that constitutes the primary means of arrangement.* Cutter's inclusion of a variety of personal titles for authors along with the entry, none of them to be considered in filing, has led to great problems in the use of Library of Congress entries in computerized systems. One of two compromises is available: either the material is always filed, or it is omitted from the machine readable copy of the entry. There seems to be no good reason to deny the user what the computer enjoys. If the word "Sir" is not to be considered in filing, it should be removed from the entry, or at the least it should be included in a mark of punctuation (e.g., parentheses), that would uniformly exclude consideration of the material in filing operations. Parentheses are more perilous to employ than brackets, and brackets are less effective than omitting the matter not to be filed.

These five rules were found to be sufficient for filing cards in the University of Mandalay catalog, although it should be explained that the catalog did not contain 100,000 cards, and subject headings were kept separate from the author and title entries. The rules as they stand are too simple for large library catalogs, but they do not differ in great detail from those finally determined in the second edition of the ALA Rules for filing catalog cards. These rules do not take into account certain determinations of the alphabet characteristic of a given language. Interpretation is necessary for each one of them so far as the individual library is concerned, so that diacritical marks, for instance, will not be considered in filing when the English language and its alphabet is generally the medium of organization. It is necessary to arrange all the material in one alphabet without exception so that if umlauts are considered they must be regarded as a letter of the alphabet, not as incidental problems. A much better system is simply to disregard umlauts and other features of printing, such as the ligatures used for the transliteration of Russian names. Certain signs and letters of the alphabet in other languages have to be interpreted, and this is best done in the entry itself rather than in special rules that make the filing operation unnecessarily complicated.

Rule 5 should note as an exception that the articles in English (and possibly other languages) should not be employed as entry words. Articles may be disregarded uniformly when they occur in the entry position, but they must be considered when arranging the rest of the entry. In Mandalay the rule was amended for English language materials so that "the," "a," and "an" were omitted, but articles in other languages were always considered in the filing. The Burmese language does not employ articles, and the only significant collection in a foreign language was in Russian which does not employ articles either. An entry in French or Spanish was likely to be disregarded by Burmese students in any case, and it is impossible to create a rule that can be used without ambiguity if articles in several languages are to be omitted. Even if the article is omitted in English only, problems may arise when the letter "a" is not an article at all, but rather represents either the initial letter of an entry in abbreviated form or has some other ambiguous meaning.

The second edition of the ALA Rules provides for great latitude so far as the library is concerned in what it recommends as filing procedures. The rules are generally simple although the large numbers of examples may seem to make the book complex. The Library of Congress Rules are vastly more complicated, partly because of peculiarities of filing in the Library of Congress card catalog and partly because of traditions preserved from the days of Cutter. However, there is no excuse for making filing a more difficult job than it needs to be, nor for believing that one may somehow avoid the results of misjudgments in developing filing rules. The extent to which one varies from the Mandalay Rules is likely to be the extent to which one must vary from the most efficient rules yet found. Certainly libraries should employ simple rules, such as the Mandalay Rules, for all filing in temporary, build-up catalogs and files.

Conclusion

From the foregoing it can be assumed that filing operations can be made efficient not only for the filer but also for the user. A good test of a filing method is the inexperienced person who is employed to do the filing. If this individual finds the file difficult to use, then we may be assured that the user will find it no easier. Habitual use of a catalog is often necessary to establish exactly the filing rules used, but once filing rules are set up, exceptions should not be permitted because the end result with inflexible predictability will be a loss of efficiency. Vast dictionary catalogs go beyond what Cutter ever supposed, and the computer is a kind of stern judge of any filing procedure. Hines and Harris provide some relief, but the only valid procedure is to make entries conform to efficient filing practices.

The iron laws were so named because the experimentation that established them was based on a metalanguage and tested within that restrictive medium first. They are not tied to any given language but operate whenever a sequence of symbols having an inherent order is arranged to provide a predictable location for any given symbol string. In the application of the rules to library filing, it was found that efficiency, however measured, was dependent upon the critical factor, that mark that provides the predictable location, and the necessity of keeping semantic arrangements separate from alphabetic arrangements unless different symbol strings are employed.

The Appendix shows, in abbreviated form, how the Iron Laws were developed from the metalanguage. The testing in natural language has been omitted because it is largely unnecessary. Most of what has been stated above is common sense applied to a common problem, and it requires no metalanguage to assert that as the difficulties of filing increase, the efficiency of the filer decreases.

Appendix

BXSKADI—A METALANGUAGE

Alphabet: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.

Consonants (pronounced like English; G is always hard like the "g" in go): B, D, F, G, H, K, L, M, N, P, R, S, T, V, Z.

Vowels: A (like the "a" in father), C (like the "aw" in law), E (like the "e" in they), I (like the "i" in machine), J (like the "i" in bit), O (like the "o" in go), U (like the "u" in mute), X (like the "u" in bus).

Diphthongs and semiconsonants: Q (like the "oy" in boy); W (before vowels, like the "w" in way, after consonants like the "ow" in cow); Y (before vowels, like the "y" in yard, after consonants like the "ai" in aisle).

Values:

0	H
1	B, X, S
2	K, A
3	D, I
4	G, O
5	L, U
6	W, Y (like English 'wi' in wide)
7	F, E
8	R, C
9	T, J
10	Y, W (like English 'yow')
11	P (X)
12	(B) Q
13	M (X)
17	N (X)
19	V (X)
23	Z (X)

Word Formation

The semantic value of each word is determined by the composition of vowels and consonants. All consonants indicate rows in a grid and all vowels indicate columns.

B is an operative sign indicating the addition in the amount of the vowel that follows.

S is an operative sign indicating the subtraction of the amount of the vowel that follows.

A vowel preceding a consonant vowel combination indicates a product whether preceded by B or S. B indicates a positive number, S indicates a negative number.

R indicates the power of the number. If it follows the consonant-vowel combination of a number less than base eight, it indicates that the number is a base. R indicates the product of an equal number of rows and columns if it follows a consonant-vowel combination of a number from 1 to 10. It indicates the number multiplied by itself to the power indicated if it precedes a consonant vowel combination. Between a consonant and a vowel, R indicates 8 rows.

The metalanguage is created to provide a great number of roughly synonymous terms capable of distinct interpretation. Any number may serve as the base of an enumerative system with the products of vowels and consonants, including additions and subtractions as indicated, and powers of the base as needed.

The following vocabulary indicates how the metalanguage may be used to form words for the purposes of experimentation in the nature of language.

1	BXS	11	PX	21	FI	31	YIBX	41	YOBX	51	NI
2	KA	12	BQ	22	PA	32	GC	42	FY	52	MO
3	DI	13	MX	23	ZX	33	PI	43	YOBI	53	YUBI
4	GO	14	FA	24	KQ	34	NA	44	PO	54	TY
5	LU	15	LI	25	RUL	35	FU	45	TU	55	PU
6	WY	16	KRX	26	MA	36	DQ	46	VA	56	FC
7	FE	17	NX	27	TI	37	DQBX	47	YOBE	57	VI
8	RC	18	TA	28	FO	38	VA	48	GQ	58	BAYOBJ
9	TJ	19	VX	29	YABJ	39	MI	49	REF	59	YUBJ
10	YW	20	LO	30	YI	40	YO	50	YU	60	LQ, DOL

It will be noted that prime numbers after 23 must be indicated by one of the convenient basing systems, for instance, base 10 or possibly base 12 or 8.

In the following vocabulary base 12 is shown.

1	BX	13	BQBX	48	GQ	108	TQ
2	BA	14	BQBA	.....	.....	.....	.....
3	BI	15	BQBI	60	LQ	120	YQ
4	BO	.....	.....	.....	.....	.....	.....
5	BU	22	BQBW	72	WQ	132	PQ
6	BY	23	KQSX	.....	.....	.....	.....
7	BE	24	KQ	84	FQ	144	RABQ
8	BC	25	KQBX	.....	.....	1728	RIBQ
9	BJ	.....	.....	96	RQ	20,736	ROBQ
10	BW	35	DQSX	.....	.....	.....	.....
11	BQSX	36	DQ	.....	.....	.....	.....
12	BQ	37	DQBX	.....	.....	.....	.....

Because the language is designed to yield a great number of roughly synonymous terms, following the rules of orthography, many combinations are possible.

The following vocabulary exemplifies semantic filing of a number of terms.

- 0 HX
- 1 BX, BXS, SX, SXB
- 2 KA, KX, BA
- 3 DI, DX, BI
- 4 GO, BO, GX, KAR, RAKX, RABA
- 5 LU, LX, BU
- 6 WY, WX, BY, KI, DA, BAI (homonymous with BY)
- 7 FE, FX, BE
- 8 RC, BC, RX, RIKA, GA, KO
- 9 TJ, TX, BJ, DIR, RID
- 10 YW, YX, BW, LA, KU, BAU (homonymous with BW)
- 11 PX, YWBX, BQSX
- 12 BQ, DO, GI, WA, KY
- 13 MX, BQBX, FASX
- 14 FA, KE
- 15 LI, DU
- 16 RA, KC, KRX, RAGX, RABO, FOG, GOR

17	NX, KRXBX
18	TA, KJ, BADIR, WI, DY, KRXBA
19	VX, KRXBI
20	LO, GU, KW, YA, FISX
21	FI, LOBX, KWBX, KIE
22	PA
23	ZX, KQSX, BQBP
24	KQ, RI, DC, GY, WO
25	RUI., RALX, RABU, IUR
26	MA
27	TI, DJ, RIDX, RIBI
28	FO, GE
29	DWSX, BQBU, BOBX
30	DW, YI, LY, WU, BALI, DXDU
31	DWBX, BQBE
32	GRX, RO, GC, KRA, BAGOR, BAROG
33	PI
34	NA
35	FU, LE
36	RAWX, WYR, DQ, TO, GI
37	DQBX, VASX, DWBE, YOBE
38	VA
39	MI
40	GW, YO
41	GWBX, YOBX, DQBU
42	FY, WE
43	GWBI, YOBI, DQBF
44	PO
45	TU, LI
46	ZA
47	GWBE, DQBXP, DQSX
48	GQ, KRI, RY, WC
49	FER, REF, RAFX, RABE
50	LW, YU, GQBA
51	NI
52	MO
53	LWBI, YUBI, GQBU
54	TY, WJ, DIKI, TIKX
55	PU
56	RE, FC
57	VI
58	WWSA, LQSA, BADQSX
59	LQSX, LWBJ
60	WW, YY, LQ, DOI., GUD, LOD

The experiments testing of the iron laws can be conducted with this vocabulary.

1. There is a direct relationship between the critical factor in filing and the number of filing indicators in a sequence having inherent order (law of acceptability).

A small base such as base 4 includes only the characters B, X, S, K, A, D, I, G, O, R. The vocabulary, or enumeration, in such a base would be as follows.

Semantic Filing

1	BXS	12	BIGOR	23	RAGORBOBI
2	KA	13	BIGORBX	24	RAGORBXBAGOR
3	DI	14	BIGORBA	25	RAGORBXBAGORBX
4	GOR	15	BIGORBI	26	RAGORBXBAGORBA
5	GORBX	16	RAGOR	27	RAGORBXBAGORBI
6	GORBA	17	RAGORBX	28	RAGORBXBIGOR
7	GORBI	18	RAGORBA	29	RAGORBXBIGORBX
8	BAGOR	19	RAGORBI	30	RAGORBXBIGORBA
9	BAGORBX	20	RAGORBO	31	RAGORBXBIGORBI
10	BAGORBA	21	RAGORBOBX	32	RIGOR
11	BAGORBI	22	RAGORBOBA		etc.

Alphabetic Filing

BAGOR	GORBI	RAGORBOBI
BAGORBA	GORBX	RAGORBOBOBX
BAGORBI	KA	RAGORBXBAGOR
BAGORBX	RAGOR	RAGORBXBAGORBA
BIGOR	RAGORBA	RAGORBXBAGORBI
BIGORBA	RAGORBI	RAGORBXBAGORBX
BIGORBI	RAGORBO	RAGORBXBIGOR
BIGORBX	RAGORBX	RAGORBXBIGORBA
BXS	RAGORBA	RAGORBXBIGORBI
DI	RAGORBI	RAGORBXBIGORBX
GOR	RAGORBO	RIGOR
GORBA	RAGORBOBA	

Other words may be added utilizing the same rules of spelling. Although provision is made for the letters K and D, they are each used only once in the preceding lists. Words containing these letters will follow the filing rule that establishes the critical factor. If K or D are the first letters, they will file with the critical factor first. As the letters are used elsewhere, the critical factor occurs with each letter in the position where it establishes its location.

Words to be added:

16	KRX
17	KRXBX
18	KRXBA, DXGORBA
19	DXGORBI
20	GORBAKX
21	GORBIDX
27	KAGORBXDX
30	BAGORBADX
32	GRX, KRA

The alphabetic list will accept these changes readily, but in each case the critical factor is established at the place where the theretofore unused letters occur, and the previously used letters become critical factors only when several words containing unused letters are added.

KRX follows KA and precedes RAGOR
 KRXXB follows KRX and precedes RAGOR
 KRXXBA follows KRX and precedes KRXXB
 DXGORBA follows KI and precedes GOR
 DXGORBI follows DXGORBA and precedes GOR
 GORBAKX follows GORBA and precedes GORBI
 GORBIDX follows GORBI and precedes GORBX
 GORBXXDX follows GORBX and precedes KA
 KXGORBXXDX follows KRX and precedes RAGOR
 BAGORBADX follows BAGORBA and precedes BAGORBI
 GRX follows GOR and precedes KA
 KRA follows KA and precedes KRX
 KRX follows KA and precedes RAGOR
 KRXXB follows KRX and precedes RAGOR
 KRXXBA follows KRX and precedes KRXXB
 DXGORBA follows DI and precedes GOR
 DXGORBI follows DXGORBA and precedes GOR
 GORBAKX follows GORBA and precedes GORBI
 GORBIDX follows GORBI and precedes GORBX
 GORBXXDX follows GORBX and precedes KA
 KXGORBXXSX follows KRX and precedes RAGOR
 BAGORBADX follows BAGORBA and precedes BAGORBI
 GRX follows GOR and precedes KA
 KRA follows KA and precedes KRX

Following the orthographic rule that R may be used to show the base if it is less than 8, the R has been included. It simply establishes the letter as usable within a basing system. It can be subtracted down to Item 16 in the semantic filing without causing any disarrangement in either the semantic filing or the alphabetic filing. R is a redundant letter until it becomes the critical factor. If the base is extended to 9, R would become ambiguous, indicating a square of 4, rather than 4. In the additions above, R in KRX and GRX is ambiguous so far as the semantic filing is concerned so that R in KRX would indicate $2 \times 4 \times 1$ and R in GRX would indicate $4 \times 4 \times 1$.

2. The critical factor can be located precisely only if every mark used in filing has a definite value in the sequence (law of clarity).

The laws of ambiguity and of redundancy follow from this and are observable in the example above. In fact, a better arrangement of the base 4 would employ the metalanguage more precisely and would avoid the problems that arise by including R as an indicator of the base.

Semantic			Alphabetic		
1	BXS	17	GORBX	BXS	GORBI
2	KA	18	GORBA	DI	GORBO
3	DI	19	GORBI	GA	GORBOBA
4	GO	20	GORBO	GABX	GORBOBI
5	GOBX	21	GORBOBX	GABA	GORBOBX
6	GOBA	22	GORBOBXA	GABI	GORBX
7	GOBI	23	GORBOBI	GI	GORBXGA
8	GA	24	GORBXGA	GIBA	GORBXGABA
9	GABX	25	GORBXGABX	GIBI	GORBXGABI
10	GABA	26	GORBXGABA	GIBX	GORBXGABX
11	GABI	27	GORBXGABI	GO	GORBXGI
12	GI	28	GORBXGI	GOBA	GORBXGIBA
13	GIBX	29	GORBXGIBX	GOBI	GORBXGIBI
14	GIBA	30	GORBXGIBA	GOBX	GORBXGIBX
15	GIBI	31	GORBXGIBI	GOR	KA
16	GOR	32	RIGO	GORBA	RIGO

etc.

The other tests follow, with the critical factor as the indicator of efficiency.

3. If the critical factor is not found on a given mark, that mark is redundant. Material added that utilizes the unused mark will not affect the critical factor (law of redundancy).

The reader can test this by refiling the examples given, omitting any sequence of numbers, and then reinserting them. The whole block of inserted numbers will arrange themselves without affecting the critical factor.

4. If the critical factor cannot be determined because two marks have the same value, the marks are ambiguous (law of ambiguity).

This has been shown in the semantic filing but is apparent also from the example of R used in the base 4 sequence.

5. As the critical factor attains the same location in two separate files, they become equal in filing density. When the files are intermixed, the critical factor will not shift except as the same mark in the same location is the critical factor. If any mark in one file is not used in the other file, the critical factor will shift toward the initial reading position (law of equality).

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JAY E. DAILY

FILMOREX SYSTEM

The Filmorex equipment provides for storage, search, and distribution of information, using photographic and electronic techniques.

Documents and related index information are registered photographically (see Figure 1) on microfiches and are classified by subjects. The microfiche is a 35 × 60 mm film divided into two zones:

1. A "text" zone, on which the text or the summary of the document is micro-photographed. This may also include figures, tables, and graphs.
2. A "code" zone, onto which are photographed the documents' coordinates, that is to say, the key words which it includes. These coordinates are represented by a combination of black and transparent squares, set out in parallel lines. There are fifteen codes, each of which can be fitted in any order or sequence. In fact, as many subjects as are needed can be used by means of multiple microfiches.

The lower portion includes the abstract of the document; the upper portion is divided by a series of horizontal lines, on each of which, by means of black and white squares, the representation of a five-number code signifies an index entry (and equivalent code).

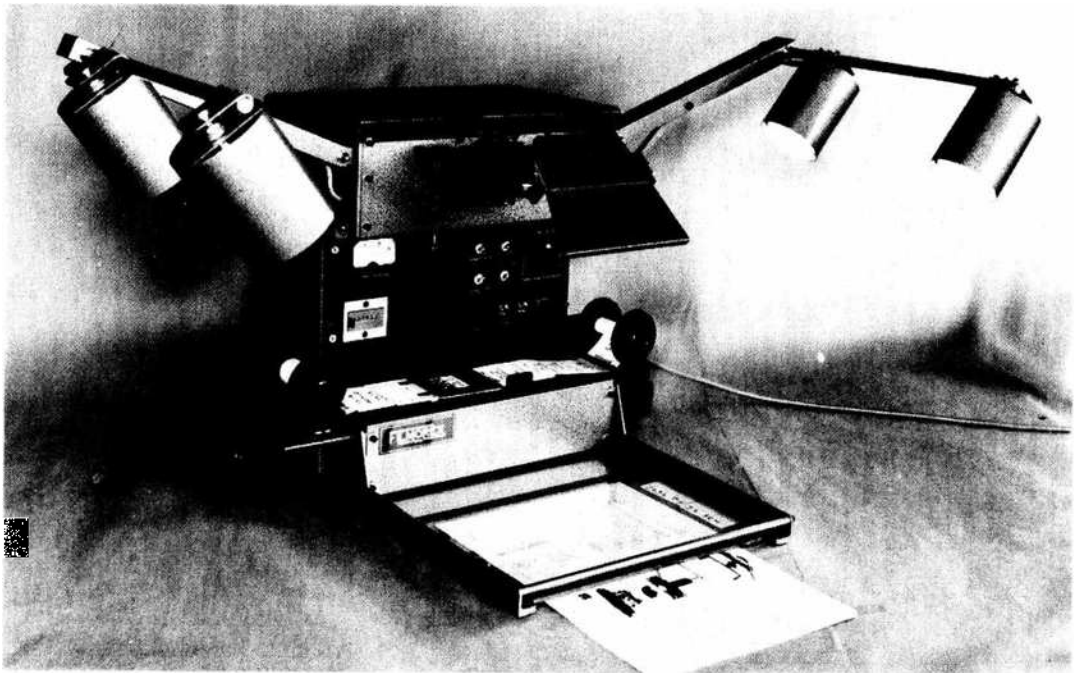


FIGURE 1. *Filmorex camera.*

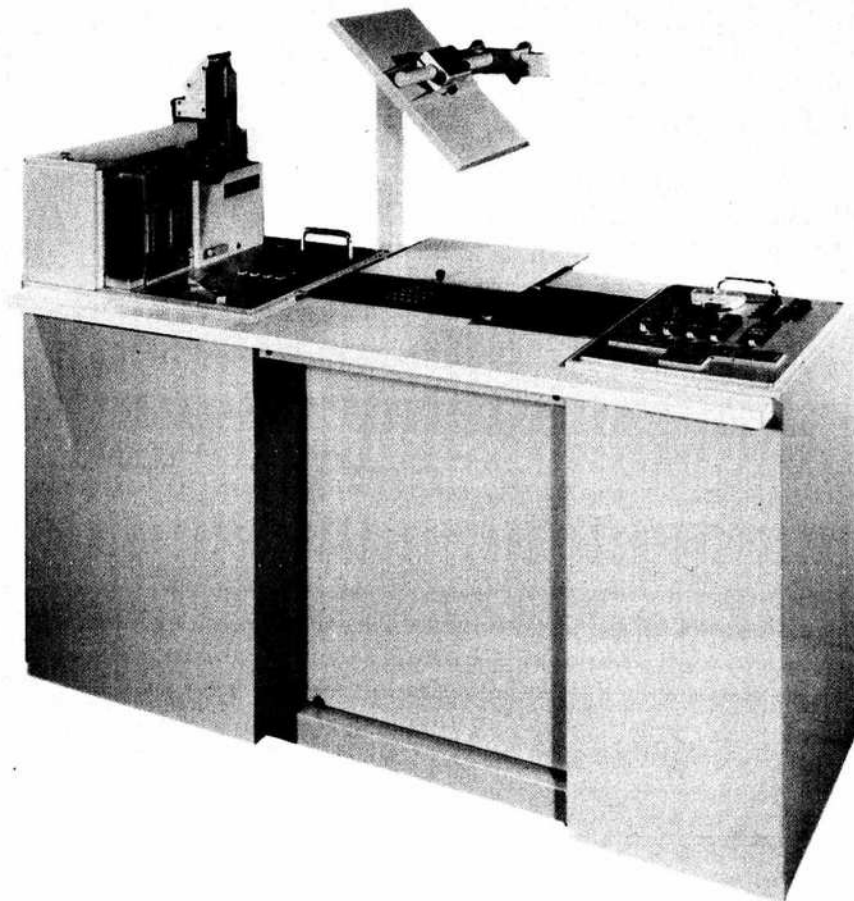


FIGURE 2. *Filmorex Selector.*

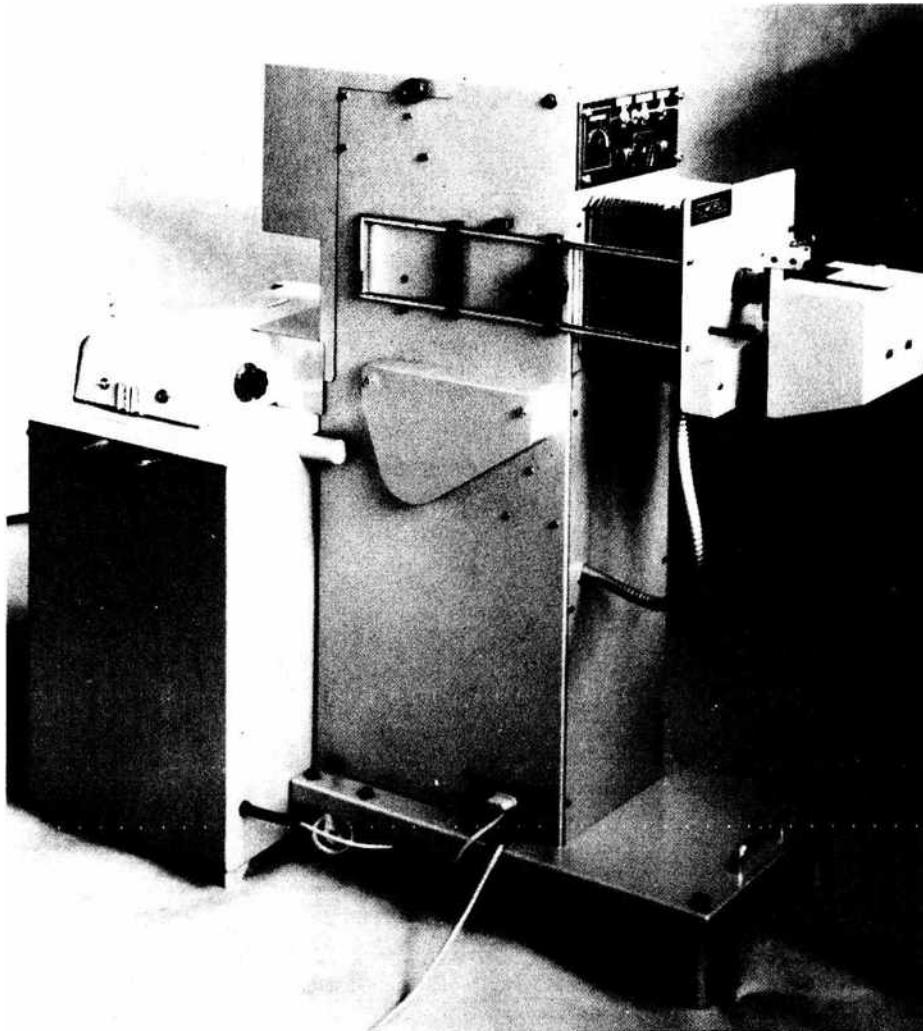


FIGURE 3. *Filmorex Photolister.*

The search for documents is carried out by an electronic "selector" which scans the microfiches and selects all those which deal with a particular search prescription. The microfiches selected can then be read directly by means of a microreader or else be reproduced in hard copy.

Entry of information into microfiche entails the following steps:

1. Preparation of the document: each document is analyzed by a specialist who prepares a brief extract and selects appropriate index entries.
2. Photographing: the document is transferred onto a microfiche by photographing simultaneously:
 - a. The "abstract" (or the first page of the document).
 - b. The "document's" index entries, by means of coded vocabulary-cards.

After development and cutting of the film, the microfiche will be seen to include two zones, one with the text and the other with the coding (representing index entries).

Microfiches are scanned by means of the Filmorex Selector (see Figure 2) which locates and selects automatically all microfiches which include one or more index codes which have been specified.

The selector includes a viewer which enables microfiches to be read while passing them through the selector at slow speed.

The selected microfiches can be automatically enlarged by a photolister (see Figure 3) to produce enlarged copies of abstracts or first pages of documents that have been recorded.

J. SAMAIN

FILMS IN LIBRARIES

Films in libraries are not new. Commendably, librarians have always been alert to new developments in film as well as other audiovisual materials and technology. Not so commendable, however, is the fact that librarians have no effective and systematic method of realizing the contributions of socioeconomic and technological developments other than as public relations techniques. Since a theory of human communication is apparently not as yet acceptable to the profession of library and information science, film and other media materials are treated largely as peripheral to the basic considerations of infrastructure development.

The first commercial motion picture showing is sometimes considered to be the exhibition of Edison's kinetoscope in 1894 (1). Within 20 years of this event, librarians were exploiting the relation between motion pictures and books. Bookmarks, posters, and news stories whose intent was to lead the patron from motion picture to fiction, biography, travel, and history were employed as publicity devices in order to increase community awareness of the library. An integral and systematic approach to audiovisuals as materials of equal or superior value to books has, however, been slow in developing among librarians. Even today films have not been fully utilized as communication tools.

In any event, the Madison (Wisconsin) Public Library was using motion pictures to illustrate stories for children in 1910. This reference (2) in the literature is the earliest known, at least to this investigator, and may serve as a candidate for a library "first." Even at this early date "audiovisuals" were used as supplementary illustrative material, and it was found that film quality was much inferior to the book—two themes which have persisted throughout the history of film utilization in libraries.

The essential functions of film library programing and services were identified almost a quarter of a century before real involvement with filmic materials developed in the profession. In making its report in 1925 (3), the Committee on Relations Between Libraries and Motion Pictures of the American Library Association

indicated in its recommendations the three basic functions of film library service which even today have only been partially realized:

That the public library in the larger cities be urged to establish and maintain, in connection with their information services, indexes to the agencies from which moving picture films may be obtained for educational and recreational purposes.

That an effort be made to induce a selected number of public libraries (chosen with some regard for geographical divisions) to assume the functions of collecting and distributing films for the use of schools, clubs and other organizations in their respective regional areas.

That in view of the amount of detail involved in the task of developing and sustaining a consecutive program of cooperation between public libraries and the moving picture producers, the services of an executive clerk, working at the headquarters of the ALA or at the office of Motion Picture Producers and Distributors of America, Inc., should be secured.

Despite an early awareness of motion pictures by public librarians, the first major impetus towards the educational use of film came from the school system. A survey (4) made in 1935–1939 found that 315 cities had full or parttime directors of visual education. In addition, 8,806 school systems in the United States owned 10,097 motion picture projectors and approximately 40,000 reels of film. The Association of School Film Libraries was organized in 1938 to act as a clearinghouse of information about educational film and as an agency for cooperative distribution. The first edition of the *Educational Film Guide* (5) appeared in 1936 and firmly codified the developing practice among librarians that film cataloging is equivalent to book cataloging.

Although schools and colleges were exerting leadership in the educational use of film, a few public librarians had begun to explore film possibilities in adult and continuing education. In 1939 only four public libraries owned films for a total of 203 films which were loaned 2,212 times during the previous year (6). However, ten libraries had sponsored film showings in connection with adult education programs and 46 libraries were giving advisory services about films even though requests were few in number. Apparently the majority of public librarians of the period did not consider the film as a significant medium for the preservation and diffusion of ideas.

Even though an awareness of films may not be new in libraries, an active interest in film service came only after the concern for the continuing education of adults began to take hold in the profession. In the mid-1940s a few leaders in librarianship realized the potential of films for adult education. These leaders began an enthusiastic and aggressive campaign to establish film use as an extension of the librarian's information function. Without fully realizing the implications of film use, this extension of the professional role led to a consideration of the librarian's educational function because films in the main require a group context and group work methods for their effective utilization.

Much of the early work in film utilization was done in the context of adult education (7). However, it is remarkable in many ways that *Educational Motion Pictures*

and Libraries (8) could be published as early as 1942. Supported by a grant from the Rockefeller Foundation to the Audiovisual Committee of the American Library Association, this report on film utilization in libraries surveyed the literature, film production, and distribution agencies as well as librarians then involved with film use. Unfortunately the literary and educational value of films only were discussed, and this may have been instrumental in limiting the librarian's attention to the film as an illustrative extension of the book collection. Nevertheless it was a baseline study and its recommendations have yet to be fully implemented in the profession.

The first real impetus towards the community use of films came not from the public library, but from the federal government's efforts during World War II to distribute films on civil defense, war bonds, and propaganda (9). A parallel development took place in Canada where, after the war, the National Film Board took on responsibility for promoting community film councils and for supplying many of the films distributed (10). In the United States it was a national film council rather than an arm of the federal government that continued promoting the community use of films. According to Jones (11), it was the Film Council of America which took over from the 16 Millimeter Coordinating Committee, a cooperative group representing film organizations designed to promote the government's war efforts:

At the end of the war, the Film Council of America came into being to continue the work of the committee, although the project no longer confined itself strictly to governmental films. This was the beginning of the film council movement, the idea of which was to create in every community a council in which representatives of labor, education, religion, etc., could meet to discuss and encourage the use of films and to serve as an outlet for film information.

Despite the development of film councils and film circuits, voluntary citizen achievement in these as well as other community efforts is seriously curtailed unless it is supported by the socially designated coordinating structure in the community (12). As yet, in the mid-1940s, only a few library leaders were concerned about the community role of the library let alone promoting an active commitment to film library development. Nevertheless, the postwar standards for public libraries did recognize audiovisual library materials (13), and this initial leadership was developed and expanded in the 1956 and especially the 1966 editions (14). However, it was not until 1970 that a serious effort was made to consider films and other audiovisual materials as an integral function of community library service (15).

The acquisition and functional use of films in a library is related to the librarian's role in the community. As a coordinating structure (12), the public library is an authority with a power base in the local community if not a national agency. Librarians in general have a common purpose, exert national leadership, and promote the common good through an agency which serves the whole public. Waldron (16) in her report for the Public Library Inquiry recognized the public library as the agency for the promotion of film services:

It can claim a number of advantages which are enjoyed by no other single organization in the community: (1) It is open to and serves the entire community. (2) It is familiar with adult interests and needs. (3) It is concerned with many phases of general education. (4) It is an established educational institution, with roots in the community and financial support from the community. (5) It is in a position to correlate films with other educational materials. (6) It is usually open long hours, is easily accessible, and can make the most economical use of films in terms of efficient local circulation. (7) It can assume leadership in sponsoring local film activities or in cosponsoring them. (8) It can assist not only in booking films but also in carrying out film programs.

The reports of the Public Library Inquiry (17) found that at least fifty libraries were involved in film activity. Studies made, however, indicated that films involve a shift in thinking and practice (16). The cultural milieu of film is radically different from books. Informational as well as other films are designed for group viewing and listening, requiring the communicative arts in which most librarians are not particularly skilled. In addition, a library is only one of several agencies in the community engaged in film services, which Leigh recognized in his general report (17) of the Public Library Inquiry:

For these reasons a public library which offers film goes out into the community. It deals with organized groups and must build its place as part of a cooperative enterprise involving several agencies interested in films. Usually the public library film personnel serves usefully as members a local film council or similar organization, with the special task of obtaining, storing, and distributing informational films and providing expert knowledge with regard to the content, purpose, and quality of the films it has acquired. Sometimes a public library becomes the home of the community's film council and cooperative film activities.

The reports of McDonald (8) and Waldron (16), which were separated by almost a decade, accurately reflected the public librarians approach to audiovisual materials in the 1940s. If audiovisual materials were used at all, they were almost exclusively limited to films, and the film's public relations value in enticing people to read books apparently was the major purpose for including films in the collection. It is interesting to compare the public librarian's methods of film utilization with an integrated audiovisual system's approach as advocated by one school library leader (18) during the same period of time:

Modern media of communication are closely interrelated and, in a sense, interdependent. Effective utilization of a film involves, first of all, a period of preparation-discussion and outlining of the educational endeavor and the reading of a guide or other reference materials to insure readiness. Follow-up may require the use of a globe for developing the true concept of the geographical information presented in the film, or the search for realia which provide concrete experience. The answers to many questions raised by the film may be found only in books and periodicals, or the opaque projection of a diagram may be required to clarify some concept only vaguely presented in the film. Thus the use of one medium

sets off a sort of chain reaction involving many types of educational tools and experiences. The printed word is an important link in the chain, but it is only one of the many links. Teachers and pupils need all the resources that make up the complete chain.

Agencies other than the public library are involved with film acquisition and distribution. Among these, the public schools and the universities have developed extensive collections which in many instances are more comprehensive than the film collections available to the general public. There are few if any universities which do not have film collections. Such film collections tend to be large, especially in the land grant institutions and/or those universities with large schools of education which maintain liaison with school districts in the surrounding region. In fact, it was in the academic institutions that the concept and function of the film library was really developed (17):

It is important to realize that the film library as we know it today had its origins not in the public library but in state university extension divisions. These were the big film libraries in the early days of film history, and today these collections are larger than ever. To a great extent these film libraries owe their start to the U.S. Department of Agriculture, the oldest film producer still in existence. As early as 1912 the Department deposited films with land grant colleges, and this ultimately led to the development of film libraries in extension divisions.

However, it must be remembered that film collections in the schools and especially the universities have practically nothing to do with library development. In 1955 only about 15% of academic libraries had centralized audiovisual services over which librarians had control (19). The extent to which such audiovisual service was integrated with library services is another question. Films and media services have in general been initiated and have evolved almost in isolation from library service. It is only in the very recent past that some reversal of this trend has begun to appear in school and college systems (20), but as yet little at all in the universities, even though elementary guidelines have been identified for academic libraries (21).

The only notable exception to this situation is the University of Pittsburgh whose previous director of libraries was concerned with redefining the university librarian's role in media services (22). The Media Communications Center is administered by an associate director of university libraries. Within these facilities is housed the Regional Instructional Media Center which owns 8,000 prints (3,500 film titles). These films are available to forty school systems in Allegheny County as well as to the university faculties.

The U.S. Library of Congress has been acquiring films since the early 1890s through the operations of the copyright law. The deposited motion pictures between 1894 and 1912 were largely series of positive photographs printed on rolls of paper (23). The collection presently contains over 32,000 separate film items and is administered by the Motion Picture Section, Prints and Photographs Division of the L.C. Reference Department. Copies of films not restricted by copyright,

gift, or physical condition may be ordered from the Motion Picture Section. All motion picture entries are listed in the *Library of Congress Catalog* and the *National Union Catalog*. Kuiper (24) summarizes the work of the Library of Congress in the following manner:

In addition to the Copyright Office's historic activities in registering films for copyright claims and in cataloging copyright entries, the Library's activities now encompass a broad acquisitions program, a program to preserve motion pictures and related materials, a program to provide cataloging and bibliographies services for films to libraries, scholars and the motion-picture world, and a study center for the use of research-oriented users.

The National Information Center for Educational Media (NICEM) has been established at the University of Southern California as a national clearinghouse for all types of media. NICEM issues a number of mediagraphies, but its index to 16mm film (25) is a valuable supplement to the Library of Congress catalogs. On the other hand, the National Audiovisual Center was set up in 1969 in the U.S. National Archives and Records Service to handle the sale and distribution of all United States governmental films (26). Although previous catalogs were available for films produced by various agencies of government, there were a great variety of sources from which these films had to be obtained.

According to Kim (27) there were twenty-five public library cooperatives in 1959. Fourteen of these were film circuits and the remainder were of the central pool type. These and other patterns of film distribution had developed over the years since a pilot project was begun in Missouri in 1948 under a Rockefeller Foundation grant (28). However, the first comprehensive study of public film distribution was made in 1955 by the Office for Adult Education, American Library Association (29). At that time there were eighteen film cooperatives in existence and the report was organized into categories which apparently followed those previously suggested by McDonald (8)—film utilization, personnel, administration, and organization.

By 1960 the number of film collections had risen to eighty-one in public libraries of cities over 50,000 population (30). The film circuit is another method which has been employed by librarians to distribute films (31). In this method a group of libraries pool film resources in order to provide for community needs. The films belong to the group and new acquisitions as well as previous holdings in some instances are divided into sets. Each library borrows a set of films for a month or two, after which it is forwarded to the next library on the circuit.

Film circuits have proved useful in small libraries and where the rapid processing of bookings is difficult. But film circuits have limitations, the principal one being that indiscriminate use of films is encouraged. Since a limited few films are available locally in the deposited set, real choice to fit a particular need is next to impossible. Film circuits may have a public relations value in promoting initial film utilization in small communities, but they should be supplemented by and be eventually eliminated in favor of large central film collections to which libraries in the

region have rapid access and distribution services. Specifications have been developed for a statewide film library in New York (32) and the film networks which exist have been identified in three categories (33):

Consolidated: where one board of trustees controls the policy of the entire system, with the units being branches rather than separate "member" libraries.

Federated: where a cooperative agency is started and the trustees are appointed by county boards of supervisors. Local libraries within each county retain their autonomy and contract with the county library for services and financial aid.

Cooperative: where a system is formed by request of the member libraries themselves, without county political endorsement.

A notable example of a rapid access and distribution system is the statewide film project of the North Carolina State Library (34). Supported by the state, a large collection of 16mm films is made available to all citizens through the various public, county, and regional libraries in the state. Few individual libraries have film collections of their own, but access time to the central collection has been reduced to a minimum. The range of titles and prints makes it possible for the local librarian to meet fairly specific community interests almost on demand. Of course, individual libraries are expected to provide resources both commercial and community for their own mediagraphic counseling services in working with organizational program planner and others (35).

Some advances are being made in achieving a successful mix of libraries and media (36). The materials are being considered from a unified approach (37). There is even a beginning awareness that the patron expectations constitute an important variable to consider. Considering the lack of awareness of a human developmental approach to audiovisual and library services, a listing of some elementary guidelines (38) might serve a useful purpose:

Begin with a one-paragraph policy statement of the rationale for using the media you are choosing in your library or organization. In several sentences, describe the users for whom these media are intended.

Use standard reference sources plus the Yellow Pages to find hardware. Devise a hardware evaluation form and use it when you are discussing hardware with dealers or checking out hardware they lend you. Use such guides as the Library Technology Reports at this step. When you finalize your choice, write down why you chose this particular hardware.

Duplicate step three for software. Be sure to involve faculty.

Prepare inventory cards for hardware, including insurance and maintenance and downtime information. Don't forget security arrangements.

Prepare catalog cards for your software.

Plan and conduct training programs that include both equipment and production "hands-on" opportunity.

Make arrangements to observe users using the equipment and devise user evaluation forms for feedback from them to add to your own notes.

Rarely has an integrated approach to media materials in libraries been better presented than by Swank (39) in an effort to overcome the stigma attached to audio-

visual materials. The approach taken is the more remarkable considering the period and the context of academic library administration when it was made. Considerable emphasis was placed upon the content of media materials and the communicative value of all media considered as an infrastructure system:

The collections and the facilities for their immediate use should be associated as closely as possible with the related book collections. We should not permit an isolated audiovisual library to arise within the library or anywhere else, unless unavoidable circumstances such as the nature of a library building, dictate a separate arrangement.

The implications of media developments including films has been conceptualized by Kent (40). It appears that the film, both 16mm and 8mm, are still significant elements in the communication process (41) and that the systems approach to film and media utilization remains a basic problem (42). It may be that 8mm film collections in the local library will help to overcome the distribution problem by providing immediate availability of a large film collection in even the small library. In any event the 8mm cartridge has been called the paperback of the film industry.

Public library film librarians formed a new association in 1967 (43). A number of public librarians had been dissatisfied with the Educational Film Library Association as well as with the Audiovisual Committee of the American Library Association. The emphasis of the new association, the Film Library Information Council (FLIC), are reflected in its publication *Film Library Quarterly*. It is to be hoped that FLIC will help librarians develop integrated services (44) and the kind of collections which Forsdale (45) has envisioned:

This is the nutshell dream about 8mm in libraries: a film collection in every library; films shown on equipment which can be used as easily as a phonograph. The day is probably near when people who have never seen a film projector can drop into a library, choose from a stock of dozens (or hundreds) of films and see a picture of their own, after a minute of instruction in use of the machine.

Film Evaluation and Program Development

Audiovisual materials in general use today include those experiences and devices used in communication which employ sight and sound. These experiences and devices include two large categories: nonprojected and projected materials. Materials and equipment in each of these two categories may be used separately or in combinations. When used in combinations, film and/or television are the most appropriate media of communication.

Nonprojected materials include flat pictures, charts, graphs, objects, specimens, models, maps, globes, or bulletin boards used as illustrative materials; and field trips, dramas, plays, and exhibits used as activities.

Projected materials include slides, filmstrips, recordings, tapes, transparencies,

opaque materials, motion pictures, radio, television, and related projection equipment.

The reasons for this dichotomy between projected and nonprojected materials exist in the historical antecedents of the library and media specializations. Librarians have cautiously admitted visual material into the library collection simply as illustrative matter subordinate to the printed knowledge stored in books. On the other hand, media specialists, not hampered by tradition, approach knowledge as something to be communicated. To meet the purposes of media specialists, all audiovisuals, projected or nonprojected, are used singly or in combinations as dynamic components in the communications process.

In library terminology the nonprojected materials of the media profession are known as nonbook materials. Nonbook materials include flat pictures, charts, graphs, objects, specimens, models, maps, globes, music scores, and to some extent microfilm. The only projected audiovisual material which has been used by libraries in general is the 16mm film and in more recent years the 8mm film. Consequently, filmic materials almost exclusively constitute the basis of materials upon which evaluative criteria and program designs have been developed by librarians.

Both silent and sound films make a positive contribution to communication and instruction. The silent film may be less effective for immediate recall than the illustrated lecture, reading, or storytelling, or than a film with oral commentary. In fact, retention from silent films is about 80% of that from sound films. Combined auditory and visual impressions, as in the sound film, are more effective than other devices. Films have the advantages of animation, depth, realism, and often color. Some librarians feel that films focus the attention of a group even better than reading materials.

The fact that the film proceeds at its own pace, without possibility of control by the librarian, may at first appear to be a disadvantage. A film presentation does not lend itself to spontaneous group discussion, nor to immediate review of salient points, or to audience participation, unless specific plans have been made for that purpose. This fact may be recognized in film programing, but Phinney's counsel (46) does not appear to have had much effect on the evaluation and abstracting of films (47). Some day a greater realization may develop of the peculiar contribution of sound films in helping to bridge the gap between the spoken word and its symbol.

Action always wins out over words in the battle for attention. Action has a deep and powerful hold on the unconscious. Words support action by clarifying and completing its meaning. Words, however, are mere noise unless they are used to express the idea already being formed in the audience's mind. Meaningful action rivets attention. It creates tensions and dilemmas in the audience who individually and inwardly ask questions. Narration should help to answer these unspoken questions. Questions and answers lead to an idea which gradually takes shape in the minds of people in the audience. The idea struggles for completion. Narration supplies words to help in the crystallization which for the audience is recognition and fulfillment (48).

At first movie makers suffered from the absence of an audience. They treated each scene exactly as a play would be done in a theater, i.e., for a fixed audience. But Griffith introduced and developed the idea of a mobile, omnipresent audience, and film making became a carefully constructed succession of shots. Each shot is charged with meaning and rivets attention. This shifting viewpoint involves the audience in constant activity and thus rapidly enlists emotion. Brilliantly designed crises receive satisfying resolution only when the audience has been involved in the inner turmoil.

The audience is involved in a constant activity of thinking and feeling. While words can say only one thing at a time, pictures can say and imply. Words and detailed pictures help to compound the implication. Sounds (dialog, music, effects) help to extend implications through selection. Sound effects can be inclusive or selective. Music helps to underscore some element or inject meaning not present in the action or words. It can comment, satirize, deplore, encourage, foreshadow, or remind. Thus implication can be added to implication by selection and volume.

The film evaluation and selection process has generally been taken seriously at least as far back as the time when Stevenson (49) published her "manifesto" on the subject. Film evaluations are featured, for example, in the reviewing medium *ALA Booklist* (50), and the criteria for such evaluations have been listed (51). UNESCO has helped to standardize evaluative criteria throughout the world (52). *Films for Libraries* (53) is a standard and basic list of evaluated and selected films which has gone through several editions. From 1936 to 1962 the *Educational Film Guide* (5) served as a basic bibliography of films and was only superceded by the *Educational Media Index* (54) and the current NICE M mediographies (25).

Films, like any other media materials, are means for establishing communicative contact with patrons. Films are employed for their value in satisfying informational and educational needs. Phinney (46) has succinctly emphasized the value of problem orientation for the use of any materials in a library or information center. Librarians already have many competencies which can be employed in film utilization such as selection, evaluation, content analysis, and guidance research: "We must not let our enthusiasm for an exciting new venture, nor the importuning of the eager patron, make us forget that training which can be applied to films as well as books" (49).

