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SERVICES

FISCAL YEAR 1978

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
National Institutes of Health

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NATIONAL LIBRARY OF MEDICINE
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Preface

The purpose of this report is to give an account of the programs and services performed by the National Library of Medicine last year. This preface merely identifies a few highlights which deserve some special mention. As always, the labors of the staff are the most precious ingredient contributing to the progress and accomplishments described in this report. I will miss sorely the outstanding contributions made by Melvin Day, Deputy Director, who will be leaving NLM early in FY 1979, and Davis McCarn, Associate Director for Planning.

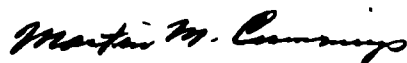
Over the past year the progress made on construction of the new Lister Hill Center Building has been most gratifying. The builders are now several months ahead of schedule and, if all goes well, we will begin to move into the building in the fall of 1979, rather than the spring of 1980 as originally scheduled.

Another bright note this past year was the appointment of seven new members to the Board of Regents. After having to cancel two consecutive meetings because of a lack of members, it is reassuring to have once again a Board of Regents made up of leaders in American medicine and medical librarianship. The Library will need the guidance of the Board especially in resolving the many important issues attendant to the move of the National Medical Audiovisual Center to the new building in Bethesda and the integration of the NMAC with the Lister Hill Center program.

Readers of this report will not fail to note that NLM's online services network continues to grow in number of member institutions, searches performed, and data bases available. Among the new online services this year are SERLINE (biomedical serials), HISTLINE (history of medicine), BIOETHICSLINE, and the Registry of Toxic Effects of Chemical Substances.

Also notable this year was a meeting at the National Library of Medicine of eleven hospital medical librarians to advise us on how we at NLM were meeting our commitment to assist hospital libraries. From that meeting came many valuable suggestions which should lead to improved support of their services to health professionals.

I invite all members of the health community to let us know how we can better serve their information needs.



Martin M. Cummings, M.D.
Director
National Library of Medicine

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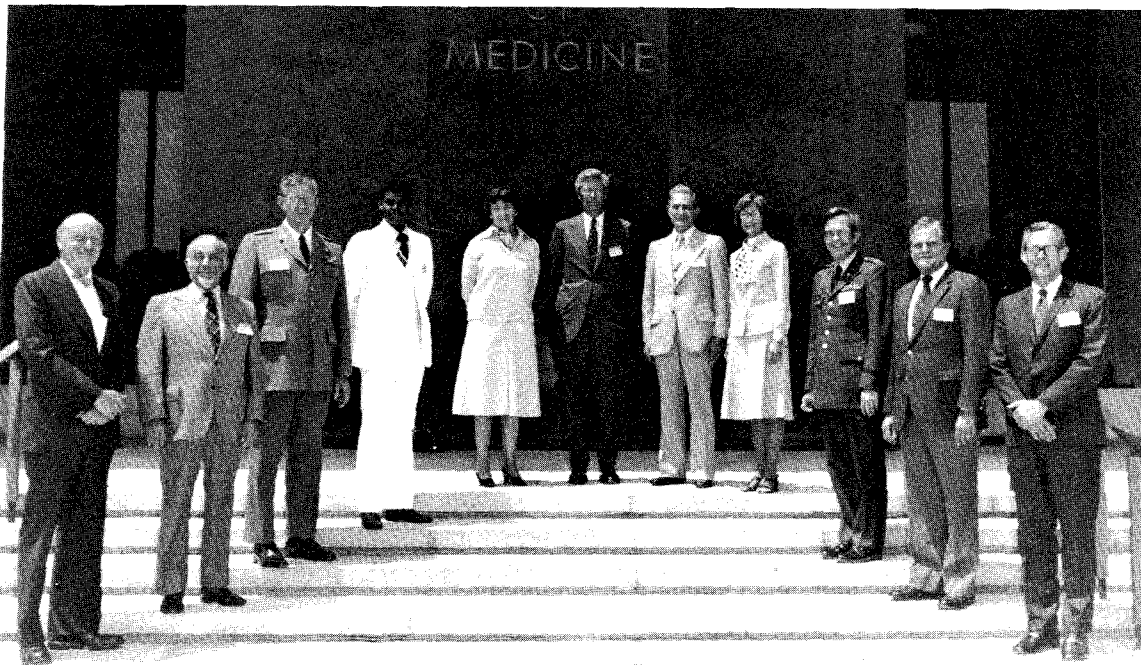
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Chapter 1: Policy and Direction

Kent A. Smith, Assistant Director
for Administration



NLM Board of Regents, May 1978 meeting, left to right: Dr. Thomas C. Chalmers, Dr. Cecil G. Sheps, Brig. Gen. Ernest J. Clark (*ex officio*), Mr. James F. Williams II, Dr. Faye G. Abdellah (*ex officio*), Dr. Nicholas E. Davies, Rear Adm. J. William Cox (*ex officio*), Dr. Doris H. Merritt, Col. John C. Richards (*ex officio*), Dr. S. Richardson Hill, Jr., and Dr. Kelly M. West.

Board of Regents

The NLM Board of Regents has an important role in the development of NLM policies and plans. On March 20, 1978, the Senate confirmed the President's nominees for seven positions on the Board, three Board vacancies remain to be filled. The Library had been without appointed Regents since August 1977. The new Regents are:

Thomas C. Chalmers, M.D.
President and Dean
Mount Sinai School of Medicine of the City
University of New York

Nicholas E. Davies, M.D.
Attending Physician
Piedmont Hospital, Atlanta, Georgia

S. Richardson Hill, Jr., M.D.
President
University of Alabama in Birmingham

Doris H. Merritt, M.D.
Dean, Office of Research and Sponsored
Programs
Indiana—Purdue University

Cecil G. Sheps, M.D.
Professor of Social Medicine
University of North Carolina

Kelly M. West, M.D.
Professor of Medicine and of Continuing
Education
University of Oklahoma

James F. Williams, II
Medical Librarian
Shiffman Medical Library
Wayne State University

Regents are selected from among leaders in the fundamental sciences, medicine, dentistry, public health, hospital administration, pharmacology, scientific or medical library work, or in

public affairs. In addition to the ten appointed members there are seven *ex officio* Regents: the Surgeons General of the Public Health Service, the Army, the Navy, and the Air Force, the Chief Medical Director of the Department of Medicine and Surgery of the Veterans Administration, the Assistant Director for Biological, Behavioral, and Social Science of the National Science Foundation, and the Librarian of Congress.

The Board met on May 25-26, 1978, to review NLM programs and grants applications. At that time the Board unanimously elected Dr. Kelly M. West Chairman of the Board of Regents for the year 1978-1979.

One of the first tasks facing the new Board will be to reevaluate and redefine the missions of the Lister Hill National Center for Biomedical Communications and the National Medical Audiovisual Center in anticipation of the merger of these two programs in 1980. For this purpose, the Chairman appointed the following Board members to a special subcommittee: Dr. S. Richardson Hill, Jr. (Chairman), Dr. Thomas C. Chalmers, and Dr. Nicholas E. Davies.

Lister Hill Center Building

Progress has been rapid on the construction of the new Lister Hill Center building. The construction contract was awarded in June 1977 to the George Hyman Construction Company. Completion of the building was originally scheduled for December 1979, current projections would permit partial occupancy by September 1979, three months ahead of schedule.

SUA Inc., an interior design firm, has conducted a comprehensive space analysis of the NLM programs that will occupy the new building. The contractor has defined each program's

space needs, identified requirements for office furnishings, established the interior layout requirements for the building, and is currently assisting in the design of the public areas.

NLM has begun consideration of art works for the Lister Hill Center building. The two major art works proposed are a mural for the main lobby conveying the history of biomedical communications in abstract form, and a large sculpture to be located on the podium terrace. Artists will be nominated by a panel of experts from the National Endowment for the Arts, with final selection to be made by General Services Administration's Fine Arts Committee.

Financial Resources

The National Library of Medicine's FY 1979 appropriation will provide \$41,431,000 and 503 positions, an increase of \$3,812,000 and 8 positions over the levels available to the Library in

FY 1978. The increase will be used to maintain basic NLM services, increase support for research and development in biomedical communications, and upgrade the computers used to provide online services to the health community.

Personnel

In FY 1978, the NLM Personnel Office completed the second year of the DHEW three-year classification review program, auditing 159 positions.

The U.S. Civil Service Commission conducted a personnel management evaluation at the National Medical Audiovisual Center (NMAC) in Atlanta in May 1978. The evaluation covered the personnel management program at NMAC and the problems and issues related to the pending relocation of NMAC personnel to Bethesda in 1980. NLM management has

Table 1
Financial Resources and Allocations, Fy 1978
(dollars in thousands)

| | |
|---|----------|
| Amounts available for obligation | |
| Appropriation, NLM. | \$36,746 |
| Pay cost supplement | 873 |
| Earned reimbursements | 948 |
| Total | 38,567 |
| Amounts obligated by Extramural Programs | 8,987 |
| Amounts obligated for direct operations | |
| Lister Hill National Center for Biomedical Communications | 3,352 |
| National Medical Audiovisual Center | 3,651 |
| Office of Computer and Communications Systems | 3,476 |
| Library Operations | 8,642 |
| Toxicology Information Program | 2,416 |
| Review and approval of grants | 885 |
| Program direction | 5,511 |
| Subtotal, direct operations | 27,933 |
| Total obligations, NLM. | 36,920 |

developed an action plan in response to the Commission's evaluation and recommendations.

The Library continues its program to recruit and hire handicapped persons. In FY 1978 a second sign language course was conducted, with 15 employees participating. The NLM EEO Coordinator, Arthur Robinson, has been designated as the NLM Selective/Placement Program Coordinator, and has been instrumental in improving the work environment and opportunities for handicapped employees.