Film evaluation and selection as well as increasing film literacy among librarians has been promoted by *Films for Libraries* (53), an annotated basic list of recommended titles which has appeared at intervals since 1955. The first paragraph of its preface gives an overview of film utilization in libraries:

During World War II, the demand for and use of 16mm films came into prominence. Before the war the general interest films numbered only 500 titles, in contrast to 25,000 films produced the first seven years after the war. Today almost 4,000,000 feet of new film per year are made available to the 16mm user. In 1947 only twelve public libraries in the United States maintained film collections. Today 66 public libraries have their own collections and 137 are members of cooperative film circuits. In March, 1954, the public libraries in the United States reported the circulation of 54,689 16mm films shown to 3,840,482 people.

There is a certain danger in treating films in libraries as distinct from audiovisual and media service. Goldstein (55) has called this the librarian's obsession with film which may have been a factor in the slow development of library media services. Although relatively expensive, a wide range of films can be readily purchased which tends to blind the average librarian to his responsibility for the creation and local production of materials (56). To an extent, a lack of commitment to films and other audiovisual utilization may result from an overemphasis of logical and literary composition in western culture (57).

The criteria for the evaluation of filmic materials has received considerable attention from librarians, more so than any other aspect of film development in libraries. This is not surprising when one realizes that selection principles for librarians include consideration not only of the materials themselves, but also of the policies for indexing and for use by groups and organizations. Neither the indexing nor the group use of films has been satisfactorily resolved and this may account in part for the heavy emphasis upon selection criteria. The indexing of film and other media materials is most in need of professional attention even though standards do exist (58,59) which, however, are largely book oriented. Little "subject" analysis of films, even on an elementary level, has appeared similar to Pryluck (60) and Snow (61).

In the minds of many librarians, the form of the film has worked to its disadvantage. Because of its physical form, the film and other audiovisual materials, for that matter, have been reduced to second-class book materials (62). As much as the previous generation of library leaders inveighed against this practice, it has only been recently that any change was possible (35). The current approach to the evaluation of films has been succinctly stated by Holloway (63).

The following criteria are used as guides: the importance of the content of the film to the library's objectives and the effectiveness of its presentation; the superiority of the film medium in the particular case under consideration over other media of communication; the type of group for which it is adapted; and easy, inexpensive availability of the film from other sources. More explicitly, the film content must be valid, true to fact, true to life, true to text (if based on writing). It should contain no half truths nor generalizations. Subject matter should be of lasting value or timely importances. It should be presented in a manner suited to its content, with no condescension, no loaded words, avoiding cheapness, preachiness and coy humor. The film is an art form and should be judged for its style, imagination, originality and other aesthetic qualities in much the same manner as books.

Quite early in the use of films in libraries, film materials were recognized as one of the important new languages of our time. While advocating film literacy on the one hand, Starr (64) has argued for flexible evaluative criteria and pointed out that films are original materials in their own right and not mere appendages to books. Indeed films are substantially different from books. Schindel (65), for example, stresses the fact that a film deteriorates in quality and changes character when viewed by a single individual. Because films and books are often evaluated together

and because the content of one is frequently presented in the other, e.g., the film version of a book, the following guidelines may serve as examples of evaluative criteria for cross-media analysis:

Character:

How has the leading character been changed? For example, has he been made more likeable, handsomer, younger, wealthier, more forceful, more unequivocal?

Have minor characters been eliminated, added, or substantially altered?

Have relationships between characters been changed? For example, has a mistress in a book or play become a "friend" in the television adaption?

Have other identifying characteristics been altered? For example, have specific religious, ethnic, or political affiliations been eliminated? Has a Communist become simply a "radical?"

Setting:

Has the place of the events been changed? Has Cuba become "a small Latin-American country?" Has Mississippi become "somewhere in the South?" Have the settings been made more luxurious or more poverty stricken? Have scenes been added or omitted? Have incidents been added or omitted? Have action sequences been expanded or compressed? Has a descriptive passage been transformed into visual images? Have symbolic images been visually communicated?

Language:

Has profanity or obscenity been removed? Have simpler or more explicit explanations been used? Has dialog been transferred from one character to another? Has a descriptive passage been transformed into dialog?

Conflicts:

Has a single goal been substituted for the complex ends sought in the original? Have complex motivations and solutions been reduced to single lines of action?

Theme:

Have the philosophic or ideological bases for the action been removed? For example, has a man's political passion been replaced with a romantic one? Has the original theme been eliminated or altered? Has the theme been made more explicit? Has virtue been made to triumph and sin been punished? Have transgressions against contemporary values been rectified?

In addition to a certain preoccupation over the film evaluation and selection process, some librarians are concerned with effective utilization (66). Advisory as well as previewing services are available for the program chairmen of organizations, and workshops are sponsored on effective film utilization. Frequently there is no other department of the typical library which keeps as close contact with patrons, both initially and follow-up, as does the film lending service. Perhaps because films are expensive to purchase, it is often the film librarian who is one of the first on the staff to survey community resources and make available a union list of locally owned films.

During the two decades after midcentury, several librarians in various libraries started conducting film programs and giving advice on film use to program planners in the community. The media therapeutic use of films and other audiovisual materials has been recognized but almost in passing. It has not been dealt with extensively in the literature (67). However, based upon considerable audience research of the rule-of-thumb analysis which is conducted in many libraries, a number of reasons have been identified for the slow growth in community use of films:

People often have difficulty in *selecting* films most useful for their individual purpose.

People often have difficulty in *obtaining* films and film projectors.

People often have difficulty in *using* films effectively in their group programs.

A film information center in a community serves as a clearinghouse for information about films. It is logically located in the library because there it is available to all groups. The center should, of course, include all audiovisual information which has meaning for the people who may wish to use its services. It should include film evaluations, information about equipment, sources of aids, sources of films and equipment in the community, a list of equipment and films owned by groups and individuals, a list of projectionists available, a list of groups using films, and a list of available discussion leaders.

This vertical file serves the library and the community. In preparing it for use, the librarian learns about the audiovisual field as a whole and discovers the resources available. Such a service is usually the first elementary step in developing audiovisual services. It is a step that all libraries should take whether or not the library owns films or plans active participation in a film program. A comparison of the 1960 ASD guide (68) with the 1967 version (69) indicates that in the minds of at least some librarians the trend in use is toward audiovisual materials of all types. Points to consider in developing a film information center may include the following:

Information about audiovisual aids and equipment; sources, descriptions, prices, evaluations. This includes ability to operate the equipment and how to assist groups in selecting films and in planning programs.

How to plan program: physical arrangements, development of topics, selection of films, discussion needs, relation of books and other materials to the program.

How to publicize the service: through radio, newspaper, and television and through direct approach to groups and individuals most interested in the program.

How to plan for the service the library expects to give: shall the library own films? books films for groups? own equipment? lend equipment? buy filmstrips? plan programs completely? assist groups in planning?

How much the library assists groups will depend partially on the extent of its film resources. Even if the library does not have films of its own, plans can be made to help groups book them from other sources. Sources, as well as film titles and their suitability for the group, will be required information. Before offering this

service extensively, the staff should build up a knowledge of available resources and especially the dynamics of community life (70).

When used appropriately, audiovisuals can assist and strengthen the total service program of the library, providing enhanced communication and creative opportunities for patrons and staff. An integrated library-media system can effectively deploy public funds in order to produce and distribute superior programs. Films in libraries have in general been made to bear a heavy burden, but a new era appears to be at hand as librarians begin to work together with and through the social communication systems:

Through workshops and training courses in which the characteristics of audiovisuals and their role in communication are studied.

Through developing institutional policies that make the maximum effective use of all media, including television, for public communication. There is a need to examine the value of film libraries, adult discussion activities, and relationships to television.

In cooperation with other groups, specific projects can be initiated to cope with a community problem.

Through frequent consultation and contact with officials of broadcasting stations, efforts can be made to coordinate the deployment and use of all media of communication.

In the literature of film utilization there is some emphasis on the use of films in adult education. In addition to recognizing the film viewing experience as a group experience, a number of librarians insist that film showings should be introduced and followed by discussion encounters (71). Regardless of whether this practice may be of dubious psychological value, apparently it has some benefit for librarians who, in order to give film advisory service, must have some experience in leading film discussions. Such a practice may be defensible where participant fears raised in viewing filmed sequences of human deviations have to be allayed by a psychiatric resource person. In any event, the purpose for film programing in libraries appears to be to present films which raise questions rather than answering them (72).

Film as well as other media utilization presupposes an audience assembled in one place at one time. Of course, this does not entirely rule out the one-person audience, but such a situation is not as frequent nor does it serve the primary purpose of film transmission. Consequently group methods are mandatory, and add a dimension to library service that may be a worthwhile counterbalance to the overindividualization of reading. The lack of appreciation of group dynamics in the profession (73) is probably one of the most basic reasons why film and other audiovisual services are not more widespread in library and information science. Even where outreach programs (74) are developed, the emphasis is upon lists of films which can be screened for immediate success.

Community utilization of films has long been a concern of various community agencies and organizations. Ever since the Bryan project (9) for the Office for War Information, considerable emphasis has been placed on the public library role

as a coordinating structure in the community. Even though later studies (27,75,76) have substantiated this role, public librarians in general have proceeded cautiously. A serious question remains as to whether film collections on the library premises are actually as useful as immediate access to large central collections with rapid distribution.

The programmatic aspects of film utilization have had an uneven development in library service. Apparently there are as many failures as there are successes in film programming (77,78). But from a communications viewpoint this is to be expected when discrete program segments are scheduled and a study of behavioral outcomes is studiously avoided by the profession (79). Of course it is difficult to evaluate such procedures, and it is remarkable that as many film programs turn out as well as they do. There are, however, some notable exceptions where the audiovisual department has been in existence for many years and where it has been integrated with total library service (80).

Films are not in opposition to books. They serve different purposes and can be used together. The amount and kind of service varies with library and institution. Schools make much use of films, and school libraries are becoming distribution centers for audiovisual materials. Most large- and medium-sized public libraries provide film service. Universities use films in teaching but only a few university libraries serve as distribution centers. There are all kinds of ideas on publicity in audiovisual literature. But the greatest contribution librarians can make to the community regardless of mass media publicity is to locate the groups interested in film programming and work directly with their needs. As they discover how the librarians can assist them in clearing away obstacles to their programs, the library's service will grow. Sources, as well as film titles and their suitability for the group, will be required. Before offering this service extensively, the staff should build up a knowledge of available films.

Too many film programs have produced disastrous results because the film was used as a lure—an end in itself. The 16mm film is usually slower in action than the theatrical 35mm entertainment film, and is produced at a minimum price in comparison with Hollywood costs. Therefore the glamour, the characteristic style of acting, and the expensive settings are missing. Instead we find in the 16mm film much that is down-to-earth, informational, and valuable. The library staff can help users of 16mm films understand their contribution to the educational world, so that those who see the films will approach a showing with keen anticipation and will not be disappointed.

Professions other than library and information science have used films and other media materials extensively. Because of this broad perspective on audiovisual materials of all types, and particularly because of their concern for both content and context, these other professions have developed evaluative criteria (81). But these criteria are more context oriented than the content evaluative criteria of library science. As a result, the context evaluative criteria have greater significance for program development and index cue formation.

Further evidence of a need for a systems approach to media materials is a lack of audiovisual materials in the local history collection. Although oral history has

received some attention in recent years, few librarians use sight and sound extensively to record the events of community life (82). There is little evidence that local production facilities (56) are considered to be an integral function of audiovisual services in any but school libraries. Even where local history and total media librarianship (83) is promoted, it appears that the publicity value of media far outdistances the systematic approach to communicative activity.

A film society is another possible format to consider in film programing. The purpose of a film society is to help people experience films rather than to promote passive attendance at a film showing (84). Since the audience constitutes the film society, there is a sense of participation which is similar to what must have been experienced in Franklin's Junta. The more homogeneous the membership the greater likelihood that film viewing will be successful. Involvement is also heightened when as many members as possible participate in the selection of films for programing (85). Occasional film festivals (86) serve a useful function of attracting new film enthusiasts.

The current picture of film programing and utilization in public libraries has not moved much further than the recommendations of the 1925 report (3) to the American Library Association. There is still considerable emphasis upon films in public relations and especially in the promotion of new releases through press releases and previewing sessions (87). Film festivals and program planning institutes for the program chairmen of organizations hopefully lead to better cooperative relations with business, industry, and other agencies (88).

Despite the current picture of film programing, at least in public libraries, there are one or two indications that the film may yet become a catalytic force in the revolutionary transformation of library collections (89). The old style of library programing with its heavy emphasis on promotion may yet give way to something resembling the community development enterprise (79). In two instances (90,91), community problems have been identified in developmental planning before the neighborhoods have been involved in the production and programing of filmic analyses of the problem encounters of community life.

Even though the general trend is away from the one-shot use of single types of materials and equipment, public librarians have a long way to go to meet the objectives set by Rufsvold (18) for school librarians. One can only speculate as to whether public librarians will ever reorient themselves to such a systems approach to media integration as indicated in the following (92):

The beginning of a real revolution in the use of instructional technology, A-V materials and other teaching tools is evident. This trend is due to recognition of the fact that instructional materials and equipment are not used with optimum effectiveness when they are employed simply as aids. Rather, they must be involved as integral parts of total instructional plans.

However, if community development experimentation continues and expands into a movement, public library media programing may yet become socially significant. Like other professions, librarians have been challenged by a new set of imperatives which require an enhanced awareness of the interdependence of media

in maximizing communication. A more perceptual approach to an understanding of communication, which neither linear logic or the stimulus response of books can supply, is possible when librarians become involved with the community development enterprise. The following points are but a reminder of significant areas of concern in media programing:

Analyze your library agency in order to understand why it is interested in certain publics. Of particular significance are those resources available from other social, educational, and communications agencies. No single other agency in the community is in as favorable a position as the library to discharge the responsibilities of a coordinating structure.

A library study is also, to an extent, an analysis of the library's image. For example, the book may predominate in *this* library in all its stuffy splendor, or the librarians in *that* library may be oriented towards a more open-ended learning experience for all people. In the latter instance, media will predominate, including a wide range of materials and equipment.

Analyze your publics, in the plural, because the community (whether public, academic, or special) is not one amorphous mass. It is composed of individuals who have many characteristics in common with others. These common characteristics become the "subject heading" under which librarians can analyze their publics and group them into categories so as to beam messages to them with specialized content that can be expected to catch and hold their awareness.

Analyze your resources in order to determine whether the materials available are pertinent to the interests and abilities of the publics to be reached. Audio-visual and printed materials, as well as persons with special capabilities are available and could be given wider exposure. When resource persons are identified, they can be made available to others through one of the library's reference tools known as a community resource file. Another reference tool, the community calendar, identifies the programs and other organized activities of groups, and lists them for wide perusal.

Campaign planning is a method used by libraries to focus attention upon a particular public to be reached. Just to program without reference to a target group is to disperse efforts and to scatter effectiveness in a wasteful misuse of resource potential. When media are orchestrated around an issue, it becomes easier to precipitate an ever-widening involvement of people in the community in studying the need for change and in making it difficult for people to avoid thinking about the specific issue at hand.

Summary and Conclusions

Considering the historical recency of the technological inventions supporting film communication, film use in libraries has had a long development. Various methods have been employed to exploit the communicative effectiveness of films. At last there is a growing awareness among librarians that all types of audiovisual materials, not films alone, have to be considered in an integrated system if *communicative* activity is to be engendered in patrons.

It may seem curious to the reader of this article on film utilization in libraries to find that the general conclusion reached is that a consideration of films only in

libraries is beginning to lose emphasis in favor of employing all types of media materials is a communicative system. However, this conclusion seems to be inescapable when one considers the general trends which are becoming increasingly evident in the literature:

FROM cooperative and federated film circuits, TO consolidated and centralized collections of film.

FROM consolidated and centralized film collections only, TO widespread and large local collections of 8mm, the paperback of film.

FROM the film as only an illustrative adjunct to books, TO all media materials as the primary method of communicative involvement.

FROM an emphasis upon film literacy and culture alone, TO an appreciation of the surprise value of data from any source.

FROM the acquisition of commercial producers products exclusively, TO programs of local production of materials in order to meet specific needs.

FROM librarian initiated and planned programs, TO a greater involvement of the participants (receivers) in the processes of communication.

FROM one-shot and discrete programs such as festivals, showings, and clinics, TO the development of sequential communications systems.

FROM the reference retrieval interrogation of patrons, TO the creation and production of all types of audiovisual materials in therapeutic counseling experiences.

FROM evaluative criteria based on the formal composition of traditional rhetoric, TO criteria based on the juxtaposition of sight and sound as well as audiovisual literacy.

FROM indexing and classification based on subject analysis, TO the development of media cues based on content and context analysis.

Librarians have the conviction that the good life will come about to a considerable extent through an active involvement in reading, viewing, and listening experiences. The media, especially audiovisuals, make it possible for librarians to use all knowledge and the abilities of librarianship to best advantage. From the librarian's point of view, the media can focus widespread attention upon concerns and interests and thus make it difficult for anyone living in a community to ignore issues which, if solved, would lead to a better way of life. The film is not a particularly new method of communication, but the filmic system combines in the communication process all the elements and professional capabilities with which librarians are familiar and which many of them use frequently:

Knowledge of community is often called community development adult education. Studying the community helps to identify issues, programs, and resources. It becomes for the librarian a major educational method whereby people are involved in studying the need for change before actually making changes.

Knowledge of materials, whether books, recordings, or films, is a strength which stands the librarian in good stead when he comes to program and to realize how voracious the mass media are for program materials. Certainly any collection of materials called upon to support media services will have to be adequate, because if one title is so much as mentioned in the mass media, it will cause an acute "run on the market."

Product evaluation is necessary for the successful selection and use of a considerable range of media and equipment. Despite the "consumer reports" approach and in order to make specifications for any one piece of equipment, it is important to identify reasons for, and the place of all audiovisuals and all media equipment in the library.

Knowledge of methods of communication is basic to the effective utilization of media and materials. Since the mass media attract audiences, audience participation must be organized in some way. Librarians giving program planning services utilize not only materials selection skills, but also their abilities in speaking, paneling, and discussion.

Subject analysis which precedes any consideration of classification is being supplemented by the concept of cross-media indexing based on content and context analysis for a file of references where all the variant materials on one topic, or indeed subject, are arranged in the same file.

Systems analysis makes it possible for librarians and others to understand the relation of the media materials and equipment to the purposes, policies, and procedures of a particular library system, as well as to the concerns of individuals, groups, and communities.

When one examines the objectives and functions of the library in relation to community expectations for film programming, it is difficult to find another agency with such a broad potential for serving as a coordinating structure in the community. The library is the most broadly based of the agencies in a community, and indeed, of the other informational and educational agencies. The library is supported by the entire community and works to involve all citizens in the use of its resources and services. Certainly the library discharges its responsibility to best advantage when it is in the forefront of community development, promoting mass media for educational purposes.

Of its nature, the library is a switching center for information transfer, a function which previously was called a clearinghouse service, and included such basic reference tools as a community resource file and a community calendar. On a very basic level the library makes its services available to the media of communication. This includes off-premises use of audiovisual materials and reference services. The library has the indexes and catalogs necessary for the location of materials and obtains, for example, films, kinescopes, and videotapes for showing by television stations. Indeed, the library may sponsor educational and documentary films which have been cleared for television.

With media, especially film, it is possible to cover program content with greater compression than in the usual lecture method and expose individuals to a wide range of communicative and instructional stimuli. A great deal of traditional program time is consumed in describing examples and in relating experiences and applications. Perception in individuals can be triggered more economically of time and with greater individual appreciation using one or more audiovisuals in compacted sequence which are integrated into a communications-complete and verbal-iconic context.

The difference between traditional programming and the integrated media approach may, in part, be a matter of degree. But there are also significant differences

of kind. The integrated media program is a component in a system of communication where the individual and his learning are the center of attention rather than the librarian and his programing. Opportunities for individual participation and feedback are deliberately increased and made possible, in part, by the more purposeful and economical use of program time.

The concept of programing is fundamental to the development of a media integrated communications enterprise. Materials, iconic or verbal, are neither a supplement to content nor a crutch for communicative methods. Responsibility for program content remains with the librarian who may be either an individual or part of a team. Once content has been determined and worked into logical instructional units, then the materials are marshaled for communication effectiveness. Some content is better presented in oral-print patterns, some in visuals, some in audio materials.

Once the learnings, the attitudes, and skills have been specified for any program, a learning atmosphere can be created utilizing a wide range of communicative techniques. Large media integrated programs may be supplemented by small learning groups, individual counseling, self-instructional sequences, and resource center research. Materials are programed into short sequences. Film clips, a few slides, a scene from a television program on the previous evening, a single transparency or two, for example, are much more effective when introduced at the pertinent psychological moment. This "teachable" moment may occur at the beginning, middle, or end of a presentation. But it seems to occur best when individuals are challenged or "provoked" into thinking.

The requirements of communication call for the immediate availability, for use singly or in combination, of the full range of communication resources. Conceptual interlock is at the core of the librarian-individual-resource relationship. Instructed in the use of one piece of media equipment, one reserve book, or in one library service routine, subsequent utilization of that equipment, book, or routine will, in turn, give further and related instruction. In this manner the individual is introduced to the process of search and discovery of knowledge in available learning resources.

Library and information science has for many years been concerned with the film as a literary, cultured, and sometimes communicative medium. It appears that the profession may now be ready to relate its experiences with film to other audiovisuals in order to provide individuals, groups, and communities with integrated resources which can support interactive environments programed for communicative activity. In any event, the challenge is evident and librarians can scarcely ignore any longer the imperative for a systems approach to media.

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PATRICK R. PENLAND

THE FILSON CLUB

The role of the private historical society in the United States has been fundamental for local, regional, and national historical scholarship. The model of the American Antiquarian Society and of other similar private historical groups in New England and the middle states has been successfully followed in the Ohio Valley since the American Civil War. The Philosophical and Historical Society of Ohio (Cincinnati), the Missouri Historical Society (St. Louis), and the Filson Club (Louisville) are outstanding examples.

The Filson Club was founded on May 15, 1884, by Colonel Reuben T. Durrett and nine other gentlemen whose names are all well known outside of the borders of the Commonwealth: Richard H. Collins, William Chenault, John Mason Brown, Basil W. Duke, George M. Davie, James S. Pirtle, Thomas W. Bullitt, Alexander P. Humphrey, and Thomas Speed. The club was named for John Filson (1747-1788), author of *The Discovery, Purchase and Settlement of Kentucke* (Wilmington, Delaware, 1784), one of the most sought-after pieces of Americana, particularly when the original map is present. There were subsequent English, French, and German editions of the book, an indication of its transcendent influence on the settlement of the West.

For over 30 years the club met at Colonel Durrett's residence. There was a paper or a lecture, a tradition followed to the present day, and a social hour with crab-apple cider and "Filson Club" cigars supplied by a member of the club. When Colonel Durrett died at the age of eighty-nine on September 16, 1913, his executors could

not distinguish between the manuscripts in his own library collection and those which were the property of the Filson Club. With a few exceptions, the entire collection was sold to the University of Chicago Library. The Durrett Collection remains a crown jewel on the Midway, and it has been given vastly better care and cataloging than ever would have been the case in Kentucky up to 1929, when the Filson Club moved into its present home at 118 West Breckinridge Street. Still, it was an irreparable loss and one that could have been avoided by a little vision on the part of leading Kentuckians of the day.

Not long after Colonel Durrett's death the late Rogers Clark Ballard Thruston visited his home and learned of the sale. He retrieved many portraits, pictures, relics, and other items that did not go to Chicago (due to the oversight of the librarians of the period who did not recognize the value of iconographic materials as historical sources). He housed them in his own office at Fourth and Main in Louisville until the middle of June 1929 when the Filson Club occupied its new home. Mr. Thruston provided an endowment of \$100,000 in all, and other Kentuckians have supported the club consistently until it is now on a solid financial base.

Colonel Durrett and Mr. Thruston provided the early leadership and gave impetus to the club's progress. Much of the club's later history is the biography of personalities who were its officers and administrators. Above all there was the contribution of the late Otto A. Rothert (d. March 28, 1956), for many years the secretary and also benefactor of the club (donor of 926 books and pamphlets, admirably supplementing Mr. Thruston's gift of 5,467 books and pamphlets). Miss Ludie J. Kinkead, Miss Evelyn R. Dale, Mrs. Dorothy Thomas Cullen, Miss Mabel Clare Weaks, and particularly Mr. Richard H. Hill, secretary since 1947, have all contributed materially to the growth of collections, their availability to scholars, the prestige of the club as a focal point for historical scholarship in the Ohio Valley, and the club's financial stability.

The club's significance is threefold: (1) above all, its collections are a priceless resource for students of both regional and national history; (2) its own publications have a solid place in the bibliography of American history; and (3) as much as any other American historical society, it has provided a stimulus for historical scholarship and popular interest in history within its community.

The collections beggar description. Although the manuscripts that went to Chicago are unique (but always available to qualified scholars on film), it is likely that the printed books and pamphlets in the Filson Club today duplicate nearly everything in the Durrett Collection and hold much more besides. There is a well-nigh complete collection of Kentucky county histories and atlases, very extensive genealogical material (invaluable for local history as well as for "headhunters"), early newspapers of the period before the Civil War, and portraits, prints, drawings, and maps unrivalled by any other collection of Kentuckiana. The manuscript collections include the papers of many prominent Kentuckians, both donations and purchases (many from the Historical Acquisition Fund established in 1935 by Mr. Thruston). The club owns manuscripts written by Joseph Hamilton Daviess (or Daveiss—he spelled it both ways), Cassius M. Clay (abolitionist, not prize fighter), Charles Stewart

Todd, James Taylor of Newport, John Wesley Hunt, John and Alexander Jeffrey, Robert Breckinridge McAfee, George Bibb and his family, John C. Breckinridge, Thomas F. Marshall and his family, Colonel Durrett, John Fitch, James Lane Allen, and Elizabeth Madox Roberts.

It cannot be too strongly emphasized that the Filson Club's collections are national in importance. The settlement of Kentucky by Virginians, North Carolinians, and Pennsylvanians has necessitated the acquisition of much basic source material relating to those states. Similarly, the role of Kentucky as the funnel for settlers in the Midwest and Far-West has been the reason for the acquisition of extensive material relating to Ohio, Indiana, Illinois, Missouri, and other states beyond the Ohio and Mississippi Rivers.

The Filson Club is open to the public and its resources may be used by all qualified scholars.

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FINANCIAL LIBRARIES AND COLLECTIONS

Financial libraries as defined in this article are those special libraries in the investment and securities industry that are primarily concerned with corporate financial information. However, the broader disciplines of commerce and industry, economics, politics, labor, etc. are interrelated, and information on these subjects also forms an integral part of the resources of the financial library. The securities industry is highly competitive, and the only way of achieving long-term success is to follow not only the stock markets and the financial activity of corporations

and industries, but also national and international economic and political conditions and all other forces that affect the securities markets. Information is the vital element in this undertaking.

Securities are the instruments of ownership or debt issued by publicly owned corporations, and the best known examples are stocks and bonds. They are bought and sold by individuals and institutions in the hope of capital appreciation and/or income. Governments at all levels issue debt securities as one means of financing their activities, and these securities are generally called "government" and "municipals." Securities are underwritten and traded by investment banking and brokerage firms.

When a broker acts as an agent, he buys and sells securities for clients and charges a commission for his service. When he acts as a dealer or principal, he buys and sells from an inventory of securities and makes a profit from a price mark-up. An investment banker purchases an entire issue of new securities from the issuing company and arranges to sell the securities to investors. Some houses perform one or both functions, and in addition often provide investment counseling or advisory services as well.

It is beyond the scope of this article to attempt to describe in any more detail the structure and operation of a brokerage house or an investment banking firm, but it is useful to know that most houses employ security analysts who spend the greater part of their time studying companies and industries. These analysts are in great measure dependent upon the library's services.

During the boom years of the 1960s when the number of individual shareholders in the United States rose from 12,490,000 in 1959 to 30,850,000 during early 1970 (1), an increasing number of securities dealers found it advantageous to establish libraries or improve existing ones as a central source for current and accurate information. At that time many firms upgraded the caliber of staff working in their libraries, often moving from a part-time file clerk to one or two full-time professional librarians with the assistance of several clerks. These libraries often evolved from what in many cases was a series of fragmented collections kept in individual offices. Centralizing collections of corporate materials, periodicals, books, and services, and assuming responsibility for acquiring them, often eliminated duplication of materials and effort, speeded the flow of information, saved money, and made the library a useful and essential part of the firm's operation.

Until the early 1900s financial information of any type was most difficult to obtain, if indeed it was obtainable. However, the real beginning of corporate information for the securities industry might well be traced to the Securities Acts of 1933 and 1934. These acts were designed to require underwriters to disclose all information to customers, and it granted the Securities and Exchange Commission powers to obligate underwriters to maintain certain forms and procedures in the writing of offerings literature and to register issues at that time with the Federal Trade Commission before being sold to the public (2). From this point in time information concerning business activities was an important part of the investment banking scene.

The birth of financial publishing began in 1860 with Henry V. Poor's *History of the Railroads and the Canals of the United States*, known later as *Poor's Manual*. There followed *Poor's Directory of American Officials* in 1886, and *Poor's Handbook of Investment Services* in 1890. Poor's manuals were merged with Standard Statistics to become Standard & Poor's Corporation, presently a subsidiary of McGraw-Hill, Inc. Standard & Poor's is the world's largest publisher of financial information. Another financial publisher is Moody's Investors Service, Inc. which was originally started in 1900 by John Moody. Moody's manuals are published in five volumes annually and updated periodically. The five volumes are broken down in the following categories: Industrials, public utilities, transportation, banks and financial institutions, and municipals and government issues. Today Moody's Investment Services is a subsidiary of Dun & Bradstreet. Dun & Bradstreet, established in 1841, is a publisher of business statistics geared mainly to credit information.

Financial libraries were developed because they offered a necessary service to investment firms. Prior to 1900 there were a few financial libraries in the securities industry, but by 1910 there were approximately sixteen established libraries. One of the earliest of these was established by Lee, Higginson and Company. Some of these early libraries were to be the foundation of a number of university collections of corporate finance. For example, Harvey Fisk & Sons' library became the Pliny Fisk Statistical Library at Princeton; the Investor's Agency's library became the Marvyn Scudder Collection at Columbia University (3). Standard & Poor's library, established in 1917, was one of the early financial libraries. It began, as most typical financial libraries do, as a one man operation. Today it is the largest library of corporate financial information in the United States. In 1941 Merrill Lynch, Pierce, Fenner, and Smith, one of the investment banking giants, established a research library that is today the largest of the brokerage libraries. The institutions most closely concerned with the securities industry, namely, the Securities and Exchange Commission, the New York Stock Exchange, and the American Stock Exchange, have libraries. These libraries are designed primarily for the particular institution but will upon occasion allow their resources to be used by its members, and by the public to some extent. Most financial libraries are located in or near the major money markets. It follows that the largest concentration of financial libraries would be in New York City and in particular in or near the Wall Street area. About 90% of all financial libraries are located here. The growth, both in size of library and in number of libraries, has followed the trends of the stock market. From 1959 to present the number of financial libraries has increased by 145%, corresponding roughly to the growth of the securities industry.

The library's first responsibility is to management; that is, to meet the needs of the organization that supports it. The staff that operates the library should be imbued with the philosophy that service is paramount and that every reasonable effort should be made to provide the document or information that may be required. It is not uncommon for firms in the securities industry to have a national and international branch system. Usually, there is only one central library which serves all

units, although certain larger branches may maintain less extensive collections. The main office library can therefore expect to serve all branches by means of telephone, private wire service, and mail.

Although it was mentioned earlier that security analysts are probably the group most dependent upon the financial library, demand may come from any segment of the company. Even the "back office" operations departments frequently need library service. Use of the library by the sales force can be related directly to profits. Since the library is a service function in a service industry, the better the quality of service the better the possibility of business. Clients frequently call upon their sales representatives for help, and correct information furnished can be an incentive to generate business. Experience has shown that it is better for the request to come from the salesman rather than directly from the client in most routine cases. However, important clients should have access to the library and good relations between company and clients can be enhanced in this manner.

Inevitably the library will sometimes be called upon to assist company executives with matters totally unrelated to finance. One might be asked to recommend a book on pottery or the best concordance to Shakespeare. This is a good place to point out that no matter how restricted the subject of a special library collection may be, there usually should be included some general reference materials such as encyclopedias, world almanacs, books of literary quotations, and biographical dictionaries.

The two avenues for disseminating information or reports to staff are by means of prearranged routing or by filling individual requests. In the former case the library maintains records showing each individual's subject interest and arranges for this material to be sent to him immediately upon receipt. In the latter case the library stands ready to provide information or reports as requested on an individual basis. Inevitably certain requests in financial libraries recur again and again. The demand for annual or interim reports of corporations is constant, and more concerning their use and acquisition will be discussed below.

Most financial libraries are prepared to furnish stock and bond prices, or quotations, for current dates and for past years. Where this kind of request is frequent, it behooves the library to have sources for obtaining daily, weekly, monthly, or yearly statistics as they may be required. The same is true for market averages or indexes as measures of the market, since they provide the analyst with a ready indicator of how the market performed at a given point in time.

Cooperation between one special library and another may be mutually beneficial. In fact, lending to or borrowing from a competitor may be necessary and useful as long as the information is not of a confidential nature. There are times when any library can discover that it needs a document which is not a part of the collection, so that cordial relations between libraries is an asset. It is also frequently possible to obtain research reports prepared by other houses for their own clients.

All special libraries reflect the needs and interests of the firm of which they are a part. In the case of investment libraries, corporate files are the most important

segment of the collection. The single most used item in the corporate files is probably the corporate annual report which publicly-owned companies send to their stockholders. The annual report with its balance sheet and income statement details the company's financial condition and earnings. It frequently describes the company and its products or services, and the more elaborate ones include pictures and graphs.

Any well-equipped securities library must be able to produce annual reports and interim reports on a wide variety of companies. The usual procedure for obtaining these reports is to be placed on a company's mailing list, but vigilance must be exercised to see that a steady flow of reports is maintained. Most libraries keep a card or other kind of index file of company material so that library users can determine which companies are included in the collection and when the reports are received or expected.

A collection of several years of annual and interim reports is invaluable in making an analysis of a company. The annual report is also frequently used as a sales aid by securities salesmen, and many libraries make efforts to have extra copies of current reports to be used for this purpose.

Corporate files and indexes to them are usually alphabetically arranged, but some librarians have experimented with arranging corporate files by broad industrial classifications to facilitate use by security analysts, who usually work within industrial categories.

Other papers usually found in the corporate files are briefly described below. Extremely high on the list of important documents in the financial collection is the *prospectus*, a circular which describes securities being offered for sale to the public. A prospectus is that portion of the registration statement that must be delivered by law to all potential purchasers of newly registered securities. It contains most of the information about the company and the offering that appears in the registration statement, which might affect an investment decision. Prospectuses are usually obtained from the investment banking house underwriting the issue.

At least once a year companies are required to hold an annual meeting for stockholders. In advance of the meeting, documents called *proxy statements* are sent to shareholders as a prerequisite to solicitation of proxies, listing and discussing all subjects to be put to a vote. Proxies are the means by which absent stockholders vote their shares. The proxy statement is important to the researcher because the matters to be voted on may significantly affect the company's prospects.

A *listing application* is a notice which must be filed with the department of stock list of a securities exchange when a corporation requests listing of its securities on the exchange. The data to be included are a comprehensive summary describing the company and a detailed description of the securities for which listing is being requested.

Finally, most corporate files contain general material describing the company and its products. This may take the form of press releases, clippings, catalogs, and studies produced internally and by other firms.

Retention policy for the "paper" collection varies with individual requirements.

In most cases a 10-year collection of annual reports is maintained plus several years of interim reports. A good policy is to have one copy of older reports but several copies of the current ones, depending on space and demand. If many extra copies of annual reports are to be kept, a separate collection of them to be freely used without any sign-out procedures may be practical. In the matter of prospectuses, it is advisable to keep at least one copy indefinitely since these documents have permanent historical and comparative value. All documents should be property-stamped and date-stamped as they are received.

Material borrowed from the files, except extra copies which may be in plentiful supply for distribution, should be signed for. For charging out material from these "paper" files, the simplest procedure very likely is to have the borrower record on a large card the material he is taking, and to insert the card in the files in place of the borrowed item. When the borrowed item is returned for refiling, the charge card is removed from the file, the transaction is completed, and the card is ready for reuse by the next borrower. In most cases there is no time limit or "due date" set unless it is known that a piece is in great demand; even then, if only one copy is in the collection, that one might be photocopied to satisfy subsequent requests.

Corporation files grow, and it is rare that a file can be discarded completely, while new files must frequently be made as new industries, new companies, and new interests arise. As the files grow, it becomes increasingly difficult to weed out a collection of thousands of folders. One method of control is to have a specific retention policy. For example, if 10 years of annual reports are kept, the filer will remove the oldest year when he files the newest, removing at the same time any extra copies of the previous year's report.

The librarian who is establishing a collection of corporate documents for the first time may wish to write to companies for their reports on a purely selective basis, or he may wish to acquire all New York Stock Exchange or American Stock Exchange listed companies, or he may choose the companies in the *Fortune* magazine's annual list of major companies, and he may then add companies as management expresses interest.

Firms heavily involved with underwriting activities may find it advantageous to have separate files of the issues in which they may be concerned as manager, co-manager, or participant. These files are variously referred to as "deal" files or "legal" files, and law requires that these records be maintained for specific lengths of time. The more important papers include the following.

Registration Statement. This is a document required to be filed with the Securities and Exchange Commission by the issuer of a public offering of securities. The Registration Statement is prepared on a prescribed form by the issuing company with the aid of its accountants, attorneys, and underwriters, setting forth current information on the company, its capitalization, its officers and directors, the purpose of the financing, the terms of the underwriting, financial statements, and a number of legal agreements.

Indenture. A legal contract prepared in connection with a bond issue describing the terms of the issue, such as maturity date and interest rate.

Blue Sky Memoranda. Papers signifying where the issue can be sold in the various states, most of which have their own securities laws to protect the public from fraud and unscrupulous practices.

Legal Investment Memoranda. Documents which indicate whether the security can be purchased by banks, insurance companies, and for trust funds.

Agreement Among Underwriters. The agreement between the manager of an underwriting and other underwriters who may join with him to form a syndicate when the size of an offering justifies several or many underwriting firms. The agreement incorporates the amount of participation of each underwriter, and grants authority to the manager to act on behalf of the purchase group in certain instances.

The demand for current information in these largely paper libraries is partially met by substantial periodical, serial, and newspaper holdings. Trade journals are essential in keeping the analyst informed of the status and trends in his industry, and the library will subscribe to the best available in each field of interest. Sensible practice requires that technical periodicals be routed to individuals according to the priority of their needs. The quantity and degree of depth of coverage the library would be expected to have depends on the intensity of research. There would be some periodical representation in all the major industries, such as banking, chemical, metals, paper, petroleum, transportation, and utilities.

The more general business and economic journals should be represented as interest, budget, and space dictate. A valuable source of current business news can be obtained from the country's leading banks, many of which publish newsletters, often obtainable free of charge. Chief among these are the periodic publications of the Federal Reserve banks. There need be no special loyalty to a periodical title. That is, if an industry should decline in interest, the librarian might very well consider canceling the subscription to periodicals in that field and discard holdings to make shelf space for more needed material.

As for length of runs, reference value as well as shelf space are major considerations. Longer holdings would be maintained of periodicals of more enduring value, while a period of 2 years or less might be sufficient for titles of lesser long-term interest. Whether to bind issues depends again on such factors as permanence of value and convenience of use. It is sometimes more economical to buy periodicals on microfilm than to bind hard copies.

Perhaps the best known daily newspaper devoted exclusively to business is the *Wall Street Journal*. The daily newspaper has obvious uses in any library; as a record of day to day business news it is unsurpassed. Traditionally, too, the daily newspaper has been the first place to look for stock and bond quotations, and long files are often kept as a convenient source of securities prices.

The function of the periodical index is to locate articles in periodicals or newspapers. A good collection of dependable indexes may obviate the necessity for clipping, which can be a time and space-consuming activity if not carefully controlled. The library will need indexes that will locate material on companies as well as on general and special subjects. Whether or not the library subscribes to

technical indexes and abstracts is an individual decision, but one good business periodical index and one major newspaper index are essential.

It is a good plan to have a separate set of files for general and special subjects which relate to the financial world. These files will be the place to house material on subjects pertinent to the company's interests, and they will probably cover a broad range. The backbone of the files may well be industry studies and analyses, but one would expect to find here information on the economy, foreign exchange, money, stock markets, the Securities and Exchange Commission, etc. These files might also be a convenient place to house some serials such as bank letters, government documents, pamphlets, and other ephemeral material. A simple and effective practice would be to use the same subject headings for both the book collection and the subject file collection. For example, the Harvard University Baker Library classification scheme and index would serve this function well (4). If a subject heading list is not available as a guide, a periodical index can be used successfully. It is a good plan to establish a card index to the subject files so that headings as they are established can be kept constant, and cross references can lead users from terms not chosen to those chosen.

The two major publishers of investment services are Moody's Investors Service, Inc. and Standard & Poor's Corporation. These are often the first place to look for basic information on company histories, income statements, description of outstanding securities, acquisitions, management changes, dividend payments, etc. The subscriber generally receives a basic volume which is kept current by means of frequent looseleaf supplements. Both services also publish periodic reports and recommendations on the stock and bond markets. One or both services are essential in any financial library.

Books generally do not play as vital a part in the financial library as other items in the collection, for the reason that the demand is most often for information too current to have been published in book form. Reports, periodicals, pamphlets, and news releases are more often required. On the other hand, reference books, in particular those with statistics, are heavily used. The larger houses require their new employees to complete an interim training program before they are allowed to deal with the public. The importance of the library is here underscored as the trainees will need books and other material to assist them in their studies.

The advent of microforms may have significant influence on the make-up of financial libraries as it may on all libraries. It is safe to say that almost all of the corporate materials described above can be purchased on microfiche, and probably all of the periodicals can be purchased on microfilm. The potential for saving space is tremendous. Any librarian establishing a financial library for the first time would be advised to consider buying microforms, and established libraries should consider transferring older files from paper to microforms if space and other considerations dictate. However, savings in space must be compared with the ease and convenience of "hard copy" and with the time element. It may take longer to find a stock price from a microform which must first be put on a machine for viewing than from an actual newspaper or other printed source. Obviously, too, an analyst making a

company study will be less inclined to sit at a machine for hours if he can use reports on paper in his office or at home. Certainly, the modern machines will make print-outs from machines, but then too the cost factor must be considered.

A well-run, well-equipped, and well-organized library can make a major contribution in any organization, but assuredly so in the securities industry. The ability to produce prompt, accurate data on a variety of subjects can be significantly influential in situations where large sums of money may be involved, or on which important business decisions may be based. The success achieved by the library in fulfilling its goals can be a factor in the prestige and profitability of the entire firm.

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FINES

One library administrative procedure that is constantly deprecated by librarians, deplored by those against whom the action is taken, receives regular, if not constant notice in the press, and serves as a mixed blessing to libraries is the procedure called "fines." A search of the literature of librarianship shows little in the way of history except that it is granted the fee system does exist in all types of libraries, and that its beginnings in the university library structure is dated about 1848. Many of those writing about library practice agree that the system of fines was designed as an encouragement to return library materials on time so that small collections could serve the widest possible use without unnecessary duplication in meeting the needs of library borrowers. There has been much doubt as to the value of the system, but the system continues to be used while the hunt for a better method of controlling license in the use of library materials continues.

From the library point of view the fine protects the property right inherent in the loaning of materials. The failure on the part of the user to obey certain arbitrary time rules for the use of library materials brings into play a penalty which is predicated on the assumption that other people are being denied access to the material for a longer time than can be countenanced by the library. The penalty is therefore assessed on a previously fixed basis to encourage the borrower to return the material. The fine set has never been analyzed carefully to determine the precise level at which it is a true effective encouragement to the prompt return of material. Nor has anyone ever assessed its contribution to outright theft to avoid what is regarded as unnecessary harrassment of the legitimate library borrower.

Another concern has been that since the material is public in nature, and must be protected by every reasonable effort to effect its return, why not solve the entire problem by not loaning the material in the first place. It has been reported that in some countries the librarians are held personally accountable for the entire in-

ventory of materials. This responsibility is financial in nature. No amount of fines could make up for outright losses, so the librarians under such circumstances, in order to protect themselves, forbid any circulation of materials whatever. Still a third question has been raised in the public library community as to the validity of retaining the rights to these funds which have been collected by a modified police action. Then there are the moralists who concern themselves with the fact that the real deterrent in the fine system is to the effective use of materials by borrowers who would rather not be bothered with rules and regulations and thus avoid the library entirely.

This last action may in part be the result of the regular appearance in newspapers of horror stories on library attempts to reclaim library materials and the total sums of money of which the library is being bilked by erring users. In 1961 this was brought to real prominence in East Orange, New Jersey, by the arrest of six people who were kept in jail overnight for failure to return their books to that town's library. The six people were jailed for failure to put up bail money which had been set by the judge at \$100. The papers avoided the fact that these people had been called in specifically on a charge of contempt of court for failure to respond to a summons requesting their appearance on the library charge months before. The result is that the librarian was pictured as an ogre in the press for having the temerity to put people in jail for not returning the library's materials and eventually was pictured in LIFE magazine hoarding his piles of books. Those piles in the East Orange Public Library and in almost every library across the country within two days of the appearance of the story in local papers attested to the fact that the assessment of fines had not been much of a deterrent, but the penalty of prison for failure to return was a much more pertinent threat. A sidelight on the situation was a statement made by a library administrator that the New York Public Library would never resort to that practice since the loss of materials was in the ratio of one half of 1% of total circulation. It went unnoticed that this figure worked out to some 60,000 books annually not returned and, at a minimal cost figure of \$5.00 per volume, was more than the total budget for all services for the East Orange Public Library. This may be the real rub. Not everyone can be cavalier in his handling of the fine problem. Some must fine and take stronger action. Some can follow the fine procedure and mark off the losses, if any, as the cost of doing business.

The most recent sidelight on the fines and the related book collection problem appeared in 1971 in the *Wall Street Journal* (1):

Some years back a library in the Northeast dispatched police on late night calls to retrieve overdue books and collect unpaid fines.

Now the Nashville, Tenn. public library said it has employed a private bill-collecting agency to handle the recovery chore.

Marshall Stewart, the Nashville librarian, is quoted as saying:

We estimate the library patrons owe us from \$8,000 to 10,000 in fines for overdue books and lost books and records. In addition. . . a lot of books have been taken out and not returned and we would like to have those back.

Professional Adjustment Service will get to keep 40% of whatever it collects.

The question may be raised as to the value of the publicity to the development of the library's relationship with its public. More and more the library is being applauded for its forthright attempts to serve its borrowers effectively. The strong effort to keep its materials under its control may give it greater strength in the community served. It could also be that even bad publicity for the library is better than no publicity at all.

The fine situation affects any library that circulates material. The period of circulation makes no difference, for, even in the university where reserve materials are loaned for an hour at a time, the question constantly arises as to the use and validity of the fine schedule as a means of effective material control. The justification of fines varies, but in essence it relates to the need for the materials to be returned in time to fill other borrowers requests for the same material, while the state of the library material budget does not encourage the practice of purchasing excessive duplicate copies. With reserve collections in academic libraries, as mentioned above, where materials circulate for in-house use and the tendency is to have at least one copy for each potential class of users, the only assurance of some cyclical encouragement to effective use for completion of student assignments is a fine ranging from 5 to 50¢ per overdue hour or part thereof. It is generally felt that the only person deterred in use is the person who cannot afford the fine; he therefore returns the material before he is through with it or never borrows the material at all.