The Library received 25 new positions in the FY 1978 Congressional appropriations, bringing the total number of NLM full-time permanent positions to 495. NLM had 494 employees at the end of the fiscal year. Primary emphasis has been placed on recruiting specialists in computer science and communications engineering for the Lister Hill Center, and on hiring staff to maintain the quality of basic library services

Staffing Activities

Lionel M. Bernstein, M.D., Ph.D., was appointed Director of the Lister Hill National Center for Biomedical Communications. He for-

merly served as the Library's Assistant Deputy Director for Research and Education.

Davis B. McCarn retired from his position as Special Assistant for Science Communications and Chief, Office of Planning. Prior to that, Mr. McCarn served as Director of the Office of Computer and Communications Systems and as Deputy Director of the Lister Hill Center.

Myron J. Adams, Jr., M.D., was appointed Director of the Library's National Medical Audiovisual Center in Atlanta. Dr. Adams has been associated with NMAC since 1971, having served as a Medical Advisor, Chief of the Materials Development Branch, and Deputy Director of the Center.

Bruno Vasta, Chief of the Bibliographic Services Division, Library Operations, accepted a position as Director, Chemical Information Division, Environmental Protection Agency. Mr. Vasta had served in his position since January 1977; he previously was Chief of the Toxicology Information Services Branch, Specialized Information Services.

Melvin Spann was appointed to the position of Chief, Biomedical Files Implementation Branch, Specialized Information Services. Mr.

Table 2. Personnel Ceilings

| | FY72 | FY73 | FY74 | FY75 | FY76 | FY77 | FY78 |
|---|------|------|------|------|------|------|------|
| Office of the Director | 12 | 12 | 11 | 9 | 10 | 12 | 14 |
| Office of Inquiries and Publications Management | 5 | 6 | 5 | 5 | 5 | 5 | 5 |
| Office of Administration | 37 | 36 | 36 | 34 | 35 | 35 | 38 |
| Office of Computer and Communications Systems | 55 | 54 | 51 | 52 | 54 | 52 | 51 |
| Extramural Programs | 31 | 30 | 27 | 22 | 24 | 27 | 25 |
| Lister Hill National Center for Biomedical Communications | 15 | 17 | 20 | 22 | 24 | 24 | 35 |
| Specialized Information Services | 17 | 16 | 17 | 17 | 18 | 17 | 18 |
| National Medical Audiovisual Center | 105 | 103 | 100 | 101 | 101 | 88 | 88 |
| Library Operations | 192 | 192 | 199 | 196 | 201 | 212 | 221 |
| TOTAL | 469 | 466 | 466 | 458 | 472 | 472 | 495 |

Spann, who has been with the Library for two years, was associated with chemical information activities including the CHEMLINE service, prior to his appointment as Branch Chief

Emilie Wiggins retired from her position as Head of the Cataloging Section, Library Operations, after 30 years of service to the Library. Lillian Kozuma was appointed to fill this position. Ms. Kozuma has been with the Library since 1972, as a librarian in the Technical Services Division.

Edith D. Blair retired from her position as head of NLM's Reference Section. Mrs. Blair came to the Library in 1960 and served as head of the Reference Section since 1971.

Sheldon Kotzin was appointed as Regional Medical Library Coordinator, Extramural Programs, leaving his former position as Head, Loan and Stack Section, Library Operations, where he had served since 1971. Duane Arenales, formerly assistant head of Loan and Stack, was appointed to head that operation.

Norman Osinski was appointed Chief, Office of Contracts Management. Mr. Osinski, who was formerly a procurement analyst with the DHEW Management and Budget Office, replaced Kenneth Styers. Mr. Styers was appointed Assistant Director for Administration and Operations, NMAC, after serving as Chief, OCM since March 1968.

Marie Pinho was appointed Chief, Applications Support Branch, Office of Computer and Communications Systems. Ms. Pinho has been a computer specialist with OCCS since 1969.

Awards and Honors

NLM Director, Martin M. Cummings, M.D., received the 1978 Distinguished Service Award from the American College of Cardiology at its annual meeting in March. Dr. Cummings was also made an Honorary Fellow of the College,

which represents more than 8,500 cardiovascular scientists in its worldwide membership.

On May 18, 1978, at ceremonies in Santiago, Chile, Dr. Cummings received honorary membership in the Academy of Medicine of the Institute of Chile. Chile's Minister of Health presented Dr. Cummings with the order of "la Cruz del Sur," citing the Director's efforts on behalf of Chile's medical libraries which have resulted in improved information services for that country's scientific community.

Dr. Cummings was also honored by the Mid-Atlantic Chapter of the American Medical Writers Association. The Association presented the Director with a certificate of appreciation citing his "outstanding contributions to medical communications."

Mary E. Corning, NLM Assistant Director for International Programs, has been elected Chairman of the Section on Information, Computing, and Communication of the American Association for the Advancement of Science (AAAS). The Section is devoted to all aspects of communications in the disciplines represented by the association and it is responsible for arranging presentations and programs at the AAAS meetings.

Arthur A. Wykes, Ph.D., a pharmacologist with the Library's Toxicology Information Program, SIS, has been elected a Director of the Drug Information Association. The Association works to further modern technology in communication for the medical, pharmaceutical, and allied fields.

NIH Director's Awards

B. Earl Henderson, Chief, Communications Engineering Branch, LHC, "For leadership of a nationally recognized program to develop and explore a broad band satellite communications network for information transfer in the health sciences."

David L. Kenton, Computer Specialist, OCCS, "For significant effort in providing technical support for the MEDLINE System and for leadership in the coordination and installation of MEDLINE in four countries, thereby expanding the dissemination of medical information."

NLM Director's Award

Clement P. Fowler, NMAC, for his outstanding success in the design, direction, and coordination of an exhibit on Health Sciences Communications Technology displayed at NLM.

PHS Commendation Medal

Myron J. Adams, Jr., M.D., Director, NMAC, "In recognition of unique scientific and administrative skills and creative leadership and originality which have resulted in the development of multi-media instructional packages that have improved the learning process for health professionals."

Lionel M. Bernstein, M.D., Ph.D., Director, LHC, "In recognition of his development of a prototype computerized information transfer system for health care practitioners."

NIH Merit Award

Betsy L. Humphreys, Assistant Head, Serial Records Section, Technical Services Division, "For providing improved access to biomedical information through the design and implementation of an online serials system to handle 25,000 titles."

Grace H. McCarn, Head, MEDLARS Management Section, LO, "For dedicated and effective direction of user support services for the Library Online Retrieval Network."

Melvin L. Spann, Chief, Biomedical Files Implementation Branch, SIS, "For vital leadership and creative application of technical skills in furthering the development of CHEMLINE as a major national chemical compound information retrieval service."

EEO Special Achievement

Peggy J. Beavers, Librarian, Reference Services Division, "For the positive influence she exerts on peers and subordinates as a result of her personal commitment to the NLM EEO program, and for her invaluable contributions to the EEO Committee."

James J. Hartman, Personnel Officer, Office of Administration, "In recognition of his sincere dedication to the principles of equal employment for all individuals, and for his prowess in mediating sensitive employee-management interactions."

Melvin L. Spann, Chief, Biomedical Files Implementation Branch, Specialized Information Services, "For the exceptional leadership and guidance he has provided to the EEO Advisory Committee during his tenure as chairperson. Under his direction, the Committee has developed strong, well-defined objectives, the realization of which will result in a progressive, responsive EEO program for the Library."

Equal Employment Opportunity

Library Associate Recruiting

The NLM Library Associate Program is a one-year internship for librarians designed to develop technical skills and experience necessary for effective management support of medical libraries. In an effort to make the NLM Library Associate Program better known to library students, particularly minority students, and to encourage careers in medical librarianship, Library staff conducted visits and interviews at 15 library schools which have special medical bibliography courses or a significant minority population. Seven Associates were selected for the program including one minority male (see Chapter 2, "Highlights," for a list of the 1978-79 Library Associates).

EEO Committee

Under the direction of the Chairman, Melvin Spann, the EEO Committee reviewed the NLM Affirmative Action Plan and selected five items from the plan which were considered to be "top priority action items." The Committee regards accomplishing these objectives as necessary to sustain NLM's commitment to equal employment opportunity and affirmative action:

- Develop career ladder opportunities in occupations with limited advancement potential.
- Administer an effective recruitment and placement program for minorities, women, and handicapped persons.
- Reestablish the program to employ youth within the Summer Aide Program and other components of the Summer Employment Program.
- Continue special recruitment efforts to secure minority applicants in the Library Associates Training Program.
- Continue to have a full time EEO Coordinator who monitors the NLM EEO Program and reports to the Director, NLM.

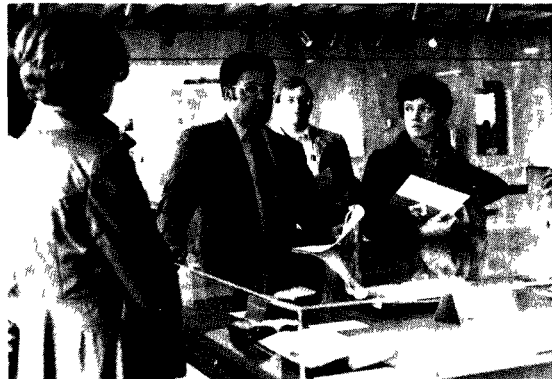
The NLM EEO Committee initiated the *EEO Update*, a publication to inform NLM employees of events or items of interest occurring in the EEO community and to provide a forum for employees to express their ideas and concerns regarding EEO and personnel matters. The *EEO Update* will also respond to employee concerns in order to improve communication and affirmative action efforts at the Library.

Marie Pinho, Chief, Applications Support Branch, OCCS was selected as the delegate to the NIH Women's Advisory Committee. Alice Ladson, Supervisory Library Technician, Reference Services Division, is the alternate delegate to the Committee. The delegate represents the Library and advises the NIH Federal

Women's Program Coordinator on issues important to women at NIH.

Exhibits

In addition to four regular exhibits in the NLM lobby during FY 1978, one special exhibit was prepared in collaboration with the National Eye Institute. The historical development of neuro-ophthalmology was the subject of an exhibit from May 1-12 that featured historical prints and early works from the History of Medicine Division. The exhibit coincided with the Second Congress of the International Society of Neuro-ophthalmologists, whose 80 members viewed the exhibit at a ceremony at NLM on May 2. The exhibit was developed by Ronald Fishman, M.D., a Washington, D.C. neuro-ophthalmologist and member of the Society.



"Medical Bibliography Tool of Science" was the theme of an NLM exhibit that attracted some 50 visitors from the AAAS. Reference librarian Howard Drew (center) helped show the visitors around the Library.

Earlier in the year, "Health Sciences Communication Technology," prepared by staff of the National Medical Audiovisual Center, was featured. The exhibit was described in last year's report (since it opened in September 1977) and it was on display through December. In January 1978 a lobby exhibit titled "Medical Bibliography: Tool of Science" portrayed the development of medical bibliography from the introduction of printing down to the present

NLM Programs and Services

computerized bibliographic services. The exhibit reflected the theme of the 1978 annual meeting of the American Association for the Advancement of Science whose members visited NLM on February 15, viewed the exhibit, and were conducted on tours of the Library.

On May 15 "Medicine on the Early Western Frontier" was featured in the lobby. This exhibit, prepared by Peter D. Olch, M.D., Deputy Chief of the History of Medicine Division, proved to be one of the most popular ever presented. It was the subject of several feature articles in newspapers and Dr. Olch was interviewed on

National Public Radio. The exhibit included published and unpublished materials (such as diaries), prints and photographs of the early West, and artifacts (early surgical instruments, etc.).

The last exhibit in FY 1978, installed in September and scheduled to be up until January 1979, celebrates the 400th anniversary of William Harvey's birth in 1578 and the 350th anniversary of the publication of his discovery of the circulation of the blood. Featured are a number of portraits and first editions and translations of Harvey's publications.

Chapter 2: Library Services and Operations

Joseph Leiter, Ph.D., Associate Director,
Library Operations



HISTLINE a new data base on the history of medicine is queried by Senta Lowenstein, Laura Young, and Dr. James Cassedy of the History of Medicine Division

Highlights

New or Revised Publications

- *Abridged Index Medicus* A comprehensive review and analysis of content resulted in changes so that this publication will better serve the needs of small hospital libraries. The initial appearance of the revised publication will be January 1979.

- *Hospital Literature Index*, published by the American Hospital Association (AHA), is now produced by NLM's MEDLARS system.

- *NLM Classification*, 4th edition (see Technical Services Division)

- *NLM Audiovisuals Catalog* (see Technical Services Division)

- *KWOC Index of NLM Serial Titles* (see Technical Services Division)

- *Health Sciences Serials* (see Technical Services Division)

- *Online Services Reference Manual* (see Bibliographic Services Division)

- *Audiovisual Serials in the Health Sciences*, a new quarterly bibliography of audiovisual serials intended for continuing education in the health sciences, is produced in cooperation with and distributed by the Medical Library Association.

- *Physical Fitness/Sports Medicine* is a new recurring bibliography produced in cooperation with and distributed by the President's Council on Physical Fitness and Sports Medicine.

New Online Data Bases

- *BIOETHICSLINE* (see Bibliographic Services Division)

- *HISTILINE* (see History of Medicine Division)

- *Health Planning and Administration* This is a comprehensive file covering literature on the planning and administration of health care delivery programs. The data base has been generated from existing NLM data files, expanded coverage of publications not available in current files, and from publications in the

Hospital Literature Index This file has been produced in cooperation with the American Hospital Association and the Health Resources Administration and will be publicly available on November 1, 1978. Initially containing 95,000 citations, the new data base will grow at the rate of about 25,000 records per year.

Online Services

- Online searching continued to expand, increasing in FY 1978 to 777,360 searches (up 15 percent). An additional 314,162 searches (up 45 percent) were performed offline. Of the 165 new U.S. institutions added to the network this year, 83 were hospitals and other direct health care institutions. Online training was expanded—over 800 users were trained in 29 classes.

Reference and Circulation Services

- Although interlibrary loan demands appeared to be leveling off in FY 1978, demand for reference and reader services continued to grow. Part of the drop in loans may be attributed to the new copyright law, which became effective January 1, 1978. Fulfillment rates and throughput time continued to improve.

Technical Processing

- The entire shelf collection of current serials dating back to 1963 was reviewed item by item and a complete inventory of missing items was recorded in an online file. We are filling these gaps through purchase and filming from other sources. This has produced a significant improvement in processing and filling circulation requests.

Card Catalog

- Although computerized catalog files make it easier to alter bibliographic records in response to rule changes and revised cataloging procedures, maintaining a card catalog is still onerous and costly. The planned adoption of a

major revision in the Anglo-American Cataloging Rules has created a critical problem for large libraries. Since a large portion of the NLM card catalog is already under complete machine control, a detailed analysis was made of the problems involved in adopting the new rules to determine whether closing the card catalog and establishing machine control over the entire collection is feasible. These studies have been completed and a detailed set of specifications for converting the entire file to a machine readable record has been developed. The three-year program to implement these plans begins early in FY 1979 so that conversion will be complete by the time the revised Anglo-American Cataloging Rules take effect in January 1981.

Library Associates

- Seven recent library school graduates were selected for one year (1978-1979) of training at NLM as Library Associates:

Susan J. Barnes, M.L.S., University of Washington

Larry S. Ellis, M.S.L.S., Atlanta University

Brenda L. Greene, M.S.L.S., Pratt Institute

Dianne E. McCutcheon, M.S., University of Illinois at Urbana-Champaign

Patricia R. Patterson, M.S.L.S., Syracuse University

Barbara A. Rapp, M.S., University of Illinois at Urbana-Champaign

Philip Wexler, M.L.S., Rutgers University

Bibliographic Services Division

Indexing

In FY 1978, 232,563 articles were indexed for *Index Medicus*. This includes 229,857 articles from serial literature and 2,706 from monographs. Additionally, 19,265 citations were processed for special indexes such as *Index to Dental Literature*, *International Nursing Index*, and the *Population Sciences: Index of Biomedical Research*. A total of 251,828 arti-

cles was indexed for the MEDLARS data base. In addition to these, 1,361 "articles" from 483 audiovisual serials and 6,618 articles for the Health Planning and Administration data base were processed.

Two new indexing stations were set up one in Brazil under the auspices of the Pan American Health Organization, the other in South Africa. These two join stations in France, Germany, England, and Sweden that also contribute indexing to MEDLARS.

The annual indexing orientation was held September 18, 1978, and was attended by approximately 100 persons including NLM indexers and revisers, U.S. commercial contract indexers, and technical resource persons from the regions. The same orientation package of 65 pages used at the one-day session was sent to all non-U.S. MEDLARS centers together with all tools to be used for 1979 indexing.

During 1978, seminars on indexing consistency were conducted for the members of the indexing staff responsible for the revision of articles indexed for *Index Medicus* and other NLM publications. These seminars emphasized the importance of consistency in applying indexing rules. As a result of these seminars, recommendations were made for improvements in related areas such as in the selection of articles from chemical journals and other selectively indexed journals.

A concerted effort to control gaps and to improve currency in the journals covered in MEDLARS was made during the year. Additionally, more emphasis was placed on the improvement of the overall throughput time from receipt of the journal to the time the article is indexed and input into the data base. As a result, 97 percent of the *Index Medicus* citations indexed in FY 1978 contain 1977 or 1978 imprint dates.

A completely revised MEDLARS indexing training syllabus, consonant with 1979 Medical Subject Headings changes and the latest indexing

policy, was prepared. The syllabus also contains 27 indexing exercises, with answers, for the use of foreign centers conducting their own training programs.

MEDLARS Management

The MEDLARS Management Section serves as the public contact point for the day-to-day operation of the NLM Online User Network. This Section provides answers to telephone and written inquiries about the use and characteristics of the various data bases, maintains billing records, processes applications for access to the data bases, handles the mailing of offline prints and offsearches, and produces manuals and other descriptive materials.

A new data base, BIOETHICSLINE, became available in March 1978. BIOETHICSLINE, produced in cooperation with the Kennedy Institute Center for Bioethics, Georgetown University, provides bibliographic information on questions of ethics and public policy arising in health care or biomedical research. Among the topics covered are medical confidentiality, euthanasia, genetic intervention, abortion, informed consent, behavior control techniques, human experimentation, psychosurgery, recombinant DNA research, the definition of death, and the allocation of scarce medical resources. HISTLINE (see HMD report) became operational through NLM only, and available only to American centers, late in the year.

Three new recurring bibliographies were produced. *The Hospital Literature Index*, in cooperation with the American Hospital Association, the *Index of Audiovisual Serials in the Health Sciences*, in cooperation with the Medical Library Association, and *Physical Fitness/Sports Medicine*, produced for the President's Council on Physical Fitness and Sports Medicine. The MEDLARS Management Section continued to process various NLM publications including *Index Medicus*, *Cumulated Index Medicus*, *Abridged Index Medicus*, the *Recurring Bibliographies*, and *Literature Searches*.