A study of the literature shows that the subject of fines has been much in the periodical press. There has been little study of it in the monographic literature. This leads one to believe that the practice of levying fines is of constant local and current concern, but in the long range it is not considered a significant problem of library administration. From the listings in *Library Literature* it can only be assumed that the fine problem is worthy of more consideration because its existence continues to be like a burr under a saddle to a horse; the lack of interest in the fine problem seems to many librarians like a lack of interest in having all of their materials available in an orderly manner to its patrons. There is no doubt about the disagreement on its value and its purpose. There is also no doubt of the differences of opinion on the effects of the fine system on library use.

The most significant point brought out in a search of the literature is that today's discussions are not much different than the ones that developed during the depression period of the late 1920s and early 1930s. At that time budgets for the purchase of materials were significantly reduced. It was felt that the library was catering to a large group of patrons who had to look for their recreation in areas like the public library, and since the amount of money available for fines was limited, many public librarians and a host of children's librarians believed that the fine system deterred the use, rather than the return, of books. It was felt that books were not being used by those who most needed them because of the uncertainty of returning them on time. The Newark Public Library is credited with one of the earliest solutions to this situation in the development of an anonymous amnesty program in which borrowers could return their long overdue books, no questions

asked, by depositing them in receiving cases in the library. After all, the real purpose of the fine system was to get the books back.

The amnesty system thus started in the 1930s has been periodically repeated by libraries with varied success. *Library Literature* lists articles on both sides of the question. Some of the articles are almost vituperative in their analysis of the problem.

The problem was not and is not limited to the United States. Austria, England, Russia, Germany, and even China have known the problem. In the latter a study performed on international fine practices credited the stringency of fine laws and action in the United States to the better development of libraries in the United States (2).

A recent visit to the Camden Borough Libraries of London brought out the fact that fines are still very much in evidence there, though with some doubt as to their effectiveness. Fines had been at the rate of tuppence a day up to the value of the book. With the change to the decimal system the fines have been reduced to one new pence with the same limitations in ultimate cost. Some of the materials return, some still do not. Collectors who go after the books have been used in London where the fines have proved ineffective.

Collectors have also been used in the United States. Again the literature shows that Western Union messenger boys were used to have books returned in the 1930s. Monclair, New Jersey, always an innovative library, seems to be credited with the earliest use of collectors, although the Hammond, Indiana, and Washington, D.C. public library systems were other early contenders. The method seems to have fallen into discard because of the cost to the libraries in a period of limited budgets. The next mention of use of Western Union is in the early 1960s when the Dayton Public Library reinstated the system as a more humane method of solving the problem of delayed book returns after the East Orange experience. Many libraries had collectors on their payroll as part of internal security forces. The Brooklyn Public Library used this method quite successfully, but then it fell into disuse as it ceased being effective because of the increased mobility of the population.

The advantage of most fine systems and collection systems is directly related to the stability of the community population. If a person knows that he can be readily approached for the return of materials, the system acts as a greater deterrent than would otherwise be the case. With families moving more frequently it becomes more difficult to handle the "skip," as it is called in the trade. The tracing of that kind of a person can be expensive and takes a special talent. Evaluation of the cost has kept most libraries from using the method.

Another approach to the fine situation has been that of offering a discount for returning overdue material. The schedule at Dartmouth College was 40% off if fines were paid when the book was turned in, 20% discount if fines were paid on receipt of notice, but a 50% collection charge was added if the student had to be billed by the bursar. At Yale University fines were assessed only on stack books borrowed, not on reserve books. The strictness of the ruling needs some evaluation.

One warning to a student on failure to return a reserve book on time cancelled his borrower's privilege for the remainder of the year. Duke University must have looked closely at this since it operated a suspended system in which fines were assessed but not collected if the offense was not serious. To keep this from being abused, Duke maintained records on student offenses in the circulation department. Dartmouth rechecked its procedure and found some deterrents in that the amount of collections turned over to the bursar was reduced 19%. Since 52% of fines were still being turned over, there should be some question of the actual value of the fine system used as a deterrent. The academic library with its access to the bursar's office and its capacity to withhold granting of degrees when fines and uncleared records are still outstanding should have fewer problems in the fine situation, yet the literature bears out the fact that the fine problem is equally serious in the academic community and almost as difficult to solve. Relationship of fines assessed to the rate of loss of books uncharged might be a useful study in the avoidance of fines through theft.

The fine and theft situation has been reviewed and found to be so serious that there has developed an entire business based on deterrents. Public and college libraries are now investing in detection systems which tend to discover uncharged books as the patron/borrower attempts to leave the library without following the standard checkout procedure and thus avoid the need to return the material on time. The systems are too new to determine their actual rate of deterrence at this time.

As alluded to earlier, the children and school librarians are probably the most concerned with the fine system as a deterrent. This group of librarians is involved in encouraging extensive readership. In this practice they have been most successful. The fine systems imposed by their libraries have interfered with their efforts to such an extent that over the years since the 1930s there have been constant attempts at minimizing the fine problem. Children, if properly exposed to reading, love to read. They also love to take materials out in quantity. They frequently forget the quantity of materials they have and, above all, they never worry about dates. It thus becomes the parent's problem to keep track of the materials or to pay the fines. Many parents have adopted the attitude that the library should not loan books to their offsprings without the parent's permission. This certainly is anathema to librarians. With some success the librarians in this area of service have adopted means of reducing the problem either by abolishing fines or by reducing the number of items which can be borrowed at any one time. The aim is the significant one of not so completely applying a deterrent that it will negate the basic purpose of the library, which this writer understands to be the collecting and organizing of library materials for use.

In this brief survey of the fine system one element has been bypassed: the concept of fines as a source of income for the library. Many library borrowers have told their librarians that their fines are paying the librarians' salaries. No matter what the size of collections, this is far from being the case. Until recently in New Jersey fines collected in public libraries were returnable to the municipal treasurer

as are fines for traffic violations and related fees. A statute on the books in 1970 now permits the public libraries of New Jersey to keep their fines and to use them for library purposes. It is too early to determine the effect, but it is hoped that lost books will be more easily replaced.

In a study done by Arnold Miles and Lowell Martin for their book *Public Administration and the Library* (3), the annual reports on city library revenue for Los Angeles, Chicago, St. Louis, and Cincinnati were checked. Their findings, expressed as proportions of total expenditure, were 7, 4, 6, and 4% for these cities, respectively. It was determined that not only was the proportion of revenue from fines small, "but they are a dubious source from which to exact higher returns, and the cost of collecting them is substantial." This statement was made in 1941. Thirty years later it is doubtful that there has been any real change in the situation. The New Jersey law seems to cut down on the need for additional auditing of a minimal account on a regular basis. This can be a substantial savings since it is frequently municipal custom to audit small accounts on a regular monthly basis, process the funds on a daily basis, and maintain a separate record account throughout the year. It is obvious that the cost benefit of that procedure was minimal for the investment in the control of fine collection.

In summary, the control of collections by the use of the fine system in libraries has a long administrative history. Nowhere has there been an exhaustive study of the matter, nor has there been a definitive evaluation of benefits versus costs. It is obvious from the literature that librarians are of many minds, but that there are too many sides of the question to afford a simple solution. It would seem that no librarian can afford to permit his library collections to melt away by attrition through circulation without return. He would be considered remiss and would not be able to do his job effectively if he could not replace the materials for use. When funds are reduced, the library procedure of control becomes a greater concern for the library. The fine procedure is then overhauled, actions of a variety of types are frequently instituted, and librarians concern themselves with the effects the procedures have on their areas of activity.

There is no one solution to the problem of using fines as a control device. There is probably no solution. The need to have books returned, and within a reasonable time, is obvious to the librarian caught on the horns of the demand dilemma. The new borrower wants or may want material now in circulation. That borrower usually is not willing to wait for the material to be returned, and certainly not willing to consider that his opposite number in the borrowing fraternity may not return the material on time if at all. The librarian must either replace the needed material now not available, or institute a procedure that will get the material back in a reasonable time. His activities may antagonize other borrowers, thus reducing annual use of the library and bringing into question its validity as a service organization worthy of public support. It is not a pretty picture. In the institution the service-oriented librarian, as the children's librarian, does not wish to lose the client, so painstakingly taught the values of reading, to the peculiarities of library administrative procedure which harp on getting the book back on time. It is

agreed that the wrong person usually worries about the return of material and the payment of fines. It is also possible that no matter what fine system is in use, the hard core borrower, the transient, and the book thief still will not be affected.

Financially, we are assured that depending on fines for budgetary relief is not of great value and the costs of collection are reasonably high. Under the circumstances the writer can see no move toward uniformity of fine systems, but would hope that consideration of this could be undertaken. He would also like to see work done on developing a nationwide library card and a central registry which then might give the system of getting materials back by a fine procedure some kind of national status along with the other credit card activities. If fine activity is to get regular notoriety, it might better be used to strengthen the library in its community as a needed service, not as a peculiar agency that is abusive to its patrons.

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HAROLD L. ROTH

FINLAND, LIBRARIES IN

Public Libraries in Finland

In 1967 the Republic of Finland celebrated the fiftieth anniversary of its independence. Earlier, from 1809 on, the country had belonged as a separate Grand Duchy to the Russian Empire and before that it had been part of the kingdom of Sweden. In 1971 the population of Finland was 4.7 million, of which over 50% was urban. The average population density is 15 per sq. kilometer. The language of 93% of the population is Finnish, while 7% is Swedish speaking.

Public libraries started to spring up around the middle of the nineteenth century through the initiative of university students and clergy. Local library associations were founded to get the program started, and funds for purchasing books were received through collections and from various sources of municipal income. State aid for municipal libraries was not given until 1921.

It is evident that the public libraries at the outset were rather simple. Books were mainly on religious topics or on practical subjects. The reason for this was simply the fact that there were not too many Finnish books printed in the 1850s. A meaningful comparison has been drawn between the difficulties in Finland 100 years

ago and those in some new African countries where libraries are being set up in the 1960s: in Finland in 1850 there were no books printed in the vernacular and the population was still quite illiterate.

Public library work in Finland began to go forward before the public school system got off the ground. A compulsory education act was passed in 1921 and illiteracy has long been nonexistent. Since that time the public school system has taken the lead away from library work.

At the beginning of the twentieth century Finland was being influenced by the public libraries in the United States, and the library system began to rid itself of the impression of libraries being a type of charity organization meant for poor people and to develop into a modern library movement offering services to all people.

In 1921 when public libraries began to receive regular government aid, the State Library Bureau was set up and a group of library inspectors were chosen to give aid and to direct activities in the whole country. The first library bill, passed in 1928, gave strong support to the libraries in the rural municipalities. It also established the status of the State Library Bureau and divided the country into seven administrative districts, in each of which a touring library inspector gave instructions in library administration and development.

The outdated Public Libraries Act of 1928 became a hindrance in the development of library work with the passage of time. The 1939–1944 wars prevented new legislation and it was not until 1962 that the renewed Public Libraries Act came into force. A typical feature of the Finnish act is that rural municipalities receive twice the amount of state aid as do cities and towns, the former receiving two thirds of their expenses, while the latter receive one third. Libraries in hospitals and social institutions such as old people's homes receive 90% state aid. The Central Library for the Blind, which is owned by a private association, receives a 95% state subsidy. The state also provides 10–40% assistance for new library buildings.

The 1962 Act made possible the founding of central regional libraries, a project that had been under discussion for more than half a century. In Finland such libraries are called provincial libraries and their number in 1972 was eight. The government yields the rights of provincial library to a city library fulfilling certain conditions and willing to undertake certain functions. Provincial libraries receive a special grant from the state for the work they do outside their own municipalities. Their responsibilities are, for example, to set up local history collections, to send interlibrary loans to smaller libraries in the area, and to arrange consultative meetings for librarians and library board members. Recently some provincial libraries have also taken the tasks of the local audiovisual centers.

The effect of the renewed Library Act can be seen clearly in the development of libraries. Table 1 shows the number of libraries, total number of volumes, number of home loans, and number of borrowers in 1960 and in 1970. Both the total number of volumes and the number of home loans have been doubled due, to a considerable degree, to the favorable influence of the Public Libraries Act. The decrease in the number of libraries has been caused by the closing down of many

TABLE 1
Effect of the 1962 Finnish Public Libraries Act

Year	No. of libraries	Volumes	Home loans	Borrowers
1960	4,007	6.2 million	15.3 million	730,000
1970	2,903	12.0 million	32.4 million	1.2 million

branch libraries in rural areas, due in turn to the urbanization of the population and to the closing down of schools (where the branch libraries are usually located) because of the lack of students. The branch libraries have to a considerable degree been replaced by bookmobiles, the number of which in 1972 is around ninety. The bookmobiles, specially designed for the purpose, travel a carefully planned route 4 to 6 days a week. The bookmobiles have shelf space for 2,000–4,000 volumes. State subsidies are given for their acquisition and maintenance. The trend for more and more municipalities is to acquire bookmobiles.

The acquisition of audiovisual materials and the founding of music departments in public libraries are topical subjects. In addition to music materials, language records have been acquired for the public and they are being used extensively. There is a language laboratory in some libraries. In modern libraries there is a music department with high fidelity equipment through which the public can listen to music either by the use of headphones or in isolated booths. Library concerts and theatrical performances are also given for the public. In many cities there are



FIGURE 1. The Töölö Branch of the Helsinki City Library was opened in 1970. The building was designed by architect Aarne Ervi, and its total area is about 2,500 square meters.

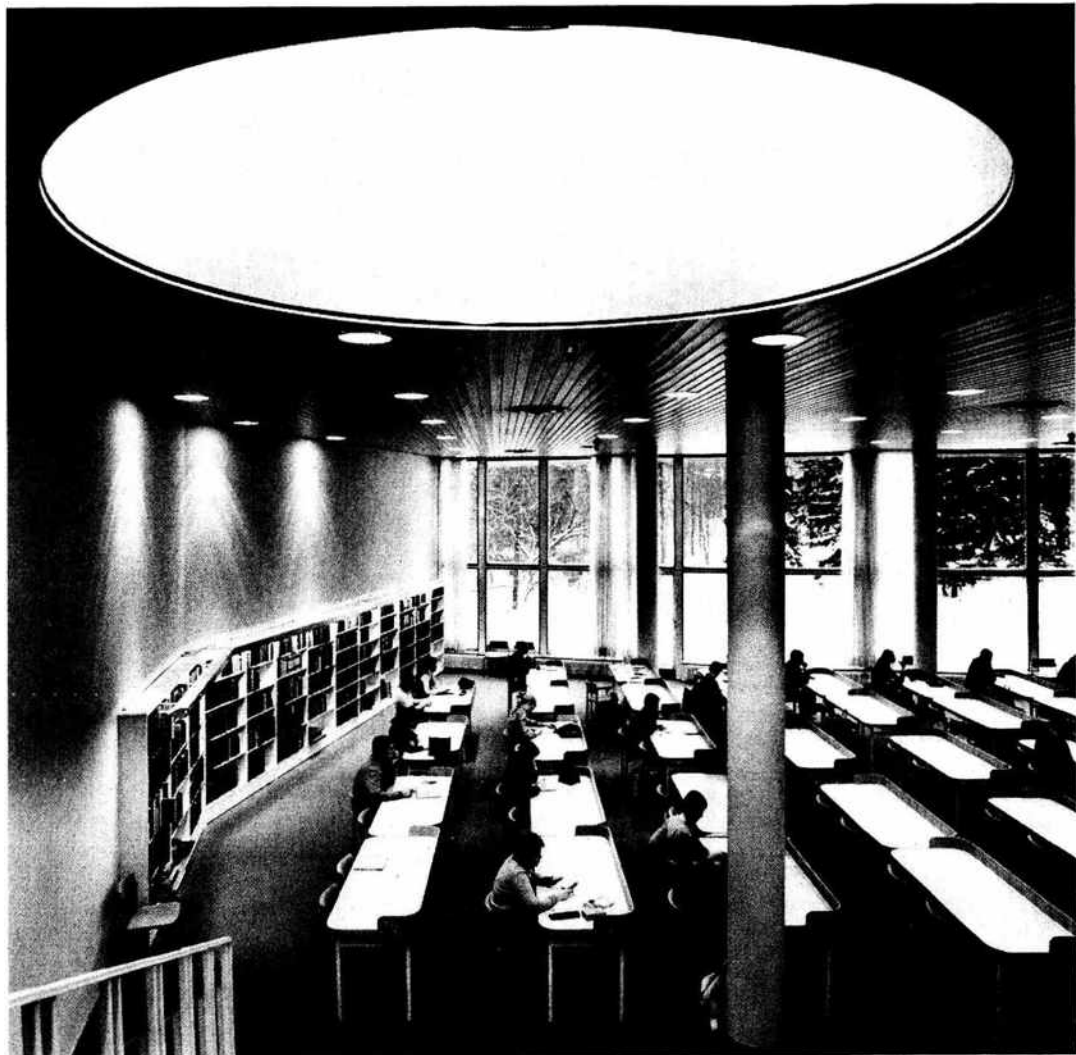


FIGURE 2. *The Reference Room in the Töölö Branch has eighty seats.*

puppet shows or improvised children's shows for children which have been as well received as the traditional story hours.

Library architecture in Finland as well as in the other Nordic countries is considered to be outstanding (see Figures 1–3). Alvar Aalto, the designer of the Viipuri Public Library in 1935, has designed the libraries in, for example, Rovaniemi and Seinäjoki in the 1960s. The beautiful and practical library building in Kuopio has been designed by Matti Hakala. Kouvola Regional Central Library is a new type of landscape library by the architect Juhani Kivikoski. The building of new libraries has without exception increased the number of people who use libraries and the number of home loans. Because the new buildings usually include meeting and club facilities, many people who previously have not used libraries have been brought in contact with them.

Librarianship is a comparatively new profession in Finland. In 1920 the first



FIGURE 3. *The Rovaniemi Public Library in Lapland was designed by Alvar Aalto. This figure shows the Lending Department with the roomy elliptical lending desk.*

professional librarianship course was given, and it was financed by funds of a private foundation. After that the State Library Bureau took upon itself the responsibility of arranging for training by giving 2 to 3 month courses at a few years' intervals. Since 1945 library education has constituted a regular feature in the program of the School of Social Sciences in Helsinki and later in Tampere when the school was transferred as Tampere University in 1966. In the fall of 1971 a chair for library and information science was founded at Tampere University and instruction is given by a professor, two lecturers, and several part-time assistants. Library science can thus be included as a subject for a M.A. degree. In Helsinki, at the Swedish School of Social Sciences, librarians train for their profession and use the other official language of the country, Swedish.

For the time being most of the libraries in rural municipalities are staffed by part-time personnel. The Library Bureau at the National Board of Schools gives short courses for these part-time librarians. It is quite certain that after municipal reform takes place in Finland, rural municipalities will also get full-time trained librarians. The goal for the next few years is to have small municipalities fused into bigger units so that the number of municipalities will be decreased from 500 to a couple of hundred.

According to the stipulations in the 1962 Library Act, the highest administrative powers over the public libraries were given to the National Board of Schools, in which the Library Bureau supervises the libraries. The bureau has, however, been forced to function with too few personnel and inadequate funds.

In 1970 notable changes took place in the state administration of public libraries. The posts of library inspectors were transferred from the Library Bureau

to the school departments of the provincial governments. School and library inspectors therefore work closely together, although the number of school inspectors (over 70) is much greater than that of the library inspectors (7).

In addition to the need for developing library administration, there are some deficiencies in library work which should be remedied immediately. For example, the Library Act should be renewed and improved in the following ways: state aid for central regional libraries should be increased, prison libraries should be brought under the jurisdiction of public libraries, shut-in service for home patients should receive state aid, and public libraries should get telex facilities. Specifications should be drawn up for libraries which strive for high goals so that state funds for library buildings and other state grants could be raised. The training of librarians must be broadened so that sufficient faculty will be available to train librarians for the entire country. The salaries for the librarians should be raised so that talented men and women will take up librarianship as their profession.

HILKKA M. KAUPPI

Finnish Research and University Libraries

The history of Finnish research and university libraries can be divided into three periods: from the Middle Ages up to the 1820s, from the 1820s to 1917, and from 1917 onward. When the first period really began we do not know; Turku Cathedral presumably already had liturgical books in the thirteenth century, though this is not mentioned in any historical documents. In the fourteenth and fifteenth centuries the cathedral owned a remarkable collection of books, some of which we know the names of, e.g., *De proprietatibus rerum* by Bartholomeus Anglicus. The collection was lent out to other parishes when needed. The cathedral library did not, however, become the first significant Finnish research library, and neither did any of the libraries in the medieval monasteries.

During the Lutheran reformation in the sixteenth century the Catholic books were destroyed and parts of them were later found in the covers of the account books used by the king's bailiffs. About 10,000 leaves of these books were found and reconstructed, and now they are kept as a separate collection in Helsinki University Library. When Turku Gymnasium became the academy in 1640 and thus the first university in the country, the small gymnasium library became the nucleus of the present Helsinki University Library, Finland's oldest and biggest university and research library as well as national library. The academy library grew slowly in the beginning, but due to donations and deposit copies, which it received from both Sweden and Finland after 1654, it had a collection of about 3,500 volumes by the middle of the eighteenth century.

When Henrik Gabriel Porthan (1739–1804) was appointed librarian in 1772, the library got off to a new start. Porthan was the first person to collect literature

printed in Finland, even though the library did not have a special "Fennica" collection in those days. The size of the library grew to 40,000 volumes. It was at that period the only important scientific library in the country. There were some school libraries, e.g., the library belonging to Borgå Lyceum, which had valuable collections, but they were intended for a limited group of users.

The beginning of the second period was linked with political change; in 1810 Finland was separated from Sweden, to which it had belonged for several hundred years, and became a Grand Duchy of Russia. Political changes brought other changes in the cultural and economic life; Helsinki became the capital instead of Turku, and the university was also moved there. Before the library was moved, it was burnt down almost completely in 1827.

Fredrik Wilhelm Pipping (1783–1868), who was not only the librarian but the rector of the university, worked hard to re-establish the library. Together with Matti Pohto, a bookbinder and bookseller, he succeeded in collecting almost all Finnish literature printed thus far, and he also compiled the first bibliography on books printed in Finland. The library received several donations from Russia and other countries, and in 1844 its new building, designed by Carl Ludwig Engel in neoclassical style and one of the most remarkable monuments of Finnish architecture, was completed. The library's growth was now rapid. In place of Swedish deposit copies it received deposit copies from Russia in addition to the books which were bought or received as donations. In 1842 there were over 50,000 volumes in the library, in 1857 100,000, and by the 1910s some 400,000 volumes. The original building soon became too small, and in 1906 the library's annex, designed by Georg Nyström, was completed to house the main part of the collections.

Besides Helsinki University Library, there were other scientific libraries in Finland in the nineteenth century due mainly to the founding of scientific societies in the 1820s. The Finnish Literature Society began collecting books in the fields represented by the society (Finnish literature, history, folklore, Finno-Ugrian languages) in 1831. In 1878 it also published the first volume of the present *Finnish National Bibliography* (*Suomalainen kirjallisuus 1544–1877*). The Finnish Literature Society in Jyväskylä started its collections in 1865 which formed the nucleus of the present Jyväskylä University Library. Other scientific societies began publishing in the early decades of the nineteenth century and even though their own collections grew slowly they were not without importance. In 1899 the collections of the scientific societies were housed in the same building and the present Library of the Scientific Societies was founded. The history of the Parliament Library can also be traced back to the last decades of the nineteenth century when the former Finnish Diet decided to have archives and a library in 1872. The first technical library was established in Finland in 1849 when the Technical School was opened in Helsinki. The school later became the Institute of Technology. The Helsinki School of Economics Library was founded in 1911.

A special feature of the Finnish scientific libraries are their student libraries. The oldest of them, the Library of the Student Body of the Helsinki University, was founded in 1858. It is a private institution owned by the students' union but

it receives state aid. This library acquires textbooks for students at Helsinki University along with other literature. There are students' libraries at other universities, too, but none as large as that of Helsinki University.

The year 1917, which marks the birth of independent Finland, brought many changes to the libraries. First, the deposit copy law passed in 1919 gave Helsinki University Library the right to receive five copies of all printed matter except newspapers, periodicals published once a week, booklets, and expensive pictorial works, of which the printers need give only two copies. Helsinki University Library then sends extra copies to other libraries which have the right to get deposit copies. These instructions are very precise, and thanks to them Helsinki University Library has practically complete collections of Fennica. The new period also brought with it the founding of two universities: the Finnish and Swedish universities in Turku, Turun yliopisto and Åbo Akademi.

In 1917 material began to be collected for the Finnish university library and the library was opened in 1922. The library work for the Swedish university was begun in 1918, and the university and its library were opened in 1919. Both libraries received large donations, and when the universities were opened the libraries were ready for use.

The years between the World Wars I and II were a time of constant expansion in Finnish scientific libraries; professional interest was aroused and international relations were established, especially with Scandinavian countries. In 1929 the Association of University and Research Librarians (Suomen Tieteellinen Kirjasto-seura, Finlands Vetenskapliga Bibliotekssamfund in Swedish) was founded. Of the eminent librarians during this period, two names in particular should be mentioned: Georg August Schauman (1870–1930), chief librarian of Helsinki University Library, a member of parliament, and founder of the library's administrative set-up; and Volter Kilpi (1874–1939), a well-known prose writer and the first chief librarian of the library at the Finnish University in Turku. During World War II the greatest loss was the Institute of Technology library which was destroyed in an air raid.

The period after the war was marked by rapid growth. Remarkable aid was given the Finnish scientific libraries through the so-called ASLA funds (Public Law 265, 81st United States Congress). According to the law, the interest on the loan that Finland had received from the United States after World War I was returned to Finland in the form of a special foundation, and from this foundation a yearly sum was given to the scientific libraries for purchasing American scientific literature. Most of the ASLA funds have been used for scholarships in American universities and colleges, and some Finnish librarians have also had an opportunity to study librarianship in the United States with these funds.

New libraries were founded in new universities and other institutions of higher education; e.g., the University Library in Oulu (1959) and Tampere (1960, formerly the School of Social Sciences), the Institute of Technology Library in Lappeenranta (1970) and Tampere (1971, formerly the Tampere Scientific Library), the School of Economics in Vaasa (1968), and the Veterinary College in Helsinki (1945; first

librarian appointed in 1962). In 1954 the Council of Research Libraries was founded by the Ministry of Education to act as an advisory body on all matters concerning scientific libraries and to promote cooperation between libraries. New buildings were erected, many of them examples of the high standard of Finnish architecture, e.g., the buildings of the Library of the Student Body of Helsinki University and the Finnish University Library at Turku. Helsinki University Library was partly rebuilt and it also received a deposit library at Urajärvi in 1955. Bibliographical activity increased and many new publications were issued: the *Index to Finnish Periodicals* (1959–), *Bibliography of Government Publications in Finland* (1961–), and a *Directory of Finnish Research Libraries* (1962; new edition in 1972).

At present there are about 400 research and university libraries in Finland, and together they comprise a collection of some 6 million volumes. Most of them are small libraries belonging to firms and institutions. According to library statistics for 1970, the largest one is Helsinki University Library (38,325 meters of shelving, 1,373,000 volumes) (see Figure 1), next come the Swedish and Finnish university libraries in Turku (*Åbo Akademis bibliotek*, 702,000 volumes, and *Turun yliopiston kirjasto*, 649,328 volumes). As far as home lending is concerned, the most frequently used libraries are Tampere University Library (138,665 home loans in 1970) and the Library of the Student Body of Helsinki University (122,595 home loans in 1970). The greatest number of interlibrary loans were at the Institute of Technology Library in Helsinki (7,522 items borrowed). In 1970 the biggest purchasing allowance went to Oulu University Library (927,300 Finnmarks).

There are two trends visible in scientific libraries today in Finland: an attempt at cooperation and coordination between different libraries, and specialization. Cooperation and coordination can be seen in plans for cooperative acquisition of library material, both at the national and international level—the so-called Fennia Plan and Scandia Plan. The former stands for joint acquisition policy for Finnish scientific libraries; the latter the same for Scandinavian libraries in different fields such as medicine and agriculture. The acquisition policy brings with it a need for interlibrary lending. Thus a central library network is being established in the country. Many libraries, in fact, work as central libraries but only one, the Central Medical Library, was founded especially for that purpose (1966). The Council of Research Libraries also has a special section for interlibrary lending, which arranges meetings every year and has issued instructions for interlibrary lending.

Specialization is seen in the growing number of special libraries. For example, Helsinki University Library is not the university's only library for there are more than 100 smaller libraries belonging to different faculties and institutions. This is due to the fact that Helsinki University is big and to a great extent decentralized.

These libraries are not linked with Helsinki University Library, whose main task is to act as Finland's national library. Besides its Fennica Department it has two other divisions, the Slavonic Department and Foreign Department. The first is based on the Russian deposit copy collection and is a very remarkable library in its own field, and the second is mainly a central library in the humanities.

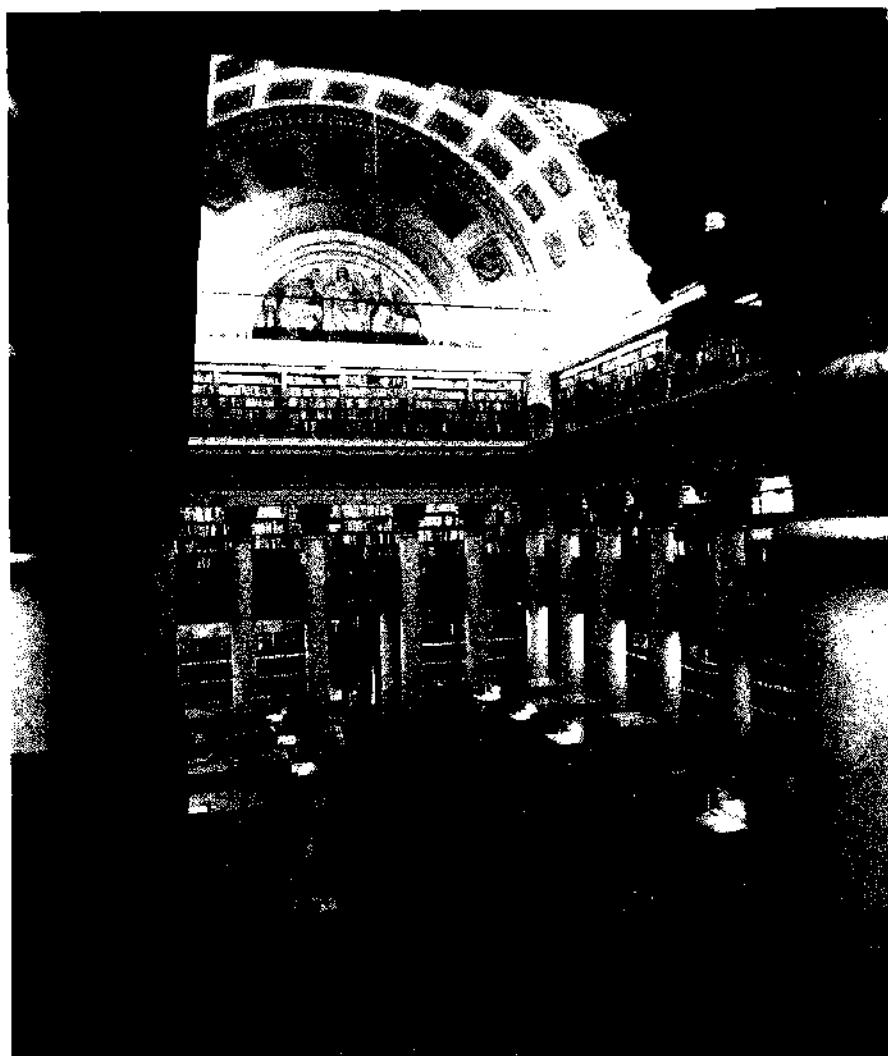


FIGURE 1. *The Catalog Hall of Helsinki University Library.*

There will be more and more cooperation over purely technical questions but the collections and reader service will remain separate. In the latter, information retrieval and the selective dissemination of information have enlarged the libraries' traditional area and also emphasized their specialization. The Finnish Association for Documentation (Suomen Kirjallisuuspalvelun Seura, Samfundet för Litteraturtjänst i Finland in Swedish), founded in 1948, has done pioneer work in introducing information science and technology to Finnish libraries and arranging courses in information science. The Finnish Council for Scientific and Technical Information (TINFO) was founded in 1969 to promote information work in libraries and information centers, and to act as an advisory body on all questions concerning scientific and technical information.

A third trend comprises an interest in librarianship as a profession and professional education. The professional association for librarians working in scientific

libraries (Tieteellisten Kirjastojen Virkailijat, Vetenskapliga Bibliotekens Tjänstemannaförening in Swedish) was founded in 1965, and in 1969 the Council of Research Libraries started a special examination common to all research and university librarians to replace the so-called amanuensis examination in university libraries. And last but not least, a professorship in library and information science—the first in Scandinavia—was established at Tampere University in the fall of 1971.

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RITVA SIEVANEN-ALLEN

FINNISH LIBRARY ASSOCIATION

The Finnish Library Association was founded in 1910. At that time the government paid very little attention to libraries, which meant that the association had a grave responsibility for furthering the progress of libraries. The association strove to encourage the founding of libraries, to give advice to librarians, and to distribute information about libraries in various ways. Model rules and bylaws were drawn up for small libraries, and the members of the association tried to collate statistical information on libraries in the whole country. Short courses in librarianship were also given. As early as the 1910s, the association had a full-time salaried consultant who took care of purchasing and selling books for the association and who made trips around the country in order to instruct librarians. The association tried to sell printed catalog cards to the libraries, but it did not succeed too well in that endeavor. Due to a shortage of funds, full-time salaried personnel had to be discontinued at the beginning of the 1920s. The association did not again get its own office and full-time salaried personnel until the 1960s.

The Finnish Library Association's work and activities were, however, never brought to a complete standstill during those decades. Continuous attention has been paid to deficiencies in library activities and to correcting them. During the years of depression in the 1930s, the association tried to subsidize libraries in communes of small means with the grants it had received. After the Winter War (1939–1940) activities centered around the libraries among the evacuated population and the libraries destroyed during the war. The association directed its energy also to building up hospital libraries and to satisfying the literary needs of sailors and prisoners. A

movement to improve the system of paying salaries to the librarians was started although it was not until the 1940s that a library-workers' trade-union was founded. Untiringly the representatives of the Library Association have gone to see the Minister of Education, sometimes to demand a better library act, sometimes to make suggestions for training librarians or for improving the condition of school libraries. Improvements have generally been accomplished, often only after a long period of patiently waiting.

The present purpose of the Finnish Library Association is to further the work of libraries and to raise the professional and social level of those who work in them. The membership of the association was about 1500 in 1971 consisting mainly of individual members because libraries cannot legally be members. The budget has been increased in the 1960s from around 40,000 Fmk (\$9,600) to 120,000 Fmk (\$28,700). The association received as state aid in 1971 30,000 Fmk (\$7,200), which is rather a small sum of money when compared with the money received by other cultural organizations in the country.

The association has centered its activities in the past few years around arranging courses and putting out publications. The commercial publishers in the country issue a rather limited selection of materials on library work as there is an evident shortage of productive and expert writers. Among the publications of the association should be mentioned *Directory of Finnish Libraries (1968)*, *Who is Who in Finnish Librarianship (1968)*, *Libraries in Finland* (in English, 3rd ed., 1971), and guides in music library work and in hospital library work. Several book lists have also been published.

The circulation of *Kirjastolehti (Library Journal)* is presently about 7,200 copies. The periodical is published twelve times a year and includes English summaries. The first volume was published in 1908.

Some library research has been conducted by the association. In 1960, in connection with the fiftieth anniversary of the Finnish Library Association, a research fund was set up to allocate grants for research on the history of library work, and on the reading habits and library attendance of children, for some union catalog projects, etc.

With the aid of the Finnish Library Association Research Fund and a scholarship from the Cultural Foundation of Finland a study project on the professional status of Finnish librarians was started in 1969 (1). The results of the research were published in 1972. A questionnaire was sent to some 750 librarians and the percentage of forms returned was 83.8. In the library profession 89% were females and 11% were males. Of the females, 45% were unmarried, the corresponding figure for males was 20%. Twenty per cent of the men held the post of head librarian, as compared to 7% of the women. Forty per cent of the answers expressed the need for better professional training. Over 80% supported the proposal that library training be combined with academic education so that library science be accepted as a subject for the M.A. degree.

For years the Finnish Library Association has been the central organization for convening nationwide biennial library conferences. In addition the association has

provided continuing training for librarians in service by arranging different types of courses, seminars, and conferences for both full-time and part-time librarians.

There are five permanent committees within the association: Audiovisual Committee, Publications Committee, Hospital Libraries Committee, Children's Libraries Committee, and Public Relations Committee. The Public Relations Committee has tried to increase the membership and to bring the libraries close to the public by distributing information through the use of posters, folders, and newspaper articles. In the 1960s a film on libraries was produced in cooperation with the Finnish Publishing Association. Programs on libraries have been made available to radio and television, and a series of library concerts has been shown on TV. A series of slides on the Finnish libraries was completed in 1970.

The Finnish Library Association has been a member of IFLA ever since its founding. In 1965 an IFLA Council meeting was held in Helsinki. Finland has been in close touch with the Nordic library associations by attending the annual meetings of library associations in the neighboring countries. The Finnish Library Association hosted the Sixth Anglo-Scandinavian Public Library Conference in Koli in 1970.

A library service company, Library Services, Ltd., has been working along the lines of corresponding firms in Scandinavia. The firm was founded in 1950 by the Finnish Library Association which owns the majority of the shares. Since 1961 this agency has been operating as a joint-stock company.

During the last 10 years the growth of the firm has been quite rapid. The capital stock has increased from 3,000 Fmk (\$750) to 57,000 Fmk (\$14,250) and the turnover from 210,000 Fmk (\$52,500) in 1960 to 1,150,000 Fmk (\$287,500) during the fiscal year 1970-1971. Library Services, Ltd., has to some extent exported library furniture and equipment to East European countries.

The future of the Finnish Library Association is promising. Its financial status has been strengthened to such an extent that as favorable economic conditions prevail the association seems to have more potential than ever before to serve all the libraries in the country. That is why it has been proposed to change the form of organization of the association so that the Finnish Library Association would function as a central organ—like the Federation of Finnish Library Associations. In Finland there are ten library organizations (the figure includes students' organizations and library trade-unions) whose activities could no doubt be improved and developed within the framework of a central organization. At the annual meeting of the Finnish Library Association in 1971, it was decided to have this matter investigated.

The Finnish Library Association is setting up a program of objectives for the 1970s which includes the following:

1. The renewal and reformation of the existing library law so that it would better meet the needs of today and the future.
2. The encouragement of library research whose results could be applied to cultural life and library administration.
3. The extension of public relations work directed toward furthering the development of libraries.

4. The activation of international cooperation, obtaining information concerning library conditions in foreign countries for the members of the association and, correspondingly, informing others of the Finnish libraries.
5. The planning and development of training and continuation courses.
6. The planning and development of publications.
7. The finding of effective forms of activity and participation for as many members as possible.
8. The securing of financial means for future projects.

In a commemorative publication for Lionel R. McColvin (2), Helle Kannila ends her article:

The Finnish library system has developed greatly since independence and especially after the new Public Libraries Act in the 1960's. Finland and its Scandinavian neighbours can be counted among the highest developed library countries in the world. It must be said, however, that the conditions are far from ideal as is perhaps the case everywhere. The vital position of libraries in culture life has not as yet been acknowledged. It may happen that libraries are totally forgotten when planning new educational systems or means of occupying people's leisure time. The status of librarians requires improvement and many more energetic and vital librarians are needed. There must also be more literature in Finnish on librarianship and allied subjects. The lack of central regional libraries all over the country is still a deficiency in administrative organization. Many libraries lack practical premises, and library budgets are not always sufficient for the necessary bookstocks. The rationalization of library techniques is also one of the important tasks lying ahead.

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HILKKA M. KAUPPI

FIRE IN LIBRARIES

If human culture "may be said to have begun" with fire, a considerable portion of the manifestations of that culture has been destroyed by fire over the millennia that man has enjoyed and feared it. Libraries are by definition a physical plant or building and a collection of books and other informational materials housed within that plant. In either form or both they have been, since man began keeping a record of his activities, particularly vulnerable to disaster, both natural and man made.

Historical Perspective

It was a natural concomitant of the rivalry between early kings and between city states in the ancient Orient (ancient Near East) that destruction of one's enemy would result in a destruction of his palace and of the records (library) that he might have there. For the most part, however, destruction of the library could be termed an accident of war rather than an intentional destruction of an enemy's library as such.

In the Hellenistic period when the contents of libraries became intrinsically valuable to the peoples of Egypt, of Pergamum, and of Rome, destruction was apt to be the result of pillage and burning in general. More often, however, the conquerors were apt to carry off the contents of libraries as part of the spoils of war than to put the torch to them.

There were, however, some notable fires of which records still remain. In Rome the Palatine Library was damaged by fire three times: in Nero's fire in A.D. 64, in another in the reign of Commodus in A.D. 191, and finally total destruction in A.D. 363. The palace library of Tiberus was destroyed also in the fire of A.D. 191 as was the library in the Temple of Peace built by Vespasian.

A tale of fire of greater interest in the libraries of the classical world was of the Alexandrian library founded at the beginning of the third century B.C. Tradition has it that when Caesar, as a defensive measure, fired warships in the harbor, the library was severely damaged. Present research would indicate that the part of the city that housed the library was either not affected by the fire or affected only to a limited extent (see Vol. 1, p. 403). There was also a widely held Christian tradition that the library was later destroyed when the Muslims took control of Egypt. Rather, the museum and palace met destruction when Aurelian brought Egypt again under the control of the empire. The last of the Alexandrian libraries was lost when the Scrapeum, the collection housed within it, and several other temples were destroyed in A.D. 391 by the Patriarch of Alexandria, Theophilus, in retaliation for pagan riots that had resulted in Christian deaths.

In the Eastern Empire the imperial library at Constantinople, reputed to contain 120,000 volumes, was destroyed by fire in the A.D. 477 revolt staged by the pretender Basiliscus. It has been suggested, too, that "Fire, also, was a constant menace to Manuscripts, especially in Constantinople, where the dissatisfied populace often turned to 'direct political action' in the form of incendiarism."

During the Middle Ages and into modern times there were destructive fires in monastic foundations of which St. Gall in Switzerland is a prime example. The city and the monastery were destroyed by fire in 1314.

The Library of Congress three times suffered damaging fires. In the war of 1812 when the British set fire to the Capitol, the library was lost. In 1825 there was a second fire that was confined and losses were small. In 1851, however, about three-fifths of the collection were lost by fire. As a result the library got a new room with a stone floor and cast iron shelves—hopefully more fireproof.

It is evident that libraries from their early days have been subject to fire and that

until fairly recent times defensive measures have been largely ineffective. In general those who had libraries or large collections of books under their cognizance were reluctant to permit artificial light: candles or later whale's oil lamps. The danger of fire was great and periodic fires in various libraries in the western world bore testimony to their wisdom. It was possible to avoid open flames or heating that might set a library ablaze, but once a fire had started the result was frequently a disaster. The Cottonian Library, when in Ashburnham House in 1731 caught fire, "a great smoke . . . which soon broke into flame." It seems to have started by a "mantle-tree's taking fire and spread to the wainscot and then into another room. The "librarians" at first felt they could handle the blaze but soon it got out of hand. The presses in which books were stored were opened and books thrown out of the window. Considerable damage was sustained by the Royal Collection housed there, but principal damage was to the Cottonian Collection. Of some 948 volumes, 114 were reported as totally destroyed and 98 badly damaged.

Libraries, therefore, began to look for fireproof buildings as they became available, to improve their housekeeping to lessen accumulations of combustible materials that might bring on fire, and to think in terms of insuring their collections. It is interesting to note that for much of its existence the index to library subjects, *Library Literature*, contained virtually no entries under "Fires." There are, however, a large number of entries under fire insurance, for this was the direction in which librarians began to turn.

Incidence of Fire

Despite the fact that the principal commodity of a library is a combustible and that given the right set of conditions books will burn with an intense fire, librarians have been inclined to overlook until fairly recent times what is a real and present danger. They have been lulled into a sense of false security by the construction of steel and concrete buildings, a minimum of wood trim, and steel book stacks. As Dorothea M. Singer reported in, *The Insurance of Libraries*, in 1946, librarians in the large believed "books do not burn easily; even if a fire should start, it would spread very slowly"(1). As a matter of record the incidence of fires in public buildings which include libraries as classed by the National Fire Protection Association is in fact rather low. In a study conducted by the Association in the mid-1950s, fires in public buildings over a 5-year period amounted to only 2% of the total number of building fires. In the same period, however, the increases in losses grew about 20% and the number of fires increased 25%.

The Library Technology Project of the American Library Association conducted a study and reported on fires in libraries in its publication *Protecting the Library and Its Resources*(2). The study looked into some 359 library fires occurring between 1911 and 1961. It was noted that the major causes of fires in libraries were heating plant (23%), housekeeping and operations (27%), electrical failures (29%), other (lightning, arson, etc., 21%). Furthermore, 85% of the fires occurred in buildings that were constructed of masonry walls with wood interiors, building classed as "or-

dinary combustible." Eleven per cent of the fires occurred in fire restrictive and non-combustible buildings. Only 2% of the buildings studied were of frame construction.

Of interest, too, are the points of origin of fires in libraries. By far the largest percentage took place in basements (36%). Trash containers accounted for 14%, stack areas 12%, offices and restrooms 12%, attics 11% and other areas 15%.

The study in general found that poor housekeeping in its broad sense included such practices as poor storage of trash prior to disposal, storing paints and other combustible materials in boiler rooms, improper storage of microfilm, and stacking of gift materials awaiting processing near other combustibles. Smoking without proper supervision or control is an ever present danger.

The incidence of fire from the heating plant is underlined by the fact that 74% of fires occurred between the months of November and March, colder months when the plant would be in full operation. Electrical fires constitute the largest single category, and probably the largest single factor here is the overloading of circuits. Most libraries operate with a considerable number of outlets not originally contemplated in the electrical plan designed by the engineers, or used many more pieces of equipment on a single outlet than the circuit was designed to handle.

Incendiary Fires

Over the ages there have been many instances of arson, instances that have been proved, but there are far more in which there was a more than reasonable suspicion of incendiary origin. In recent years, during the late 1960s, a period of unrest on the campus, the number of deliberately set fires rose sharply.

A perusal of *Library Literature*, 1969, under the heading "Fires" indicates that there was more than a suspicion of arson in the fires of that year:

"Another fire at Indiana library."

"Arson at N.Y.U. library."

"Bombed libraries."

"Hartford Branch Library burned in September riot."

"Photographs of the N.Y.U. Engineering library, University Heights, following a series of small fires."

On February 17, 1969, a few months before the books were to be moved to a new library building at University of Indiana, a \$500,000 fire broke out in a subbasement where domestic and foreign newspapers were housed (3). It was determined that 3,811 volumes of newspapers were totally destroyed as were several hundred reference volumes. About 30,000 additional volumes were damaged by smoke, heat, and water and would have to be rebound. Arson was suspected. On May 1, a second fire occurred, a fire in which approximately 40,000 volumes were destroyed and another 27,000 damaged by smoke, heat, and water (4).