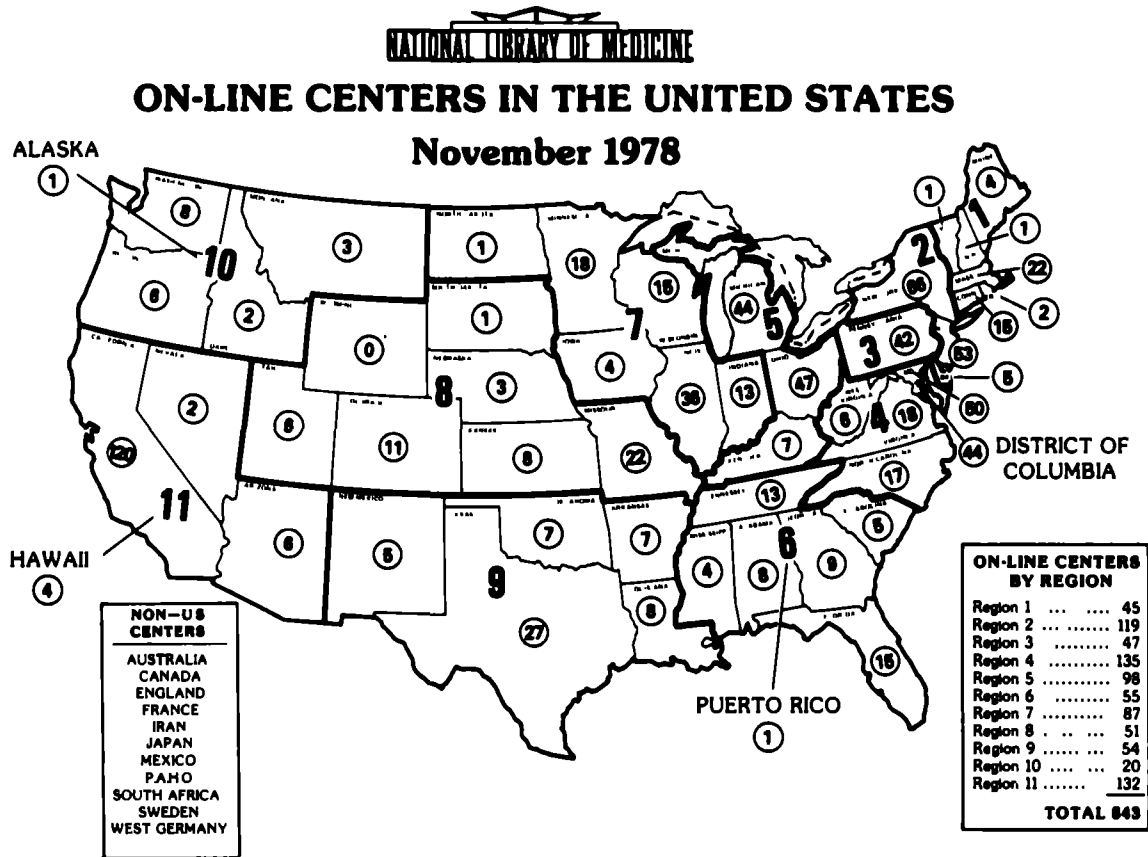
A new edition of the *Online Services Reference Manual* was distributed to online centers. This manual describes in detail each data base and includes chapters on communications, software, and searching. A *Directory of Online Users* was prepared for the first time. The Directory entries are arranged in two sets, one by personal name, the other by location. There are 738 names in the first edition of the Directory.

The third annual Online Coordinators' Workshop was held at NLM in April. At this workshop, representatives from each Regional Medical Library received a briefing on the activities of the Committee for Extension of Online Services to Health Care Facilities and shared views on increasing hospital participation in the online network. Information about planning search clinics and about updates and changes in the NLM data bases was also offered.

An important new service that was introduced this year is the stored address capability. A user may now send NLM an address to be attached to the ID code, so that no address information need be typed in at the time an offline print or offsearch is requested.

Administrative and policy changes in FY 1978 included the elimination of the \$1.00 per file charge for offsearches, and an increase in the charge per page of printout from 10 cents to 12 cents. The period between 11:30 a.m. and 1:00 p.m. daily is now billed as nonprime time rather than prime time. In September 1978, NLM began providing Tuesday morning access to online data bases.

Other changes during the past year included instituting a time limit and stringsearch limit for offsearch processing, which caused the automatic purging of over 1,700 searches in the first year, and the introduction of the LIMIT command, with which users may control the number of citations printed as the result of an offsearch.



The number of domestic online centers grew to 800. Of these, 282 are hospital or direct patient care facilities. In FY 1978 165 institutions were added to the network, 83 were hospitals or direct health care institutions.

Online Services Training

The online services training program was marked by unprecedented growth and diversification in FY 1978. 821 persons were trained in 29 courses. In addition to classes held in the newly refurbished training facility in Bethesda, classes were held in Kansas City, Detroit, Atlanta, Madison, New York City, Dallas, and Los Angeles.

The Library's Standing Committee for Online Retrieval Education (SCORE) developed, tested,

and evaluated the first continuing education course for search analysts, and plans were formulated for a second continuing education course.

Based on SCORE recommendations, a program for standardized, annual updating of searchers was adopted. Technical resource persons, selected by each Regional Medical Library, were trained at NLM in a two-day session. They will conduct one or more update workshops for searchers in their respective regions.

History of Medicine Division

In FY 1978 the computerized data base for the *Bibliography of the History of Medicine* was placed online as HISTLINE. This new data

base currently includes approximately 37,000 citations, with the majority of items published from 1970 through 1977. HISTLINE, in addition to historical references from MEDLINE, is enriched with citations from monographs and journals not indexed for *Index Medicus*. HISTLINE became operational late in the year.

Acquisitions

The historical collections were increased by the addition of 500 books and theses, an estimated 15,000 items in the manuscript collection, and approximately 300 prints and photographs. Among the important book acquisitions were Andrea Cesalpino's *Peripateticarum quaestionum libri quinque*, Venice, 1571 in which the author discussed the "circulation" of the blood in ways that mark him as a significant precursor to Harvey and a second edition of Timothy Bright's *A Treatise of Melancholy* (London, John Windet, 1586). The latter work is not only important in the history of psychiatry but also in the history of English letters, since it



A recent acquisition of the Prints and Photographs Collection (History of Medicine Division) is this print of a dentist by the American artist Grace Albee

was used by Shakespeare as an important source of ideas when writing *Hamlet*. Another significant addition to the collection was a copy of Louis Pasteur's rare *Theses de physique et de chimie*, presented to the Faculté des sciences in Paris in 1847. The theses were Pasteur's first scientific contributions and led to his work on molecular dissymmetry and thence to fermentation.

Additions to the manuscript collection included a microfilm copy of the medically related items in the papers of Senator Lister Hill. The originals of this material (some 112,300 items) are housed in the medical library of the University of Alabama. A unique addition and important resource are the files of 18th and 19th century American physicians whose names do not appear in hitherto published directories. This information was gathered by Emerson Crosby Kelly, surgeon, bibliographer, and historian of medicine (1899-1977) who had hoped to publish a directory of these early physicians. The library's collection of organizational archives was enriched by the addition of the archives of the American Association of Thoracic Surgery. This material, in addition to the papers of Evarts Graham, John Gibbon, and Emile Holman, provides an important resource for the study of the evolution of thoracic surgery in the United States.

Public Service

In spite of a substantial reduction in personnel through much of this fiscal year, service to readers and distant patrons did not diminish, with 7,560 volumes provided to readers and 2,362 books and journal articles forwarded through interlibrary loan. Some 1,840 photographs and slides were provided from the prints and photographs collection, including large numbers of slides ordered by three university departments of the history of medicine for teaching purposes.

Members of the staff have continued to participate in the affairs and programs of profes-

sional societies and to publish the results of their research. Dr. James H. Cassidy of the History of Medicine Division staff was honored as the Fielding H. Garrison Lecturer at the annual meeting of the American Association for the History of Medicine. "Medicine on the Early Western Frontier," one of the exhibits prepared by the Division, proved to be exceptionally popular and received newspaper, radio, and television coverage.

Reference Services Division

The annual increase in demand for interlibrary loan service, which began shortly after the Regional Medical Library Network came into being, now appears to have been reversed for the first time. The reasons for this are not clear at this time. One may be the passage of a new copyright law and the establishment of guidelines containing certain restrictions on library copying. Another reason might be the increasing development of local and regional resources to accommodate local and regional needs. Whatever the reasons, interlibrary loan requests dropped from a high of 280,512 in FY 1977 to 261,969 in FY 1978. This fall-off was, however, more than offset by an increase of 19,742 in requests for access to the collection from on-site users, so that the total demand on the collection actually reached an (all-time) high of 425,000. With the advent, in May 1976, of indexing in *Index Medicus* the proceedings of congresses, symposia, and certain multi-authored monographs, more requests were received for photocopies of articles or chapters from these works.

The demand for reference service was up substantially in FY 1978 and there was also a rise in the use of the Reading Room. For example, in March, just under 4,000 persons signed in at the Reading Room desk, almost 1,000 of whom were new registrants.

After two decades of unsuccessful attempts, the general revision of the outmoded copyright law of 1909 passed both houses of Congress and was signed into law by President Ford on October 19, 1976. It became fully effective on January 1, 1978. Guidelines to the new law place the burden of determining copyright compliance and maintaining records on the requesting library; the supplying library requires representation that the requester is in compliance. Since NLM is a supplier (we request perhaps 50 items a year from other libraries), the impact of the new law on our program has been minimal. In order to notify librarians of the requirements of the law, two weeks before the effective date and for over a month after, information sheets were sent with each photocopied article on interlibrary loan. Although the number of rejected requests — those lacking an indication of compliance — was expectedly large in January and February, it fell off markedly in March and April, with the bulk of those not meeting the requirements coming from foreign libraries. Requests which arrive without the compliance indication continue to be rejected and the instruction sheets and an explanatory letter are sent to the requester.

Approval was received during the year for designation of NLM as a Selective Depository Library for government publications in the health sciences, and the first shipments were received in May. This will substantially reduce selection/acquisition costs and improve the Library's collection.

Additional compact shelving, which literally doubles stack capacity, was installed on the C level, and by the year's end installation in over half the floor had been completed. The completion of the new Lister Hill Center building will free up space for additional shelving and extend the life of the present building.

A new contract for micropreservation filming of deteriorating journals was awarded in FY 1978. The contract calls for filming 1,200,000 pages of material in the first year, with renewal

options available for an additional two years. We were unable to start up in-house micropreservation filming of extremely brittle material because of the need to dedicate maximum manpower resources to meet immediate service needs. Attempts will be made to reactivate the in-house program, if only at minimum levels, during the coming year.

With the placement of subscriptions to the fiche service of the National Technical Information Service, the Congressional Information Service, and the American Statistics Index, orders for additional microfiche readers were placed, as well as for a microfiche reader/printer. The fiche collections will be serviced by the Reference Section. In addition, orders were placed for equipment to update quality control hardware and for fabrication of a new enlarger-reproducer to replace the aging Copyflo machine, which has been processing photocopies for interlibrary loans for over 17 years.

A few months prior to the beginning of the fiscal year, the Division undertook to systematically identify gaps in the current journal collection (from 1963 forward) of approximately 23,000 titles. Every title is being examined not only to determine missing issues, but the bibliographic accuracy of the record and scope of the journals. Approximately 500 titles were identified for addition to SERLINE (NLM's automated serials system) as a result of this review. Approximately 50 percent of the current collection has been reviewed, and over 50,000 missing issues were identified and captured as a management record in the gaps module of the SERLINE data base. This is in addition to gaps identified as a result of "skipped issue claiming," the review of titles during the binding preparation process, or from interlibrary loans which could not be filled because of missing issues. Over 4,000 issues have been received from serials dealers and publishers and efforts to maintain the collection in as complete a state as possible continue. Where location of missing items in the original form is unsuccessful, arrangements have been made with the

College of Physicians of Philadelphia and the New York Academy of Medicine to provide film copies of missing issues to complete the NLM collection. This is also expected to be an ongoing collection maintenance program.

Technical Services Division

The demand for bibliographic support for acquisitions, cataloging, reference services, and interlibrary lending has continued to increase during the last year both at NLM and in the field. Continuing budgetary restrictions and increased user needs in academic and medical libraries and information centers have clearly indicated the need for resource sharing by research libraries. The Technical Services Division (TSD) is responding to these needs in several areas by improving its machine readable data bases and through its publication program.

During FY 1978, the Technical Services Division experienced a decline in the production of ordering and acquisitions processing data and in the flow of monographic materials to the TSD Cataloging Section. This was the result of serious problems with the Division's minicomputer-based In Process File (INPROC). Experts were called in from the Lister Hill Center's Computer Technology Branch to improve INPROC's reliability and, by the end of the year, ordering and acquisitions processing was up substantially.

A new file maintenance system has been developed and successfully implemented for CATLINE and AVLINE by NLM's Office of Computer and Communications Systems in cooperation with TSD staff. This new online system assists in keeping cataloging data current by providing extended search capabilities for sets of records requiring modification and validation of name, series, and subject entries.

The rate of production and revision of original cataloging by TSD staff improved

slightly during the year. Cataloging backlogs still exist, however, and are the result of the continuing shortage of catalogers and revisers for materials in Russian, Northern European, and Romance languages.

The entire CATLINE data base has been made available to the Ohio College Library Center (OCLC) and, through the Canada Institute for Scientific and Technical Information (CISTI), to the Association of Atlantic Universities and the University of Toronto. Retrospective CATLINE records in MARC format are now available to the academic community in Canada and will soon be in the U.S. when OCLC mounts the NLM data. Arrangements for subscription to MARC-compatible CATLINE data will provide these bibliographic information centers with regular weekly updates of NLM cataloging records.

A new SERLINE, representing all serial titles currently received at NLM, was made available to the network during November 1977. In March 1978 SERLINE assumed all citation input and publication functions previously handled by the Journal Authority File (JAF).

As a concurrent effort to the reformatting, editing, and regeneration of machine readable NLM serial files, the serials collection has been improved by systematic claiming and serial gapping. In addition, a considerable number of out-of-scope and limited coverage serial titles have been withdrawn from the collections and serials data base. The gapping and withdrawal programs have been joint efforts of the Reference Services Division and the Technical Services Division.

The revised 4th edition of the *National Library of Medicine Classification* was completed and published during 1978. The new edition includes an extensive index, based on MeSH terminology, that provides cross references to non-MeSH terms and Library of Congress subject headings and classification numbers. Computerized production of the

classification schedules and index will allow future machine maintenance and update. The revised *NLM Classification*, published by the U.S. Government Printing Office, is widely used by medical libraries in the United States and in foreign countries. Japan and Thailand have recently requested and been given permission to translate the 4th edition.

In recognition of her excellent work in preparing and editing the *NLM Classification*, Emilie Wiggins, Head of the Cataloging Section before her retirement in December 1977, received the 1977 National Library of Medicine Regents Award and the 1978 Medical Library Association Marcia C. Noyes Award.

Several new publications were prepared by the Serial Records Section in FY 1978, the *KWOC Index of NLM Serial Titles and Health Sciences Serials*. Both titles are scheduled for publication during the first half of FY 1979. The *KWOC Index of NLM Serial Titles* is a revised and updated edition of the Index originally published in 1972. The new edition has also been reformatted and will be produced from the NLM Master Serials System using a modification of the permuted MeSH program.

Health Sciences Serials is the first microfiche edition of NLM's SERLINE and will be produced quarterly by the U.S. Government Printing Office. The computer-produced microfiche publication will include bibliographic data and locator information for all serial titles included in SERLINE and will be completely updated each quarter.

During FY 1978 the Technical Services Division began the publication of the quarterly *NLM Audiovisuals Catalog*. This product of the AVLINE data base has been expanded to contain bibliographic, review, and procurement information for nonprint and curriculum based self-instructional materials. By the end of the year there were over 600 subscriptions to the catalog entered at the Government Printing Office.

Inguinal hernia (Mitchell-Banks repair) [Videorecording] / Videosurgery -- Don Mills, Ont. Southam Business Publications, c1977 1 cassette, 18 min sd, col., 3/4 in. Audience level --Medical undergraduate, graduate, continuing education --Specialty pediatrics, surgery Rating Recommended Review date: Apr. 1978 Reviewer AAMC Learning method Lecture support Credits Barry Shandling
 I Inguinal Hernia - surgery - videocassettes I Shandling, Barry II Videosurgery
 04NLM W1 960 VC no 5 1977
Abstract:
 (Critical) This program depicts a modern accepted approach to the inguinal hernia in children. The rationale and background are presented as well as the technical aspects. The presentation is internally consistent and well done and is recommended for general and pediatrics surgery students and practitioners.
Price:
 Sale 300.00
Source:
 Southam Business Publications Cit No 7800625

Citation from the name section of the new quarterly *NLM Audiovisuals Catalog*

In a continuing effort to improve the bibliographic control of nonprint materials, TSD staff participated in Audiovisual Cataloging-in-Publication workshops at the 1977/78 Health Sciences Communications Association (HeSCA) meetings. As a result, an experimental Cataloging-in-Publication program for AV and supplemental print materials was initiated during the past year.

Medical Subject Headings (MeSH)

In preparing 1979 MeSH, consideration was given to all subject areas based on the changing needs of the users of NLM bibliographies and data bases. However, certain areas merited special attention. Terminology concerned with neurologic disorders was thoroughly reviewed with Dr. Walter Friedlander of the Clinical Neurology Information Center, with support of the National Institute of Neurological and Communicative Disorders and Stroke (NINCDS). Also with NINCDS support, Dr. Barbara Reiner cooperated in a detailed evaluation and amplification of the subject headings concerned with communicative disorders. Representatives of the American Hospital Association

and of the National Health Planning Information Center (Health Resources Administration) continued to assist our thesaurus expansion in the health care management area. These efforts resulted in many changes in existing headings, in cross references, in hierarchical relationships, and in delineation of the scope of terms. Additionally, 371 new headings, for which there were no directly corresponding 1978 headings, were introduced in 1979 MeSH.

Several new features of great value were introduced into MeSH for 1979. A historical note for each MeSH heading that has been changed since 1963 will appear in the *Index Medicus* edition of MeSH. This is helpful because, in contrast to the citation records contained in the computer files, the *Index Medicus* citation, once printed, is immutable. The user of *Index Medicus* must search in one way for articles indexed after a MeSH change, and in another way for articles indexed before the change. Until now, the user who had access to a full set of annual MeSH volumes could thread his way back through the various subject heading changes. This work has now been done for him by the MeSH Section and will be summarized in the historical notes in the current MeSH.

All MeSH drug terms were reviewed and a generic drug name was substituted for any proprietary name that was discovered. Numerous names of viruses and other organisms were changed to reflect currently accepted nomenclature.

To control the overall size of MeSH, the MeSH Section reviewed all terms that are now seldom used in indexing or cataloging. Two hundred and seventeen terms representing obsolete or rarely encountered concepts were deleted.