A "Molotov cocktail" (fire bomb) thrown on April 19, 1969, into the basement of the Gould Memorial Library on the Bronx Campus of New York University resulted in a fire that damaged an auditorium and its equipment extensively. In fact,

it is reported that the fire burned so fiercely fifty firemen were used to bring it under control. Fortunately the more than 300,000 volume book collection in the building was not damaged.

At the University of Washington the third and fourth floors of the engineering library were subjected to "a very hot, sooty fire" which broke out about 11 P.M. on Friday, February 22, 1970. Fortunately the fire did not spread beyond a small area, but about 40,000 volumes were subjected to the ravages of heavy, greasy soot. It is interesting to note that even though books were not burned, plastic spiral binding "dripped away" in heat that was estimated at 700°. Of more concern was the melting of plastic light fixtures that resulted in "festooning much of the collection in cobwebs of plastic."

Fire Damage

The most common expectation of damage in a fire is partial burning or total consumption of books. Less often considered but also very destructive of books and other library materials are smoke, heat, and water. Smoke will leave an unpleasant odor that may inhibit use but even more destructive is the heavy soot that frequently soils the book to the extent that it probably is no longer usable and must be discarded. The heat that accompanies smoke may make the paper so brittle that its life is considerably shortened. As destructive as flame itself is water. It is to be expected that in extinguishing a fire a certain number of books will be lost because of soaking, but far too often major damage comes from the use on fire hoses of pressure nozzles as opposed to fog nozzles.

Fire Prevention

To have a fire it is necessary to have heat, oxygen, and fuel present. Produce ignition and there is a fire. It follows that if any one of these elements is eliminated before ignition can take place, there can be no fire. It is important, therefore, that a building be constructed of fire-resistive materials and that areas be so broken up that there cannot be a free flow of oxygen in a tunnel or chimney effect. Good housekeeping and operation become important factors here. One way of achieving a sensible and effective operation from a fire prevention standpoint is to devise a chart or check sheet that is reviewed at regular intervals. The assumption that good fire prevention practice continues to be followed once it has been set up has led to disaster more than once.

Despite check sheets and periodic inspections, fires will still occur though at far less frequent intervals. It is essential, therefore, that adequate firefighting equipment be on hand to insure early control. Portable fire extinguishers and fire hoses in wall mountings and cases should be readily available, and usually are in newly constructed buildings.

Large libraries are now installing fire detection equipment. Now available are pneumatic fire detection units, ionized particle fire detectors, and smoke detectors. Each of these sets off an alarm either in the building, at a fire department, or both. Smoke detection systems are designed also to shut off ventilation equipment to reduce the volume of moving air and, therefore, the amount of oxygen feeding the fire.

In department stores, in warehouses, and in other areas in which there is constant danger of fire, fire regulations usually call for the installation of sprinkler systems. A sprinkler system is simply a series or network of pipes that are connected to the building's water system. At regular intervals the pipes have sprinkler heads that have a soft metal that will melt at a predetermined temperature. When that temperature is reached the metal melts and water is discharged over a circular area. There is also included as part of the system an alarm that will call the attention of the occupants of the building to the fire and will also summon the fire department.

This latter system is by far the most controversial type of fire controlling equipment so far as librarians are concerned. With rare exceptions they have resisted such installations, for to most of them damage by water seems a far greater hazard to their collections. Where local ordinances have mandated sprinkler systems for the class of buildings into which libraries fall, they have sought variances or permission to substitute smoke detection systems with an alarm at fire department headquarters.

In 1959 the New York Public Library and an insurance firm set up a test situation in Norwood, Massachusetts. An installation of a four-tiered stack in the New York Public Library was duplicated. In a test the 14,000 books on the stack were set afire. Sprinkler protection was provided in this test and a very large part of the books turned out to be salvageable. A second fire with the same number of books in the stack and the same ignition but no sprinkler protection became "a blazing inferno" in 5 minutes; in 9 minutes the blaze had enveloped the four levels of the stack with the "temperature at the top . . . over 1400 degrees" (5). In October 1960 it was announced that the sprinkler system would be installed in the New York Public Library stacks. Cornell University was not convinced by this demonstration, however, and the Olin Library was built without sprinklers. The authorities accepted the library's contention that the building's fire resistive materials and control of draft potential would preclude the kind of blaze that developed in the Norwood test where the open stacks served virtually as chimneys.

One other type of early acting protection should be noted: carbon dioxide systems. The gas is clean, does not damage books, and is effective as an extinguishing agent. Its major disadvantage—and it is major—is that the odorless gas endangers human life. For if it deprives the fire of oxygen necessary for combustion, it also deprives the human being of oxygen he needs for life.

From almost the earliest days of libraries, fire has been a threat to their existence. Modern methods of fire prevention have eliminated or developed controls of many of the causes of fires. The number of fires has been reduced substantially, but fires have not been eliminated.

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FRANK B. SESSA

FIRST EDITIONS

Before coming to the matter of priority, it is necessary to define the word "edition." Strictly speaking, it comprises all those copies of a book which are printed at any time or times from the one setting-up of type. This includes those printings which are made from plates. Basically, therefore, it is the re-setting of the type which constitutes a new edition, not necessarily with any new material although this will usually be the case. An important distinction must be preserved between *edition* and *impression*. The term *impression* covers those copies which are printed at any one time; that is, without the type having been removed from the bed of the press.

Both these definitions, here given in their simplest and most abbreviated form, can be extended considerably. This will frequently need to be done when more elaborate problems have to be argued from the basis of such definitions and when this simple approach does not have sufficient depth. It is, however, adequate in the present context.

It will be apparent from the definitions that an edition can consist of several impressions and did so frequently in many periods of printing. The forms would be removed from the bed of the press following the printing of one impression and stored while awaiting their return. It was this removal, and the subsequent lapse of time, which allowed of the possibility of change in the type. Such changes would not be considerable in quantity, certainly not sufficient to constitute a new edition, but they could be important. The nature of any such changes could vary from instance to instance. They would not, in every case, be designed as improvements. Some of them would be accidental and might be corruptions of a better text carried in an earlier impression. The important point is that differences do exist and need to be investigated in order that their importance may be established.

It follows that a first edition must be the first example of the printing of a text "from the one setting up of type." In other words, it is the first appearance of a particular piece of writing. This, as a definition, sounds straightforward. The problem lies frequently in being able to determine which of several printings has priority of issue. In certain cases it is a question of deciding the case on purely bibliographical grounds.

One example of this kind is provided by the early printings of Sir Thomas Browne's *Religio Medici*. In the first edition of Geoffrey Keynes's *A Bibliography of Sir Thomas Browne* (Cambridge University Press 1924), an octavo printing of 1642 containing eighty leaves (Wing B. 5166) was given as the "first unauthorised edition." Another octavo printing, also of 1642, with ninety-six leaves (Wing B. 5167) was given as the "second unauthorised edition." Keynes adds a note (p. 9) to the eighty leaves printing stating:

All previous authorities (Wilkin, Greenhill, Williams) have regarded this as the *second* unauthorised edition, but a comparison of the engraved title-pages in copies of this and the other unauthorised edition (see next entry), which are in contemporary bindings and have never been tampered with, shows that the plate is quite fresh in this edition and perceptibly worn in the other, which must therefore be the latter of the two.

In the *Times Literary Supplement* for April 18th, 1952, Sir Geoffrey wrote a letter reversing the order of these two unauthorised editions. This still left unchanged the position of the "true" or at least the "first authorised edition," another octavo printing dated 1643.

Other problems are those which arise from the fact of different forms of publication in the early stages of a book's history. The dilemma is particularly apparent in the category of book issues sometimes known as "pre-firsts." This is obviously an impossible and illogical term but in the special circumstances it has some merit. It covers such difficult and controversial items as "trial issues," "copyright editions," and part-issues." John Hersey's *Hiroshima*, for example, was first published in the issue of *The New Yorker* dated August 31, 1946 (pp. 15-60). Does this constitute the first edition of the work or does that title go to the first appearance of the text in hardback form? If it is the latter, as most people would urge, then it is possible

for the text of a work to have been read by a wide general public before the appearance of "the first edition." This must appear to be a somewhat unusual state of affairs in the simplest terms of the expected use of the language. For this reason it is sometimes suggested that the wording "first printing" might be used on these occasions to distinguish from "first edition." Sir James Barrie's *Farewell, Miss Julie Logan* appeared first as a loose supplement in *The Times* newspaper on December 24, 1931. Again this predated its publication in book form. Ernest Hemingway's *The Old Man and the Sea* appeared on pp. 34–54 of the issue of *Life* dated September 1, 1952. Truman Capote's *In Cold Blood* appeared first in four successive issues of *The New Yorker*; September 25, 1965 (pp. 57–166), October 2, 1965 (pp. 57–175), October 9, 1965 (pp. 58–183), and October 16, 1965 (pp. 62–193). Many other examples of cases such as these exist in contemporary writing apart from the legion of examples from nineteenth-century literature.

Of these the best known example is probably Conan Doyle's *A Study in Scarlet* which first appeared in *Beeton's Christmas Annual* for 1887. In such instances, with periodical appearance preceding book issue, there is an increasing likelihood of textual changes having been made between the two appearances. This means that the text which is nearest to the author's original intention, a phrase often used to justify the importance of first editions, will probably reside in the periodical issue. There is a clear and distinct difference, though not necessarily less interesting, if the "pre-first" issue is in an abridged form. An instance of this is Richard Hughes's *High Wind in Jamaica* to which one whole issue of *Life and Letters* was devoted in 1929.

A second kind of problem in determining the exact status of a particular piece of printing springs from the habit of publishers in issuing a form of the book prior to normal trade issue. One modern reason for this is to have copies, usually of the text in its final proofed form and printed on an inferior paper, available for trade use in various ways. These are widely known as "advance copies." Another example comes from "copyright issues." In these cases a few copies were printed in a country other than that of the book's origin in order to secure copyright there. The practice has been particularly common in Anglo-American publishing history. For example, ten copies of R. L. Stevenson's *Master of Ballantrae* were printed in the United States in 1888, a year before its first English printing. The further development of this is found when a full normal edition of a book is printed, with priority, in a country other than that of its origin. For example, the English printing of Louisa May Alcott's *Under the Lilacs* preceded the American printing (Blanck 187 and 188). The English printing of Fenimore Cooper's *The Prairie* preceded the American (Blanck 3834 and 3836). In the reverse geographical direction, the first American printing of Thomas Carlyle's *Sartor Resartus* and the first American printing of Wilkie Collin's *The Woman in White* both preceded their respective English printings. In situations such as these, one is left with the basic question: "Which is the first edition?"

If examples such as the foregoing are relatively unknown, one other category of "pre-first" has achieved considerable renown. From the middle of the eighteenth

century onward there was considerable use of "part-issues." The climax came between the appearance, in parts, of *Pickwick Papers* in 1836–1837 and of *Daniel Deronda* in 1874–1876. Publication was at weekly, fortnightly, or monthly intervals, and the complete work would occupy up to approximately twenty-four parts. Normal book publication would follow the completion of the part-issue publication.

The "first edition" cult, as it has somewhat unkindly been called, is sometimes difficult to understand. Much "book collecting" consists of the accumulating of first editions. In cases where it is applicable, this will normally mean "the first impression of the first edition"; in other words, the earliest form in which a book reaches the public in regular published form. It may be nothing more than fickle fashion which dictates the, at times, exorbitant prices which such items can command in the sales rooms. No one expects fashion to be in any way reasonable or logical.

Aside from fashion, however, it is the earliest published version of an author's text which is of special interest and concern, and the one from which all later amendments will spring.

ROY STOKES

THE FLEURON

The Fleuron. A Journal of Typography, consists of seven numbers issued between 1923 and 1930. Number I was issued in 1923, II and III in 1924, IV in 1925, V in 1926, VI in 1928, and VII in 1930. The journal was named for a type of printer's ornament called fleurons or printer's flowers. One of the first articles discusses the origins and use of fleurons (1).

Although the number of copies produced varied from issue to issue, there were usually 1,100 to 1,200 copies issued on commercially produced paper with an additional 120 to 150 copies produced on handmade paper.

The first four numbers were edited by Oliver Simon and printed at the Curwen Press, London. Oliver Simon was then typographer for the Curwen Press (2). The last three numbers were edited by Stanley Morison and printed at the University Press, Cambridge. However, Stanley Morison contributed to all seven issues and it is his name that is most closely associated with the journal. In 1922 Stanley Morison was associated with the Monotype Corporation. In 1925 he became typographic adviser to the Cambridge University Press. He became typographic adviser to *The Times* in 1930, and during his association with it he designed "one of the most successful of modern typefaces, Times New Roman" (3). He was the most influential of the twentieth century typographers and it was through *The Fleuron* that he first advanced his ideas concerning typography.

The editors decided, after the production of the first issue, that the subject could be covered in a limited number of volumes and that therefore "*The Fleuron* should be limited to a maximum of seven numbers" (4).

One of the purposes of *The Fleuron*, and the most important from the current point of view, "was to discuss problems of type, page and book design in greater detail than was possible in any existing trade paper" (5).

The emphasis throughout the journal is on contemporary book design and production, both in England and abroad. There are general surveys, by country, of current printing; for example, "Czechoslovak Printing" by Method Kaláb (6) and "Tendencies in German Book-Printing Since 1914" by Dr. Hanna Kiel (7). There are articles on contemporary printers that include checklists or bibliographies of their work; for example "D. B. Updike and the Merrymount Press" by W. A. Dwiggin (8), "On the Work of Bruce Rogers" by Frederic Warde (9), and "The Work of Karl Klingspor" by Julius Rodenberg (10). All of the articles about contemporary printers and printing include excellent examples.

Probably the most valuable essays are those written by Stanley Morison. An outstanding series is that on cursive type which covers the history and development of cursive typefaces and ends with Morison's recommendations for a slanted Roman face (11). Morison's best known essay, "First Principles of Typography," first appeared in No. VII of *The Fleuron*. In this essay he says that "In all permanent forms of typography, whether publicly or privately printed, the typographer's only purpose is to express, not himself, but his author" (12).

Of particular interest and value to the current student are the typographical reviews that evaluated both commercial printing and new type faces. In the analyses of type faces, gatherings utilizing the type face have been hinged into the volume. For example, there is an octavo gathering set in types of Fournier's design as revived by the Lanston Monotype Corporation (13); another octavo gathering utilizes types designed by F. Pastonchi issued by the Lanston Monotype Corporation (14). All of the examples were designed for use in *The Fleuron* and many were set by the Cambridge University Press. Accompanying each example is a criticism of the type face and a discussion of its utility. This was a recurring feature of *The Fleuron*. The reviews are unsigned.

The Fleuron is itself an outstanding example of excellent book production. It is copiously illustrated. Many of the illustrations are examples of typography and have been reproduced by letter press and therefore afford far finer examples than could otherwise have been achieved.

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MARTHA L. MANHEIMER

FLOATING LIBRARIANS

The floating librarian is a community librarian. Since the beginning of the public library movement in America, many librarians have emphasized community development (1). But more often than not, the role of such community librarians has been narrowly conceived (2) as largely doing public relations for the infrastructure of library and information science. Recently the floating librarian has emerged as a communications change agent (3). The younger members of the profession have turned the community worker concept into a people oriented professional role and renamed it the floating librarian. The floating librarian is a change agent working on behalf of people, whereas a traditional community librarian appears to be largely a public relations worker.

The idea of the floating librarian is a revolutionary development and entails more than is implied by the concept. It is essential to point out in this article not only the present status of the floating librarian, but also its historical antecedents as well as locate the entire development within the broad confines of the community development enterprise (4). Wright (5) has surveyed the role of the library as a coordinating structure and McClusky (6), among others, has provided a rationale for community organization and development as the basis for wide citizen involvement:

A comprehensive program of adult education should serve the interests of the entire community. Potentially it must be accepted by all groups and must be as universal as possible in its appeal. Adult education, therefore, is too large for any one agency. It requires the combined planning of all organizations and the coordinating service of some group continually investigating, planning, and acting in the interests of the community as a whole.

At a time when institutions, agencies, and organizations struggle to establish a "relevant" interface between themselves and the community, the role of the floating librarian is of considerable importance to the leaders of the library and information profession. This is particularly the case today when the function of the satellite group, whose purpose was to cushion and interpret the impact of an agency upon the community, is being seriously challenged by concerned citizens in all socioeconomic and cultural levels (7). One has but to review the literature (8) of "friends of libraries" (9) to realize how little relevance this one type of satellite group has for a wide range of concerns and interests of people actually living in the contemporary urban community.

The role of the floating librarian and information specialist has emerged in the profession as the coalescence of several, and often disparately, perceived developments. In essence, however, the floating librarian functions as a communications leader (3). The role of a communications leader has been explicated if not formally defined by Hall (10). According to Hall, the communications "elite" is a self-selected group of comparatively few individuals who by their communicative efforts move a community or a society from an informal to a formal awareness of fundamental social issues. The floating librarian is a community communications librarian.

Communication bears an organic relation to society (11). It is not separate from the rest of society. It is really society communicating and varies in function more in degree than in kind. Communication, whether in a modern state or a traditional one, handles the cognitive business of society. It passes back and forth the danger signals of rising strain, the need signals and the opportunity signals (ways to satisfy needs) as well as the decision signals by which any organism tries to maximize its desired functioning, to minimize the associated stress and strain, and to maintain a satisfactory working balance inside and outside in the society. At any moment in the history of society the function of a communicative profession (12) is to do whatever is required by society.

It is one thing to claim the role of a communications profession, and thus perhaps obtain a reputation for leadership, but quite another to perform as a communications leader as Hall has considered the function or as Stone (13) envisioned the role of the floating librarian many years ago. In one 7-year period after Hunter (14) created a vogue in the analyses of the reputation for leadership, over 500 studies were made in this one aspect alone of community leadership (15). Probably no fewer studies have been made of the dynamics of leadership as indicated by Hare (16) or in the Berelson compilation (17) of research findings. The point is, where should the emphasis be and what is its significance for the development of library and information science?

In the literature of mass communication, considerable research has been undertaken on that role of the community structure which extends the influence of mass communication (18). Opinion leaders not only influence mass media, but through organizations and other reference groups deepen that influence (19). Earned leaders within the neighborhoods continue to propel these and other influences through the talking chains or channels. The floating librarian must understand community structure (20) which may be perceived as a constraint upon his activity but which in actuality is a considerable help in implementing his program development.

Community development (21) is the social method used by society to help develop the material well-being of all peoples. It is also used as a means of preserving or developing and enhancing democratic processes and principles. Community development may employ two general methods which can be used to meet interests and solve problems in the sociopolitical collective. On the one hand a market decision can be made in which all of the individuals involved decide on a course of action. In order to do this, for example, without collective organization and planning, the decision is made on the basis of numerous (perhaps thousands) of independent votes recorded in a poll (22).

On the other hand, administered decisions are made by a few individuals in the sociopolitical infrastructure who are representative of, or empowered to act for, the collective through some form of organization. Leadership of a type may be involved in the administered decision even though it may be difficult to describe it as communicative leadership. In any event the study of community infrastructure is essential for the floating librarian who otherwise may remain naive about how things get done in the real world of urban politics (23).

The infrastructure upon which library communication rests reflects the structure and development of society (24). The size of the communication activity (mass media and their audiences, the transfer of the individual communications roles of traditional society to organizations, the stretching out and the multiplying of communication chains) reflects the economic development of society. The ownership of communication facilities and the purposeful use of communication as well as the controls upon communication reflect the political development and philosophy of that society. The content of communication at any given time reflects the value pattern of society (25). The patterns of communication networks, which determine where information flows and who shares it with whom, reflect the homogeneity of the culture within a society.

So much for a brief identification of community structure as one constraint upon the communications leader. There is another set of constraints within which the floating librarian operates. These stem from the infrastructure of library and information science. However, infrastructure standards have been developed which are based upon generalized models of information effectiveness and utilization. The first model (26) is a generalized theory of a communications infrastructure upon which communications standards can be based to guide the floating librarian in the community. Resources are available through the infrastructure so that communications can be used to help prepare people to play new roles in expanded

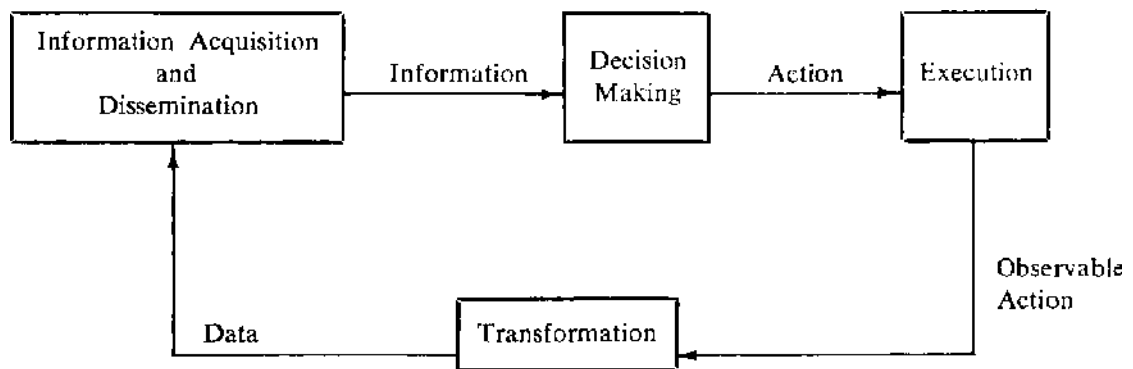


FIGURE 1. *Infrastructure of communication.*

community development and organization. As indicated in Figure 1, there are four essential functions: acquisitions and dissemination, decision making, execution, and transformation.

Library agencies and their services constitute the most natural and functional coordinating structure in the community. No other agency has as broad a mandate from the people nor an influence more fundamental than library service. The recognized elements of a coordinating structure constitute the essential foundation of librarianship regardless of type of library within which it is practiced.

A service institution such as the library must be closely related to its constituency, to the predominant interest of local people, to their beliefs and aspirations, and to their problems. The library must know of, and work with, the organized groups and established institutions which the people maintain. It must study other sources of information and ideas and avoid unnecessary duplication of existing facilities while supplementing and filling gaps in the available intellectual resources (27).

Each community has many agencies and institutions organized to achieve social purposes or to give opportunity for expression of varied interests (4). Some of these agencies are of such fundamental importance that society gives them legal status and sanction. The library is an example of such an agency which since 1850 in American society has moved from a purely voluntary, associational type into full legal status and support (28).

Back in the mid-nineteenth century when the social library was established, hopes ran high for it as "the people's university." At best the library has served the reading needs of that small proportion of the population which seeks it out. Despite any mythical expectations to the contrary, the floating librarian has succeeded in becoming a change agent for the total *educative* community. As a result of the Library-Community Project, librarians have learned how to participate in community life (29). However, the motivation to do so has not until recently been supplied by younger members of the library profession who are in the process of explicating the role of the floating librarian.

The generalized model of a communication infrastructure identified above is of itself not sufficient to explain the range of involvement and functions of the community change agent. A second model is needed which is based on interpersonal communication and the dynamics of community encounter. It is cybernetic (30) and provides not only a basic understanding of information surprise for the floating librarian, but also a method of comparing one communication system with another. The essential components of this model within which the floating librarian operates are indicated in Figure 2.

In order to realize the potential of the floating librarian, it is necessary to move from the bounded finite infrastructures of library and information science to interactive communication systems in a dynamic environment (31). Infrastructure considerations grow out of an emphasis upon a service distribution and information transmission, precisely those aspects which in any other area of human endeavor would be called a service occupation. For the floating librarian, however, the emphasis is on the use of information for socioeconomic, political, and cultural purposes. Based upon knowledge as codified in the social sciences and in particular communication science (11), there are a number of assumptions underlying the role of the professional change agent:

The function of criticism keeps the social system under control in terms of community objectives.

Power structure response to continuous citizen criticism follows an ordinal distribution: (a) agreement and well-wishing; (b) committees and/or commissions are appointed; (c) economic and/or legal action occurs as a result of committee or commission reports.

The number of people involved in decision making varies directly with the range of contacts in the communication system.

People are willing to use information as a social resource to the degree that it is perceived as an essential ingredient in decision making.

The encounter situations which develop among floating librarians, citizens, and community decision makers are inevitably controversial (32). The traditional librarian's credo of intellectual freedom is but a pale initiation of these dynamic learning situations. Figure 3 shows the range in the cycle of interactions which can occur (33). The influences, decisions, and results indicated in Figure 3 are parallel to the preceptor, interpreter, and effector components of the cybernetic model of communication. These are diagrammed as shown in Table 1.

The confrontation is between the change agent professions like floating librarianship and the community power structure (see Figure 4). In either instance, social power is the ability to satisfy people's preferences. The real question is whether the preferences of people will be satisfied through the negotiation of political and economic leverages or by the opportunity for effective assembly and for facilitated access to appropriate information (34). Cunningham (35) has discussed various common methods for linking neighborhoods to city hall which can be employed by citizens and various helping professions working together.

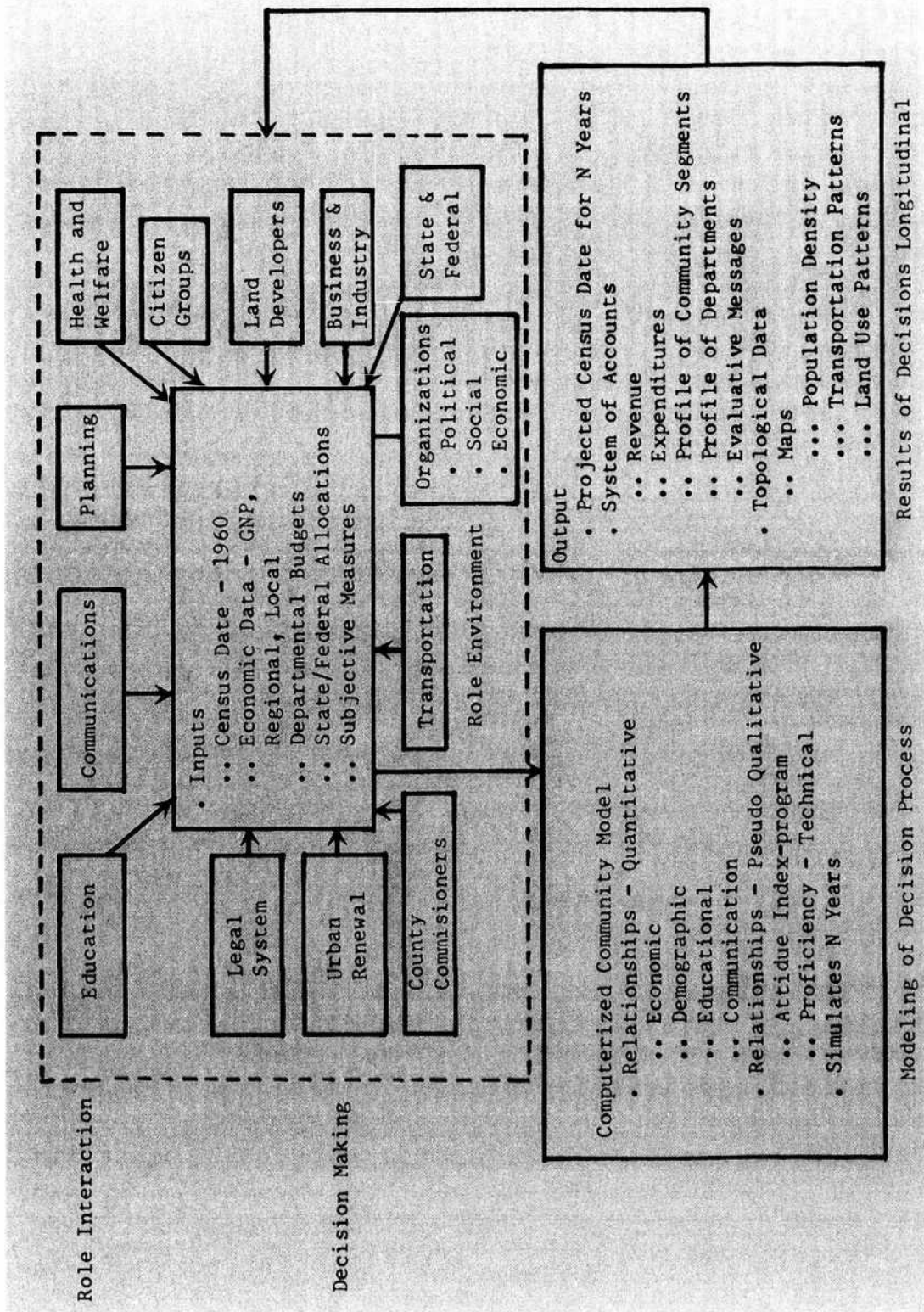


FIGURE 2. Community decision components.

TABLE 1
Cybernetic System Components

Preceptor	Interpreter	Effector
Organized and projected information	Role-structure (off- and on-line)	On-line data matrix
Mass communication Organizations	Cognitive structure: Organized information space	Land use Financial constraints
Talking chains	Affective structure: Power Government Skills structure: Roles people play	Legal constraints Demographic constraints




The infrastructure of library and information science is not sufficient to ensure that information (i.e., retrievable data) will surprise people (36). A mediating profession of floating librarianship is needed to create conditions (or to exploit actual conditions) which will maximize the surprise value of retrievable data. The problem is how to arouse the curiosity level of a target audience (37,38). The audience may be an individual, a group, or a community. This means that information must be made to meet needs and interests. In effect, information can widen the involvement of people in the political and economic power structure. In other words, the floating librarian makes sure that people will pay attention.

The floating librarian in the community develops programs, whatever their names or sponsorship, which stress the citizens' participation in the improvement of their physical and social environment (39). The community development approach stresses process rather than content. Changed attitudes of people are more important than the material achievement of community projects. The scope of community development is more inclusive than adult education and, as a process of improving the common life of the community, it is necessarily educational and informational.

Sociologists have long recognized that the community exerts a great influence on the development of human personality (21). A democratic society depends for its existence upon citizen participation. No better way has been found to achieve widespread and enlightened citizen participation than through involvement in community problems (40). It is here that library programming comes alive and takes on real meaning and purpose for the individual.

In order to nourish the development of a structure through which the community is to be changed, people must become discontented with existing conditions in their community (7). This involves the development of an image of potentiality or maturity not only among leaders but as widespread as possible among all the people. It is the responsibility of floating librarians as community leaders to help develop this discontent and to inculcate the image of potentiality and maturity (41).

POTENTIAL CONFLICT
 Conflict = Two or more groups competing for limited resources, power positions, prestige etc.

 High
 Med
 Low

Direction of Interaction ←

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1 State Administrator		X	X																	
2 Federal Administrator	X																			
3 State Librarian	X						X										X			
4 Fed. Div. of Libraries		X	X				X													
5 County Manager							X	X	X	X										
6 County Planner	X						X							X						
7 County Communications	X	X					X										X	X		
8 Urban Renewal	X						X	X												
9 Anti Poverty (CAP)	X						X	X												
10 HEW	X						X	X	X											
11 Land Developer																				
12 Citizens																				
13 Communications Budget									X	X										
14 " Planner	X						X										X			
15 " Agents-														X						
16 Conventional Librarians			X				X							X	X				X	
17 County Council	X	X																		
18 Council of Librarians							X										X			
19 Tax Association																				
20 Business and Industry																				

FIGURE 3. Community interactive behaviors.

The change-agent librarian seeks to identify and use community interests and problems for the growth and development of people in the community (42). Interests and problems become the motivations essential to the assembling of the *who's* which upon involvement begin to interact with the *what's*. Such is the formula for translating concerns into educational programs. Who needs to know what about this problem? A librarian can identify groups (the *who's*) that can use information (the *what's*) for a community-oriented library service program.

The discontent generated must be focused and channeled into organization. The floating librarian undertakes the task of planning in order to meet unmet needs and to develop potentiality. But it also involves an action program, a program designed step by step to develop the potentialities in the community, as well as human and natural resources (43). The problems of the community are not insurmountable provided librarians employ an appropriate organizational structure (35), the proper procedure, and a fundamental action program through which these specific problems can be solved. There are, in general, three types of community organization (44):

Community institutions include schools, churches, social welfare agencies, business, and the like which perform well-defined functions recognized as necessary

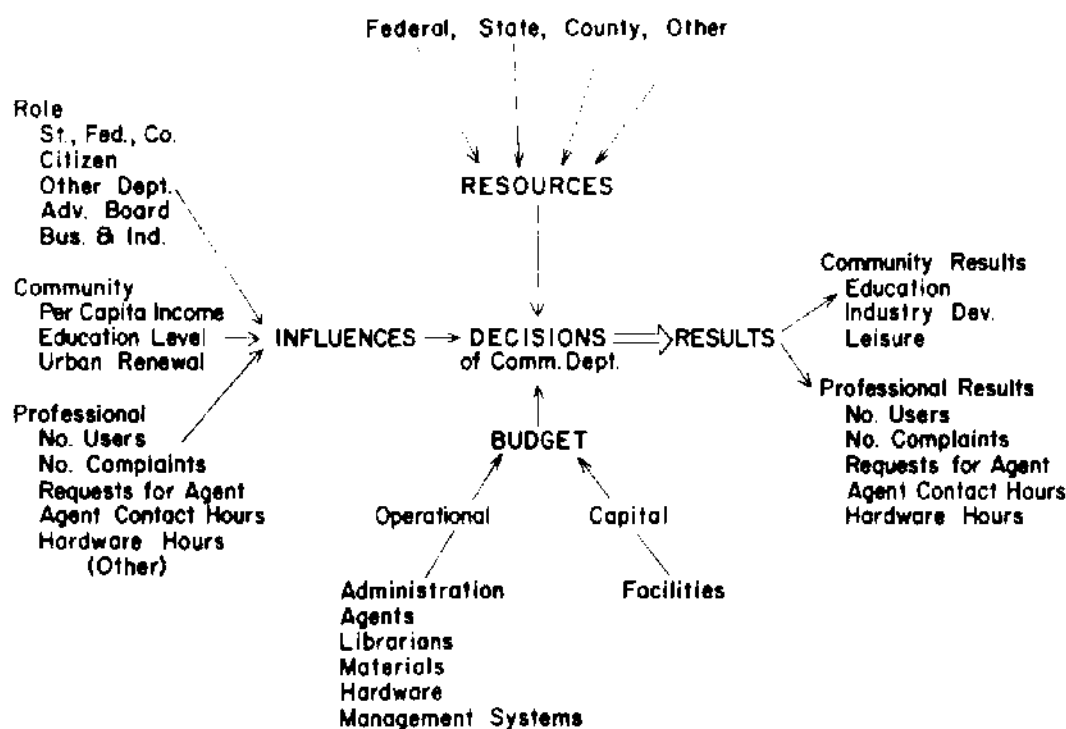


FIGURE 4. *Cybernetic confrontation components.*

and desirable by the community. Community institutions, because of their fixed areas of responsibility, bureaucratic organization, and established patterns of operation, make slow adjustments to changing conditions. They often accept new areas of responsibility only when forced to by public demand. Community institutions are focal points around which organizations known as satellite groups are formed, e.g., PTA, "Friends Groups."

Formal associations include the multiplicity of clubs, lodges, church societies, fraternities, and professional associations. The formal associational structure of the community overlaps and interacts with the institutional structure as well as with the informal groups. Formal associations are themselves engaged in community education and action. They usually have sufficient structure as well as flexibility to meet change and new needs if their purposes are broad enough to permit active commitment to community action.

Informal groups include the complex, unstable, and infinitely varying patterns of social interaction which underlie the formal organizational structure of the community. These activist groups or "talking chains," because of their lack of well-defined structure, are difficult to involve in organized community activities. They are sometimes moved to action by the confrontation tactics of activist groups.

Despite this analysis of community structure, the ability of the traditional satellite group to respond to the real concerns of a wide range of citizens has been challenged (7). There are two major reasons for this concern. In the first place, various studies have indicated that only slightly more than half the adult population are ever actively associated with any type of organization (44). Second, the traditional community structure has more often than not been manipulated by the power structure into positions that tend to ignore fundamental issues in the community.

The power structure is usually composed of the men who have exploited the natural and industrial resources of the community and who have mustered the people into productive work life. These individuals dominate the economic and political life and, according to power structure analyses (45), tend to exert a pervasive influence over the entire community in the following ways:

Keep the formal associations talking about goals and objectives and involved with welfare and civic projects peripheral to fundamental problems.

Ensure that fundamental problems are not discussed widely in mass media or in organizational meetings.

Isolate (ignore) the professional worker from the small group in the upper reaches of power; he himself all too effectively isolates himself from average citizens.

Keep the underlying population, not normally members of formal organizations, from having effective channels in order to voice their demands.

It should not be concluded that the relationship of the power structure is one of overt domination or that it consciously exerts a malign influence. It does not operate with the formality and structure of a dictatorship, but the tendency towards structure usually increases in the absence of community endeavor and toward a lack of widespread freedom of communication and education. In fact, the power structure has had to take action because most communities lack floating change agents who can involve the community in policy determination that takes into account the interests of people themselves (46).

The library enjoys a unique place in the institutional structure of any community (20). As an agency of the people it is nonpolitical, upholds no particular interest, and subscribes to complete freedom of communication and education. Consequently, floating librarians have the infrastructure base from which they can the more readily work with both the power structure and the community for a better democratic way of life for all.

The floating librarian uses the community coordinating structure (i.e., library service) to support and strengthen the existing organizations in the community (47). At no time should there develop a feeling of competition between them and any special interest group in the community. In fact, one of the major purposes is to develop participation in special interest groups and to develop effective leaders not only for its own organization but in all other organizations in the community. Each individual citizen should be studied carefully in order to understand his or her potentiality for leadership (48). Many people cannot perform effectively in one leadership position but can do so in another. The floating librarian seeks out, trains, and develops leadership capacities to the fullest degree possible in every individual in the community.

Developing Concept

In the minds of many librarians and information specialists, the idea of a floating librarian remains as a concept under development (49). This is to be expected where

there is a considerable time lag between traditional library and professional developments in response to the discontent of emerging neighborhoods as well as demands for lay control of community libraries (50). However, Martin (51) has maintained with some emphasis that the librarian has an essential responsibility as a politician. Lincoln (52) has proposed a pyramid theory for winning library elections based on wide community support. In any event, the imperative of social responsibility is before the profession (53). Without librarians who "float" and interpret information for people wherever they may be, the concept may disappear from the profession for lack of realization.

In any event, the concept of the floating librarian is not particularly new in the history of librarianship, even though the term itself may be of recent origin. Originators of the idea include Learned (54) and Wheeler (55) who in 1924 vigorously propounded the idea of a community librarian who was both an educator (Learned) and a politician (Wheeler). Actually the public library in the United States was founded on the principles of continuing education (56) and community involvement. But it is interesting to speculate as to why these principles lay dormant for so many years. Indeed Ditzion (57) may have identified the problem when he considered that librarians were merely being shrewd in using this objective in order to win better support:

For library interests, humanitarianism was too often a tactical approach to the sympathies of persons of influence. It was, to be sure, psychologically sound to appeal to human and social values shared by Americans in all walks of life.

In any event, neither the 1876 report on libraries (58) of the U.S. Office of Education, which was a collection of papers about library service, nor Maddox (59), in analyzing the first 10 years of the proceedings of the American Library Association, seriously discuss the role of the librarian in the community. Although there was a brief attempt during the first decade of the nineteenth century (60) to make the university and its library the center for continuing adult education, no library until the 1920s made any serious effort to define its role in the community. Librarians in the first quarter of the new century were apparently more concerned with the expansion of basic services such as buildings and book collections than in developing community-wide services (61).

To a considerable extent, the history of the librarian in the community is the history of public library adult education (1). It was not until 1924 that the first attempts were made to provide a rationale for community services. Wheeler (55) considered community public relations to be essential in order to keep the library before the public and to induce citizens to use the library's resources. Learned (54), on the other hand, saw in the library a community intelligence service based on an aggressive, socially interpretive role:

The similar task of community analysis confronting the staff of an intelligence center is quite as preponderant, and covers an immensely wider range, both of personal and group interests, together with a far greater variety of mental attitude among its beneficiaries. Its business is not only to answer but to raise educative questions in as many minds as possible.

One of the first compelling statements on the library in the community was the collection of papers edited by Carnovsky and Martin (62). For the first time, one begins to sense the merger of two trends which had been developing concomitantly: the importance given to community study by Wheeler (55) as a basis for library service, and the emphasis upon an educational role of the library by Learned (54). The central purpose of these papers was to counteract the habit of thinking of the library in terms of its infrastructure as distinct from function.

By 1950 the Public Library Inquiry has finished its long and exhaustive search into every phase of the public library. As a result of the general report (63) it was possible to define the general role of the library as a coordinating structure (2) in the community. However, any myths which had been developing about the effectiveness of the librarian in the community were rapidly deflated. Based on what apparently is the first research study of the librarian as change agent (61), librarians at that time were not notably oriented towards action in the community.

It should be obvious in this presentation and in other surveys (2,64) that the major emphasis in previous discussions of the library in the community focused upon the library as an agency and not upon the role of the librarian as a *change agent*. Walter Stone (13) was apparently the first librarian to make this important distinction. Almost immediately thereafter, the Asheim report (65) made an attempt to elaborate this new role for the librarian in terms of the training needs for knowledges, attitudes, and skills needed by the community librarian.

However, it was not until the Library-Community Project (29) that a concerted effort was made to train librarians for action in the community. There were a number of hypotheses which this field research project was designed to test. The major hypothesis held that librarians and trustees could, through involvement in the project, learn to work more effectively in the community. A number of situations were created to help a few "pilot" librarians to realize this objective.

The results of the Library-Community Project have not been realized (66), principally because no theory of communication compatible with professional objectives was available to explain its contributions. This situation has been remedied, and a theory is available (67) which is general enough to include the library and information sciences as well as their professional competencies within the gestalt of human endeavor. A research vehicle has been developed and its potential for canonical and experimental research design has been described (30,33).

In the meantime there have been several movements for change at the professional level. As a result of the Congress for Change in 1970 a number of these movements began to coalesce. In her challenge paper at the Congress, Bundy (68) outlined some of the competencies which the librarian as change agent would need. The same theme has also been expressed by Garrison (69). As far as can be determined, Bundy was the first to use the term "floating librarian" for the librarian as a change agent.

Of course, the concept of the community change agent is not new. Agricultural Extension has developed the role of the rural community change agent over a period of more than half a century (70). In 1950, Sanders (40) "popularized" the

competencies of the community worker in dynamic situations. Burke (71) and Duncan (72) have developed a model of social interaction that is more functionally oriented than the infrastructure model of Parsons (73).

There are two historically influential sources for the role of floating librarian in the community: (1) the recent dissatisfaction with the profession among younger librarians which emerged in the 1960s and eventually found expression in the Congress for Change; and (2) the sociological inquiries of the Chicago Graduate Library School of the 1930s and 1940s which were eventually applied to the profession in the American Heritage and Library-Community Projects of the 1950s. Waples study, *What Reading Does for People* (100), remains as a major seminal approach to a model of communication for the community librarian.

During the mid-1960s two projects were undertaken, the New Haven (74) and the Brooklyn experiments (75), which were catalytic in channelizing the general dissatisfaction with the librarians role in the community. In New Haven a social worker was employed in one branch (74), while in Brooklyn professional librarians walked the streets (76) in an effort to make library service relevant to people who had not previously used the libraries. These developments were related to the war on poverty (77) which is a social imperative for the floating librarian.

Another movement which developed during the latter part of the 1960s was based on the concept of social responsibility (39) and received formal recognition in the New York Social Responsibilities Round Table. Although localized in the New York area as the result of the controversy over community control of the schools in Ocean Hill-Brownsville (78), the movement towards social responsibility received widespread attention. An attempt was made during 1968-1969 to have the American Library Association accept the Social Responsibilities Round Table as part of its formal structure (79). But the bibliographic pentagon in Chicago was not able to respond that rapidly to the wishes of its younger members and a Congress for Change was called, June 20-22, 1969.

In general, the Congress for Change was a speculation on the role of the floating librarian as an independent information agent in the community and appeared to endorse the twin propositions of Bundy's "manifesto" (68): decentralized and lay control of library service as well as advocacy to achieve the library rights of people in various settings:

One advantage to working for himself or for a client group would be that he could more effectively place demands on libraries and other information services to which his clients have rightful claims. He could indeed assume an advocacy role for his clients, being deliberately troublesome when a library did not readily supply services or information to which he as representing his client is entitled.

In the meantime another development was realized at the Graduate School of Library and Information Sciences, University of Pittsburgh. It was perhaps less dramatic in form than the social responsibilities round table movement but carries far-reaching significance for the profession. A seminar was initiated in the fall semester 1969 to teach the role of the floating librarian in the community. The

seminar continues to be based on involvement of the participant in defining his role both in an actual and in a simulated community.

As may be expected, involvement in the simulated community proved to be the more valuable learning experience for participants. The encounter model of decision making upon which the training is based involves librarian participants in the organizational and interpersonal effects of information transfer in governmental, management, and community decisions. The training model for the floating librarian has considerable significance for the profession. It incorporates within its design the revolutionary fervor of the professional "turks" and the historical antecedents for community involvement which the profession has been endeavoring to implement over the years (3) as well as the theoretical constructs so desperately needed by a library and information profession (67).

In the summer of 1970 an institute on the floating librarian was held at the Graduate School of Library and Information Sciences, University of Pittsburgh. The institute was funded by the Bureau of Libraries and Educational Technology of the U.S. Office of Education through its librarian training program. For the first time in the history of library education professionals in the field who had been innovative in some elements of the role of the librarian as a change agent, as well as communications theoreticians and researchers, were brought together in a dynamic encounter.

Floating Librarians in the Community (3) is the first formal record of the validation of the instructional and research vehicle available at the Graduate School of Library and Information Sciences, University of Pittsburgh. In the meantime the work of verification continues (30) as the problems of measurement (80) (nominal, ordinal, and interval) are solved and explicated, and the instructional enterprise for librarians and information scientists (33) also continues (1972).

The floating librarian, both as a concept and as a function, is related to the idea of an ombudsman or an advocate but in a sense that makes this type of function appropriate for librarians. Even though appropriate, it is still highly controversial to maintain that the librarian has responsibility for the surprise value of the information provided to his client. Consequently, the literature which exists about the floating librarian is scattered under a number of headings in the professional indexing service (81).

There have been various stirring calls to social action which have been widely discussed in the library profession, such as those by Johnson (82), Stone (13), and others. Blakeley, however, has expressed the current challenge to the social responsibility of librarianship. According to Blakeley (39), librarians have a choice but have yet to commit themselves. The choice is

between continuing to try to flee individually from our common problems and turning to face them together; between continuing to behave like passive victims of social forces and trying to act like positive agents in their control; between continuing to live in accord with the "four walls" philosophy or beginning to live in accord with philosophy of community renewal.

Recognizing that limitations exist in the traditional approach of library standards for public services, a few adult services librarians have a bill of rights for adults (83,84) under development. While a step in the direction of improved services, it does not get at the fundamental problem of taking responsibility for, and leadership in, identifying the behavioral outcomes sought by the continuing learner. If only Wheeler's objectives (55) were realized, public relations methods could serve for initial communications programing (85).

It appears that library service to the disadvantaged has captured the attention of today's librarians in a way similar to the emphasis on service to the foreign born which preoccupied the librarians in the first quarter of this century. The priorities in service to the foreign born have shifted to those who are also disadvantaged (86). During the period 1964-1968 over 250 articles appeared in library literature about public library service to the disadvantaged (87). This literature is descriptive of what librarians have been doing in developing services (88). While it is not critical, the very nature of the services demanded and provided have since then led a number of librarians to consider advocacy as a basic role for the profession of library and information science.

A careful distinction is required between information science and communication (89) in order to understand and appreciate the change agent potential of the floating librarian. The surprise value of information is essentially entropy-reducing if and only if the information transfer endeavors of library and information science become situation-producing professions (12). The floating librarian defines this function for library and information science.

The library qua library has the potential to be a major entropy-reducing influence in the social structure only in a latent manner. The ideas contained in the documents may make the library the "hottest spot in town" (90) but the potential will not be realized until more floating librarians create situations that will make people dissatisfied with present library services. Traditional library service has, of course, organized that part of information space (i.e., the published record) which is most amenable to logical organization but which is least sought after for information surprise by most people. There is a whole area of information space developed and determined by the present moment, the immediate past, and the impending future (futurology) which not only remains unorganized but is avidly sought after by the majority of people. In these areas information surprise means power.

Power is an inescapable factor in the affairs of men. Whereas power in the physical sciences is the energy to do work, power in the social realm is the ability to satisfy wants. Conceptually, the floating librarian has unlimited power and is constrained directly only by his ability to organize the totality of information space and to create conditions wherein information surprise can occur for the greatest number of people (34,91).

There appears to be an irrevocable clash between this power to satisfy wants through information and the economic power which governments can exercise in order to ameliorate the condition of all people. Indeed, at this level of development

the library profession is but dimly aware of the problem. Its "precious" so-called contemporary intellectual freedom stance is but an effete and superficial shadow of the confrontation challenges which the floating librarian must face in his daily activities.

The floating librarian as a community librarian has captured some of the enthusiasm and dynamic involvement which has been demonstrated so effectively and for so many years by the Agricultural Extension agents (60). In applying these and other methods to the urban situation, the floating librarian is helping the library realize some of the hopes for it (now more than a century old!) as a focal point for the people's university and as a learning laboratory for the entire community. All life influences can be educational, and to make them increasingly effective the floating librarian has found that many educational forces in the community must be marshalled simultaneously (92,93).

The floating librarian values the role of the activist as an essential and necessary ingredient in the healthy life of any community. While he may upon occasion be an irritant to the majority of moderate citizens, yet without the activist the community would not be as desirable a place to live (7). The activist becomes involved in whatever role that can be counted upon to irritate the public's fancy. His major method is iconoclasm and his patron saint is Thersites of Grecian lore. Whatever proposal is made even in his own group, the activist is vociferous in denouncing it and champions a diametrically opposing position which is, of course, a minority position.

Often the new proposal when it is made and as it begins to shape up, appears to be a concession to radicalism. But as one begins to examine it more closely, one finds that the substance of the proposal remains in the camp of the moderates while the dramatic externals are designed to palliate the wishes of the activist's more radical constituents. Thus the activist and the moderate complement one another, but it takes the moderate to follow through and implement the dramatic and intuitive insights of the activist (32).

The floating librarian keeps his community under continuous review in order to identify the variety of teachable moments which make the *timing* of informational and educational efforts productive. By involving an increasingly wider range of adults in community study, the librarian is determining subject areas in which the library and other community agencies can prepare "units" of program development for "curricular" study (93). The immediate program planning of agencies, organizations, and groups shift in accordance with the progressive, cooperative identification of community problems and interests. The librarian becomes an active educator applying professional insight to community problems where it is needed most, beyond the library walls (94).

The library is no longer just an agency. The floating librarian uses it as a *method* for aiding people to learn continuously. A community related library can promote an improved community-wide background. People learn better and faster when the knowledge sought is closely related to everyday activities in the community (95). This is evident in the fact that the programming of television networks is beginning

to have almost as potent an influence on the citizen as his actual community background (96).

Recognizing their liberal adult education responsibility to the community, librarians also begin the slow process of making it difficult for the majority of people to avoid thinking about the issues in the community and in the world at large:

No matter how well one is acquainted with the community in which he lives, a fresh and searching look, a reshuffling of the available facts, will bring new insights. The process of looking at the community may be regarded as taking stock, an attempt to map the present position before deciding on new destinations. Comprehensive and specific knowledge of the characteristics of the people making up the community, the circumstances under which they live, and the extent and kinds of change that are taking place will help in estimating their capabilities and their interests; it will provide clues as to both the nature and underlying causes of their problems, and those of the community at large (97).

Communities are characterized by the things in which people are interested; the situations, qualities, or conditions they value. Such community values may be hard to identify. But they are important to the floating librarian who is trying to work professionally with the community in any type of informational, educational, or action program. Communications and educational programs are doomed when they simply do not fit into the dominant value patterns in the community (98). The librarian must identify basic values in the community and build his programs in terms of them.

The importance of this kind of community analysis has been indicated by Lester Asheim, "For the kinds of problems which the library is best fitted to study, two major approaches are probably most useful: content analysis and audience research" (99). This involvement of people in activities associated with the library is educational by intent. It is not done simply to overcome the limitations of tax support. Such citizen involvement helps to keep the library closer to all the people. Citizens accept change more readily when they themselves have determined the need for it. The community development approach to information utilization and educational programing, instead of being a mere concession to democracy, is based on sound communication principles and includes the cybernetic and systems models of communication.

Models and Methods

The unique characteristic of the floating librarian is in the role of a change agent. A new dimension is added to the profession when the floating librarian takes responsibility for helping people determine a desirable range of changed behaviors for themselves. The traditional retrieval and program skills which respond to demand are inadequate in the new context (101). Even the concept of intellectual freedom remains an effete notion to people who are disadvantaged and discontent

(102). Such people want advocacy (103) before they can ever be expected to seek out the opportunity to read widely and for self-maturation.

In contrast to the rather passive role of most librarians, the floating librarian has responded more positively to the task of fulfilling human aspiration and accomplishing social purpose. In order to offset the preponderance of bureaucratic elements which are inherent in any infrastructure (104), the floating librarian movement is at the moment attempting to organize its advocacy functions into the more formal role of ombudsman. Citizens who are insecure and lack social support need a professional service to lend them its strength and resources (105). Neighborhood information and other types of centers (91,106) have been developed, but the problems of institutionalization and bureaucracy eventually appear.

To offset the limitations of structure and maximize his role as advocate, the floating librarian may have to be attached to some ombudsman's agency whose sole purpose is to investigate citizen complaints (107). The need for an opportunity to redress individual grievances may be widely recognized (108), but it will not be easy for many, if any, but a select few librarians to transfer from a library to an ombudsman's agency where of necessity materials and bibliographies will have to be eliminated (109). The management of a bibliographic apparatus of any sort would cripple the effectiveness of the floating librarian. As yet, the role of the floating librarian is largely a symbol of the demand for new modes of redress against the large and opaque bibliographic pentagons which operate in the urban communities of America.

Professional reactions to the new social imperative have ranged from injured consternation at the "evident" ingratitude among younger librarians to the *mea culpas* over the lack of social relevance in librarianship (110). A sense of introspection has developed in the profession because the usual training of librarians has not prepared librarians for the dynamics of planned change (111). Indeed the profession at large has never seriously considered the role of the floating librarian, let alone developed models of communication that would lay a foundation for appropriate implementation. As most, the opportunity for change remains a dilemma to the majority of librarians (112).

At one point in the history of community development education it was necessary to raise the discontent level of people in the neighborhoods before much involvement and action would result. But today most community situations have changed. People are already discontent and frequently involved in indigenous action programs. It is rather the librarians themselves who will have to change (113) whether as a salesman, community coordinator, or floating librarian (114).

The social problem cannot be avoided. Individual libraries and especially librarians are struggling to define a role for themselves under rapidly changing conditions (115). Earlier in this century the role of the librarian in adult education was defined in response to the needs of the foreign born and the unemployed. In a comparable way, some aspects of the floating librarian's role are being developed in relation to the problems of the disadvantaged. However, the full potential of the librarian as a deliberate change agent will be but imperfectly realized until more

curricula are developed on the basis of communications research. Certainly more effective methods of evaluating the librarians impact upon the community need to be developed (116).

Other than a few notable exceptions (3), librarians do not generally serve the community as catalysts in order to promote the identification of group interests and problems. The models of communication upon which the profession is presently based do not permit the use of demonstrations and other educational strategies for citizen involvement, nor muster liaison with a wide range of community resources. Many librarians do not understand that funding for library service is a commitment of the *total* community. In much library-community relations, there is a tendency to rush into ill-conceived publicity programs rather than give the community and its groups enough time to become aware of, and informed about, deep community concerns or to discuss their purposes and interests in relation to program development. Librarians need training in community, group, and power-structure characteristics and dynamics in order to overcome insecurity and lack of ability in community development. There is a constant inclination to sell the public publicity programs (117) rather than to understand people's needs and interests as the basis for any community development enterprise contrived for the educational and informational enterprise.

Behind the rhetoric of activism, several young librarian leaders are beginning to apply some of the principles and methods developed by the American Library Association in its American Heritage and Library-Community Projects. Ignored by the profession, these leaders have applied their talents and high creative potential to the overwhelming problem of trying to humanize librarians. These programs in *human* communication have been an opportunity for young librarians to experiment, and inductively to develop principles and methods which are viable in the contemporary community. Out of the activist ferment, the intellectual creativity, and group confrontations sessions have emerged a new emphasis on the professional specializations of the community worker and the floating librarian. In fact, it appears that there are four principal models of the communications librarian in the community (3).

The first model is that of the "outreach project." Outreach or extension services reverse the tendency of many library programs which expect patrons to come to the main or branch building for service. Of course, the concept of library extension is not a new method in the profession. But librarians have recently experimented with a greater variety of techniques, such as storefront libraries, drugstore collections, reading stations, and book vans. In most instances these outreach projects have distributed types of ephemeral and audiovisual materials that until a few years ago were not included in library collections. In addition, the staffing of such projects has included indigenous people who are attuned to the social mores of the neighborhoods.

The second model of the community librarian includes the type of community involvement which was pioneered by the American Library Association through its projects funded by the Fund for Adult Education: principally the American Heritage

Project and the Library-Community Project. The institutional stance developed in this model is grounded in the historical objectives and standards of the profession (33). Community development education is based on the premise that the community is the matrix of a liberal education for all citizens. In other words, the involvement of citizens is a major educational method whose purpose is to create a climate of community life wherein the continuous learning of all people can occur.

The third model is that of the community librarian whose role is not curtailed by regular hours within the library. The daily schedule of this community worker is so freed that he can work to meet the emerging needs and interests of people in the community when and where these occur. The role of the community worker is a catalytic change agent. It may include the role of advocacy but not the function of ombudsman. Exerting information leadership, he labors with those who work for changes that will better all those citizens who are psychologically disadvantaged. This means all community people, black and white, poor and rich; for as Brock Chisholm says, "There are no problems which do not exist, except in the minds of people."

The final model is truly one of the floating librarian whose purpose is to meet the informational needs of his client groups. The floating librarian is an independent information specialist who works outside the confines of institutional support. This type of specialist serves and may be supported by those persons and groups who have need of kinetic information—information whose meaning is relevant to their conditions and their concerns. This role includes the concept of advocacy as well as the concept of the ombudsman. As an ombudsman, the floating librarian could be employed by any office that is established to coordinate the advocacy functions needed by a community. In any event, this professional person is adept at ferreting out information where it lies hidden in any agency, institution, or the most "public" of library infrastructures.

Whichever model of his role, or combination of them, a librarian chooses to use in guiding his activity in the community, the profession at least in "theory" has long held certain social objectives. The community is considered to be a marketplace of ideas as well as a learning center where the citizen may explore divergent avenues of social change. The role of the professional person is to stimulate all the articulation possible in relevant and orderly decision-making processes. Librarians have held to a concept of the community as the matrix of a liberal education for all who participate in its affairs. But it is a concept without substance, an effete individualism which often shrinks from rubbing shoulders with the "unwashed masses."

While there may be several models of the librarian in the community, there appear to be two essential functions of the floating librarian: the advocate and the ombudsman. The function of ombudsman is to coordinate the various advocacy services available to the citizen and to lodge formal complaints. The library has prided itself upon its nonsectarian and nonpolitical role in the community. As such, the library is in an enviable position as the coordinator of information sources and the services of the organized community, but there is a very real question as to whether it could ever serve as a coordinator of advocacy services.

In response to community imperatives, floating librarianship has developed major methods of interface with the community. These communicative methods have been used in an effort to offset the inherent bureaucracy of the professional infrastructure. As distinct from objectives or procedures, methods are the general ways or motivational devices by which a profession creates relationships between the knowledge and information it has to diffuse and the concerns and interests of people (118). The major communicative methods of the floating librarian can be organized around Dickoff's (12) five functional areas in any profession: agency, patron, objective, method, and protocol. Each of these general methods can encompass a wide range of interface communicative activity. Indeed, contemporary floating librarians have experimented with many creative and innovative techniques.

It must be remembered that the following methods are general ways of community interface, or points of emphasis as yet to be achieved in the reorganization of the infrastructure of library and information science (26) in order to support communication services. Each of these methods exists largely in a latent way in the present library infrastructure. These methods need to be given conscious and deliberate attention by library staffs in order to give floating librarians the support necessary to achieve their objectives. In fact, Stone (119) has made it obvious that certain aspects of the infrastructure, such as the branch library system, are an anachronism and exist as vestigial remnants of an age before the development of communication media and technology (120).

Communicative method *one* includes the continuous study of needs and concerns of individuals, groups, and communities by community study (total community), audience research (reached users of library), and market analysis (unreached publics). Librarians in communication services are involved with these techniques, or in the creating of new ones, that will motivate persons to learn and to communicate. For example, communication librarians stationed at the point of first contact with the public have the ability to work with all age groups and interests in at least sufficient depth to make referral to more specialized library and/or community resources.

The requirements of market and audience research are partially met as the functions of a coordinating structure begin to operate. The community needs, resources, and services are made known to the community as a whole. Out-of-community resources are obtained as soon as the need for them is anticipated. Services are developed that will motivate people to participate in information surprise experiences. Media are so orchestrated into a comprehensive communications program as will saturate the community, make it difficult for people to avoid thinking about the issues of concern, and get the "talking chains" going in the community (18).

Communicative method *two* includes the identification and securing of community and out-of-community resources (121). Resources include all human, printed, and audiovisual materials recorded and published in the public domain; resource persons, agencies, and organizations; and present moment developments in the mass media. Most metropolitan areas are rich in information resources, both general and specialized. Major libraries have begun to work together through a

network known variously as a regional library center in order to avoid unnecessary duplication of collections and to facilitate access both to their own resources and to other libraries in the national network.

A good amount of knowledge, particularly that related to the work-a-day life of the people, exists in records and sources that are ephemeral and not highly organized, or perhaps remain unorganized. This type of knowledge is often mission-oriented. Information is retrieved from such sources only so long as there is an obvious and continuing need, usually for a limited clientele. So far, libraries with limited support have only been able to acquire and store the more structured materials which have a greater probable potential for continuing information retrieval.

There is another extensive category of knowledge of the immediate past which does not exist in records at all, but is available only in the minds of specialists and professional experts. The information is rendered kinetic when the individual patron interfaces with a consulting expert over an immediate problem or specific interest. Resource control in such instances includes the identification of consultants and an awareness of the scope and availability of their expertise (122).

Finally there is the knowledge of the present moment and the impending future where the emerging needs of the people help to shape the information sources of the present moment. There are several media of communication in metropolis whose knowledge of the present and the immediate future is a constant and continuous source of information which few citizens in the area could avoid even if they wanted to do so. This type of information, while not the major preoccupation of present library service, constitutes the primary concern of the floating librarian. Yet it must be observed that Machiavellian power goes along with the charisma of relevance which accrues to the retrievers and disseminators of this type of information.

In communicative method *three* the floating librarian programs and helps improve the programs of those agencies and organizations by cosponsoring programs in areas of concern where programs are not now under development; surveying resource production to identify lacunae in knowledge; and promoting research in areas of concern not researched or developed with a published record (123). These basic problems are still unattended and with each passing year become more imperative (124). There is a need in most communities and in the metropolitan area, especially, for indexes to information spaces that exist in ephemeral and mission-oriented sources and materials.

Even though specialized information processing centers are available in metropolis, there is a serious lack of coordination. There is no one clearinghouse to which to turn. The discrepancy which exists between need and the mustering of information and of making it kinetic in the affairs of citizens is approaching a crisis. If left unattended, it will be interesting to speculate on the contributory affect of a lack of available information upon the urban disorder of our time. The indexing of information spaces is needed by people in such range and depth as will provide the information "surprises" they are seeking.

In communicative method *four*, the floating librarian makes it difficult for all

people to avoid thinking about personal, group, and community issues. Stimuli are media, so that the social endeavor becomes a community programed for communication and learning. Professional librarians are stationed at points where they can immediately interface with patrons whether on the premises or out of the community. These librarians are skilled in interviewing, guidance counseling, and group and community work. They are prepared in educational psychology and communications for dyad, group, and community contexts:

In the *dyad*, professional librarians are needed who can work with all age groups and interests in order to listen, encourage, and stimulate person(s) to think about their problem: label and define the problem or experience; develop synonyms for flexibility; and negotiate files for retrieval.

In the *group*, these librarians develop sequential experiences on a predetermined topic of concern in order to counsel for group processes; train for leadership and role productivity; respect other viewpoints and develop ability to handle other value systems "objectively"; and transcend negative group roles.

In the *community*, the floating librarian serves as a communications leader in order to create a saturation awareness and stimulate information surprises; motivate participation by "needling" the value system(s) of the community; motivate learning by involvement; and follow-up by preparing specific materials to meet particular purposes.

In communicative method *five* the effectiveness of library services is evaluated. Categories of evaluation which serve as the performance categories include new audiences (groups) reached, increased county legislation for social issues, increased (or reallocated) county budget for social issues, increased per capita library income, increased effectiveness of satellite groups, speed of out-of-community access, increases in number and range of out-of-community resources, decrease and lack of censorship problems, and overcoming type of library service.

Considerations of goal or terminus devolve around the end point of the activity. Specifically, library science has addressed itself to a sense of order whether personal, social, or knowledge oriented. Librarians have a clear apprehension of entropy (the disorder to be overcome), the negative entropy (information) to be achieved, and the professionally appropriate and effective entropy reducing (control devices) systems. The system is essentially an information-processing communicative concern where information takes the form of data about objectives, environment, and resources. The function of the communications staff is to create relationships or communication experiences between citizens and the knowledge which coordinated library service has to diffuse.

The overriding concern in these five methods is the dichotomy between the creation of new knowledge and the use of it by a communicative floating librarian. The purpose of knowledge generation is to achieve order through the predictive power of an orderly research procedure. The purpose of communication, on the other hand, is to make the predictive power of knowledge kinetic in the affairs of men. The findings of the sciences are related to the purposes of society, groups, and individuals by the various professions. Such normative and prescriptive functions

of a communicative profession have been expressed in the above set of standards for a coordinating profession.

The goals of a coordinating structure can be developed out of the actual needs of the community (125). These goals, to be understood, must provide a strong motivating force for people joining together to meet common needs, and the general methods and procedures must be acceptable to the people. The methods and the general procedures to be acceptable must be worked out from the goals of the particular community. These goals must have wide acceptability and be understood by all the people in order to avoid the tendency among many communities for the goals to be placed in the background. In such instances the particular action projects become ends in themselves. This is an educational job which must be carried on continuously in every organized community.

Summary Observations

With the floating librarian, library and information science has finally had the model of a viable community change agent placed before it, not merely for consideration, but for acceptance or rejection. Rejection of the model would confine library and information science to the infrastructure of communications. On the other hand, acceptance would establish the profession among the communications elite even though at present the advocate and the ombudsman have difficulty in being employed by government. This might be a trivial problem were it not for the fact that the majority of libraries and information centers in America are publically funded. In any event, floating is an appropriate descriptor for a certain type of librarian who is not determined or curtailed in his future activities and services by the subjectivity of any one individual or group. If he is, he then becomes a mission-oriented special librarian for which a practice model already exists in the professional infrastructure. Oddly enough, it is the special librarian who in most instances is privately supported rather than the reverse.

The true floating librarian is a librarian who is not employed by an institution or agency of government. He becomes a professional person by virtue of his ability to recognize as well as create situations wherein information surprises can occur, and not by virtue of the fact that he is the manager of a professional infrastructure for housing static information spaces. The knowledges, attitudes, and skills needed are those of a socially responsible professional. These include not only the organization of information space as well as retrieval skills, but an information-surprise "sense" that can only be honed to perfection through the listening and hypothesizing skills required in counseling and group dynamics. This information-surprise sense serves the librarian when he creates provocative and developmental contexts within which the patron can work for his own maturity.

There have been some developments in floating librarianship as a result of the innovative leadership displayed by a number of the younger professionals in library and information science. But these leaders with few exceptions operate within a

traditional professional infrastructure. The library profession has as yet to accept wide responsibility to serve as a coordinating structure in the community—an elementary and preliminary consideration before librarians can develop significant communicative activity. It is apparent that the role of the floating librarian will not be fully realized as long as developments are confined to field services.

Considerable innovation has occurred with a number of models and methods that field service librarians have employed in order to redesign the infrastructure of library and information science. At the same time, it is one thing to pursue the objective of coordinating the informational and educational services of the community. However, it is quite another to undertake advocacy services let alone claim the role of ombudsman and attempt to coordinate the various advocacy services available to the citizen. But it must be accomplished, or else citizens will continue to be oppressed by the logical and abstract infrastructure of organized library information space.

Neither the floating librarian nor his more conventional colleague feel as yet the imperative to become communication leaders, a role for the floating librarian which cannot be fully specified unless innovative practices take into account the findings of communications research and experimentation. In any event, the sociocultural information space continuously being created by the symbol manipulators needs to be mediated by a helping profession. The mass media are effective in arousing attention, but it remains for the floating librarian to help people deepen these experiences and relate them to their everyday concerns and interests.

The communications elite as symbol manipulators in a free enterprise system more often serve a propagandistic purpose than an educational and developmental one. These communications leaders provide the sociocultural networks of sign and symbol so necessary to the effective development and maintenance of social relationships. A sociocultural information space of this nature is a pervasive environmental factor of considerable significance in helping people move from an informal to formal awareness of social issues. However, floating librarians serve a primary social purpose by ensuring that this running sociocultural commentary becomes a cognitive-affective map to which the average citizen can relate his everyday disparate experience and thereby find meaning for it.

As far as infrastructure considerations are involved, librarians are backed up by the power and resources of the state. However, when it comes to widespread inculcation of information surprise by floating librarians, especially for those coalitions locked in deadly combat with government, a serious problem arises. The problem becomes critical at the local level where the issues may divide neighbors. There is little that can be impersonal about community and particularly neighborhood issues when the question is one of how much power is to be shared. Information supply is in most instances the basis of power. Institutionally-based librarians find it difficult if not impossible to provide client advocacy or ombudsman information service when the patron challenges government itself. Such librarians can only work effectively where the transactional confrontations are not with city hall.

The question of whether the organization of the totality of information space

constitutes a coalition inimical to government is a grave consideration for the future of floating librarians. Precedents are available, however, if librarians will only look to the historical antecedents of library service in America. The control and distribution of information space as represented by the traditional publishing industry was early placed under state ownership and control. Today information transfer and service is largely a governmental responsibility through an uncoordinated network of publically funded school, academic, public, state, and federal libraries.

Government is the formal organization of the social enterprise. Property and legal rights constitute the set of rules about transactions. Transactions which go on among citizens are continuously being formalized into "permanent" coalitions. For government not to intervene is to sanction those transactions. However, the scope of government is total for its society, and since its actions or inactions cover all possible situations, government must break up all coalitions which threaten its hegemony whether on the local, state, or federal level. Nevertheless, as floating librarians organize their advocacy functions into the more formal role of ombudsman, the necessary dominance of government can be cushioned for the average citizen.

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FLORENCE AGREEMENT

Among the most difficult obstacles in the way of full production and free circulation of books in large areas of the world are the tariff and currency restrictions. The latter is particularly significant in underdeveloped countries. Since its inception after World War II, UNESCO has been investigating and studying these obstacles in an effort to secure the free flow of books and other types of publications. To overcome the restrictions on the transfer of funds among many foreign countries, which was the main block in the way of acquiring any library material, UNESCO introduced the International Coupon Scheme in 1969 which proved to be a successful plan.

In the meantime, UNESCO has sought to reduce the tariff on all types of publications through an international agreement on the importation of "Educational, Scientific and Cultural Materials," which was adopted by the UNESCO General Conference at Florence, in 1950.

Under the "Florence Agreement," books, periodicals, newspapers, scientific instruments, and other educational and cultural materials are granted a duty-free entry in any of the countries that signed the agreement. The same applies to maps, music sheets, and even wall posters. The exemptions apply to books in any language, not withstanding their educational, scientific, or cultural levels or values.

The Florence Agreement provides also that internal taxes on imported articles may not exceed those applying to domestic products, and that import handling fees not exceed actual cost. Under another provision the signatories agreed to grant permission and foreign exchange of funds for printed materials needed by public libraries.

In October 1960, the president of the United States approved the bills implementing the Florence Agreement, which was considered a triumph to over 15 years of efforts by American librarians, educators, and publishers. According to Public Law 89-651, tariff duty is removed from books, scientific instruments, and other educational and cultural materials for the benefit of all countries, not just those which have adhered to the agreement.

At the present time there are seventy-two countries that adhere to the Florence Agreement (1).

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FLORENCE, LIBRARIES IN

For nearly 6 centuries Florence has been the leading city of Italy in most areas of cultural development; it is pre-eminently so in the early development of libraries, both private and public, and in modern services to scholars and its citizenry. With the beginnings of the Renaissance in the early fourteenth century came a deepening interest in, and regard for, the written word. And there followed the concept of a collection of books to which any citizen with scholarly interests should have access. Florence was then a city of 50,000 to 60,000, of which a relatively small percentage were literate. Art in all its forms, literature, and historical studies were the topics of the day. As manuscripts were esteemed and collected by those who could afford them, so the copyists labored at book production.

The first public library in Florence, and indeed, in all Italy, was formed by Niccolò Niccoli who, on his death in 1444, left more than 600 volumes to "*omnibus civibus studiosis usui.*" This notable library had been formed in a lifetime of studious pursuits during which he bought manuscripts when available and had copies made. He had the financial support of Cosimo I and assembled the library in San Marco.

Cosimo's interest in books was at once a spur to humanistic studies and to the formation of private libraries by the wealthy. The fifteenth century saw the formation of important private libraries by the Strozzi, Rucellai, Alberti, Gaddi, Guadagni, Pucci, and Capponi families, to name only a few. These inevitably found their way into local public institutions in later years. Another aid to the formation of book collections, unique in the fifteenth century, was the bookstore of Vespasiano which was a meeting place of the learned from 1440 to 1480. Niccoli was the acknowledged "*princeps omnium librariorum.*" It is notable that both he and Vespasiano were men of humble origin and no fortune. The financial assistance of Cosimo I was essential to them. To this trio responsible for the first library should be added the name of Parentucelli for his work in establishing a practical system of classification which was adopted by many early libraries in other centers of culture.

On such early foundations rests the present day national pre-eminence of Florence in both library collections and library services. Its Biblioteca Nazionale Centrale is by far the largest library in Italy and performs the bibliographical services for the nation endemic to a national library. In holdings of manuscripts, incunabula, and other rare materials it ranks as one of the several leading libraries yet it is basically modern in its home loan provisions and service to the general public.

From these same early foundations also arose the Biblioteca Medicea Laurenziana and the Riccardiana, which rank with the Nazionale in the value and frame of manuscripts and early printed material. Somewhat less important but still enormously rich in rare early work is the Biblioteca Marucelliana.

The scholarly interests of Florence later led to the establishment of other types of libraries. A whole group of academies now flourishes in Florence, some of ancient and some of recent creation. The Georgofili, for example, dates from 1753,

when it was founded to do research for the improvement of agriculture in Tuscany. The Colombaria is even earlier. Its field is the history and archeology of Italy. Obviously more recent is the Biblioteca ed Archivio del Risorgimento. There are several noteworthy art libraries. These and similar academy libraries, discussed in more detail later, naturally undergird the great, general collections.

Of importance also are the libraries of the University of Florence. The University of Florence has concentrated most of its library resources in several important faculty libraries, of which the largest and best known are those serving the Facoltà di Lettere e Filosofia, Facoltà di Magistero, Facoltà di Medicina, and the Facoltà di Giurisprudenza.

Well-known and generally used by educated Florentines as well as visitors in residence is the Vieusseux, a subscription library founded in the early nineteenth century and a focal point for the intelligensia, native and foreign, for several generations.

The Biblioteca Nazionale Centrale stands well above all other Italian libraries in size of collections (over 3 million volumes), in bibliographic services to international scholarship through its publications, and in the general modernity of its cataloging, reader accommodations, and other aspects of public services. It is encyclopedic in acquisitions and ranks equal to other Italian libraries in the prestige of manuscript and rare book holdings.

The library had its origin in the private collection of Antonio Magliabechi, who died in 1714 and left his books "to the general benefit of the city of Florence, but especially for the poor." Under the patronage of the state the library was officially opened for use in 1747 under the name of the Magliabechiana. The founder was a deformed, shabby scholar of so fierce a mien and sharp a tongue that even the Medici were reported to fear him. Largely self-educated, he was appointed by the Grand Duke Cosimo III to take charge of the library he had collected. Magliabechi carried on a voluminous correspondence with scholars throughout Europe and despite lack of funds formed a personal library of some 30,000 volumes in various languages, including Arabic, Persian, Armenian, and Turkish. His knowledge and his collecting interests were encyclopedic.

The interest and support of Cosimo III were followed by that of Gian Gastone and Pietro Leopoldo. Many private libraries were donated to the Magliabechiana in this early period. Especially noteworthy was that of Medicea Lotaringia (12,000 volumes and 700 manuscripts), and the collection of the Strozzi family, rich in fifteenth to seventeenth century material. The suppression of religious orders in 1773 and 1809 siphoned further collections to the rapidly growing library. Late in the eighteenth century certain of the local academies had their activities curtailed and their collections of books were added.

While Pietro Leopoldo supported the new library nobly, the present Biblioteca Nazionale owes even more to his son and successor, Ferdinand III. He returned from exile in 1790 and immediately began to form in the palace a library of manuscripts and incunabula, early editions, and books distinguished for their bindings, illustrations, or similar factors. These flowed to Florence from all parts of Europe,

in collections and as single items. Local resources were not overlooked, as witness the acquisition of the manuscripts of Cellini and of Galileo and his disciples.

The support of Ferdinand was in turn continued by his successor, Leopold II, who built up enormously the library's holdings in modern autograph material, now the most important in Italy. The Gonnelli collection, acquired in 1852, brought some 17,000 letters and documents of leaders in science, art, literature, and government. Included are Bembo, Machiavelli, Guarino, Vasari, Franklin, Montesquieu, Richelieu, and Newton, as well as popes, cardinals, and princes over several centuries. At the same time important collections of manuscripts, incunabula, and other rare books were regularly acquired by this library, now known as the Biblioteca Palatina.

The two great libraries, the Palatina and Magliabechiana, were brought together in 1861 to form the present Biblioteca Nazionale Centrale. It was then granted the copyright privilege—one copy of any work published in Italy. Centralization under aggressive and able librarians increased the flow of gifts. Especially noteworthy in the latter nineteenth and early twentieth century are the gifts of correspondence, manuscripts, and private libraries of modern literary and historical figures. Special mention should be made of the rare holdings in musicology in which the Nazionale may well be unrivalled.

In short, while many Italian libraries have their strong points, unique holdings, and collections more or less important for various studies, no one of these challenges the Nazionale in general pre-eminence for all studies of Italian scholarship and creative thought and writing.

A new building was built for the library, fronting the Arno river at Piazza Cavalleggeri, and was first occupied in 1935. Partly because of the pre-eminence of the collection and partly because of the modernity and spaciousness of the quarters this library, instead of the Biblioteca Nazionale in Rome, was gradually assigned most national responsibilities. It assists production of the union catalog, it compiles and publishes the *Bibliografia Nazionale Italiana*, and it issues printed cards for other Italian libraries. In still other less tangible ways it carries the burden of national leadership in bibliographical and bibliothecal services. Added to this is a responsibility to international scholarship required by the nature of the collection, and the cares of operation as a public library to the citizens of Florence and its environs.

All this responsibility was being handled in 1966 by a staff of 114, of which only fifteen had university degrees. The budget was reported by the director at that time as

under L. 50,000,000 (\$80,000) for everything, ordinary and extraordinary—maintenance, functions, acquisitions, binding, expenses of all types, about the budget of a provincial library in England, Germany or Russia. . . . The Bayerische Staatsbibliothek spends on scientific and administrative matters a sum ten times greater.

The seriousness of this situation, one in which practically all Italian libraries might be included, led to the appointment of a Commission of Inquiry for the

Conservation and Recognition of the Historical, Archeological and Artistic Patrimony. . . . Its report of May 1965 stated:

A summary view of the crisis of the National Library shows this as serious as ever, not only because library provisions every day prove less adequate to the needs of the constituency and for scientific research and because labor and material costs rise at an increasing rate, but principally because the institution itself is changing rapidly, reducing services because of pressures which are either secondary or entirely foreign to the proper function of a national library.

It is clear that weaknesses in public services and collections of other Florentine libraries, particularly the academic ones, shifted burdens onto the Nazionale that drained the meager resources at its command away from its primary "national" responsibilities. In the words of the director,

Every reasonable attempt to re-organize the library, to coordinate its services, is blocked, both by the scarcity of funds and personnel and by the heavy burden of routine. It is solely due to the quality of the library staff, worn out and humiliated as it is, that the National Library of Florence is still functioning in the fields of bibliography and scholarship. But . . . the *Bibliografia Nazionale Italiana* is in arrears, as is the printed card service. The catalogs are in serious arrears and partly disorganized. The bibliographical holdings in the special and other reading rooms are out of date. Our program for the purchase of foreign publications is scarcely alive. The library has increasingly avoided research activity of importance. Work on the rare book and manuscript catalogs is practically halted. Long ago we gave up altogether the purchase of manuscripts and of collections of rare and expensive books. The principal library of Italy cannot take part in book auctions or even purchase in the antiquarian market.

This serious condition might have continued indefinitely were it not for the flood of 1966. On the morning of November 5, 1966, any informed observer would have said that the National Library was virtually destroyed; building, catalogs, and the principal portion of the book collection. However, leadership and sacrifices beyond all understanding not only saved the library but in saving it won the financial support of the government and brought a considerable modernization of work methods, equipment, and public services. The American student in Florence will find the card catalog, in steel cabinets and on 3 × 5 cards, very similar to what he has used at home. He may sit at a carrel desk more modern than previously experienced. He will see his reference books on open shelves. Lighting is reasonably good. There are, of course, special rooms for manuscripts, early printed books, and current periodicals. He will even find nickel machines for photocopy and there is a library-operated Xerox service at modest cost. For various reasons the flood gave great impetus to student use of the National Library and the director of the late 1960s did everything within his power to meet their needs. He undoubtedly remembered the heroic services of thousands of student volunteers in saving the library in the dark days of 1966 and 1967. This is an Italian library where the senior scholar

will find the customary special provisions and deference in an upstairs area but where university students are definitely welcome.

As this is written several areas normally assigned to public service have been taken over for laboratories and work areas in the restoration of material. This situation is expected to continue into the 1980s.

Ranking with the Biblioteca Nazionale Centrale in holdings of early printed works and priceless manuscripts is the Biblioteca Medicea-Laurenziana, with over 4,000 incunabula and more than 10,000 manuscripts. This was originally the personal library of Cosimo the Elder. It was importantly enriched by his sons Piero and Giovanni, but its chief growth came under Lorenzo the Magnificent who scoured Europe for valuable material with the intention of making it a public library.

The library suffered various vicissitudes after the fall of the Medici. It was sent to the Convent of San Marco. Later it was sold to Cardinal Galeotto Franciotto and transported to Rome where it came into the hands of Leo X, the son of Lorenzo.

Michelangelo was commissioned to design an appropriate building for the collection in Florence. The library of some 3,000 codices was finally opened to the Florentine public in 1571 in the magnificent quarters which it has occupied ever since.

During the seventeenth century its growth was modest but the eighteenth brought a greatly increased interest in development of the collection.

A number of the finest manuscript treasures in existence are included in its holdings. For example, it has the Medicean Virgil dating from the fourth or fifth century, the Pandects, or compilation of Roman law prepared at the order of Justinian (sixth century), the Syrian Evangels of the sixth century, the seventh–eighth century Bible from the Monastery of Jastrow in Northumbria, the tenth century Horace with Petrarch's annotations, and many similar priceless codices.

At the direction of Lorenzo, Greek and Latin texts had been collected from every section of Europe. Among these is the Greek codex of the tenth century by which were saved for later ages works of Sophocles, Aeschylus, and Apollonius of Rhodes. Naturally the writings of all the early humanists were deposited here; the collection in this respect rivals the Vatican. Like the Nazionale, the Laurenziana was the receiver of important private libraries and of the manuscripts and letter files of numerous historical figures; from Petrarch to Poliziano, from Machiavelli to Guicciardini, from Cellini to Savonarola, Leonardo, Rousseau, Napoleon, Alfieri, and many others. A major accession made by the government in 1884 was the purchase of a portion of the Ashburnham library.

The illuminated manuscripts number about 1,000 and preserve authentic records of the life, practices, and costumes of the populace up to the Renaissance.

The Laurentian library is a most important bridge between the history and literature of antiquity, the gradual development of language and literature in the thirteenth–fifteenth centuries, and the bloom of inspiration and studies of the Renaissance. Its holdings are largely limited to manuscripts, first or otherwise rare editions, and modern works needed for the use of these early materials.

Toward the end of the sixteenth century the Riccardi family brought together the nucleus of the Biblioteca Riccardiana, which has placed special emphasis on the history and literature of Italy. Various additions were made in the following century. The library came into the possession of the Commune of Florence and was turned over to the state as a public library in 1815.

The importance of the library lies in its manuscripts and in its earlier printed books. It contains some 4,000 manuscripts and over 1,300 incunables. The entire library numbers less than 50,000 books and pamphlets. Particularly noteworthy are the Dante manuscript which contains one of the best portraits of the poet; the famous Riccardiana Virgil, illuminated by an unknown artist for Cosimo the Elder; important autograph writings of Matteo Villani, Alberti, Jacopo Nardi; and the Bible with annotations of Savonarola.

The Marucelliana is one of the several most important libraries of Florence for general cultural studies. It was founded by the Florentine Abbe Francesco Marucelli and opened to the public in 1752. Endowed by the founder, it has become a national library and by law receives all material published in the province.

The original collection of Marucelli was increased greatly by his heirs. The suppression of the monasteries in 1809 put much priceless material on the market. Under the first librarian, A. M. Bandini, special attention was given to Florentine and Tuscan culture. Later emphasis was placed on industrial art. However, the general character of the library has always been maintained. The central location of the building makes the library especially attractive to students from the licei, the university, and several academies.

The collection numbers nearly 400,000 volumes and pamphlets, including 484 incunables and 2,130 manuscripts, as well as correspondence and manuscripts of modern literary and political figures. There is a very large and important collection of engravings.

During World War II the Marucelliana suffered only minor damage at the site; however, much valuable material was badly damaged, not from enemy action, but from poor storage conditions at distant "safe" refuges.

Next to the national libraries, best known to the intelligensia of Florence and particularly the English colony is the Biblioteca del Gabinetto Scientifico Letteraria G. P. Vieusseux. This is a subscription library which specializes in literary, historical, and scientific material in the languages of Western Europe, but particularly English and, of course, Italian. Its principal function is the circulation of books for home use.

The library was founded in 1819 by Gian Pietro Vieusseux of Genevan ancestry. He drew together at his study many of the leading literary figures of the period—Manzoni, Leopardi, Giordani, Tommaseo, Capponi, Gioberti, Colletta, d'Azeglio, Giusti, and Niccolini, as well as foreigners such as Stendhal, Michelet, Lamartine, Browning, Ruskin, and de Vigny. These people naturally contributed to the new library, which continued to grow rapidly after the Unification.

The library suffered severe damage in World War II. Modern metal shelving was provided by the government as well as funds for other furnishings and for

replacement of lost materials. The location on the ground floor of the Palazzo Strozzi spelled enormous damage from the flood of 1966. A new location is planned for it. Virtually the whole collection of more than 300,000 volumes and pamphlets was inundated.

By early 1968 a total of 50,000 volumes had been cleaned and disinfected and were available for use; nearly twice as many were dried and chemically treated but required further work. By December 1970 nearly all the less important material that did not require major repair was ready for reader use but the restoration of the valuable material (largely first edition and association volumes of nineteenth century literary figures) goes slowly. As of that date, some 6,800 volumes had been rebound. A staff of sixty-four is engaged principally in the recovery effort.

Libraries at the University of Florence are generally gathered into large but autonomous units under the ten faculties of the institution. The central university library which serves all students and covers all subjects is unknown in Italy, and the tendency elsewhere in the country is to splinter the book collections into scores, sometimes hundreds, of independent little units. The University of Rome, for example, has over 200 separate libraries, many of them obviously small and little known. There are some of these minor collections at Florence, as there are at larger American universities, but they are few.

The largest of the faculty libraries and the broadest in scope is that of Letters and Philosophy. It reported holdings of nearly 1.5 million pieces recently, but this includes a vast number of pamphlets and reprints. The actual count of bound volumes, excluding journals and series, is estimated to be 200,000. The library was badly damaged by the flood. One hundred thousand volumes, pamphlets, and reprints were damaged, of which 35,000 were lost. Both author and subject catalogs were flooded.

The Library of the Faculty of Agriculture and Forestry deserves special mention as a principal library on forestry. It has some 75,000 volumes, pamphlets, and reprints. The large law library was badly damaged in 1966 but it was quickly built up by means of an aggressive solicitation of gifts all over the world. The library of the Facoltà di Magistero (Education) escaped flood damage and fell heir to the U.S.I.S. library when this was "liquidated." It is therefore a center for American studies. Other libraries of a size and importance to warrant mention are Medicine, Political Science, and Botany.

Supplementing these libraries and broadly cultural in nature are a considerable number of special libraries of the government, academies, and other bodies. Nearly all of these restrict admission, but grant reader privileges to scholars with letters of introduction and established need to use a particular collection.

The most important group of libraries is that for historical studies. Small and highly specialized is the Biblioteca dell' Istituto di Studi Etruschi. Of a similar nature is the Biblioteca dell' Istituto Genealogico Italiano, founded in 1877. This specializes in heraldry and biography as well as genealogy. It has a small number of early manuscripts.

Of considerable importance is the Biblioteca ed Archivio Comunale with over

1,000 manuscripts and 25,000 volumes. Although established only in 1913, this collection brought together the important documents which trace the development of Florence from the 1781 edict of Leopold to the unification of Italy in 1865. Naturally there are more recent materials. While much of the collection is official, it has been enriched by many important gifts from private sources. In recent years these include the rare books and maps of Domenico Tordi, the manuscripts of the history of Florence of Robert Davidsohn, the Florentine historical collection of Andrea Corsini, and the works on sanitation of Francesco Boncinelli. While principally a scholar's library, it also operates small branches for the reading public in several locations.

The *Biblioteca dell' Archivio di Stato* was established by the government in 1852. It supplements the State Archives. Specialized libraries on geography are maintained both at the University's Geographical Institute and at the Military Geographical Institute. The latter was established in 1872 and has a large collection of some 75,000 volumes and pamphlets.

With the *Biblioteca ed Archivio Comunale* is located the important *Biblioteca ed Archivio del Risorgimento*. Founded in 1909, it has had rapid growth in scholarly and rare material through gifts of private libraries. It is the special interest of the *Societa Toscana per la Storia del Risorgimento*.

The oldest and largest of the art libraries in the city is that of the *Gallerie di Firenze*, established in 1770 by Grand Duke Leopold. It is under the management of the *Soprintendenza alle Gallerie*. Smaller but valuable for art studies is the *Biblioteca dell' Accademia di Belle Arti*.

The library that is perhaps best known, or at least much used, by historians and students of art is the *Biblioteca dell' Istituto di Storia dell' Arte-Kunsthistorisches Institut*. Founded in 1897 by a group of German scholars, its support was taken over by the German government 5 years later. Control was taken by the Italian government after World War II, but returned to Germany in 1953. While it covers all Italian art, specialization is Florentine and Tuscan. It suffered severe book losses in the 1966 flood but an active campaign of solicitation brought a flow of replacements.

Several miles outside the city is the important library of *Villa I Tatti*, the home of Bernard Berenson which now serves as a center for Renaissance studies, operated by Harvard University. This numbers about 70,000 bound volumes, the wide ranging collection of a cultivated man. It was naturally strong in art and archeology, and purchases since Berenson's death have been entirely in art and Renaissance studies. The library is particularly notable for the collection of some 50,000 photographs of art. These are being reproduced for subscribing libraries. I Tatti also has an important collection on Renaissance music and the manuscripts and correspondence of Berenson.

Ranking with the *Biblioteca Nazionale* for the study of music is the *Biblioteca del Conservatorio di Musica Luigi Cherubini*, a collection of nearly 30,000 volumes and pamphlets. The present library was formed in 1862 by uniting two existing collections, that of the Granducal court and that of the music school of the *Accad-*

emia di Belli Arti. Operated by the government, the library has been greatly enriched by gifts of scholars over the past century. Virtually all branches of music are covered—theatrical, sacred, vocal, instrumental, theory, esthetics, history, etc.

Three special libraries deal with aspects of agronomy. The principal one is the Georgofili (Biblioteca dell' Accademia Economico-Agraria dei Georgofili) which was founded in 1753 to study the development of agriculture in Tuscany. It is the first library in modern times to be devoted to *materia agraria*. Exchanges and gifts have built it to impressive scholarly proportions in most aspects of agricultural economy. The Georgofili was badly damaged in the flood of 1966. The Biblioteca dell' Istituto Agronomico per l'Oltremare was established in 1909 as a tool for research in agriculture in tropical and subtropical countries, particularly those areas of Africa on which Italian interest centered. Also of agricultural interest is the Biblioteca della Stazione di Entomologia Agraria, with some 25,000 volumes and pamphlets. The collection is built very largely on exchanges for publications of the station.

Three religious libraries of importance to scholars survived the several governmental suppressions of religious orders. The Biblioteca del Convento dei Cappuccini has a collection of more than 20,000 volumes and pamphlets as well as twenty-five incunabula and sixty manuscripts. The library was begun late in the sixteenth century but the books were dispersed in 1810 under the Napoleonic suppression. Recreated, another dispersal took place in 1866. The present library has been built largely by donations of individuals and other convents of the order. The emphasis is theological and historical. Considerably larger is the Biblioteca del Seminario Archivescovile Centrale with nearly 70,000 volumes, sixty-five incunabula, and 500 manuscripts. The collection originated in a convent, and was given to the Seminary in 1783 by Grand Duke Leopold. Emphasis is given to patristics, canon law, church history, and theology in general. Of much broader scope is the Biblioteca dello Studio teologico per laici which includes material of general cultural interest.

Florence is the seat of several of the most important academies in Italy and each has a research library. The Accademia della Crusca is the center for research in Italian philology and its library supports these studies. The modern academy dates from the time of Napoleon I but a portion of the library dates back to antecedents of the middle eighteenth century. The library is situated on an upper floor and therefore escaped flood damage in 1966 although duplicates and academy publications in the basement were lost. Holdings include over 100 incunabula and 300 manuscripts.