Terms originally introduced as minor descriptors sometimes become the subject of increasing interest and attention in the literature we index. Fifty-nine of these were identified and

converted to major descriptors so as to be separately searchable by the *Index Medicus* user.

Mid-Atlantic Regional Medical Library (RML IV)

RML IV serves 500 libraries in health-related institutions throughout the District of Columbia, Maryland, North Carolina, Virginia, and West Virginia. In FY 1978 a new governance structure was instituted for the RML, consisting of a 28-member Regional Advisory Council and an 8-member Executive Board elected from the Council.

The Council focused on program objectives and priorities, while the Board concentrated on the planning process and needs assessment. The Council and Board provide most of the planning and decision-making for the RML IV

Program, reflecting the increased participation and responsibility being assumed by libraries within the Region. New committees were appointed to advise the Board in the areas of needs assessment, planning, resource sharing, and communications.

In FY 1978 a technical resource person was selected from the Region to conduct three NLM online updates for the 134 online centers in the Region. A provisional document delivery cost-sharing plan was drafted in accordance with network requirements and principles. NLM inter-library loans filled to Region IV totaled 77,006 in FY 1978. The Region IV Education Plan, which formerly emphasized a self-study approach, now features basic workshop training. Workshops on the bibliographic citation and on hospital library management were given in 16 locations to 194 attendees. Six online workshops on search strategy were given for 107 experienced online analysts at three locations within the Region.

Table 3. Online Searches

| <i>Data base</i> | <i>July 1975- June 1976</i> | <i>Transitional Quarter¹</i> | <i>FY 1977</i> | <i>FY 1978</i> |
|----------------------------------|---------------------------------|---|----------------|----------------|
| AVLINE | 2,139 | 868 | 9,100 | 10,425 |
| BIOETHICS | — | — | — | 1,582 |
| CANCERLIT | 4,777 | 1,469 | 15,841 | 23,086 |
| CANCERPROJ | 891 | 368 | 3,863 | 4,208 |
| CATLINE | 103,307 | 22,079 | 125,455 | 147,138 |
| CHEMLINE | 9,347 | 2,773 | 25,482 | 33,009 |
| CLINPROT | 20 | 7 | 596 | 1,017 |
| EPILEPSYLINE | 339 | 280 | 1,630 | 2,327 |
| HISTLINE | — | — | — | 183 |
| JOURNAL AUTHORITY | 486 | 132 | 898 | 511 |
| MEDLINE | 286,250 | 77,963 | 405,653 | 460,209 |
| MESH VOCABULARY | 1,189 | 314 | 2,302 | 2,303 |
| NAME AUTHORITY | 5,598 | 832 | 10,464 | 4,936 |
| RTECS | — | — | 471 | 5,983 |
| SDILINE | 39,353 | 6,400 | 19,677 | 19,581 |
| SERLINE | — | — | — | 11,914 |
| STORED SEARCH | — | — | 45 | 53 |
| TDB (TOXICOLOGY DATA BANK) | — | — | 1,286 | 1,572 |
| TOXLINE | 18,356 | 5,454 | 39,432 | 47,323 |
| TOTAL | 472,052 | 118,939 | 662,195 | 777,360 |

¹July-Sept 1976

Table 4. Offline Searches

| <i>Data Base</i> | <i>July 1975- June 1976</i> | <i>Transitional Quarter¹</i> | <i>FY 1977</i> | <i>FY 1978</i> |
|---------------------------------|---------------------------------|---|----------------|----------------|
| AVLINE..... | 6 | 2 | 9 | 20 |
| BACK66..... | 15,591 | 7,546 | 34,600 | 38,028 |
| BACK69..... | 33,686 | 10,089 | 45,185 | 49,658 |
| BACK72..... | 37,749 | 12,098 | 59,388 | 68,423 |
| BACK75..... | — | — | — | 58,625 |
| BIOETHICS..... | — | — | — | 1 |
| CANCERLINE..... | 330 | 269 | 1,257 | 1,472 |
| CANCERPROJ..... | 56 | 27 | 286 | 356 |
| CATLINE..... | 78 | 15 | 87 | 101 |
| CHEMLINE..... | 3 | 0 | 5 | 17 |
| CLINPROT..... | 0 | 0 | 6 | 11 |
| EPILEPSYLINE..... | 18 | 16 | 31 | 38 |
| HISTLINE..... | — | — | — | 0 |
| JOURNAL AUTHORITY..... | 0 | 0 | 0 | 0 |
| MEDLINE..... | 14,169 | 5,348 | 26,924 | 28,846 |
| MESH VOCABULARY..... | 5 | 0 | 1 | 0 |
| NAME AUTHORITY..... | 0 | 0 | 0 | 0 |
| RTECS..... | — | — | 12 | 36 |
| SDILINE..... | 8,795 | 5,245 | 39,454 | 53,856 |
| SERLINE..... | — | — | — | 2 |
| TOXICOLOGY DATA BANK (TDB)..... | — | — | 12 | 3 |
| TOXBACK..... | 2,149 | 1,239 | 5,628 | 6,716 |
| TOXLINE..... | 1,354 | 1,009 | 5,663 | 7,953 |
| Total..... | 113,989 | 42,903 | 218,548 | 314,162 |

¹July-Sept 1976

Table 5. Bibliographic Services

| | <i>July 1975- June 1976</i> | <i>Trans- tional Quarter¹</i> | <i>FY 1977</i> | <i>FY 1978</i> |
|-------------------------------|---------------------------------|--|----------------|----------------|
| Articles Indexed | | | | |
| NLM..... | 38,400 | 8,600 | 39,663 | 60,589 |
| Other U.S..... | 100,000 | 24,500 | 84,785 | 84,213 |
| Foreign..... | 116,600 | 32,600 | 135,532 | 87,761 |
| Total..... | 255,000 | 65,700 | 259,980 | 232,563 |
| Recurring bibliographies..... | 28 | 28 | 26 | 28 |
| Journals indexed..... | 2,408 | 2,410 | 2,525 | 2,543 |
| Monographs indexed*..... | 186 | 159 | 225 | 87 |
| Abstracts entered..... | 103,200 | 29,100 | 111,467 | 94,174 |

Indexing of selected monographs began in May 1976

¹July-Sept 1976

Table 6. History of Medicine Activities

| | June 1975- July 1976 | Transi- tional Quarter ¹ | FY 1977 | FY 1978 |
|-----------------------------------|-------------------------|---|---------|---------|
| Acquisitions | | | | |
| Books..... | 904 | 182 | 504 | 489 |
| Modern manuscripts..... | 82,452 | 13,544 | 77,177 | 15,805 |
| Prints and photographs..... | 815 | 119 | 606 | 293 |
| Processing | | | | |
| Titles Cataloged..... | 3,721 | 695 | 3,225 | 2,782 |
| Modern manuscripts cataloged..... | 44,201 | 16 | 61,290 | 37,527 |
| Pictures indexed..... | 577 | 136 | 495 | 526 |
| Articles indexed..... | 3,950 | 519 | 6,074 | 4,887 |
| Pages microfilmed..... | 160,583 | 59,423 | 152,994 | 124,158 |
| Public Service | | | | |
| Reference questions answered..... | 1,782 | 408 | 1,803 | 2,160 |
| ILL and pay orders filled..... | 2,162 | 578 | 2,456 | 2,362 |
| Reader requests filled..... | 5,760 | 1,322 | 5,386 | 7,560 |
| Pictures supplied..... | 1,995 | 430 | 1,848 | 1,840 |

¹ July-Sept. 1976Table 7. Acquisitions Statistics¹

| | FY 1976 | Transitional Qtr. 1976 ² | FY 1977 | FY 1978 |
|-------------------------------|-----------|--|-------------|--------------------------|
| Serial Records | | | | |
| New Titles Added..... | 722 | 288 | 990 | 1,272 |
| Discontinued Titles..... | 289 | 48 | 812 | 830 |
| Current Titles Rec'd..... | 18,086 | 18,326 | 25,831 | 23,711 |
| Publications Processed | | | | |
| Serial Pieces..... | 169,726 | 41,656 | 172,804 | 173,566 |
| Other..... | 19,582 | 5,225 | 25,000 | 21,793 |
| Total..... | 189,308 | 46,881 | 197,804 | 195,359 |
| Obligations for: | | | | |
| Publications..... | \$859,572 | \$275,997 | \$1,350,683 | \$1,571,836 ³ |
| Included for Rare Books..... | 76,008 | 26,061 | 79,246 | 81,185 |

¹Does not include History of Medicine Acquisitions²July-September 1976³Includes \$57,000 in *quid pro quo* arrangements for services abroad

Table 8. Growth of Collections

| | <i>Previous Total (Sept. 1977)</i> | <i>Added FY 1978</i> | <i>Withdrawn FY 1978</i> | <i>New Total</i> |
|-----------------------------|--|--------------------------|------------------------------|----------------------|
| A. Book Materials | | | | |
| Monographs: | | | | |
| Before 1500 | 564 | 0 | | 564 |
| 1501-1600 | 5,483 | 41 | | 5,524 |
| 1601-1700 | 9,594 | 64 | | 9,658 |
| 1701-1800 | 22,913 | 145 | | 23,058 |
| 1801-1870 | 39,250 | 60 | | 39,310 |
| Americana | 2,283 | 2 | | 2,285 |
| 1871-Present | 352,296 ¹ | 11,861 | 510 | 363,647 |
| Brief listed-INPROC | 13,984 | 2,828 | | 16,812 |
| Theses HMD | 281,311 | 141 | | 281,452 |
| Pamphlets | 172,021 ² | 0 | | 172,021 |
| Bound serial volumes | 545,202 | 38,096 | 6,619 | 576,679 |
| Total volumes | 1,444,901 | 53,238 | 7,129 | 1,491,010 |
| B. Nonbook Materials | | | | |
| Microforms | 60,356 ³ | 18,405 | | 78,761 |
| Audiovisuals | 5,394 | 2,755 | | 8,149 |
| Pictures | 72,235 | 263 | | 72,498 |
| Manuscripts | 822,308 | 15,605 | | 837,913 |