La Colombaria (Biblioteca dell' Accademia Toscana di Scienze e Lettere La Colombaria) takes its name from the dove cote of G. G. Pazzi, a palace tower in which a group of savants met to study the history and archeology of Italy, especially Tuscany. The collection was begun in 1735, and it has been supported by gifts of members. Some 7,000 items are either rare editions or manuscripts. It suffered serious damage in World War II, and again in the flood of 1966.

The Società Dantesca Italiana maintains a library of over 7,000 volumes and

pamphlets. Of similar size is the Biblioteca della Società Botanica Italiana, founded in 1888. This library is housed with the collection of the University's Botanical Institute. The Biblioteca tecnica grafica is an excellent young library of 2,000 volumes on typography and the book arts in general. There are naturally many other specialized libraries serving vocations, as the *carabinieri*, or special studies, as astronomy. But no account of Florentine libraries would be complete without brief mention of the collections representing the interests and cultures of other European countries. Previously as noted, Germany's effort in this area was turned to art by the development of the library to serve the Arte-Kunsthistorisches Institut. Through the University of Grenoble, France maintains a large general library of French culture called the Biblioteca dell' Istituto Francese. This includes a valuable collection of books in Italian printed in France, particularly by the colony in Lyons (sixteenth century). Somewhat smaller but still sizable is the Biblioteca dell' Istituto Britannico, founded in 1918 by a group of English and Italians with the aid and approval of the British government. The United States had a U.S.I.S. library at Florence until the middle 1960s when curtailment of funds forced its closure. The collection was given to the Facoltà di Magistero.

While Florence won a special place in the history of culture for its early development of both public and private libraries, it also commands unique attention for the "Miracle of Florence," which is the recovery of the treasures of rare books and archives from the damage of the 1966 flood.

Florence was visited with 19 inches of rain in 48 hours, enough to flood any inland city. To Florence it brought the worst flood in its history; one day of utter disaster with all the water gone the following morning. There had been many other floods, the major ones spaced out by the centuries: November 4, 1333; September 13, 1557; November 3, 1844; and finally November 4, 1966. This last was by far the worst whether measured by height of water, destruction of property, or damage to cultural objects. As the water broke through confining walls at various points it poured into the city, down the narrow streets from different directions, at speeds of up to 40 miles an hour. Nothing could withstand such a current, and enormous whirlpools were formed as the currents met in the piazzas. When the water receded it left behind it an estimated 500 million tons of mud mixed with oil from tens of thousands of fuel tanks, full for the coming winter, as well as a tangle of dead animals, sewerage, cars, and debris of every description. This malodorous mixture permeated and settled in every nook of basements and lower floors, sometimes to a height of 15 feet above street level.

Nowhere was the damage quite so great as at Piazza Cavallegeri. Here the river broke over the wall and poured straight down a slope into the huge fronting doors of the Biblioteca Nazionale Centrale. The enormous basement of 100,000 square feet was completely flooded, as was the main floor to a height of 5 feet. As the waters receded, they left here, as elsewhere, an enormous tonnage of mud inside the building. Even the cars remaining in front of the building were buried to window height.

Here then were the problems facing the director when at last he was able to

cross the Arno as day broke on November 5. Nearly 1,200,000 volumes and pamphlets were flooded and a considerable portion literally buried in mud. While no incunabula and very few manuscripts were involved, the total included 100,000 rare volumes of the Magliabecchi Collection, the 50,000 folios of the Palatina, an enormous newspaper collection of 400,000 volumes (much of it unique), 50,000 foreign theses, 60,000 modern works, duplicates, posters, prints, broadsides, maps, music, and miscellaneous materials. Add to this the computer used for publication of the national bibliography, the catalog of 8,000,000 cards, the book conveyor, all the typewriters, plumbing, wiring, elevators, and other apparatus. Walls and possibly foundations were damaged.

The situation was hardly better at a number of other libraries. The major portion of the 350,000 volume collection of the Viesseux was flooded. Included were the first editions and association copies of the notables who had used it for a century and a half. At the university some 200,000 volumes were under water. Also very badly hit were the Cherubini, the Georgofili, the Colombaria, the Risorgimento, the Kunsthistorisches Institut, the Centro Didattico, and the Archivio di Stato. In the major libraries of the city a total of 2 million books were submerged.

Senior librarians of Florence faced a mountain of seemingly insoluble problems on the morning of November 5, 1966, as they surveyed the damage to their collections. There was the vast extent of the damage to the collections, some 2 million volumes, and many millions of catalog cards. It would take armies of trained people to salvage so much in time to prevent permanent damage. Then there was the problem of disorder. Four hundred thousand volumes of newspapers, for example, each one weighing many pounds. If these were moved out and dried the very task of sorting the salvaged volumes would occupy a corps of workers for months. Then there were technical problems. Was it possible to save books with coated papers? Mold lay right around the corner, only a few days off, and mold eats paper. How could it possibly be staved off? There was the native psychological problem, enormously strong in the Italian tradition, against permitting anyone except staff to enter a book stack. Florentine intelligensia marvelled and cheered when this was shattered by the Director of the Biblioteca Nazionale by ordering volunteers into his basement. To librarians impoverished in every operation all their professional lives, the sums necessary for restoration were beyond all possible attainment. The official estimate of damage to major libraries, made a few weeks after the flood, was \$9,650,000. It was actually at least twice that figure and, in American terms of labor and material costs, perhaps 50 million dollars. Then there was the lesser but great problem of restoration of the physical plants. Were foundations safe and walls undamaged? Wiring, plumbing, shelving, and many other elements would have to be replaced or restored. Finally, who could organize such a vast enterprise?

It is the miracle of Florence that the necessary leadership was found, that the funds and the manpower somehow appeared, like manna to the ancient Hebrews, and the technical problems were solved. There have been losses and mistakes but, 4½ years after the disaster, the libraries of Florence are well on the way to recovery

and in certain operations have made great progress in improvement over pre-flood conditions. In some limited respects the flood benefited the library situation by spotlighting for the nation the importance of these resources and their need of adequate support.

The great leader of the recovery was Dr. Emanuele Casamassima, Director of the Biblioteca Nazionale. For a full month he did not leave the building. Dressed in a Churchillian coverall, he lived, like his thousands of volunteer workers, on sandwiches, coffee, and wine at irregular intervals and, when exhausted, slept on one of the dozens of army cots in a damp, cold, upstairs reading room. His inspired vision, his magnificent planning, and his personal example were of great inspiration. Assistance also came from Rome. Dr. Nicola Mazzaracchio was within weeks of retirement from his position as Director General of Academies and Libraries, but he arrived several days after the disaster with principal assistants and helped organize army and other national government assistance.

Funds in amazing quantity became available eventually, but manpower needs were miraculously and magnificently solved by the unsolicited appearance of thousands of volunteers, mostly young people. Culture and the Florentine libraries became their cause. They worked from dawn to dusk at the dreariest tasks, lived on coffee and sandwiches, and slept on bunks in converted freight cars and on cots in damp public buildings. And they stuck with it, individually for months, collectively for years. As recovery points were set up the length and breadth of Italy, the volunteers appeared and were given simple instructions on treatment of the stained and damp volumes. The major force centered, of course, in Florence. While much is made of foreign students as volunteers, the great majority were Italian. Technical and professional assistance came from most European countries and the United States, but particularly from England. While the various national fund raising campaigns, especially the American Committee to Rescue Italian Art, contributed large sums for libraries, the principal ingredient has been the enormous increase in the governmental appropriation for the Biblioteca Nazionale.

It was in the field of technology that major obstacles were encountered. The experts had sharp disagreements about methods of treatment. Errors were made initially. However, agreements were worked out soon on emergency measures and the long-range procedures gradually took form, largely under English and American leadership. The flood forced attention on a multitude of problems regarding molds, removal of stains from paper, restoration of bindings, and similar matters. Later, training was given to Florentine binders in binding design and craftsmanship to be used on the valuable books. From University Microfilms, a branch of Xerox, came technicians and equipment to microfilm the newspaper files and the card catalog. Funds raised by the American Library Association financed expert advice on modernization and mechanization for the acquisition and cataloging of books as well as the printing of the Italian National Bibliography.

At the National Library, salvage lines several hundred yards long passed the books, dug out from the mud in the basement, to the army trucks, which took them to salvage points the length of Italy. As the Vicusseux, the university libraries, and

elsewhere, corps of volunteers, mostly students, salvaged the volumes, wiped the worst mud away, usually pulled the covers off, then rolled each shorn lamb in the tons of drying sawdust that had been trucked to Florence. Rare books received more considerate treatment. At recovery points most books were initially simply left to dry on racks in rooms with heat and with blowers to move air and exhaust the moisture. Simple economic measures were used to clean and rebind modern, less valuable material but no pains were spared with the valuable Magliabecchi-Palatina volumes as well as the rare books from other libraries, some of which were recovered at the National Library. Here, in a series of workshops, a corps of more than 100 specially trained workmen took volumes completely apart, treated them painstakingly page by page, deacidified and resized the paper, and finally rebound them in a style and with materials appropriate to the volume. Even when metal clasps were called for these were hammered out by skilled artisans.

At the Biblioteca Nazionale the entire catalog of 8 million cards had to be laboriously cleaned, card by card, by hundreds of volunteers working a full year with scrapers, brushes, and other hand tools. It was then microfilmed and xeroxed in standard 3 × 5 size. Likewise the battery of cameras was put to work on the enormous newspaper archive so that microfilm would be available for scholarly use in Florence and in the United States. When filmed, the actual newspapers, which came through the waters remarkably well with practically no care, were stored in a warehouse outside the city.

Many of the libraries required new metal shelving. The books had swelled in the water and many were so tightly packed that the choice facing the rescuer was either to break the bindings or to knock off the end of the shelf with a hammer.

While recovery is still proceeding at the Biblioteca Nazionale (it will be for more than a decade) and at the Vieusseux, it is virtually completed at the smaller libraries. The equipment has been replaced and the losses written off. For example, at the library of the University's Faculty of Letters and Philosophy some 35,000 volumes were discarded.

At the Biblioteca Nazionale the repairs to the building were virtually completed early in 1969 and new shelving, carrels, and other equipment were in place. The sterilization of books was completed in 1968. The damaged modern books and journals had all been identified and put in order. Arrangement of the newspaper files, a Herculean task, was well advanced. Much pamphlet and fugitive material, theses, broadsides, etc., was still being worked over outside the library, according to a late 1969 report. It was there stated that of the rare books, 51,000 had been studied and prepared for restoration treatment; 17,000 had been cleaned and the paper treated; nearly 10,000 had been completely restored (it was estimated at the time that the work would be completed in 18–19 years, but production has been increased since that was written); considerable work had been done on prints and maps; the bindery for modern books and journals, which uses economical methods, would finish its work before 1975; great progress had been made with a complicated series of microfilming projects—various special catalogs, the newspapers, and journals. Much material that was discarded as too badly damaged or not worth

restoration costs had been replaced. Estimates vary as to the percentage of material destroyed, or not recoverable, but it is believed to be less than 5%. The extraordinary care used makes it seem that some material was in better shape after the flood than it was before. Certainly the organization, services, and procedures in general at the National Library were greatly improved in the reorganization.

In summary, the miracle of Florence lies in the vast improvement of libraries since the otherwise tragic flood. The whole country rose spontaneously, from the hordes of beatniks to plump legislators and bureaucrats, to save the national heritage. College professors stood in line with soldiers and *contadini* to pass muddy books endlessly, hand to hand, to the waiting trucks. All of Europe and indeed the western hemisphere contributed the volunteers that patiently scratched at and cleaned the millions of catalog cards. From this the world has a matchless example for any future, similar crisis; it has learned much about treatment of adhesives, paper, inks, and binding exposed to water, oil, and mud. And from it has come an emphasis on the conservation of library materials, long overdue in other countries.

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ARTHUR T. HAMLIN

FLORIDA ATLANTIC UNIVERSITY LIBRARY

On October 25, 1964, Florida Atlantic University, the fifth campus of the State University System of Florida officially welcomed its first classes on the site of a former airbase located on the outskirts of the little town of Boca Raton on the Atlantic Ocean some 30 miles south of Palm Beach. Boca Raton is often referred to as the "millionaire's paradise." The traditional ceremonies requisite to the dedi-

cation of a new university were scrupulously observed, but the event was not a carbon copy of the multitude of similar occasions which record the explosive growth of higher education in America since the end of World War II. An unusual sense of excitement prevailed which went beyond the fact that President Lyndon B. Johnson was on hand to receive an honorary doctorate of Humane Letters. There was a feeling among those assembled that something really different and important had arrived on the educational scene, a new university sincerely dedicated to innovation and experimentation.

On the face of it, there was reason for optimism. Foremost among the objectives and guidelines established by a special planning commission for the new university were the following:

- (1) That FAU would be an upper division and graduate university, the first of its kind in the nation.
- (2) That it would utilize to the fullest possible extent the latest advances in educational technology. Specific mandates in this area were the use of closed circuit television for a high percentage of group instruction and computer-based library systems.
- (3) That independent study and credit by comprehensive examination be encouraged among the students through the easy availability of innovative aids to learning, particularly individual lectures and whole courses on TV tapes and computer-based information banks (1).

Freed from the responsibilities of teaching lower division courses, and with visions of spending the bulk of their time on research and individualized instruction rather than the traditional classroom lecture, the faculty tended to view Florida Atlantic University much as Thoreau viewed Walden Pond. The students, sensing that the new university offered a way out of the lockstep and anonymity that characterizes progress through most academic programs, were equally enthusiastic. For both, Florida Atlantic University held promise of living up to its claim to being the place "where tomorrow begins" (2).

It is probable that the library profession was more aware of Florida Atlantic University than any other group in higher education, as a total "library system" based on the computer was one of its major goals. At the time, this was a truly revolutionary idea and as such received its due meed of glory in the professional literature in the months prior to the dedication of the new university. Suddenly, out of nowhere, so to speak, came a brash newcomer staking an unhesitating claim to the role of pathfinder into the future.

The reactions of the profession to the reports of what was being attempted at Boca Raton were varied. To some librarians the directions taken by Florida Atlantic pointed the way toward freedom from what they considered traditional, outmoded tribal orthodoxies which stifled creativity and progress. At the opposite pole stood those who believed that the state of the art as they inherited it was "the best of all possible worlds" and for whom radical change was an anathema and secure mediocrity a desirable status. In between stood the bulk of the profession. Intuitively this group welcomed the experiment, but its enthusiasm was tempered

by the traditional pragmatism characteristic of the profession. An attitude of hopeful watching and waiting could best describe its stance. For better or worse, as Joseph Becker noted, "the spotlight of the library profession was on Florida Atlantic University" (3), which had set its sights on creating the "first fully automated university library in the world." (The impact of the experiment can be clearly judged from the roster of foreign visitors in the early years of the University. Between February 1965 and June 1966, twenty librarians from foreign countries visited the campus, two from Australia, five from Germany, three from Holland, seven from England, and one each from Thailand, Yugoslavia, and Norway.)

Florida Atlantic's position in the center of the stage was to be short-lived. Like the poor player referred to by Macbeth, it strutted and fretted its hour and then was heard from no more. Of the eleven articles published by staff members on the systems which were being developed and which to a large extent were responsible for creating Florida Atlantic's image among librarians, all but one appeared between April 1963 and July 1964—in other words, roughly during the year prior to when the university accepted its first students and the library had to assume the responsibilities for a full complement of normal services. While every thinking person would concede that starting a new university and a new library is a difficult task beset with obstacles and that the normal expectation is a fair amount of difficult problems in the early months, the silence on library developments at Florida Atlantic after July 1964 was both unexpected and disconcerting. Tantalized one way or another by the optimistic claims put forth by FAU, the library profession, confirmed believers, pragmatists, and doubters alike, was left almost completely in the dark regarding the operational performance of FAU's experimental systems. After the summer of 1964, the only sources of information regarding this subject were the professional grapevine fed by accounts of visitors to the campus and the inevitable rumors which too often pose as fact.

As the months passed, and the professional journals noted an increasing number of FAU library staff members accepting new positions culminating with the resignation of the Director of Library and Information Retrieval Services early in 1967, it became apparent that the experiment which had been launched with such confidence and such fanfare had failed. For those who had been swept into an uncritical "technology can save us" attitude by FAU's bold approach, the news dribbling out of Boca Raton was a severe blow. For the moment at least the god of these dedicated missionaries had failed them. The promised miracle had not come to pass.

At the other pole, the smug satisfaction among the *Candide's* in the profession was often ill-concealed. Here and there among this group could be detected a tinge of glee and an incipient hope that after what had happened at Florida Atlantic the profession might remain isolated almost indefinitely from the pressures and possibilities of the new technology. As for the pragmatists, those who had taken a wait and see attitude, their emotions were mixed. They regretted the failure of the experiment as success could have advanced the profession and the interests of the communities it serves immeasurably. There was also a certain amount of resent-

ment toward those who had been involved in the experiment stemming from what is currently called a "credibility gap." What the profession had been told was one thing. What was actually being accomplished was another. On the one hand, there were the articles in the professional literature, and the unpublished papers given at professional meetings which created the image of success. On the other was the stark fact that the FAU Library never came close to achieving its program goals. Two years after it opened its doors, the library in any meaningful terms had almost ceased to function, a fact that was carefully documented by the report of a Southern Association accrediting team which visited the campus in the spring of 1967, which stated that the library met none of the six standards necessary for accreditation.

As for the automated systems themselves, the serials program was abandoned in 1966 and all of the technical services programs related to acquisitions and the production of the computer-based book catalog in the spring of 1967. The circulation system alone functioned largely as planned, and was the only bright jewel in an otherwise badly tarnished crown. (During the spring and summer of 1967, the system was reprogrammed to run on IBM 360 series equipment by Bruce Alper of the University Computer Center staff. Mr. Alper later joined the staff of the University Library, and is presently Director of Data Processing at Arizona State University.)

Because of the total failure of the computer-based technical services effort, by the spring of 1967 public services as generally understood were nearly impossible. The condition of the catalog, about which a great deal more will be said later, and the collections themselves can best be described as chaotic. Binding had been neglected, and serials records were for all practical purposes nonexistent. A serious lack of leadership in the public services area contributed to the confusion. Although the circulation system, or rather that part of it which relied on the computer, functioned well, standard circulation policies had not been developed. For instance, there was no policy for holds on the records of students who failed to return overdue library books or for nonpayment of fines and/or lost book and processing charges. A student could charge-out an unlimited number of books and clear his records for re-enrollment, graduation, or receipt of transcripts for a token payment of \$10.00. To the larcenous and the knowledgeable, the FAU Library was the cheapest bookstore in the world until the fall of 1967.

This is not to say that there were no significant technical achievements at FAU, as there were. The system design for the computer-based book catalog included the concept of variable length records utilizing header indicators similar to those developed for the MARC program although not as sophisticated. The group responsible for designing the system also kept in mind the possibilities for reasonably sophisticated information retrieval and the coding included a good deal of information regarding bibliographies, language, translations, etc. Because of the pressures to produce the first printed catalog, this type of coding was stopped early in the experiment. Nevertheless, from the theoretical point of view, the original FAU group pioneered in areas which later were to be fully exploited by the MARC project. Finally, the first printed catalog, which utilized a 120-character upper-

and lower-case chain containing a wide range of diacritical marks, was a distinct technical success in spite of the inaccuracy of a large percentage of entries and other bibliographic problems. On balance, however, the technical successes achieved at FAU were outweighed by the library's failure to implement and sustain the basic library systems necessary for an adequate level of library service, either computer-based or manual. Unfortunately, from the moment the FAU experimental systems, with the exception of circulation, had to go operational, it was downhill all the way.

What caused the failure of the FAU experiment which was at its point in time so "noble in motive and far reaching in spirit?" As might be expected, the answer to this question is not simple. Yet, three or four contributing factors stand out in clear relief.

First and foremost among these was the fact that at no level in the planning process was more than superficial attention given to the long- and short-range costs of launching and establishing on a firm basis the type of innovative and experimental university envisioned by the planners. For instance, the only reference to costs in the Planning Commission's Report is the completely undocumented opinion that the proposed guidelines if followed would ensure a "more effective program at less cost for the money spent. (4).

This claim on behalf of the dollar saving potentialities of the new technologies was enthusiastically endorsed by FAU's administration. Indeed, at the beginning it was accepted as a self-evident truth by almost everyone involved. In retrospect, it seems somewhat incredible that no one went on record during the planning stages to the effect that experimental systems require extraordinary funding, and that during its early stages of development FAU would require special appropriations above and beyond the income generated by the productivity formula used in the state university system. As a matter of fact, the assumption was just the opposite. In other words, it was predicted that the experimental systems would actually reduce the cost of teaching a credit hour. In the minds of the planners, FAU's experimental systems were to be the *deus ex machina* which would provide the answer to the spiraling costs of higher education. This view was fully reflected in the productivity formula set for FAU by the Board of Regents during the early years of its existence, a formula which required 36% more student credit hours to generate a full-time teaching position than at the University of Florida and 29% more than at Florida State University. [The State University System of Florida operates on a productivity formula based on student credit hours per full-time equivalent (FTE) teacher. Except for its first year when enrollment fell far below projections, FAU's productivity ratio was higher than for any other campus in the system. For instance, in 1967 it took 349 student credit hours to produce one F.T.E. faculty member at FAU, but only 256 at the University of Florida and only 269 at Florida State University. Of major importance in the overall funding for the University was the fact that F.T.E. teaching positions, in turn, generated the general expense budget of the university.]

As the true operating costs of the computer-based experimental systems in the

library and those of the Learning Resources Center in the area of educational TV began to unveil themselves, the university's budget situation became increasingly difficult. Despite the fact that the library's automated programs, with the exception of circulation, had ground to a halt and the efforts of the Learning Resources Center had been severely curtailed by the spring of 1967, FAU continued to suffer the burden of a productivity ratio which was higher than that of the other campuses until 1969 when the FAU Vice-President for Academic Affairs, Dr. Stanley B. Wimberly, finally won his long battle for parity within the state university system.

Unfortunately, the emerging awareness of the economic realities of the experimental systems coincided with the impact of near disastrous enrollment projections at FAU. The enrollment projected for the charter class scheduled for the fall of 1964 was 2,000 FTE students. The final total was only 615. As a matter of fact, the enrollment predicted for the charter class was not reached until 2 years later. (The original enrollment projections for FAU anticipated 10,000 students by 1970. Enrollment for 1970/1971 was approximately half of this figure. Enrollment continued to lag behind projections until 1968/1969, when more realistic figures were developed based on the experience of the previous 3 years.) Thus the high productivity formula established for FAU, which was based on expected cost savings stemming from the new technologies of the computer and closed circuit TV teaching and far lower than anticipated enrollment, propelled the university into a serious budget crisis at the moment it opened its doors.

The university, to its sorrow, soon learned that there would be neither help nor sympathy at the state level, despite the fact that part of the responsibility for the university's unfortunate position was the result of bad planning at the state level. Further complicating the situation was the authorization of two additional campuses for the state university system, one at Pensacola and the other at Orlando. The addition of two new campuses guaranteed that competition for state funds within the system would be vigorous. Predictably the older universities were totally reluctant to support special funding to enable FAU to continue to develop its experimental systems and programs. Had they done so, it would have had to be at the expense of their own programs and ambitions. The inevitable result was that bit by bit FAU's experimental programs disintegrated until about all that was left were the fading hopes and memories of the planners and founders of the university. In less than three years, the university, which had taken as its motto "where tomorrow begins," found itself the victim of its short and hardly illustrious past—grist for the historian's mill rather than a source of inspiration for those looking toward the future.

In the Learning Resources Center, taped or live courses via closed circuit television were abandoned and replaced by kinescoped copies utilizing a standard movie projector. (It should be noted that budget problems alone did not fully account for the failure of closed circuit TV teaching at FAU. Faculty resistance stemming from a strong adherence to traditional methods and the amount of work necessary to produce a course on TV were also significant causal factors.) The director of Libraries and Information Retrieval Services, who had come to FAU with visions

TABLE 1

Comparison of Printing Costs for a Computer-Produced Book Catalog Between a 120 Character Upper/Lower-Case Printing Chain and a Standard 48 Character Upper-Case Chain^a

No. of main entries	Total entries for author, title, and subject catalog	Total pages	Machine time (hours)		
			IBM 1403-2 Printer, ^b 120 character chain, 240 lines per minute	IBM 1403-3 Printer, 120 character chain, 440 lines per minute	IBM 1403-2 Printer, 48 character chain, 240 lines per minute
36,000 ^c	144,000	4,320	70.0	53.0	22.6
72,000	288,000	8,640	127.0	93.0	38.2
180,000	720,000	21,600	300.0	213.0	85.0
360,000	1,440,000	43,200	587.0	413.0	153.0

^a The data is from Mark Price, *A University Library System for Catalog Printing, Circulation, Serials and Acquisitions*, IBM Corporation, White Plains, New York, July 1, 1965, XXVI.

^b This was the equipment available in the FAU Computer Center as of May 1965.

^c This was approximately the size of the FAU collection as of May 1965.

of on-line systems looming over the horizon, was forced to abandon the special upper-lower case, 120 character print chain in the production of the second edition of the computer-based book catalog which came out in May 1966. In addition to upper- and lower-case letters, this print chain had a number of important diacritical marks such as the question mark, the colon, the semicolon, and the umlaut, all of which if not exactly indispensable for descriptive cataloging are at least extremely useful. The decision to discontinue using the chain was based solely on budget considerations related to processing time. Table 1 shows the differences in printing time between the special chain containing 120 characters and the standard forty-eight character upper case only chain. It also documents how the costs of computer-produced book catalogs escalate with the growth of a collection through the computer being turned into a printing press, a function for which it was not designed and is therefore both costly and inefficient.

In this connection, it is interesting to note that in academic libraries computer-based book catalogs have generally utilized a standard computer printer to generate the master copy. Little serious consideration has been given to using the computer tapes in conjunction with phototypesetting equipment—a technique which can significantly reduce production costs (5).

It is impossible to say if commercial production of the FAU book catalog utilizing phototypeset output would have materially changed the final outcome of the project. As will be noted later, there were system design and personnel problems which were major contributors to its failure. Nevertheless, the printing time required for regular supplements and cumulations of the catalog was a major cost

consideration not only in terms of dollars, but in the number of hours the computer was tied up and unavailable for other uses. As the university grew and developed its core administrative systems, and as scientific use of the computer increased, the library found it increasingly difficult to get the documents it needed from the computer center on a regular schedule. The approximately 6 hours of printing time needed to produce a 4,000 title supplement utilizing the 120 character chain became harder and harder to schedule, and the approximately 53 hours needed to print an updated master catalog a practical impossibility. [It is interesting to speculate to what extent the availability of COM (computer output microfilm) equipment might have had on the FAU experiment. Compared to either computer printout or phototypesetting, COM is very inexpensive. It is conceivable that a university dedicated to innovation could have successfully implemented catalogs on microfilm with a one year card supplement.]

As it was the catalog degenerated into irregular supplements printed on computer paper and was finally abandoned entirely, as already noted, in the spring of 1967.

The progenitor of the FAU computer-based library systems, was the University Library Information Systems Project (ULIS) carried out at the University of Illinois at Chicago between 1959 and 1962. An understanding of the nature of this project is essential to understanding what subsequently happened at FAU.

The purpose of the ULIS Project was ". . . to investigate the possibilities of a total system of mechanization of routines in a university library" (6). Funding came from the Council on Library Resources and the University of Illinois Research Council. The system contractor was the General Electric Corporation.

As the study progressed a key factor in the thinking of the investigators was the very high cost of acquiring and fully processing a volume unveiled by a cost study of the Technical Services Division. They found that it was costing \$18.51 to acquire and fully process a purchased book and \$13.00 for a gift book. Apparently shocked by these figures, their attempt to explain them can best be characterized as an a priori assumption followed by a series of nonsequiturs. For example, the investigators concluded from their study that processing costs in all university libraries of similar size must approximate those at the University of Illinois at Chicago, that all manual processing systems are inherently inefficient, and finally that the computer offered the only hope for reduced costs and a higher level of service. "It is concluded," they wrote in their final report, "that librarians actually have little choice in applying new techniques (electronic data processing and system analysis) in that something must be done to cut costs . . ." (7). With the advantage of hindsight, it would appear that the ULIS Project personnel often tended to view the computer as an end in itself rather than a means. The computer's glittering but unproven promise in the area of library management apparently blinded them to other possible alternatives to bringing down the high costs of the acquisition and processing of library materials. As for the costs of computer-based library systems, the investigators concluded that a fully automated library system would cost slightly more than a traditional manual system during the first 5 years of operation and

thereafter slightly less. Here it is crucial to note that this conclusion is based on their belief that the processing costs at the University of Illinois at Chicago were more or less standard across the country.

None of the systems developed on paper by the ULIS Project were ever put into operation at the University of Illinois at Chicago. Shortly after the completion of the final report, the director of libraries accepted the call to Florida Atlantic University and it was here that the systems were destined to be operationally tested. As has already been noted in some detail, they failed, and a major reason why they did had to do with operational costs.

Two other factors played significant but subordinate roles in the demise of the FAU experiment. The group of librarians who were assembled to create the first "fully automated university library," in spite of their enthusiasm, had at best only a superficial knowledge of either computers or data processing. In this respect they certainly were not unique within the profession at the time. (It should also be noted that the staff of the University Computer Center knew little or nothing about libraries. The staffing pattern itself at FAU is interesting. For 1963/1964, the year prior to opening, there were thirteen professionals, two secretaries, and four clericals. It would appear that the ratio of professionals to nonprofessionals was the opposite of what it should have been.) One of the serious consequences of this situation was that in attempting to design operational systems based on the pioneering work at the University of Illinois at Chicago, the FAU group fell into a number of naive assumptions. First and foremost among these was the idea that the preliminary work done at Chicago made it possible to bypass manual backup systems during the period when the new computer-based systems were being tested and debugged. For instance, confidence in their ability to develop operating systems in short order based on the ULIS Project was of such magnitude that no serious discussions were ever held regarding what would happen if unforeseen difficulties arose with either the software or the hardware.

The consequences of this oversight were serious. When the computer-based systems failed, the students and faculty were left without many of the services which even the least sophisticated library user takes for granted. Had proper attention been given to the need for manual backup systems during the period when the new computer systems were being developed and operationally tested, this situation could have been avoided. As it was, the faculty and students of FAU learned long before the Defense Department that "fly before you buy" is a good policy to follow where technological innovations and entirely new systems are concerned.

Another example of the naivete of the library staff was the assumption that untrained clerical personnel could be relied on to code Library of Congress copy for keypunching without having their work revised. Consequently, no proofing or editing procedures were established and no correction program was written. As a result, the first edition of the book catalog was riddled with errors, not just the kind of errors which drive catalogers into a frenzy, but the kind which confuse and mislead the user. These were most evident with respect to filing problems such as proper names beginning with "Mc" or "Mac" and initials confused with names.

There were examples of subjects interfiled in the author and the title catalogs. From the user's point of view another disconcerting feature was the large number of blind cross references in the subject catalog. Human errors such as misspellings and words misspunched added to the confusion. William Shakespeare was a particularly vexing problem as he appeared in at least four different places in the subject catalog and at least four in the author catalog due to variant spellings. Despite the fact that the Catalog Department began proofing entries for new titles in the fall of 1964 and undertook the monumental task of editing and proofing retrospectively in March 1965, the second edition of the book catalog which came out a little over a year later still contained a substantial number of the same type of errors discovered in the first. There just were not enough people available to create the supplements needed to update the basic catalog and at the same time correct errors on the original tapes. The magnitude of the problem can be seen in the dates of publication of the catalogs and supplements. Between the first edition which came out in September 1964 and the second edition which appeared in May 1966 there were only three supplements. The first of these was published in October 1964. The second was a cumulative supplement published in February 1965, and the third was an uncumulated supplement printed on computer paper in September 1965. The inability of the library and the Computer Center to produce regular cumulative supplements and the problems related to the bibliographic control of input were major factors leading to the abandonment of the computer-based book catalog in favor of a card catalog in the spring of 1967.

In addition to inadequate funding, system design failures and the overly ambitious nature of the library programs when viewed in the light of the capabilities of the library and Computer Center staffs, there was another factor which played a minor but nevertheless measurable role in ringing down the curtain on the FAU experiment. Within the university's table of organization, the library was established as a division of the Learning Resources Center along with radio and television and graphics. This meant that the director of libraries reported to the director of the Learning Resources Center, and library problems and needs had to be communicated through him to the vice-president for academic affairs. Unfortunately, the director of the Learning Resources Center was a school media specialist with no background or experience in either libraries or computers. Consequently, the library was poorly served at the level where university-wide decisions were made, particularly in the area of the budget. In establishing this arrangement, FAU reflected a point of view which holds that a learning resources center as the media specialist conceives of it, and a library as a librarian conceives of it, are (1) identical in essence and purpose, and (2) that consequently they can be successfully and productively wedded. For those who believe in the validity of these propositions, the FAU experience should be instructive.

In brief, what was envisioned as the joining of two willing and compatible partners destined to live in holy and blissful matrimony turned out to be a forced and artificial union of short and bitter duration. It is possible that a different mix of personalities would have come closer to producing the desired results, but if one

really looks at the true nature and function of a library as opposed to a learning resources center such as FAU established, it should be clear that the problem was not personalities but a serious flaw in the basic theory behind putting such units under a single administrator in a university whether he be a librarian or a media specialist.

The primary function of a learning resources center is the mass transfer of information through the utilization of a wide variety of mechanical, electrical, and electronic aids. Its general thrust is supportive of the efforts of the classroom teacher who, in his capacity as classroom teacher, is also part of the mass transfer of information process.

A library, on the other hand, is in a very real sense the means whereby the individual can escape from the unavoidably limited frame of reference which the classroom represents. Oriented totally towards the needs of the individual, the library is a unique institution with a unique educational mission. It provides the resources whereby the individual can weigh and challenge what comes to him through the mass communications network via a number of tracks: print and non-print material, television, the movies, politicians, pressure groups, and teachers. It is, in short, the only known antidote for too much mass communications. It is the place where the individual can seek for himself a sense of intellectual integrity and the self-understanding which is the ultimate goal of education. In organizing a university, to attempt to wed an institution whose business is the totality of the human intellectual experience with one whose primary concern is the packaging and delivery of information through the mass communications network is very bad match making. And the FAU experience stands as witness to it. The organization chart to the contrary, the director of the Learning Resources Center never achieved administrative control over the library. The inability of the two units to talk a common language or have a common mission led them to drift apart and ultimately cease any communication at all. (The Independent Study Laboratory which housed a large collection of films, filmstrips, recordings and taped courses, and lectures was and is housed in the library. It was and is administered by the director of the Learning Resources Center. In 1968 the cataloging of the material was begun and the cards added to the main public catalog. The Independent Study Laboratory was never a serious source of friction between the library and the Learning Resources Center. The problems manifested themselves at a higher level.)

In summary, the FAU experiment failed because it ran afoul of the three major problems so often experienced by institutions attempting to implement a new technology, lack of adequate funding to support the necessary research, development, and operational phases, system design failures, and operational or human failures. In spite of the failure, FAU could have contributed enormously to the library profession's progress toward efficient and effective computer-based systems had it documented and publicized the problems it encountered as they occurred. It was, after all, the pioneering effort in the field, and the profession looked to FAU for leadership. It is unfortunate that those involved chose instead to blanket the difficulties encountered with silence, ignoring the fact that progress in a technologi-

cally oriented society is as dependent upon the analysis of projects which fail to achieve goals as it is on the resounding successes.

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H. WILLIAM AXFORD

FLORIDA LIBRARY ASSOCIATION

The Florida Library Association can trace its origin back to 1901. Secretary's notebooks and other documents on file in the Florida State Library indicate that a "Professor Hays"* of the State Normal School at DeFuniak Springs was the first president, and Miss Carolyn Palmer, librarian of Stetson University, was the first secretary-treasurer. These two people continued in office until 1904 when "Professor Hays" left the state, and Miss Palmer became president. In these early years, meetings were held in conjunction with the Florida Education Association, since most of the members belonged to the teaching profession. There were only two or three library workers in the state and only one full-time librarian, Miss Carolyn Palmer of Stetson University (1). For the first 5 years of its existence, the association held only business meetings.

The first pre-arranged program meeting took place in St. Augustine in December 1906 (2). This was also the first meeting to be reported by the *Library Journal*. There are no records available after 1909. What was apparently the last meeting of this first attempt at a state library association took place in Gainesville on December 30-31, 1908, and is reported in the February 1909 issue of *Library Journal*.

The Constitution of the first Florida Library Association can be found among the documents in the present Florida Library Association's Archives in the Florida State Library. Correspondence between the officers of the early association was

* In 1901, C. L. Hayes was listed as Principal of the State Normal School of DeFuniak Springs in the Report of the Superintendent of Public Instruction of Florida. We have found no record of a "Professor Hays" and in spite of the difference in the spelling of the name, we feel it is safe to assume that C. L. Hayes was the first president of the Florida Library Association.

found in the Jacksonville Public Library several years ago and it is also now in the Florida Library Association Archives.

After a lapse of more than 10 years, Miss Helen Virginia Stelle, librarian of the Tampa Public Library, called an organizational meeting of the Florida Library Association in Orlando on April 26–27, 1920. Miss Stelle presided as temporary chairman until the election of Mr. J. F. Marron, librarian of the Jacksonville Free Public Library, as the first president of this second attempt at organizing a state library association.

Apparently unaware of the activities of the first group to call themselves the Florida Library Association, the twenty-three persons who attended the meeting in 1920 signed a register as "Charter Members of the Florida Library Association." A list of their names also follows this history. By the time of the next meeting, which was held in Tampa, the association had twenty-eight individual and eight institutional members. At the Tampa meeting, the association voted to affiliate with the Southeastern Conference of Librarians and with the American Library Association.

The association's first objective was the establishment of a state library agency; its second was the enactment of legislation to permit the establishment of county libraries in Florida. Largely as a result of its efforts, the present State Library was established by an act passed in 1925 and implemented in 1927. Passage of a permissive county library law followed in 1931.

In 1927 the association began publication, at regular intervals, of the *Florida Library Bulletin*, which continued until 1935. It was succeeded by sporadic mimeographed newsletters until the establishment of the present *Florida Libraries* in 1949.

The association has conducted two surveys of Florida libraries. The first, *Florida Library Service*, 1935, was edited by Helen Virginia Stelle and published in 1937. The second, *Libraries in Florida: A Survey of Library Opportunities in the State*, was prepared by the Survey Committee of the association and published in 1948.

The latter publication marked a resurgence of association activities after a lapse of three years (1943–1945) during which no annual conference was held because of World War II. Since 1946, when it was reactivated, the association has enjoyed a steady growth which resulted in the appointment of an executive secretary in 1953.

Fred D. Bryant was the association's first executive secretary. He was succeeded by Mrs. Gretchen Conduitte who was in turn succeeded by Mrs. Virginia Reif, the present executive secretary.

The Florida Library Association is now organized along traditional lines with four divisions: College and Special Libraries, Public Libraries, School and Children's Libraries, and Trustees and Friends of Libraries. In addition there are the Reference Services Roundtable and the Technical Services Roundtable, both affiliated with the American Library Association. However, a committee is now at work on a plan to reorganize the structure of the Florida Library Association, and is due to report its findings in 1972.

In 1959 the first "Operational Procedures for the Florida Library Association" was published. In 1966 the Florida Library Association was chartered by the Secretary of State of Florida as a non profit corporation. The Charter of the Associa-

Florida Library Association List of Meetings and Presidents, 1920—To Date

Date	Place	President
1920	Orlando	Helen V. Stelle (Chairman)
1921	Ocala	J. F. Marron
1922	Tampa	Helen V. Stelle
1923	DeLand	Louise E. Gamsby
1924	St. Petersburg	Cora Miltimore
1925	Orlando	Cora Miltimore
1926	Eustis	Anne Van Ness Brown
1927	Miami	Anne Van Ness Brown
1928	Lakeland	Olive Brumbaugh
1929	No meeting	J. F. Marron
1930	Jacksonville	J. F. Marron
1931	Gainesville	Helen V. Stelle
1932	Winter Park	Louise Richardson
1933	Clearwater	Louise Richardson
1934	Lake Placid Club	Wm. F. Yust
1935	Orlando	Wm. F. Yust
1936	Jacksonville	Carl Bohnenberger
1937	Miami Beach	Mary Bright, Acting
1938	St. Petersburg	Mary Bright
1939	Mt. Plymouth	Henrie May Eddy
1940	DeLand	R. W. Severance
1941	Clearwater	Bertha Aldrich
1942	Vero Beach	Bertha Aldrich
1943-1945	No meeting	Wesley Summers
1946	Sarasota	Eulah Mae Snider
1947	Miami	Ida Keeling Cresap
1948	Lakeland	Betty W. Service
1949	Tampa	Sara M. Krentzman
1950	Gainesville	Stanley L. West
1951	Orlando	Clara E. Wendel
1952	Miami	Paul A. T. Noon
1953	Sarasota	Alice Pearce
1954	Pensacola	Louis Shores
1955	West Palm Beach	William S. Frieze
1956	Jacksonville	Elizabeth Peeler
1957	St. Petersburg	Dorothy Dodd
1958	Orlando	Helen Keefe
1959	Miami	Archie McNeal
1960	Clearwater	Frank Sessa
1961	Miami	Elliott Hardaway
1962	Jacksonville	Betty Lunnon
1963	Clearwater	Ruth Rockwood
1964	West Palm Beach	Thomas Dreier
1965	Miami	Harry Brinton
1966	Clearwater	Margaret Chapman
1967	Jacksonville	Elizabeth Mann
1968	Miami	Verna Nistendirck
1969	Miami Beach	DeLyle Runge
1970	Fort Lauderdale	Cecil Beach
1971	Daytona Beach	Lynn Walker
1972	Miami Beach	Leo Meirose

tion now serves as its constitution, so a new set of bylaws had to be written, which necessitated many changes in the operational manual. In 1968 the second edition of "Operational Procedures of the Florida Library Association" was published, which reflects the necessary changes.

The Florida Library Association has had a very active Legislative Affairs Committee in recent years, which has resulted in an increased awareness of the needs of Florida libraries by the members of the Florida Legislature. Library services at all levels have increased tremendously in the last 10 years.

The Florida Library Association continues to be a vital, growing association, deeply involved in the promotion of library development in Florida.

Constitution of the First Florida Library Association, 1901-1909

1. This association shall be called the Florida Library Association.
2. Its object shall be to promote the library interests of the State of Florida.
3. Any person interested in promoting the object of the association may become a member, by vote of the executive board or the association, on payment to the treasurer of a registration fee of twenty-five cents.
4. Any local library club in the State of Florida on due application may be recognized by the executive board as an affiliated club and thereafter such members of such club residing in the state shall be members of this association without payment of additional dues. But the right to vote for officers, to hold elective office, or to vote on a proposition to amend the constitution is limited to members who have paid the regular annual fee of 25 cents.
5. The officers of the association shall be a president, vice-president, secretary and treasurer who shall be elected annually. These officers with the presidents of all affiliated clubs shall together constitute the executive board which shall have power to act for the association in intervals between its meetings.
6. The annual meetings of the association for the election of officers shall be held in connection with State Teachers' Association if practicable. Other meetings may be held at the call of the executive board.
7. No officer, committee, or member of the association shall incur any expense in its name, nor shall the treasurer make any payment unless authorized by specific vote of the executive board.
8. This constitution may be amended by a three-fourths vote of the members present and entitled to vote at an annual meeting, provided that each member entitled to vote thereon has been notified of the proposed amendment in the call for the meeting.

Officers of the Florida Library Association, 1901-1909

1901-1904

President:	C. L. Hayes Principal of the State Normal School DeFuniak Springs
Secretary-Treasurer:	Miss Carolyn Palmer Librarian of Stetson University DeLand

1904-1906

President: Miss Carolyn Palmer
 Librarian of Stetson University
 DeLand

Secretary-Treasurer: W. H. Hall
 Principal of High School
 Miami

1906-1908

President: George B. Utley
 Librarian of Jacksonville Free Public Library

Vice-President: J. W. Simmons
 Orlando

Secretary-Treasurer: Miss Mollie B. Gibson
 Jacksonville Free Public Library

1909

President: Miss Mary W. Apthorp
 Librarian of Florida State College for Women
 Tallahassee

Vice-President: M. B. Hadley
 Librarian of the University of Florida
 Gainesville

Secretary-Treasurer: Miss Mollie B. Gibson
 Children's Librarian
 Jacksonville Free Public Library

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MARGARET L. CHAPMAN

FLORIDA STATE UNIVERSITY, SCHOOL OF LIBRARY SCIENCE

Over a century ago the West Florida Seminary was established by the 1857 state legislature. Continuous operation of this higher learning facility led in turn to the Florida State College, established in 1901, and this institution was the immediate precursor of the Florida State College for Women, established in 1905.

Library science began in the Florida State College for Women in 1926. The first library science course, 300, had the title "Library Methods." Its catalog description said the course was a "study of library administration, reference work, book selection, cataloging and classification." The course, taught by the college librarian, was planned to meet the needs of those who might find themselves in charge of school libraries. Juniors and seniors were admitted to the 3-hour course (1). By 1928, two courses were listed with reference to school libraries, and a Department of Library Science was mentioned. Sufficient growth of interest in the subject apparently generated additional catalog entries, which named four courses taught during the next year. By 1930, seven courses were available for those who wished to qualify as teacher-librarians. Twenty-five students were admitted to the program for which the Department of Library Science had two persons listed as responsible for instruction. However, the catalog of that year referred to only one instructor who taught all seven courses (2).

Five years later, eight courses in library science were available. The college offered a similar array, plus or minus one or two additional titles, for the next 16 years until the inception of the Library School in 1947. The course content during these years was wide ranging: children's and young people's literature, the usual core work of selection, cataloging/classification, administration, and reference, teaching the use of the library, and library history. This program matched the typical undergraduate work of Type II schools of the era, and apparently satisfied graduates who stayed on to work in Florida school, academic, and public libraries, as well as those who were employed in other states.

On May 15, 1947, the legislature signed a bill making the Florida State College for Women coeducational, and renaming the institution The Florida State University. The School of Library Training and Service (SOLTAS) was established in the beginning of the academic year 1946-1947. It began operation under Dean Louis Shores, who came to The Florida State University from George Peabody College. The catalog for 1947 listed a faculty of four full-time persons. Twelve courses were offered in addition to individual study opportunities. Graduate level study was offered from the inception of the school, in contrast to only undergraduate study during the period 1926-1947.

By 1948-1949 the full-time resident faculty had grown to eight, in addition to several visitors during part of the program year. Audiovisual course work was noted in the *SOLTAS Bulletin* for that year, an innovation which the school featured in its information documents. The full program, which encompassed several bachelor's degree programs, also offered the M.A. and the Master Library Certificate. The courses were typical, even though the fifth-year master's degree was somewhat ahead of most other schools of the period. The courses offered for graduate students only during the first year were:

Research Bibliography
History of Books and Libraries
History of Children's Literature

Library Types
 Library Supervision
 Education for Librarianship
 Basic Communications
 Documentation for Librarianship
 Research in AV Materials
 DIS (3)

A thesis was required of Type I students who wished to receive a Research Master's degree "intended to prepare specialists, instructors of Library Science and research workers." Type II, Service Master's, required a service study concerned with a specific library problem (4).