¹Corrected figure. 2085 monographs withdrawn by contractor FY 1977-not reported

²In collection before July 1, 1975. Additions now included with monographs

³28,720 Microfiche transferred from Documents Collection FY 1977-previously not reported

Table 9. Cataloging Statistics¹

| | <i>FY 1976</i> | <i>Transitional Qtr. 1976²</i> | <i>FY 1977</i> | <i>FY 1978</i> |
|----------------------------|----------------|---|----------------|----------------|
| Completed Cataloging | 15,044 | 3,051 | 13,507 | 14,186 |
| Catalog Cards Filed | 118,628 | 24,992 | 126,591 | 166,300 |
| Volumes Shelf-listed | 13,326 | 3,310 | 12,182 | 14,166 |

¹Does not include History of Medicine Cataloging

²July-September 1976

Table 10. Circulation Statistics

| | July 1975- June 1976 | Transi- tional Quarter ¹ | FY 1977 | FY 1978 |
|---|-------------------------|---|---------|---------|
| Number of requests received | 380,475 | 90,900 | 423,801 | 425,000 |
| For interlibrary loan | 263,072 | 64,716 | 280,512 | 261,969 |
| For readers | 117,403 | 26,184 | 143,289 | 163,031 |
| Number of requests filled | 301,965 | 74,785 | 343,313 | 329,119 |
| For interlibrary loan | 205,695 | 51,743 | 221,517 | 193,804 |
| Photocopy | 184,704 | 47,153 | 198,760 | 176,158 |
| Original | 20,991 | 4,590 | 22,757 | 17,646 |
| For readers | 96,270 | 23,042 | 121,796 | 135,315 |
| Number of requests unfilled | 78,510 | 16,115 | 80,488 | 95,881 |
| Interlibrary loan | 57,377 | 12,973 | 58,995 | 68,165 |
| Rejected | 18,127 | 4,585 | 23,083 | 28,164 |
| Referred | 8,684 | 2,099 | 7,946 | 7,445 |
| Returned as unavailable | 30,566 | 6,289 | 27,966 | 32,556 |
| Reader service returned as unavailable .. | 21,133 | 3,142 | 21,493 | 27,716 |

¹July-September 1976

Table 11. Reference Services

| | July 1975- June 1976 | Transi- tional Quarter ¹ | FY 1977 | FY 1978 |
|-------------------------------------|-------------------------|---|---------|---------|
| Requests by telephone | 13,275 | 4,015 | 15,043 | 16,317 |
| Government | 3,562 | 1,201 | 4,119 | 4,540 |
| Nongovernment | 9,713 | 2,814 | 10,924 | 11,777 |
| Requests by mail | 1,446 | 342 | 1,140 | 753 |
| Government | 189 | 43 | 106 | 33 |
| Nongovernment | 1,257 | 299 | 1,034 | 720 |
| Readers assisted | 17,613 | 5,819 | 26,772 | 30,763 |
| Government | 3,793 | 1,098 | 4,726 | 5,811 |
| Nongovernment | 13,820 | 4,721 | 22,046 | 24,952 |
| Total | 32,334 | 10,176 | 42,955 | 47,833 |
| Government | 7,544 | 2,342 | 8,951 | 10,384 |
| Nongovernment | 24,790 | 7,834 | 34,004 | 37,449 |
| Reading room users registered | 28,384 | 5,725 | 32,060 | 33,504 |

Table 12. Binding Statistics

| | <i>July 1975- June 1976</i> | <i>Transi- tional Quarter¹</i> | <i>FY 1977</i> | <i>FY 1978</i> |
|--|---------------------------------|---|----------------|----------------|
| Number of volumes sent to binder | 24,997 | 6,274 | 33,045 | 33,881 |
| Obligations for binding | \$95,508 | \$25,000 | \$113,104 | \$157,426 |

¹July September 1976

Chapter 3: Computer and Communications Systems

Harry D. Bennett, Director
Office of Computer and Communications
Systems



The present IBM 370/158 computers will be replaced early in 1980. Shown in the NLM computer room are Ernest Freeman (standing, left), Howard Somers, and Richard Wiles of the OCCS staff.

The Office of Computer and Communications Systems is responsible for providing data processing and data communications support to all elements of the Library. As such, it has a critically important supporting role for Library Operations as well as Specialized Information Services. The present IBM 370/158 multi-process computer system is the equipment workhorse providing this support.

NLM is working with the General Services Administration on a competitive purchase to replace the IBM 370 system in early 1980 in order to provide the capacity necessary to meet the Library's growing requirements for data processing services. This replacement, which has been in the planning stages for over two years, will handle the estimated 20-25 percent growth rate until 1985. The system will be installed in the Data Processing Facility in the new Lister Hill Center building presently under construction. This facility has been designed to house the data processing equipment necessary to support NLM through the 1980s.

Considerable emphasis has been placed on improving the performance of the present 370 system so that NLM's data processing requirements can continue to be met on the existing equipment until the replacement system is installed. In the summer of 1978 four million bytes of main memory were added to the 370 system. This increase will insure that the present system will continue to meet NLM's needs until the new system becomes operational in 1980.

During 1978 OCCS implemented several new online input systems. MEDNAM (MEDLARS name authority processing) provides for the online input and maintenance of authority names in support of cataloging. This procedure both im-

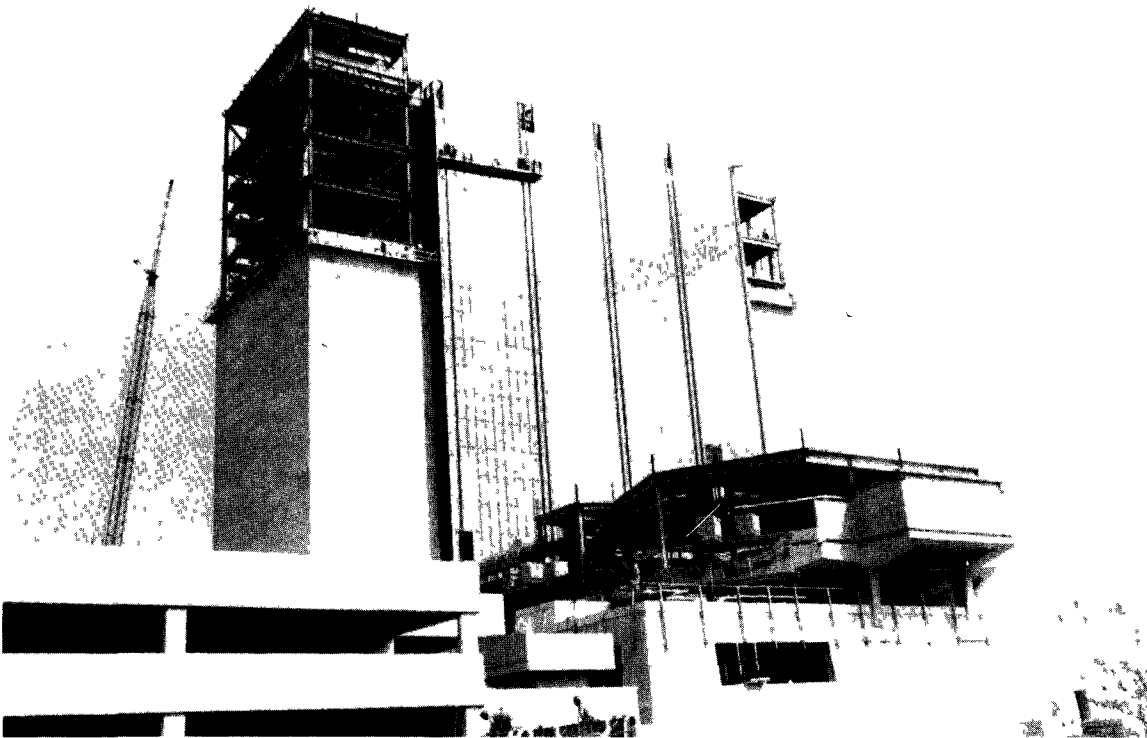
proves upon the previous cumbersome batch input method and accelerates the validation and release of associated catalog items. MEDVOC is a companion system that provides much the same facility for input and maintenance of NLM's vocabulary authority file. MEDCFM is the most recent system and provides greatly enhanced online maintenance capabilities for the CATLINE file. MEDCLASS is the name of the system which was developed to support the input processing of data for the NLM Classification schedule. Through this system, and the development of supporting publication software, NLM was able to produce the first computerized classification schedule.

SERLINE, BIOETHICSLINE, and HISTLINE were added to the growing list of ELHILL retrieval files in FY 1978. Each file required the development of substantial software in order to convert it to retrieval format. In addition, the ELHILL system — the online retrieval portion of MEDLARS — was enhanced with a number of new features to facilitate its use by the biomedical community. These new features, along with the improvements made in 1977, were distributed to three of our foreign partner installations for their use early this year.

In addition to providing computer training, systems analysis, and software support to all components of the NLM, OCCS continues to utilize off-the-shelf software and tested state-of-the-art advances to optimize and improve existing application systems. Furthermore, the staff provides assistance to other government and private organizations in data base management systems technology. In 1978, special data bases were developed to provide direct support to the Council on Environmental Quality and the White House Conference on Libraries and Information Services.