Three years later, the *Bulletin* listed these courses for graduate students:

Government Publications
 Method of Investigation and Research
 Printing and Publishing
 Advanced Reference Service
 History of Books and Libraries
 Library Education
 Materials Service
 Sound Film
 Still Projection and Graphics
 Basic Communications
 Cinematography
 DIS (5)

The School of Library Training and Service continued under this title until 1953, when it was renamed the Library School. The *Bulletin*, 1954-55, indicates little fundamental change except for the nominal enlargement of program and greater variety of course offerings. By this date the audiovisual component was a firm fixture and a major source of attraction for those students interested in professional advancement and in newer directions in librarianship.

In the succeeding immediate years after the change of name, the Library School consolidated its accredited status through expansion of its program, its faculty, and its student body. It sponsored a variety of functions which led the school into a position of leadership in its field: in-service training activities for school—academic—public libraries from Florida and neighboring states; the advanced program of audiovisual courses on campus and through extension offerings; and a variety of experimental programs for students and practicing librarians. In 1954-1955 the full-time faculty numbered eleven; the audiovisual program provided five courses at the graduate level; and a number of interdivisional programs were available to students through cooperative undertakings within the university. By 1958-1959 the faculty had become fourteen in number, evidence of institutional support for the school and its academic and professional growth.

The school was first accredited by the American Library Association in 1953; its accreditation has been continuous since that date.

In 1960 the Library School became a graduate facility within the university, thus ending the award of a bachelor's degree in library science. Certification programs were offered for the training of school librarians which led to the bachelor's degree. Also, as a result of an agreement between the school and the College of Arts and Sciences, a double major (English or History and Librarianship) or a library science major with a strong subject field minor in Arts and Sciences provided undergraduates the opportunity to obtain a bachelor's degree with a strong library science component.

The previous strong and in-depth audiovisual program was transferred to the (then) School of Education, while the instructional materials courses for librarians continued to be taught in the Library School. The *Bulletin* for that year revealed a typical library science program, with multiple references to audiovisual courses (two of which were required for all students in the school's graduate program) (6).

From 1953 until the present the original designation, SOLTAS, has been preserved in the student organization which selected this historical title. This group has provided social and professional activities to students in the school through a variety of programs during each year. Both undergraduate and graduate students are eligible for membership in the organization during their residency in the University.

In 1967, after more than 20 years of service to the university, Dr. Louis Shores retired to become Dean Emeritus. He was succeeded by Dr. Harold Goldstein, formerly Professor, Graduate School of Library Science, University of Illinois. The new dean found an active information science component within the curriculum, type-of-library specializations as a standard mode of student selection for course and program concentration, and more space for the needs of a larger educational operation.

An addition to the Strozier Library was completed in early October 1967 and provided additional refurbished space for the Library School. The extra area was utilized for classrooms, an audiovisual skills laboratory, and faculty and administrative office needs. The increase in enrollment, amounting to almost 100% since 1967, has more than filled the new areas.

For some years the faculty had been seeking the approval and implementation of a doctoral program in library science. A variety of factors was considered during the several presentations, and finally in June 1968 a Ph.D. program was approved by the Board of Regents. In January 1969 the Advanced Master's Degree was also approved as a program of the school. The name "Library School" was changed to the School of Library Science by faculty vote early in 1968.

The initiation of the doctoral level of study required that the total curriculum of the school provide a range and depth commensurate with both beginning and advanced levels of study. A curricular design was accepted which requires that a minimum of 50% of the advanced student's program be in library science, while at the same time according these candidates the opportunity to achieve specialization in one or more related and useful areas. The first three doctorates awarded in library science were given in the summer session, 1971.

The school has been active during the past 6 years in the operation of federally funded institutes, beginning with NDEA support in 1966. In 1968 an institute was conducted for public librarians concerned with institutional services; in 1969 an institute for public library directors and middle management considered personnel problems and relations. Federal support for library education fellowships was received during the period when such funds were available. During the earlier 1960s and in the decade preceding, a variety of short courses and in-service training ventures were conducted for academic, public, and school librarians both in Tallahassee and throughout the state. A good portion of the school's reputation for service resulted from these activities on behalf of librarians. Additionally, faculty involvement in state, regional, and national library association activities has been noteworthy in its volume and constancy.

In 1966 the first issue of the volume of the *Journal of Library History* appeared, a product of a group of the faculty of the school and of interested colleagues from the Department of History. The *Journal* has prospered since its inception, and to date four Library Seminars have been held in connection with *Journal* activities, as well as additional publications pertinent to this specialized interest area.

Approximately 1,200 alumni have been counted since the inception of SOLTAS in 1947. These graduates occupy positions in all levels and types of libraries, and they work in most of the fifty states as well as in several foreign countries.

The school presently is the only ALA-accredited agency within the state of Florida; however, it is probable that, by 1980, there will be at least three such graduate facilities within the state university system. The anticipated expansion of the resident population, especially in the urban areas of Miami, Jacksonville, and Tampa, will demand graduate study in library science at the state universities in operation in these cities. It is most unlikely, however, that an advanced degree program will be available elsewhere than at this school. The doctoral program at The Florida State University, then, must consider in its future offerings the needs of changing practices in all types of libraries. Perhaps the Doctorate of Library Science, a nonresearch degree, may be a useful additional award along with the Ph.D. for many ambitious younger librarians whose responsibilities will not encompass research or teaching activities.

Master's level work may need to be restructured into 2-year programs for some students. If placement were to become more widely limited throughout the country, 2-year programs leading to the M.S. would help reduce both the number of graduates and the problem of position vacancies. Such a program, even though perhaps considered an anachronistic move, could provide specialization according to the ideas of C. C. Williamson, R. Munn, J. Wheeler, and others.

At The Florida State University, the School of Library Science looks forward to a period of curricular change, growth, and challenge in the 1970s.

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HAROLD GOLDSTEIN

FLOW CHARTING LIBRARY OPERATIONS*

Purpose and Use

All library operations are susceptible to application of scientific management principles. Flow charting is one management tool used in analyzing and evaluating operations for effectiveness and efficiency. Library operations or systems consisting as they do of functions, decisions, and actions to meet specified requirements can be visually studied by means of the flow chart. Such charting provides the means of rapidly scanning the elements of "data processing" or information recording which bulk so large in the library's operations.

The versatility of flow charting is illustrated by its potential use even in literature-use and library-use instruction to readers. For example, the problem of how to use a bibliographic tool, verbally explained at length by its publisher, frequently could be reduced to the shorthand of a flow chart, supplying the faster visual aid approach to an abstracting or indexing service by the user.

Comparative flow charting, picturing a library's current procedure in parallel with a suggested modification of that procedure, is a powerful testing device. By this means it can be graphically shown where operating elements may remain the same, vary, or may be eliminated as unnecessary steps. This is a useful method in the analysis and design of more efficient and effective procedures or systems.

Flow charting then is the symbolism of the systems analyst. By laying out facts in a common sense way it enables the analyst to view graphically partial or complete systems and to interpret analytically what may have been recorded only as a narrative procedure. Through the use of standardized flow chart symbols a middle ground is created between the librarian and the systems analyst and efficient and effective communication may occur as a result of a properly constructed flow chart.

Flow chart symbols can be used to represent in a logical progression the elements (functions, decisions, and actions), the requirements, the inputs/outputs

* Reprinted, with adaptations, with permission from Edward A. Chapman, *Library Systems Analysis Guidelines*, Wiley, New York, 1970, pp. 86-98.

of the system, and the equipment used in the system. Therefore the flow chart illustrates the sequential flow of work and information through a system. The advantage of using flow charts stems from a system's being a process which is constantly changing; therefore in actual operation it is difficult, many times, to understand without diagrams the relationships that exist within a system. The flow chart may be compared to a series of snapshots stopping the action within a system allowing the analyst, systematically and realistically, to evaluate the current operations and design new procedures if necessary. This is true since functions, decisions, and actions are clearly identified.

Commonly Used Symbols

The IBM X20-8020 "Flowcharting Template" symbols have been employed in the examples. These symbols may be readily used in either a machine or manual system. The construction of the flow chart may be accomplished by one of two methods: (1) progression from the top to the bottom of the chart—vertical flow method; or (2) moving from the left to the right in the chart—horizontal flow method. Either approach has its merits and should not adversely affect the ability to interpret or construct the flow chart. However, once a method is adopted it should be consistently adhered to.

The six symbols most often used in flow charting are illustrated in Figure 1. These common symbols, used to show the sequential flow of work, are connected by directional flow lines with or without arrows. Arrows only need to be used when it is necessary to represent an exit or entry line from one symbol to another which is not in the same direction as the flow method being followed (Figures 2 and 3).

Special Purpose Symbols

Special purpose symbols may be used when more detail is desired or when the more specific symbols are readily applicable (Figures 4 and 5). They may also be used in the flow charting of automated or computer systems.

Flow Charting Rules

The following general rules should be adhered to when preparing a flow chart:

1. Conventional symbols should be used to facilitate mutual understanding of the logical flow of work.
2. The system, or its components, or both, should have a clearly indicated starting and halting point in the chart.
3. The graphic flow of work should always be in one direction, normally top to bottom or left to right.

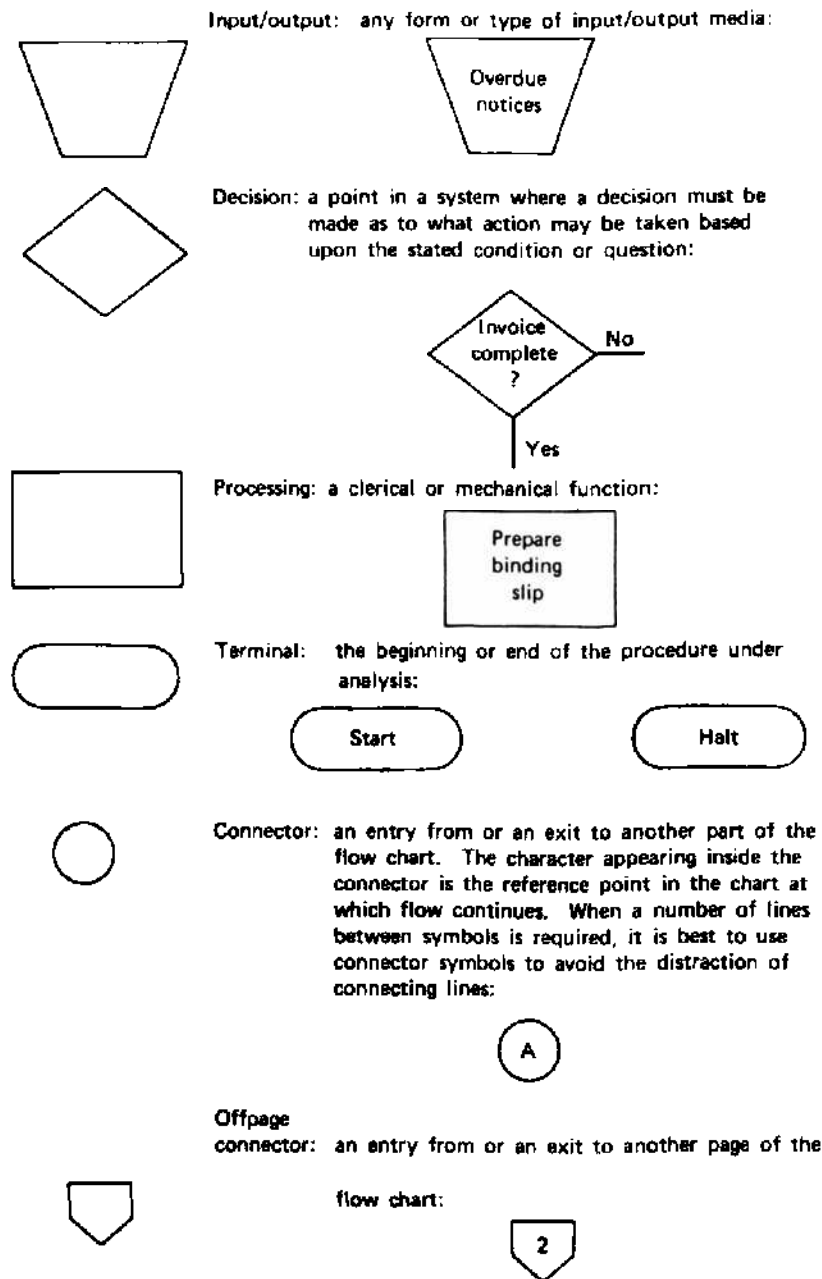


FIGURE 1. The six symbols most often used in flow charting.

4. No directional flow lines should be unconnected at any point. Every directional line should lead to another step in the chart.
5. The descriptive statement within any symbol should be succinct and mutually understandable. The terminology used should be applicable to the system being studied.
6. Wherever ambiguity may be evident, annotation or side notes should be used to provide a thorough understanding of the various parts of the flow chart.
7. Each decision "diamond" should have two possibilities—a "yes" (positive) and a "no" (negative) path.

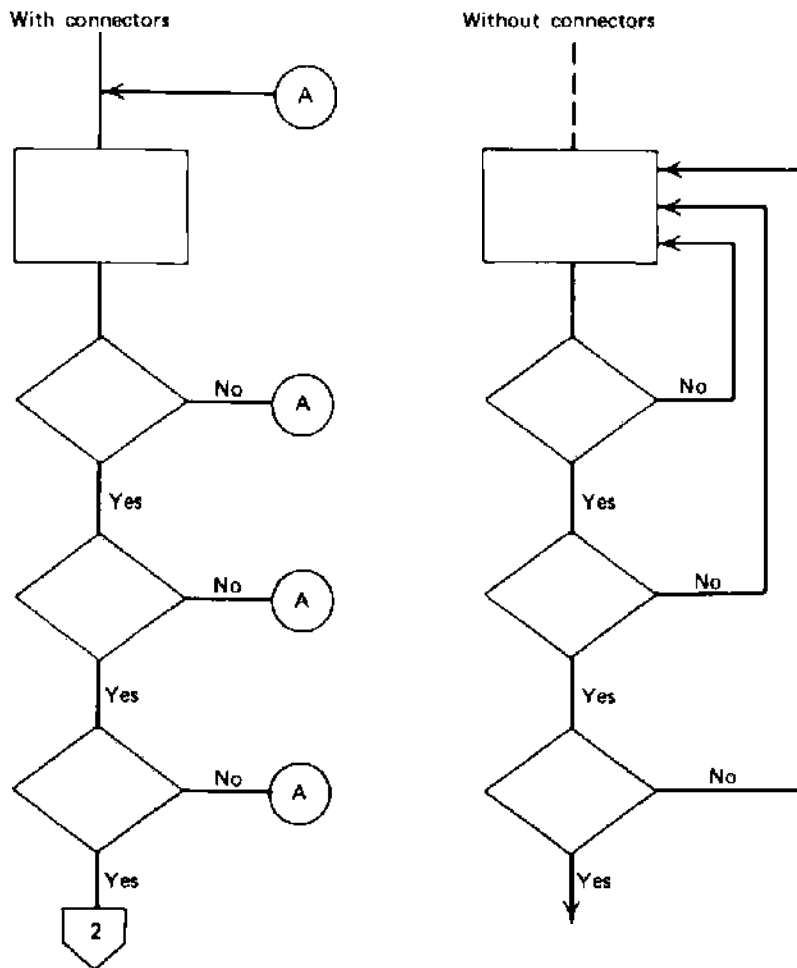


FIGURE 2. Use of connectors.

8. The flow of the work should be clearly indicative of what actually happens in the course of an operation. The realistic sequence of functions in the surveyed system should be followed throughout.
9. Because the flow charting of a complex system is an involved procedure it is recommended that other staff members associated with the problem participate in the analysis phase of the flow charting operation.
10. The analysis represented by the flow chart should be consistent within itself. That is to say a flow chart illustrating the progress of a document through a system should not be expanded into representation of a clerk's functions having no bearing on the operation being charted.

Constructing Chart

The "make ready" phase of a flow chart is of vital importance in creating a picture that is representative of the system. Awareness of the component parts of the system to be flow charted is obviously required. With the aid of summary analyses

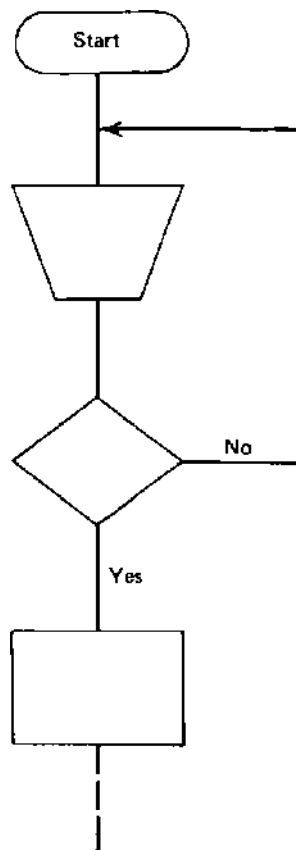


FIGURE 3. Use of arrows.

and understanding of procedures, flow charting is facilitated and the analyst should become aware of the distinctiveness of each process and the individual decisions and flow paths that exist under the present procedure.

In constructing the chart, it is recommended that "pieces" of the system to be charted be written on individual slips of paper so that the initial arrangement of the flow chart layout can be as flexible as possible. Once the arrangement is seen as satisfactory, the system can be transposed to sheet form. For expediting the often necessary photocopying of the finished flow chart, a standard paper size such as $8\frac{1}{2} \times 11$ inches should be used.

Capabilities and Results

A flow chart pictographically representing a library system is capable of:

1. Assisting in the organization of the system's structure.
2. Helping visualize the system's component parts.
3. Resulting in improved techniques, especially since the finished flow chart can be utilized as an effective training device with significant advantages over written job descriptions alone.
4. Helping in communication about and understanding of the system.

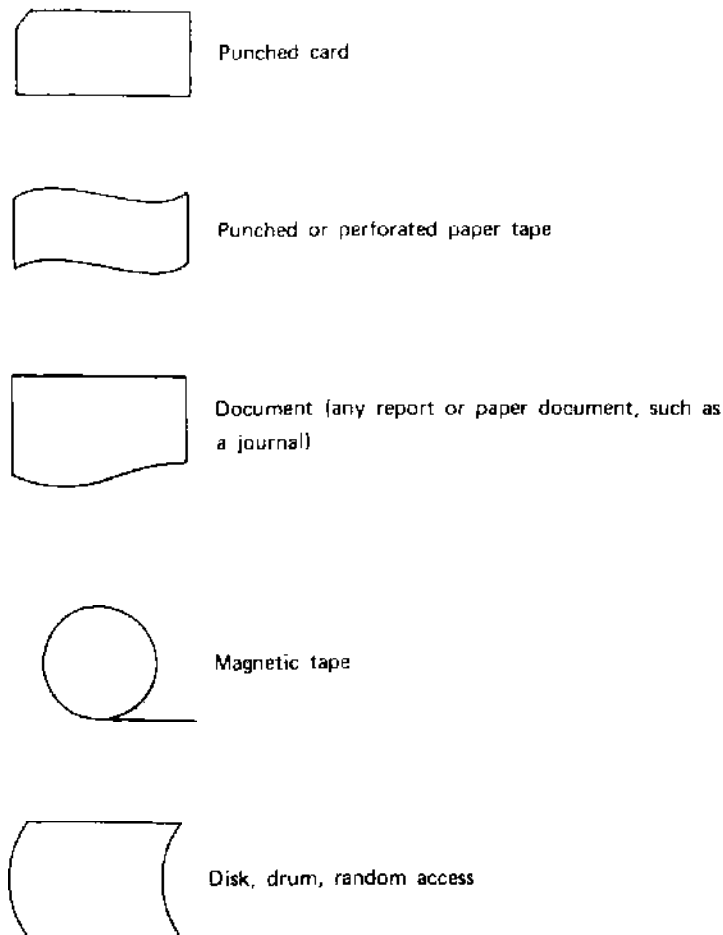
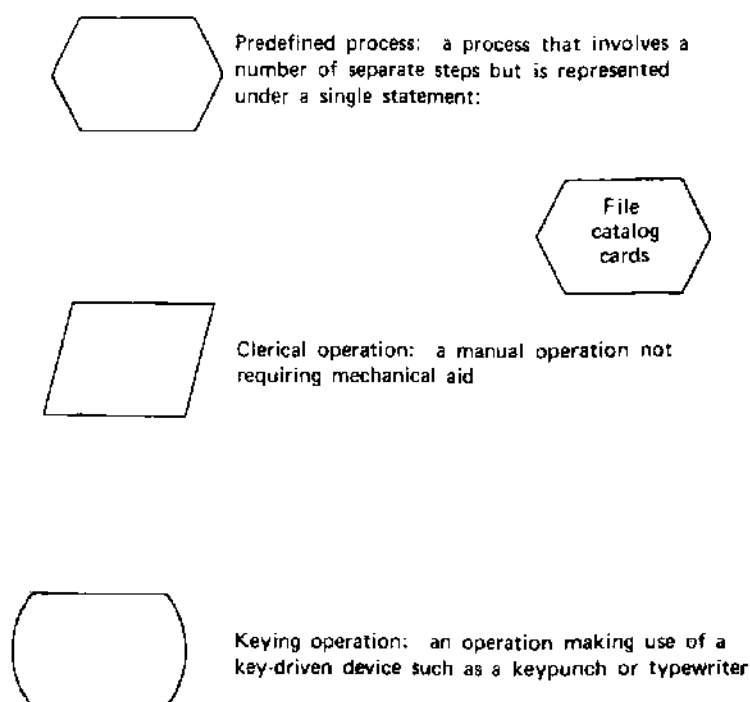


FIGURE 4. *Forms of inputs and outputs.*

At first, in combination with the summary analyses and understanding of procedures, the flow charts should show the existing system with all of its characteristic faults and strengths. One certain proof of the validity of an existing system is whether it can be flow charted effectively at all. If not, the system must be illogical.

By surveying the input to any entry point in the system the analyst as he proceeds step by step through the flow chart can see the uses that will be made of the input, what decisions **must** be made, how the input affects the decisions, and what action comes from each decision. Thus he can judge whether the decisions are correctly made in relation to the requirements placed against the system. He also can evaluate what effect various demands would have on decisions and their related actions in order to develop the set of criteria or managerial procedures that best satisfy the system's requirements.

With the standard rate for each function available, the analyst is in a position to analyze those operations appearing to be overburdened or near breakdown at certain steps depicted in the flow chart. He then can evaluate and suggest alternate paths to be taken, if any, to maximize the system's effectiveness.

FIGURE 5. *Processing functions.*

The basic question to ask in evaluating each of the flow chart's parts would be the possibility of simplifying, eliminating, combining, or rearranging any of the elements of the work flow shown.

The results of the over-all evaluation are to be used as the basis of a flow chart serving to suggest new and improved methods of accomplishing the operation under study. These suggested methods will involve major or minor changes according to the past operational success or failure of the present system. The new or improved methods will also depend upon the resources available. If any automation is planned, a concept of vital importance in suggesting revision of a system is the establishment of manual procedures and operations which will be machine compatible.

Flow Chart Examples

The remainder of this article is devoted to illustrative examples (Figures 6 through 10) of flow charts of selected library operations to provide visual aid in further understanding of how to apply the principles of flow charting. Figures 6 through 9 are progressively more complex. Figure 10, a generalized flow chart of a computer-based library operation, illustrates the use of computer system flow chart symbols.

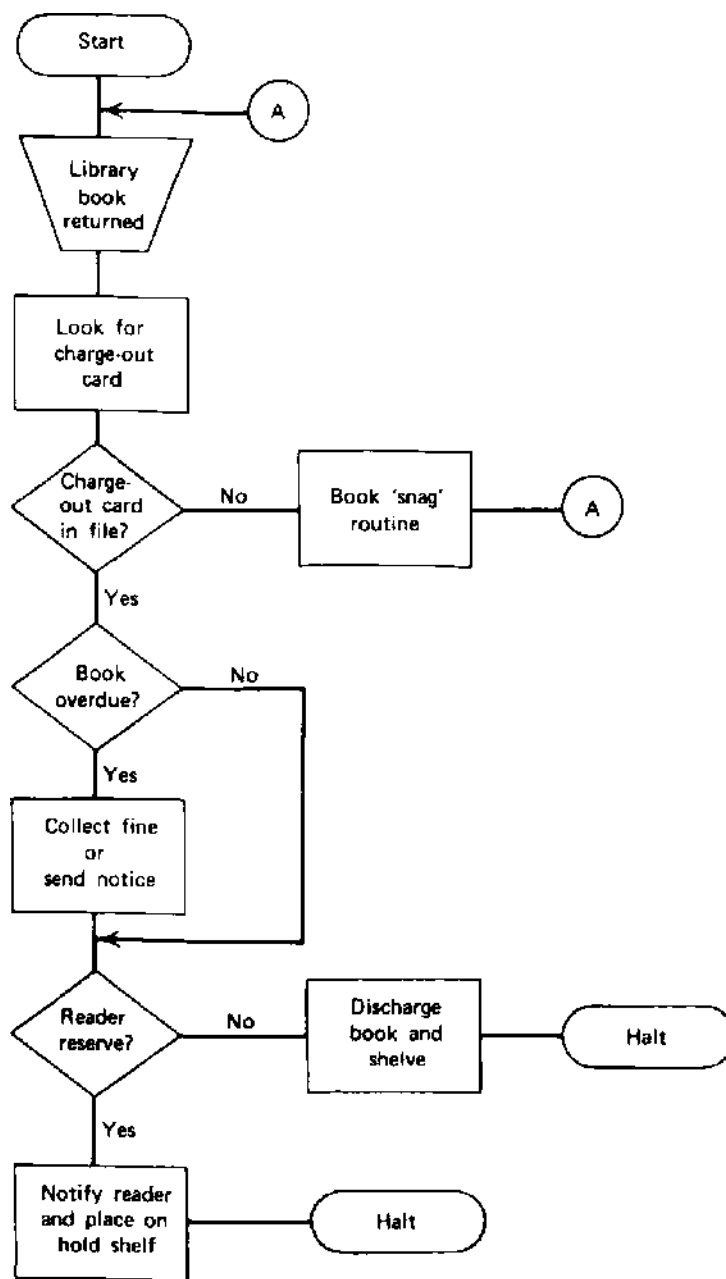


FIGURE 6. Flow-chart figure: discharge of a library book.

This article has essentially been a discussion of decision flow charting. Other charting and diagraming methods (1) may be used to describe paper work flow, functional organization, and work progress.

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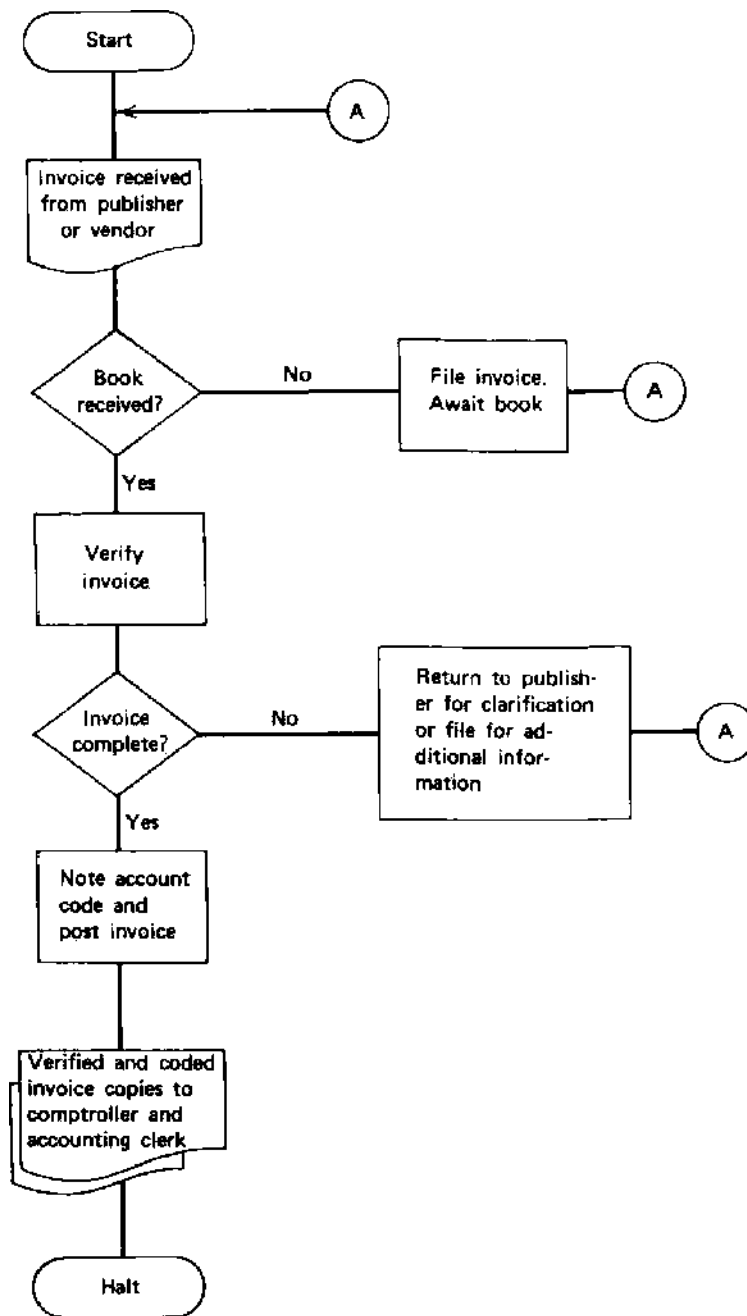


FIGURE 7. Flow-chart figure: clearance of an invoice.

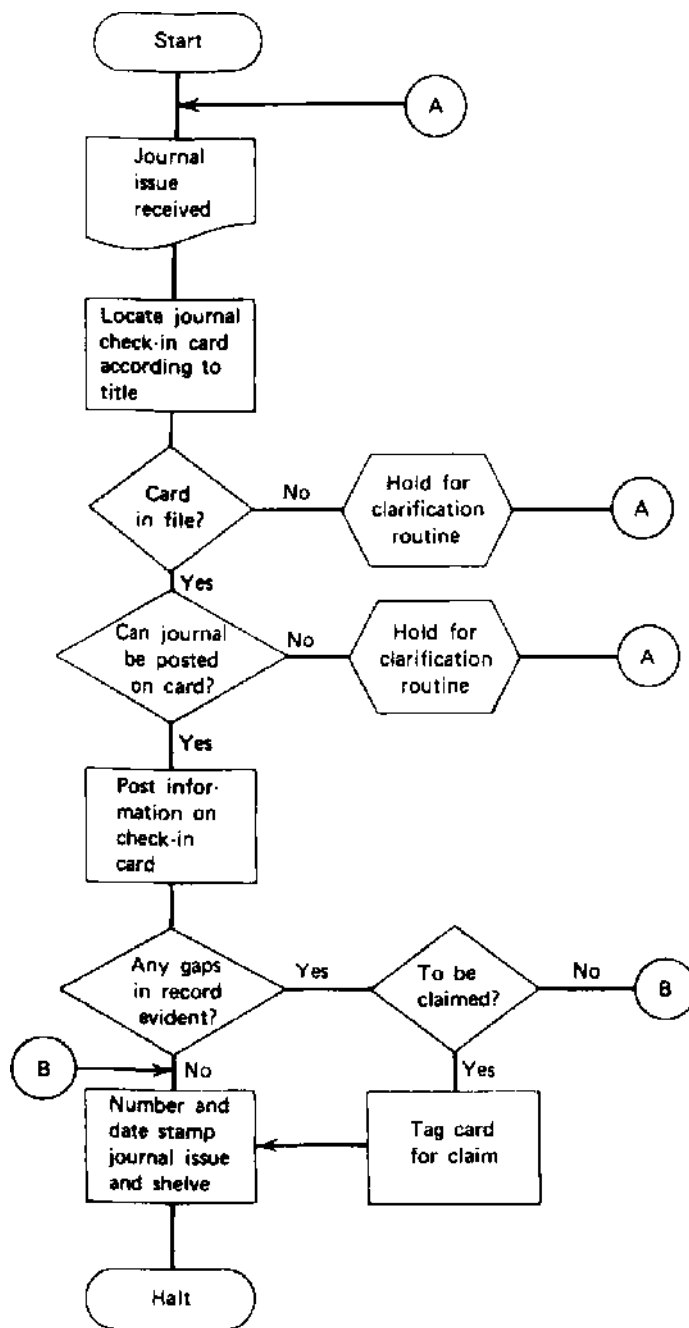


FIGURE 8. Flow-chart figure: check-in of a journal issue.

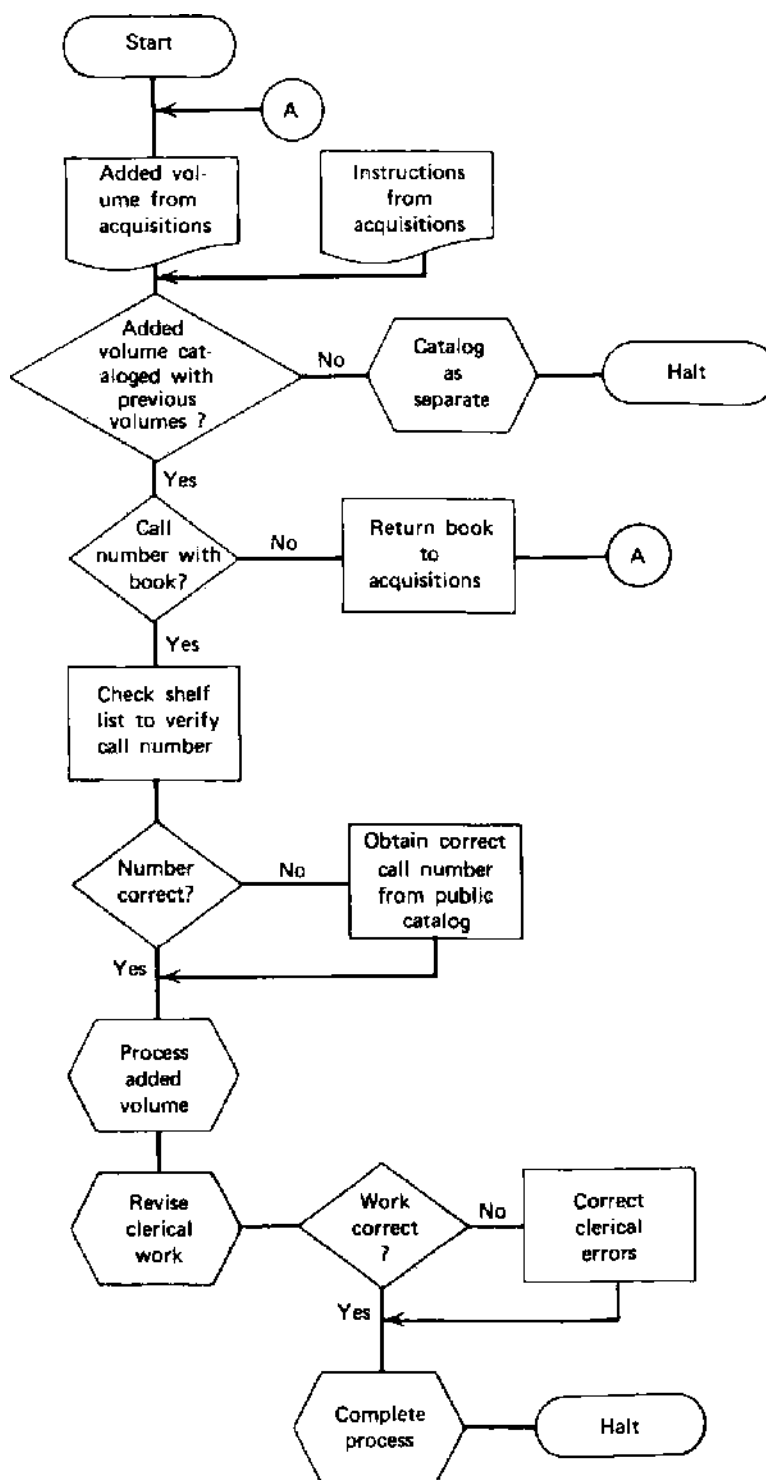


FIGURE 9. Flow-chart figure: processing of an added volume.

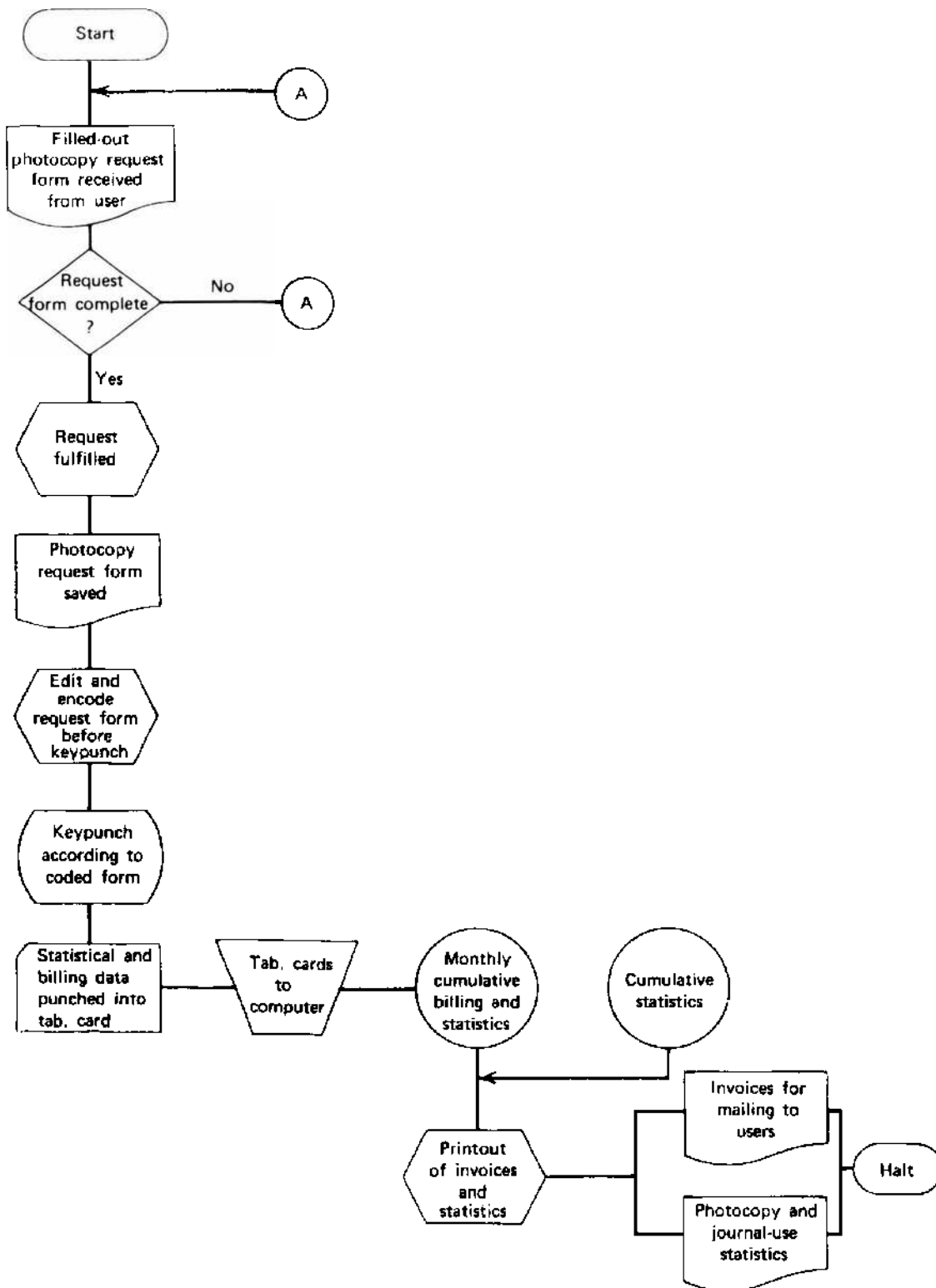


FIGURE 10. Flow-chart figure: photocopy service—automated invoicing and statistics keeping.

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E. A. CHAPMAN

J. LUBANS, JR.

FOLGER, HENRY CLAY

Henry Clay Folger (1857-1930), American businessman, was one of the leading book collectors of his time. Devoted to the memory of Shakespeare, he set himself the goal of collecting everything he could obtain which in any way related to the great English dramatist and his age. With the help of his wife, Emily, he assembled, over a 45-year period, a collection of Shakespeareana unrivaled anywhere in the world, and founded the Folger Shakespeare Library in Washington, D.C. to house it.

Though Folger was born in New York City and spent almost all of his life there, his family traced its American origins to New England and to the English settler Peter Folger, purchaser of the island of Nantucket from the Indians. Folger's father had moved to New York prior to his marriage and, during Folger's boyhood,

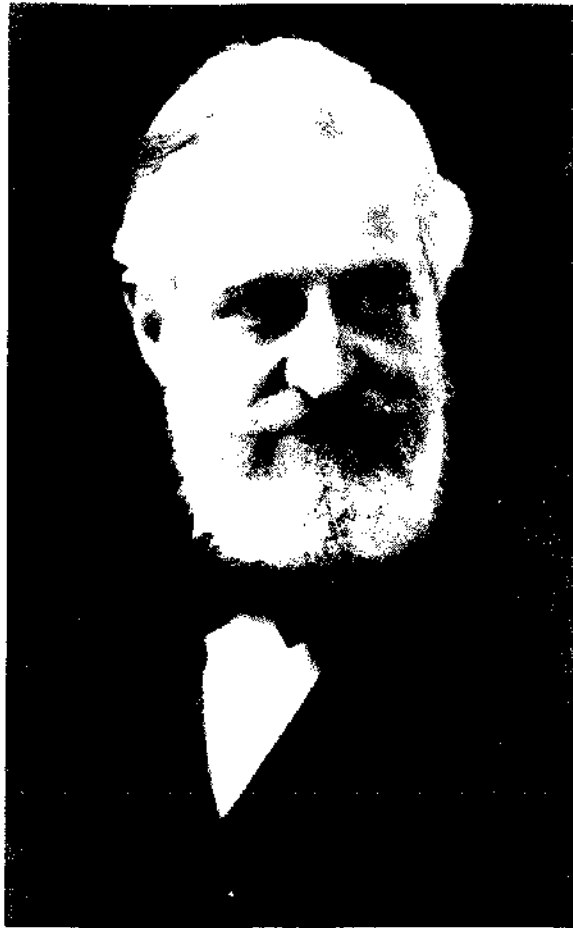


FIGURE 1. *Henry Clay Folger, 1857–1930 (Courtesy Folger Shakespeare Library).*

supported the family comfortably with his wholesale millinery business. Intelligent and industrious, Henry Clay Folger won a scholarship while in grammar school to attend Adelphi Academy in Brooklyn. Then, to complete his liberal arts training, he entered Amherst College, Amherst, Massachusetts, in 1875. The failure of his father's business during his junior year almost ended his college studies, but fortunately two of his classmates lent him the money he needed to continue. He graduated from Amherst in 1879.

Folger, a Phi Beta Kappa, evidently considered a teaching career, but a close friendship with his roommate at Amherst, Charles Pratt, opened the door to the business world. Pratt's father headed one of the affiliates of the Standard Oil Company and offered Folger a clerkship in the company. The offer was particularly attractive to Folger because it meant he could at the same time pay his way through law school at Columbia College. He accepted the position and 2 years later obtained an LL.B. degree. Deciding against a legal career, however, he chose to remain with the Pratt Company.

Although Folger was of a shy and retiring nature, he had keen business sense and quickly started up the executive ladder. His meticulous attention to detail and his powers of calm and dispassionate analysis won him promotion by 1886 to the secretaryship of the Manufacturing Committee of Standard Oil—a key body in the operations of the company—and by 1898 to the committee chairmanship. A decade later he was elected to the board of directors of the Standard Oil Company of New Jersey and by 1910 was drawing a salary of \$50,000 a year which, together with investments and other sources of income, was rapidly transforming him into a man of considerable wealth.

Action brought against Standard Oil of New Jersey under the terms of the Sherman Anti-Trust Act caused the break-up of the company in 1911. But in Folger's case this was a blessing of sorts for in the reorganization he became President of Standard Oil of New York and held the post until 1923 when he was elected Chairman of the Board. In 1928, 2 years before his death, he relinquished the board chairmanship and retired from active management of the company.

Folger's business career, for all its brilliance, was not as spectacular as those of certain captains of industry or finance of the very first rank such as John D. Rockefeller or J. P. Morgan. Nonetheless the fortune he accumulated was substantial and it allowed him to realize a dream whose beginnings must be sought in his student days at Amherst College.

He had become deeply interested there in literary studies and applied himself so well that he garnered a prize in his junior year for an essay on Dickens and followed it his senior year with another prize for an oration on Tennyson. Shakespeare, too, had attracted his attention and he enjoyed reading the plays aloud in what time he could spare from his other studies. But his literary interests remained unfocused until he chanced to attend a lecture by Ralph Waldo Emerson in his senior year. Emerson's lecture carried the rather unlikely title "Superlative or Mental Temperance." Folger was tremendously impressed by it and went away eager to read more widely in Emerson's published works. A short time later he came across the excerpt of an address which Emerson had delivered in 1864 entitled "The Tercentenary of Shakespeare's Birth." The eloquence of Emerson's prose and the grandeur of the subject produced an effect on Folger's imagination which was never to be erased. From that point forward and regardless of other preoccupations, Shakespeare always retained a very special place in his thoughts. In 1885 he married Emily Clara Jordan, a Vassar graduate whose admiration for Shakespeare was hardly less intense than his own.

The genesis of Folger's collection of Shakespeareana occurred just a few months after his marriage when he presented his wife with a Halliwell-Phillipps facsimile of Shakespeare's First Folio. The volume cost only \$1.25 but, as Mrs. Folger later remarked, it was "the cornerstone of the Shakespeare Library." After studying the facsimile and comparing it with other editions, Folger was fascinated to discover the many variations in the text of the plays which occur from edition to edition. Drawn by this new-found textual interest, Folger attended an auction at Bangs in New York City in 1889 where a Fourth Folio Shakespeare edition (1685)

was being offered for sale. Though his salary was then still modest, Folger summoned his courage and entered a bid. When the bidding closed, he emerged, triumphant, with his first "rare book"—at a cost of \$107.50 payable in 30 days.

Now launched as a collector of Shakespeare rare editions, Folger gave to the task the same painstaking thought and study which marked his advance in business. He and his wife devoted their leisure hours together to searching book catalogs and to visiting book shops. Book dealers in England came to know the couple well as a result of the Folgers' many trips abroad to visit Stratford and to seek out rare Shakespeareana.

Of all the books they acquired, the Folgers valued most highly the Sibthorp copy of the Shakespeare First Folio (1623) which came to light in 1891. One of the first of the folios to come off the press, the copy was inscribed to Augustine Vincent of the College of Heralds by the printer of the folio, William Jaggard, and was still in its original binding. However, the Folgers collected early quarto editions of Shakespeare's plays with almost the same enthusiasm they did the folios. Indeed one of their most important purchases was the unique 1594 quarto edition of *Titus Andronicus*—the first of Shakespeare's plays to have been printed. For over 2 centuries the edition had dropped from sight and its existence was known only from early allusions to it. However in 1904 a brief announcement appeared in the *New York Sun* stating that the *Titus* of 1594 had been found in a Swedish peasant's cottage. Folger excitedly cabled his agent in London and instructed him to leave at once for Sweden. When Folger received the query "What is the highest you are willing to pay?" he spent 3 hours walking the streets trying to make up his mind. The figure he finally settled upon was £2,000, enough to win him the quarto.

As the years passed the scope of the Folger's collection broadened and expanded enormously. Everything however remotely related to Shakespeare and to his world interested them. The sheer bulk of their purchases made it impossible for them to retain their books in the relatively small brick row house they occupied in Brooklyn. Almost as soon as the books arrived they were dispatched for safe-keeping to fireproof warehouses and bank vaults. For all practical purposes the collection was inaccessible and the Folgers drew criticism from a number of scholars who requested, but could not obtain, permission to examine their books.

When it was, precisely, that Henry Folger conceived the plan of bringing together his books, manuscripts, and other materials in a library dedicated to Shakespeare is uncertain. Clearly he had reached the decision shortly after World War I and probably well before, though he was remarkably close-mouthed about his intentions. The British urged him to select Stratford-upon-Avon as the site most appropriate for a Shakespeare memorial library, but Folger, who was determined "to help make the United States a center for literary study and progress," decided otherwise. His choice was Washington, D.C. on a site across the street from the Library of Congress whose resources, he recognized, would greatly enhance the value of his own library. For almost a decade he quietly bought up the properties required for the library site. When he resigned from Standard Oil of New York in early 1928 he gave increasingly of his time to the final planning of his library and

the next 2 years were occupied by frequent consultations with contractors and architects. On May 28, 1930, the library cornerstone was laid but Folger never saw the building completed. He died on June 11, 1930. Mrs. Folger, who maintained a close interest in the construction and, later, in the operation of the library, visited it frequently until her death in 1936.

PHILIP A. KNACHEL

FOLGER SHAKESPEARE LIBRARY

The Folger Shakespeare Library, founded by Henry Clay Folger and administered by the Trustees of Amherst College, is a research institution for the advancement of learning in the humanities. Located in Washington, D.C., and formally dedicated in 1932, the Library houses an unequalled collection of rare Shakespeare editions and Shakespeareana. Substantial additions of books and manuscripts related to Shakespeare and to his world have steadily increased the usefulness of the library for research on Shakespeare and have heightened its value for all students of the Renaissance. The broadening scope of the Folger's resources has, in fact, transformed the library into an international center for the study of almost any aspect of Western civilization in a period reaching from the invention of printing to the early eighteenth century. Its collections of English literature and theater history extend through the eighteenth and nineteenth centuries.

Although Henry Clay Folger died in 1930 when construction of his library had just begun, he had already planned for its future in a will drawn up some 3 years before. In it he designated that the Trustees of Amherst College administer the library and bequeathed to them, in trust, the bulk of his estate for payment of the construction costs and for the establishment of an endowment to provide for the maintenance, upkeep, and enlargement of the library and for additions to its collections. A specified portion of the annual endowment income was reserved for the benefit of Amherst College and in compensation for the services of its trustees.

Folger had doubtlessly believed in 1927 that his fortune was adequate for these purposes. But the stock market crash of 1929 which intervened reduced the value of his bequest. After the Amherst Trustees deducted the cost of the building and other necessary expenses, they discovered that the endowment amounted to less than 1½ million dollars. Annual income on this sum would clearly have been insufficient for the library's needs and doubt was expressed that the library could open. The effect of this news on Mrs. Folger can be imagined. She was determined, though, that the dream which she had shared so long and so completely with her husband was not to be shattered at the very moment the library had become a physical reality. She agreed to the immediate transfer into the endowment fund

of approximately 3 million dollars from her own estate. The library opened as planned.

Income from endowment has continued through the years to furnish virtually all the funding for the library's upkeep and programs. In 1970 the endowment stood at approximately 20 million dollars.

Before he died Folger had arranged that in its beginning years the library would be headed by two officials of more or less coequal power and authority. To William A. Slade, a graduate of Brown University and for many years on the staff of the Library of Congress, he conferred the title of director. Mr. Slade's task was to organize and to supervise the technical services of the library. Folger turned to Dr. Joseph Q. Adams, chairman of the English Department at Cornell University and a distinguished Shakespeare scholar, to become the library's director of research, and assigned to him responsibility for those activities requiring subject expertise. When in 1934 Mr. Slade returned to his previous position at the Library of Congress, the dual headship of the Folger Library ended. Dr. Adams was named acting director of the library by the Amherst Trustees and was confirmed as director in 1936. He continued in that post until his death in 1946.

After a search lasting many months the Amherst Trustees appointed Dr. Louis B. Wright director of the Folger in 1948. Dr. Wright, a Ph.D. in English literature from the University of North Carolina and the author of numerous publications on the literature and history of Elizabethan England and Colonial America, had served for some years as director of research at the Huntington Library in San Marino, California. Dr. Wright headed the Folger Library for twenty years, retiring as director emeritus in 1968.

To succeed him, the Trustees of Amherst College turned to a University of Wisconsin Ph.D. in English Literature—Dr. O. B. Hardison, Jr. Dr. Hardison has published extensively on the literature and drama of the Medieval and Renaissance periods and for several years before his appointment at the Folger was professor of English at the University of North Carolina. He assumed the direction of the library in 1969.

The director of the Folger is assisted by an associate director who is responsible for the administration of library technical services and for maintenance of the building and grounds; a director of research activities who administers the library's scholarly programs including fellowships, publications, and the Folger Institute of Renaissance and Eighteenth Century Studies; and a director of programs who supervises library activities which serve the general public, including tours and exhibitions and activities scheduled in the Folger theater.

The Folger Library currently has a permanent staff of fifty-five persons of whom roughly two-thirds occupy professional grade positions.

After Mr. Folger had acquired properties across the street from the Library of Congress in Washington, D.C., for his library site, he engaged Paul Philippe Cret as architect and Alexander B. Trowbridge as consulting architect. The cornerstone of the library was laid in 1930 and the building completed 2 years later (see Figure 1). The occasion of its completion was marked by formal dedication ceremonies

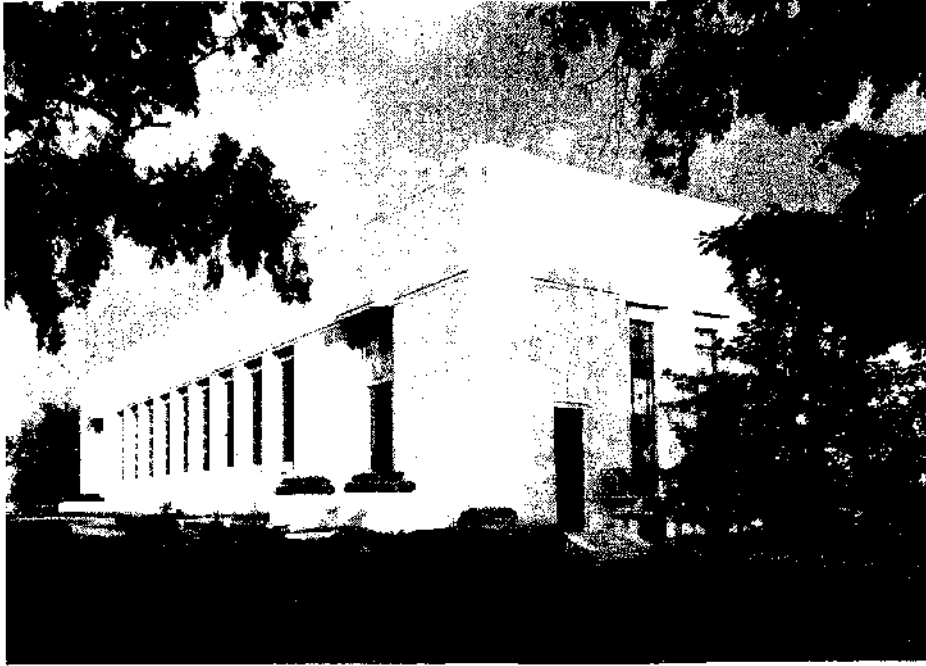


FIGURE 1. *The Folger Shakespeare Library. To the left is the north facade of the library showing bas-reliefs of scenes from Shakespeare's plays.*

on April 23, 1932, the 368th anniversary of Shakespeare's birth. Present were Mr. Folger's widow, President and Mrs. Herbert Hoover, and a gathering of distinguished statesmen, educators, and scholars.

The Folgers had worked closely with their architects in planning the building. Originally they had imagined a structure whose design, inside and out, would evoke Shakespeare's England—a setting, they believed, which would offer a fitting background for the public display of selected books, manuscripts, paintings and objets d'art and would prove inspirational to the scholars who read at the library. The architects, while agreeable to an Elizabethan interior, vigorously challenged the appropriateness of that style for the exterior because of the many government buildings of classic Greek and Roman design situated on Capitol Hill. In the end the Folgers allowed the architects a free hand for the exterior but specified a Tudor-Stuart style for the interior.

The exterior design is at once classical and modern in its simplicity and in its emphasis upon horizontal and vertical lines. Without sacrifice of individuality the architects achieved a pleasing harmony with neighboring structures. The principal facade, to the north, features nine bas-reliefs of scenes from Shakespeare's plays. Created by John Gregory in a restrained classical manner, each bas-relief has at its base an appropriate inscription selected by Mr. Folger. To the west of the building a fountain with the figure of Puck modeled by Brenda Putnam occupies a central position in a garden adjoining the Library (see Figure 2).

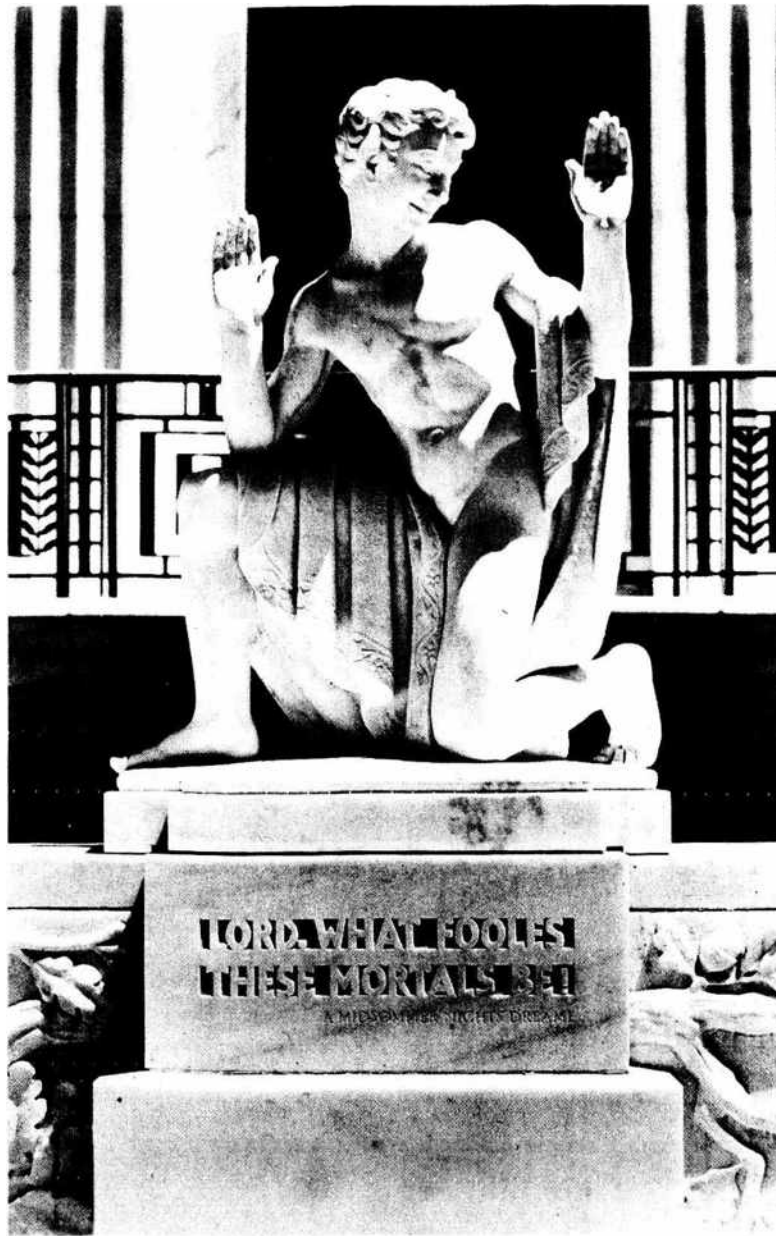


FIGURE 2. *Statue of Puck above fountain in the West Garden of the Folger Shakespeare Library.*

Inside the building the main reading room, with high trussed roof, recalls a typical great hall of a Tudor-Stuart English house or college (see Figure 3). A large stained glass window at the west end of the reading room depicting the seven ages of man was executed by Nicola D'Ascenzo. At the opposite end of the room portraits of the Folgers by Frank Salisbury flank a commemorative bronze plaque behind which have been placed the ashes of Mr. and Mrs. Folger.

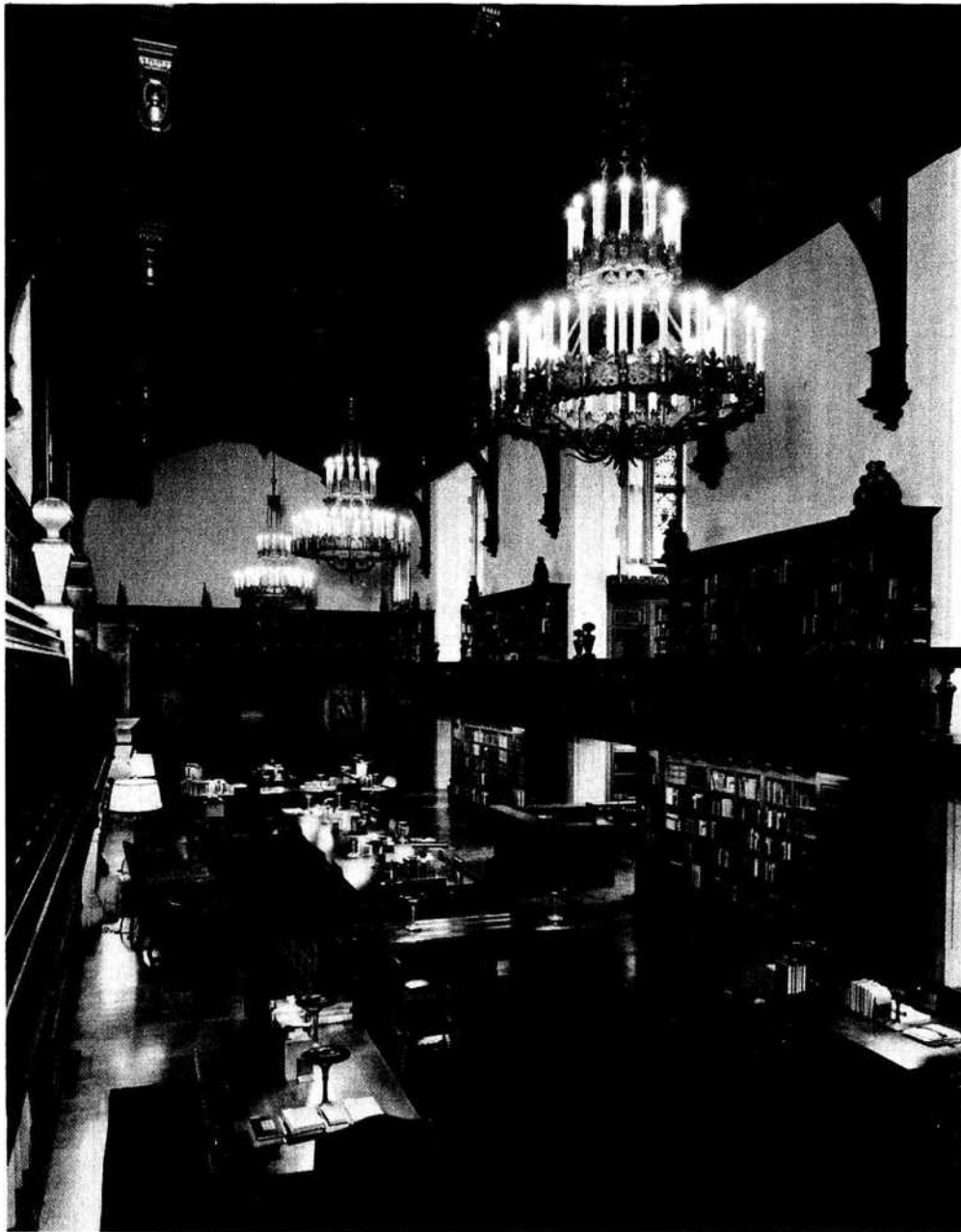


FIGURE 3. *Main reading room of the Folger Shakespeare Library looking to the east end of the room.*

The public areas of the library consist chiefly of the exhibition gallery in the north section of the building and of the theater in the east wing. The exhibition gallery with walls of paneled oak and a floor of Enfield tiles decorated with Shakespearean motifs suggests, like the reading room, an English great hall. The emplacement of the arms of Elizabeth's England and of the United States over the east and west entrances of the gallery symbolizes the Folgers' desire to create an American center for the study of Shakespeare and his Elizabethan background.

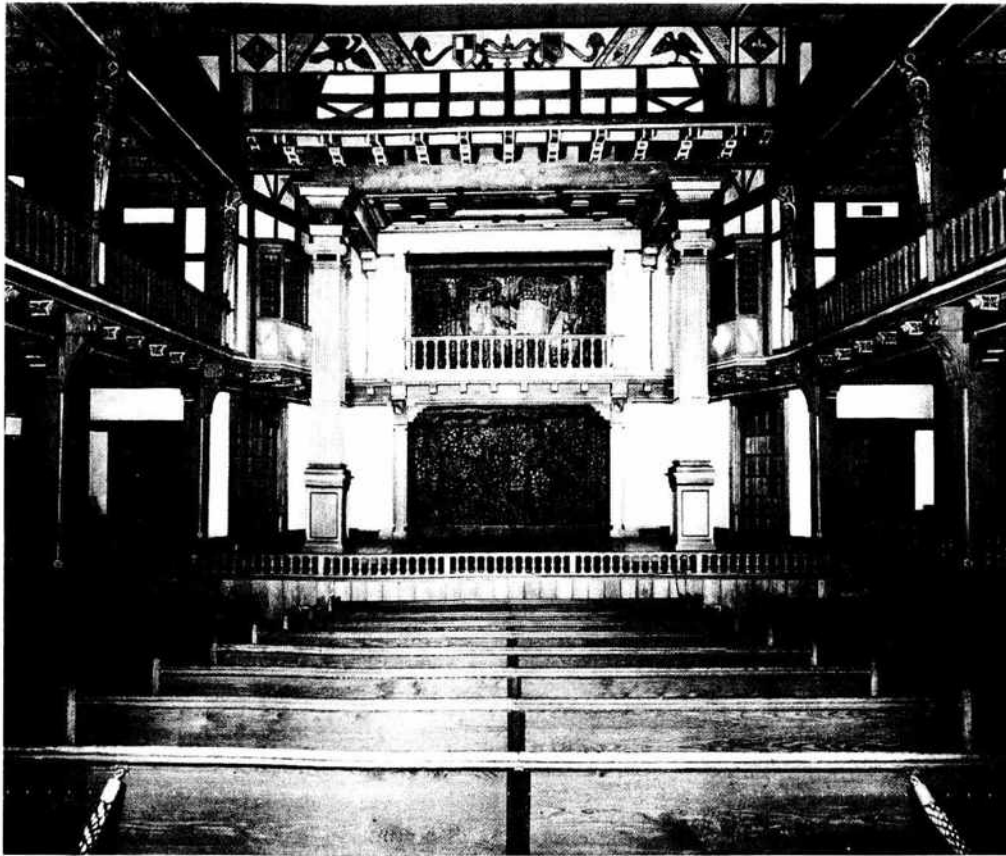


FIGURE 4. *The Folger Shakespeare Library Theatre.*

Because the Folgers were firmly persuaded that Shakespearian drama ought to be played as well as read, they included a theater in their plans for the library. Limitations of space, lack of information, and various practical considerations prevented construction of an exact replica of any particular theater of Shakespeare's time. Instead the architects strove to re-create the atmosphere of a characteristic public playhouse of the period (see Figure 4). The Folger Theatre which now seats 254 persons was equipped from the beginning with an elaborate stage lighting system, dressing rooms and other supporting facilities. It could not serve for public theatrical performances, however, because it failed to meet certain requirements of the building code. Until recently it was limited primarily to lectures and concerts. In 1970 the theater was fireproofed and a permit was secured which allows its use for public theatrical productions.

To accommodate a growing staff, many more readers, and a book collection which had doubled in size since the library opened in 1932, an addition to the original library structure was erected in 1958–1959. Placed at the rear of the building and extending one story above and below ground, the addition contains stack space for 30,000 books, several offices, a conference room and a roof garden. Property which the Folger Library has acquired across 3rd Street to the east will

eventually permit the construction of another building when expansion beyond the limits of the present facilities becomes necessary.

Delivery to the library of the first of the 2,100 packing crates in which Mr. and Mrs. Folger had stored their Shakespeare collection started in 1931 even as the last workmen were finishing the construction work. Not until 1933, however, when the 100,000 books and other items in the crates had been unpacked, checked against inventories, and placed on shelves was it really possible to appraise the extraordinary worth of the collection.

The heart of it was the seventeenth century folio editions of Shakespeare's dramatic works and the sixteenth and seventeenth century quarto editions of his individual plays and of the sonnets. Because the methods of printing in this period often resulted in textual variations from copy to copy, Folger had sought multiple copies for comparison. His collection numbered seventy-nine copies of the first folio edition of 1623 in which eighteen of Shakespeare's plays appeared in print for the first time (the five first folios in the British Museum constitute the next largest collection); fifty-eight copies of the second folio of 1632; twenty-four copies of the third folio of 1663-1664; and thirty-six copies of the fourth folio of 1685. The number and rarity of the quarto editions was similarly impressive and included the unique first editions of *Titus Andronicus* and of *Henry IV, Part I* (a fragment).

The Folgers' aim to include later readings of Shakespeare texts and the commentaries of succeeding generations of scholars and critics was attested by the presence of more than 1,000 editions of Shakespeare's collected works, including duplicates, from the eighteenth, nineteenth, and twentieth centuries. Editions of the individual plays and translations were also numerous.

The impact of Shakespeare on his contemporaries and on later generations was documented in many ways. The Folgers had purchased some 5,000 allusion books (printed materials containing references to Shakespeare) which were published before 1700 together with hundreds of manuscript allusions. Several hundred copies of Shakespeare's works from the personal libraries of important figures in the arts, politics, and other fields featured such distinguished former owners as Dryden, Pope, Washington, Lincoln, and Shaw.

Impressive, too, was the quantity of material which dealt with the history of Shakespearean stage production and the theatre. Particularly noteworthy were the many promptbooks, often with manuscript additions and deletions and stage directions, inserted by such former owners as Garrick, Kemble, and Booth, the manuscript accounts and records of English and American theatres, the thousands of theater playbills and programs, and the letters of prominent Shakespearean players and theater people from both sides of the Atlantic.

To document the visual side of theater history the Folgers had collected early portraits of Shakespeare, several hundred oil paintings of scenes from his plays (the work in some cases of major artists such as Reynolds, Gainsborough, and Fuseli), thousands of prints, engravings, and photographs of theatrical productions, and a considerable number of costumes worn by distinguished Shakespearean actors and actresses of the late nineteenth and early twentieth centuries.

A remarkable feature of the original Folger collection was its broad inclusiveness. The Folgers realized that Shakespeare could never be understood in isolation from the age in which he lived and that a library of Shakespeareana in the narrow sense would be limited in its utility. Thus while Shakespeare always remained the center of their collecting interest, the Folgers had purchased quantities of material which revealed the sources of his ideas and attitudes and which threw light on the milieu described in his works. For this reason their collection included the works of persons of such diverse backgrounds and accomplishments as Boccaccio, Holinshed, Erasmus, Montaigne, and Marlowe, and encompassed the institutions, the ideas, and the culture of the Renaissance in general.

During the administration of Dr. Joseph Q. Adams the breadth of the library's coverage of Tudor-Stuart English civilization was greatly augmented by the purchase in 1938 of the collection of Sir Leicester Harmsworth, prominent English newspaper publisher, who had died a short time before. Sir Leicester had directed his collecting energies to such fields as Elizabethan history, exploration, and theology just as the Folgers had concentrated on drama and literature. Though there was some overlap, in general the Harmsworth collection admirably complemented the holdings of the Folger Library. The purchase brought the library more than 9,000 of the 26,143 titles and editions listed in the Pollard and Redgrave *Short Title Catalogue* of English books printed between 1475-1640. These books, added to the original Folger collection, immediately transformed the Folger Library into the largest repository of such materials in the world with the single exception of the British Museum.

Other notable purchases during Dr. Adams' directorship included the Dobell Collection which added 600 items of Dryden and Drydeniana to the library's holdings, the Losely manuscripts consisting of the extant records of the Office of the Revels in England from the reign of Henry VIII through the early years of Elizabeth I, and the fifteenth century Macro manuscript which contains three of the four existing morality plays written in English before 1500.

Rapid expansion of the Folger's collections continued during the 20 years of Dr. Wright's leadership (1948-1968). Within that period another 19,000 sixteenth and seventeenth century English imprints touching all aspects of Tudor-Stuart civilization were acquired. Heightened interest in the Continental backgrounds of English civilization was reflected in the purchase of 22,000 sixteenth and seventeenth century imprints. These materials strengthened the library's coverage of such fields as humanism, the Reformation, trade, exploration, politics, and in fact the whole range of Renaissance culture on the Continent.

Also of major significance was the development during Dr. Wright's administration of a really first-rate collection of modern reference works and monographic materials, indispensable for the study of the Folger's rare books and manuscripts. Despite the proximity of the Library of Congress, the experience of readers and staff had demonstrated that there could be no substitute for a reference collection appropriate to the special needs of the Folger and readily available on the Folger premises.

Under its present director, Dr. O. B. Hardison, Jr., the Folger continues to assign a first priority to its acquisition program of rare books, manuscripts, and reference materials. Major emphasis, as in the past, is placed on Shakespeare and the English Renaissance with a secondary emphasis on the Continental Renaissance and theater history.

The Folger offers a wide variety of programs and services, some of which are intended for advanced scholars and others for students and for the general public.

A fellowship program of long standing which in 1970 brought approximately fifty fellows to the library is one of the most important of the Folger's aids to scholarship. Postdoctoral scholars working in fields for which the Folger has relevant resources, and graduate students completing doctoral dissertations are eligible for the grants which provide stipends for periods of study of from 1 month to 1 year. Fellows come to the Folger from all parts of the United States and from many foreign countries. A selection committee composed of scholars appointed by the Folger director (but whose decisions are independent of library control) was established in 1969 to award the fellowships.

Throughout most of its history the Folger Library has published editions of books and manuscripts from its collections and works of scholarship related to its resources. At present the publication program consists principally of four series:

1. *Folger Documents of Tudor and Stuart Civilization*—modern editions of rare books and manuscripts intended primarily for the use of university students and advanced scholars.
2. *Folger Monographs on Tudor and Stuart Civilization*—studies which treat significant problems concerning British civilization of the sixteenth and seventeenth centuries.
3. *Folger Facsimile Series*—facsimilies of Folger books and manuscripts which meet rigid technical and bibliographical standards.
4. *Folger Booklets on Tudor and Stuart Civilization*—brief surveys for non-specialists.

Slide sets illustrating the subject matter have been prepared to accompany many of the booklets.

For several years the Folger Library sponsored jointly with the Consortium of Washington Universities graduate level seminars in Tudor-Stuart history, literature, and drama. The Folger Institute of Renaissance and Eighteenth Century Studies, an outgrowth of these seminars, began operation in 1971 "with the objective of promoting scholarship and teaching in the humanities." The institute offers informal seminars each semester led by members of the Folger staff, by faculty of participating universities, and by scholars invited from outside the area. Students enrolled in the seminars have full access to Folger collections and services.

Varied exhibits of outstanding materials selected from the library's holdings on the subject of Shakespeare, the Renaissance and theater history are displayed for the general public in the library's exhibition gallery. A docent program, established in 1970, furnishes volunteer guides to escort school groups through the gallery and theater. Approximately 30,000 persons visit the Folger's exhibitions each year.

The library also sends traveling exhibits of Shakespeare materials to college and high school libraries throughout the country.

A diversified program of events scheduled during the year in the Folger theater is another important library service to the general public. Lectures by distinguished scholars, concerts, poetry readings, and film programs are among recent offerings. The formation in 1970 of the Folger Theatre Group, a nonprofessional acting company organized by the library, permits the staging of Shakespearean as well as modern theatrical productions for the enjoyment of Washington audiences.

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FOMIN, ALEKSANDR GRIGORIEVITCH

Aleksandr Grigorievitch Fomin, 1887-1939, Doctor of Philology, was the author of over 300 publications. Of especial importance to library science are the following: *Knigovedeniye Kak Nauka (Booklore as a Science)*, 1931; *Metody Sostavleniya Bibliograficheskix Ukazateley (Methods of Compiling Bibliographical Indices)*; *Annotacii. Teoriya i Praktika ix Sostavleniya (Annotations. The Theory and Practice of Compiling Them)*, 1929. A great part of his publications consist of reviews and of special bibliographical indices; for example, *Opyt Bibliograficheskogo Ukazatel'a o M. V. Lomonosove (Toward a Bibliographical Index of the Works of M. V. Lomonosov)* and the two volumes of the *Pushkiniana*—a complete bibliography of the works of Russia's greatest poet, A. S. Pushkin.

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OLGA AKHMANOVA

FORD FOUNDATION

The Ford Foundation is a private, nonprofit institution that has as its objective the advancement of human welfare. It serves this goal by granting funds for experimental, demonstration, and developmental efforts in the United States and abroad. It is located in a modern building of unusual architectural design in New York City.

The foundation was established in 1936 under Michigan laws by Henry Ford and members of his family as a vehicle for some of their charitable concerns, particularly in the State of Michigan.

The foundation's activities during its first decade and a half of existence were those typical of a private family philanthropy. Henry Ford and his son, Edsel, died in the 1940s, and in the settlement of their estates, slightly less than 90% of the stock of the Ford Motor Company was donated to the foundation. Since that time the foundation has followed a policy of divesting itself of this nonvoting stock to diversify its investments.

In the late 1940s Henry Ford II, then Chairman of the Board of Trustees of the Foundation, authorized a study to provide a basis for future organization and program directions for the institution. As a result, the Ford Foundation entered a new period of growth and development: It expanded its activities to a national and international scope. Since then the foundation has tried to identify and, where possible, anticipate the challenges American society would face. Within the limits of its charter and its resources, it initiated program thrusts to stimulate research, training, and action in specific fields of interest.

Education and research have been at the top of the foundation's list of priorities from its earliest days. Support has been given for improving schools at all levels, technical and vocational education, educational leadership, advancement and strengthening of higher education, and the expansion of education opportunities for American minorities.

In the 1950s the Ford Foundation initiated a program of support for the humanities and the arts. Projects were designed to strengthen general studies in

American higher education, as well as to stimulate vitality in the performing arts, such as the resident professional theater, opera, ballet, and the symphony.

The Ford Foundation began assistance for the development of a viable public broadcasting industry in 1952. It has devoted considerable resources for the establishment of national programming centers, as well as the support of community noncommercial stations throughout the country.

As social change in America increased in the 1960s, the Ford Foundation tried to find ways to provide knowledge about and accelerate action in the areas of change, such as race relations, equality of opportunity in education, employment and housing, civil rights, community development in both urban and rural areas, administration of justice, governmental organization, conservation, and environmental improvement.

The foundation has given sizable financial assistance to international projects. It initiated a program of technical assistance to developing countries in India in 1951 and later expanded it to include three major developing regions: Asia and the Pacific; the Middle East and Africa; and Latin America and the Caribbean. These programs have been focused in the fields of education, agriculture, population, and development administration. It also has funded projects in the advanced countries of the world in support of efforts toward better understanding and world peace.

Although the Ford Foundation has not made support for library development one of its principal program thrusts, it has contributed considerable amounts of money to the library field in its domestic and international operations.

Library Support in the United States

GENERAL LIBRARY DEVELOPMENT

In the early 1950s the Ford Foundation initiated staff studies into the problems facing libraries, both public and school, in the United States. It became aware that its resources were insufficient to meet the financial problems of libraries in improving their services or expanding them to meet the educational needs of the country. To supplement its staff study of this field, the foundation made a grant in 1955 to the Folger Shakespeare Memorial Library in Washington, D.C., to hold meetings of educators, librarians, and scientists to discuss the library situation in the United States. The result of these initiatives was a recommendation to establish a national library council to make a coordinated attack on the problems.

The Council on Library Resources, Inc., was established in 1956 with an initial \$5,000,000 five-year funding by the Ford Foundation. The objectives of the council, as seen by the foundation at that time, were threefold:

To conduct research in, to develop and to demonstrate new techniques and methods in the solution of the problems of libraries, particularly research libraries, and to make grants to institutions or persons for these stated purposes.

To provide leadership in coordination of efforts to develop the resources and services of libraries.

To improve relations between American and foreign libraries.

Over subsequent years, the Ford Foundation supplemented its initial support to the council with grants totaling nearly an additional \$20 million.

Prior to the establishment of the council (but in coordination with the group working on the concept of a national program), the foundation made a grant of \$60,000 in 1955 to the Pacific Northwest Library Association in Seattle to conduct a 2-year study of university, college, school, and public library facilities in that region of the country. The information developed in the study was to help in coordinating and improving those facilities and services. The foundation saw this opportunity as a pilot undertaking to demonstrate the possibilities for regional cooperation among libraries and to serve as a laboratory for developments that might be subsequently expanded through support by the council when it was established. Support for the study was supplemented in 1957 with a second 2-year grant of \$16,000.

Since 1956 the foundation has concentrated its general library support in the United States through the council, with few exceptions. One exception of note was a grant made in 1964 (supplemented in 1967) to the New York Public Library for the development of an automated book catalog for the library's dance collection. This was in connection with the establishment of the Library and Museum of the Performing Arts in Lincoln Center in New York City. After determining that the Council on Library Resources could not fund the project but considered it of merit, the foundation supported the project for these program reasons: interest in library technology, interest in the field of dance, and support of Lincoln Center for the Performing Arts. It was anticipated that the automated catalog would effect economies of staff and reader reference time, provide quicker analysis of strengths and weaknesses in the collection, and make easier the use of photocopying methods to handle requests from both American and foreign libraries. Funds provided through the two grants totaled \$141,000.

SPECIFIC LIBRARIES

The Ford Foundation, as stated above, directed its general library support through the Council on Library Resources. It has, however, given large-scale support to three specific libraries. In each case, special program reasons influenced the decisions to give this type of support.

The first of these was the United Nations International Library in New York City. In 1959 the foundation made a grant of slightly over \$6 million for construction of the library. The foundation responded to the request from Secretary General Dag Hammerskjold for three reasons: (1) to demonstrate the support of private American institutions for the United Nations; (2) to complement its other long-term programs dedicated to the reduction of international tensions and the increase of international understanding; and (3) to complete the architectural unity

of the United Nations Plaza complex of buildings. It was also recognized that an improved library would contribute to the research work underlying the technical activities of the staffs of the secretariat and other specialized organizations, as well as the preparation of materials by the permanent delegations to the United Nations.

The second was the Henry Ford Memorial Library in the city of Dearborn, Michigan. As the centenary of Henry Ford's birth approached, the foundation provided consulting assistance to the Dearborn Library Commission for planning of a new library building. The foundation believed this contribution was a fitting memorial to Mr. Ford, since he and his wife in 1923 had given to the city the land on which the then existing library was located, as well as an appropriate symbol of the foundation's interest in the community that was the original source of its capital reserves. Grants totaling \$3,500,000 were made to the city for construction of the new library.

The third was the Foundation Center in New York City. The Ford Foundation has provided continuous operating support to the center since 1957, totaling \$550,000 by 1971. The heart of the Foundation Center is its library, one of the most complete sources of information concerning the foundation world. The library contains published reports of foundations, as well as copies of tax statements filed by foundations with the Internal Revenue Service. These tax forms include basic information on the charitable contributions and grants made by these foundations and, therefore, serve as a valuable reference source to all foundations, as well as the public. The Ford Foundation's interest in supporting the center's library program reflected Ford's own concerns about full public disclosure of foundation activities.

LIBRARY ASSISTANCE THROUGH OTHER PROGRAM INTERESTS

Even though the Ford Foundation concentrated its direct efforts in the field of library development in the United States through its support of the Council on Library Resources, an indeterminate amount of funds flowed into academic library improvements from grants made to American universities and colleges as part of the foundation's other program interests. Two large-scale grant programs contributed to the growth of academic collections and the improvement of library services in the recipient schools. Beginning in the mid-1950s and ending in 1959, the foundation made a series of grants, totaling \$24 million, to over twenty universities that were aimed at developing programs of study on the Near East, the Far East, South and Southeast Asia, and Africa. These grants were followed by two additional grant programs, one supported between 1960 and 1962, involving thirteen universities and totaling \$41.5 million, and a supplemental program of \$72 million in 1965-1966 to eleven of the thirteen universities. These grants were for the support of specific area programs and other international studies. Although no over-all tally is available of the portions of these grants that were allocated by the universities for improving their library resources complementing the international studies program, it is certain that significant funds were used for library expansion.

During the late 1950s, through its expanded developmental activities in Asia, the foundation became more aware of the lack of materials in American libraries on that area of the world, and several grants were made to a few other organizations, such as the Library of Congress and The Association for Asian Studies, Inc., for projects to improve American library services in this field. These included 5-year support given in 1955 to the Library of Congress for continuation of the Southern Asian Accessions List, and 1-year support given in 1959 to The Association for Asian Studies, Inc., for the Committee on American Library Resources on the Far East. In the 1960s the foundation increased its support for programs related to Eastern Europe, and in 1969 a grant of \$350,000 was made to the Association of Research Libraries in Washington, D.C., to establish a Slavic bibliographic and documentation center.

The second major program was a series of challenge grants to private universities and colleges that extended from 1960 to 1967. Sixteen universities and sixty-one colleges were given a total of \$349 million, enabling them to use the funds to advance their long-term development. These funds were to be matched, at varying percentages per institution, by a combined total of over \$990 million raised from other sources by the colleges and universities. The use of funds was at the discretion of the institutions, and later study of the results of this program indicated that substantial portions of the funds were used for library acquisitions.

As the Ford Foundation directed more of its program activities toward solution of social problems in the country, efforts have been made to expand the resources of libraries focusing on minority experiences. Two grants totaling \$185,000 have been made since 1968 for the development of the Library Documentation Project of the Martin Luther King Memorial Center in Atlanta. The project was organized in the hope that it would become the major archival center for papers dealing with the history of blacks in the United States. The library holds the papers of Dr. Martin Luther King, Jr., and Chief Albert Luthuli of South Africa, two of the three black Nobel Peace Prize winners. It also has an extensive collection of written documentation on the Civil Rights Movement. Funds from the foundation's grants were to be used for the basic reference staff and services of the library, acquisition, and cataloging of materials.

This support was further evidenced by a number of grants made directly to predominantly black colleges for improvement of specific teaching programs. Each of these grants provided funds for improvement of the library holdings in the fields to be expanded. Examples of these are grants made in 1970 of \$250,000 for social sciences at Talladega College, Alabama, with \$12,000 for the library; \$300,000 for political science at Bishop College, Dallas, with \$82,400 for the library; and \$316,000 for the general undergraduate program at Johnson C. Smith University, Inc., Charlotte, North Carolina, with \$100,000 for the library. In addition, through the Southern Association of Colleges and Schools, Inc., the foundation made \$99,300 available to provide eighty-five predominantly black colleges with collections of paperback books on Afro-American history and culture.

Library Support in Developed Countries

The Ford Foundation has not supported a program of general library development in Europe or the advanced countries of the Pacific (Japan, Australia, and New Zealand) as it has in the United States through the Council on Library Resources. As in its domestic activities, it has provided for the expansion of the library resources of selected institutions to further other program goals.

AMERICAN STUDIES ABROAD

In the late 1950s, concurrent with its growing support for international studies in American universities, the foundation's staff became concerned with the level of knowledge and understanding of the United States by Europeans, particularly as this knowledge was being transmitted through European university teaching. After 2 years of staff study, the foundation initiated a program of support for American studies programs in European schools. Grants were made to the American Council of Learned Societies to strengthen these European academic programs through professional exchange, establishment of new professorships in certain universities, and expansion of library holdings. In 1964 the program was expanded to include institutions in the three Pacific countries mentioned above. Foundation support to the council for this purpose totaled slightly over \$9 million in the 10 years between 1961 and 1970, including funding to carry the program through 1975. By 1969 the council had made grants for library purposes in Europe totaling over \$600,000 to two institutions in Austria, one in Belgium, one in Denmark, eleven in France, nine in Germany, one in Ireland, eight in Italy, one in Malta, four in the Netherlands, two in Norway, three in Sweden, two in Switzerland, and twenty-one in the United Kingdom. The majority of these grants were for library acquisitions in the field of American studies, but a few included support for such other library needs as preparation of bibliographies on American studies materials and union catalogs of American materials in the libraries of various cities. Since 1964 over \$180,000 was granted for library assistance to seven institutions in Australia and four in New Zealand. Many of the above grants by the American Council of Learned Societies required the institutions to match the funds, with equivalent amounts from other sources, thus increasing the actual monies expended for library expansion in this field.

LIBRARY CONSTRUCTION

To assure the development of freedom of thought and education in the democratic enclave of West Berlin, the Ford Foundation committed considerable funds to the Free University of Berlin. In 1951 over \$1 million was provided to construct various needed facilities, including a library. An additional amount of \$125,000 was granted to the university in 1954 to complete the construction of the library.

This increase was necessitated by modification of the original plans based on recommendations made by a team of American library experts.

The University of Dublin also received funds for library construction. The library of Trinity College of the University of Dublin is considered one of the great libraries in Western Europe. In 1963 the Ford Foundation granted \$280,000 to the university to be used toward construction, furnishing, and equipping a new library facility. This support was given in line with the foundation's decision to provide support to a limited number of outstanding and promising European institutions outside of the foundation's normal program directions.

LIBRARY SUPPORT THROUGH OTHER PROGRAMS

Two other areas of concern of the Ford Foundation have yielded library support, however, on a more limited scale. The foundation has devoted considerable resources toward the problems of Atlantic-European unity and international peace and understanding.

Support for Atlantic-European unity has gone to European institutions that have established training and research programs drawing their student body from all European countries. In analyzing the needs of these institutions, occasionally the need for better library resources has surfaced as a principal concern. Examples of this support are a grant of \$11,500 made in 1955 to Le College d'Europe in Bruges, Belgium, for the purchase of certain library books (at the time this college had postgraduate courses in political, economic, and social problems related to the European-Atlantic community but had inadequate library resources to support its expanding teaching programs), and \$25,000 made in 1963 to the Institute of Social Studies in The Hague, The Netherlands, for strengthening its library documentation services (the institute was funded by ten Dutch universities to provide instruction and conduct research in social sciences for students and scholars from other countries).

In searching for ways to promote international peace, the foundation has supported several institutions conducting research on the causes of international conflict. One of them is the Institute for the Study of Conflict, Ltd., in London, which focuses its research work in the area of unconventional warfare and civil strife; such as urban violence, terrorism, and guerrilla warfare. The institute received \$20,000 from the foundation in 1971 to assist it in developing a unique library and reference center covering all aspects of contemporary revolutionary behavior, political unrest, and urban violence, with particular emphasis on current newspaper and periodical materials from all over the world.

Library Support in Developing Countries

Although library development has not been identified as a principal field of activity in the Ford Foundation's work in developing countries, a number of major

grants have been made exclusively for library development. More importantly (and more commonly) many grants, made primarily for other purposes, contained peripheral support for library development. Typically in such instances, within the budget of a grant to a foreign university for the improvement of professional training in a specific academic discipline an allocation would be included, sometimes large, other times small, for "library acquisitions" or "books and journals." An example of this is a grant of \$350,000 made in 1966 to the Catholic University of Valparaíso, Chile, for its School of Business, which included \$32,000 for library acquisitions. This type of support is similar to that discussed above under "Library Support in the United States" that has been extended to predominantly black colleges.

TYPES OF ASSISTANCE

The types of library needs met by funds provided under Ford Foundation grants cover a broad range of activities. They have included:

Better Opportunities for Improved Education in Librarianship. The foundation has provided training for librarians from developing countries in a number of ways: fellowship programs for advanced study in the United States; in-service training through the assistance of foreign library specialists working at the institutions themselves; and assistance to establish new library schools. Foundation support to the University of Baghdad, Iraq, from 1957 to 1965, utilized the first two methods. A fellowship program was established whereby selected university staff members studied library science in the United States, while American librarian specialists established in-service training programs at the university. These programs totaled approximately \$270,000. The last method was evidenced by the establishment of an Institute of Librarianship at Ankara University, Turkey, with foundation assistance from 1955 to 1961 totaling \$320,000. An American director was provided under this grant to head the new institute until an appropriately trained Turkish librarian could assume the position. In addition, a number of Turks were sent to the United States for their Master of Library Science degree.

Improvement of Library Collections, Including the Development of Selection Aids, such as Bibliographic Materials. A number of sizable grants have been made for the expansion of library collections in universities in the developing countries. In addition, considerable support for book and periodical purchases has been provided as adjuncts to training programs, as mentioned earlier. An example of this type of support is a grant of \$337,500 made in 1964 to the University of the Philippines for development of library resources in the social sciences. The library collection of the university was virtually destroyed during World War II and post-war reconstruction favored the collections in professional areas. The foundation's grant was aimed at developing broader cross-discipline resources. Over 23,000 volumes of books and nearly 600 periodical titles were acquired under this program, with the guidance of the American Library Association. Another grant that was made to assist an institution rebuild its library collection after it was com-

pletely destroyed, in this case by fire, was one of \$100,000 made in 1960 to the Brazilian Center for Research in Physics, Rio de Janeiro.

Provision of Adequate Facilities for Library Use. Construction support has been limited in the foundation's work in developing countries. The Federal University of Viçosa, Brazil, used \$83,500 for the construction of its central library building from a much larger grant for general development. The campus of the university is located a great distance from the nearest major city, and it had a priority need for a modern library facility to support its expanding graduate programs in agriculture.

Acquisition of Appropriate, Modern Equipment. Support for library development has often included funds to purchase microfilm readers and other equipment needed by an institution. Within the foundation's over-all support program to the University of Delhi, India, a grant of \$351,000 was made in 1967 for library development. In addition to amounts for acquisition and staff training, \$75,000 was allocated for the purchase of equipment available only outside of India. Equipment purchases were also included in a 1970 \$280,000 grant to the University of Nigeria for reconstruction of its library that had been destroyed in the Nigerian Civil War. The university is located in the Eastern region of the country, which had seceded as Biafra.

Development of Efficient Library Operations. This type of assistance has been provided in a number of ways. An example would be the provision of funds in a library development program totaling \$592,500 to the Haile Selassie I University in Addis Ababa, Ethiopia, for reclassification of its cataloging from the Dewey Decimal system to the Library of Congress system. Equipment, stationery, and clerical support were funded.

Support of Regional and International Efforts among Librarian and Library Associations. The Ford Foundation has contributed to this type of assistance in two different ways. Small amounts have been allocated for librarian conferences from grants to various international associations, such as the Higher Council of Central American Universities, based in San José, Costa Rica, which sponsored in 1962 a roundtable of librarians from its constituent universities. The foundation has also provided many library consultants to institutions in developing countries, who have, in the conduct of their work for the foundation, contributed positively toward productive interchange with their counterparts in the developing countries.

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