Chapter 4: Specialized Information Services

Henry M. Kissman, Ph.D., Associate Director,
Specialized Information Services



By the end of the fiscal year, construction on the new Lister Hill Center building was well along. Visible from this angle are the special conference facility (right foreground) and parking structure (left).

The Toxicology Information Program (TIP) is the major activity of NLM's Division of Specialized Information Services. The objectives of this program are (1) to create computer-based toxicology data banks from the scientific literature and from the files of collaborating industrial, academic, and governmental organizations, and (2) to establish toxicology information services for the scientific community.

Actions by the Federal Government in FY 1978 to implement the Toxic Substances Control Act of 1976 have caused government agencies and industry to increase their information activities related to toxic substances. This year's report shows that greater use than ever is being made of NLM's information services in toxicology and that important new information activities in the toxic substances field are being planned by the Toxicology Information Program in collaboration with other agencies.

Query Response

Query response service in the form of literature searches is provided by the TIP-sponsored Toxicology Information Response Center (TIRC) at the Oak Ridge National Laboratory in Tennessee.

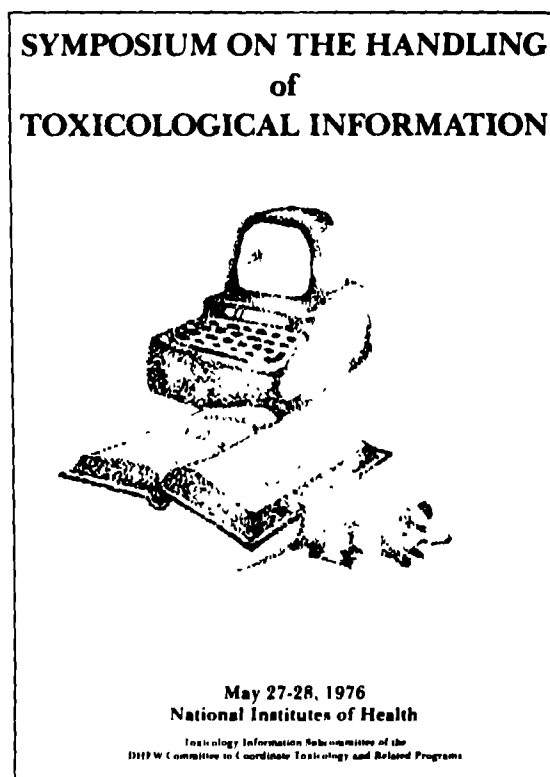
There has been a 19 percent increase in TIRC services this year over 1977. While the Center responds to search requests from the general biomedical community as well as from government agencies, the services provided to the latter group have increased substantially during the past year. Thus, in FY 1978, 76 percent of TIRC services went to Federal agencies as against 68 percent in the last fiscal year.

The increase in the overall level of services was accomplished even though the charge rate was raised from \$25 to \$30 per hour in order to bring search services closer to full cost recovery. Users are billed for these services through the National Technical Information Service, Department of Commerce. Charges for services

to the Federal agencies are recovered through interagency agreements. During FY 1978, such interagency agreements were negotiated with the Food and Drug Administration, National Center for Toxicological Research, National Institute of Environmental Health Sciences, National Institute of Occupational Safety and Health, National Cancer Institute, and the Chemical Systems Laboratory of the Department of the Army.

Publications

The proceedings of the 1976 *Symposium on the Handling of Toxicological Information* have been published and are now available from the National Technical Information Service. The Symposium was organized by the Toxicology Information Subcommittee of the DHEW Committee to Coordinate Toxicology and Related Programs to consider develop-



Published this year, the proceedings of this symposium are available from the National Technical Information Service.

ments over the last decade in the handling of toxicological information, the present state of the information transfer process in this field, and future requirements for toxicological information. The Symposium was held at the National Institutes of Health on May 27-28, 1976.

The proceedings contain the 33 papers presented at the Symposium, the transcripts of the discussions that followed panel sessions, and recommendations relating to future information needs. The publication also includes a copy of the 1966 report of the Panel on Handling Toxicological Information of the President's Science Advisory Committee, the document whose recommendations led to the establishment of NLM's Toxicology Information Program in 1967.

The Toxicology Information Program continues to manage—for the Toxicology Information Subcommittee—two publications that describe research-in-progress. The first of these, *TOX-TIPS* (Toxicology Testing-in-Progress), reports new projects in long-term toxicology testing of chemicals by governmental, industrial, and academic laboratories. The rapid publication of this information is designed to prevent the unknowing duplication of these expensive tests. *TOX-TIPS* is published monthly through the National Technical Information Service at an annual subscription rate of \$25.

The scope and contents of the second publication, *Toxicology Research Projects Directory*, are much larger. It includes descriptions of over 12,000 continuing government-supported research projects in toxicology and related fields. These descriptions—together with extensive monthly and annual indexes—offer laboratory scientists and administrators the opportunity to learn which organizations support what studies at which institutions. The publication is prepared by the Smithsonian Science Information Exchange from its extensive data base. In 1978, the *Toxicology Research Projects Directory* changed from a quarterly to a monthly publication. Some 300

subscribers receive the *Directory* from the National Technical Information Service at the subscription rate of \$100 per year.

The NLM-sponsored Toxicology Information Response Center, at the Oak Ridge National Laboratory, publishes reviews and annotated bibliographies in toxicology journals or through the National Technical Information Service. During 1978, these bibliographies covered the following topics: vinylidene chloride, health aspects of chloroform, and polychlorinated and polybrominated biphenyls. Journal publications included reviews on mercury poisoning, kepone, mirex, and chloroform.

Online Retrieval Services

TOXLINE: This bibliographic retrieval service concerned with toxicological information now provides subscribers with online access to almost 500,000 secondary journal citations and abstracts covering the most recent four years. These records deal primarily with the toxicology and pharmacology of drugs, pesticides, industrial chemicals, environmental pollutants, and hazardous household chemicals. The *TOXLINE* data base is updated monthly. In FY 1978, the entire *TOXLINE* file was regenerated and information older than 1974 was moved to the backfile, *TOXBACK*, raising that file to 400,000 records. *TOXLINE/TOXBACK* contain the following component files: *Toxicity Bibliography*, *Chemical-Biological Activities (Chemical Abstracts, sections 1-5, plus sections 8, 59, and 60)*, *Abstracts on Health Effects of Environmental Pollutants*, *Pesticides Abstracts*, *International Pharmaceutical Abstracts*, the Hayes File (a precursor to *Pesticides Abstracts*), bibliographic files from the Environmental Mutagen Information Center, Toxic Materials Information Center, and Environmental Teratology Information Center (all at the Oak Ridge National Laboratory) and a second, special file of references in teratology.

During the year, more than 47,000 online searches were conducted by *TOXLINE* users, who also requested more than two million citations, printed offline from *TOXLINE* and *TOXBACK*.

CHEMLINE: This file presently contains more than 248,000 chemical records for substances known by some 560,000 different names. It includes the 33,000 records on the Toxic Substances Control Act Inventory Candidate List of the Environmental Protection Agency. CHEMLINE records contain Chemical Abstracts Service (CAS) Registry Numbers, molecular formulas, chemical names, synonyms, name fragments, ring information, some MeSH terms, and a "locator" data element to aid in identifying other files with information about a specific substance. In 1978 the CHEMLINE file was established at the State University of New York (Albany) to increase its accessibility on the network. Total online usage for CHEMLINE reached a peak of 350 hours per month for a total of more than 3,450 hours during the year.

A four-month test was conducted in 1978 to evaluate the effectiveness of a set of substructure search screens recently developed by a consortium of Swiss pharmaceutical manufacturers in conjunction with Chemical Abstracts Service. Representatives from industrial and governmental organizations participated in this test which will lead to enhanced chemical search capabilities in CHEMLINE.

RTECS: In September 1977 the Toxicology Information Program brought a new online data retrieval file called RTECS into NLM's family of network services. This file is an online version of the National Institute of Occupational Safety and Health (NIOSH) publication, *Registry of Toxic Effects of Chemical Substances*. In March 1978, the 1976 edition of RTECS was replaced by the 1977 version and in September 1978 quarterly updating of this file was instituted in collaboration with NIOSH.

RTECS provides the online user with acute toxicity data on some 31,600 substances. For many substances, the file also contains information on: threshold limit values, recommended standards in air, aquatic toxicity, and eye and skin irritation. All data in RTECS have source references. NIOSH maintains responsibility for the content of the file.

Toxicology Data Bank (TDB): The Toxicology Information Program made substantial progress in 1978 in the development of the Toxicology Data Bank (TDB) as an online, interactive data retrieval service. The TDB contains *evaluated* data describing the chemical and biological properties and the usage of selected chemical substances which are hazardous and to which populations are exposed. Data extracted from secondary sources such as textbooks, handbook, and criteria documents are further evaluated by a task group of the NIH Toxicology Study Section comprised of pharmacologists, toxicologists and analytical chemists. Data extraction and data input are carried out for NLM at the Oak Ridge National Laboratory.

In 1978, two online tests by user groups were carried out on pilot versions of the file. The file structure was then modified as a result of these tests. Initial public access by U.S. users of the NLM online services is planned for October 1978. At that time, the file will contain some 1,100 complete substance records and another 1,400 references to records in various stages of development.

LADB: The Laboratory Animal Data Bank (LADB) contains descriptive information on animal strains and provides comparative data on laboratory animals used as experiment controls at research and testing institutions. It is an online computer system designed for use by scientists; formal training in computer retrieval methodology is not necessary. Eventually, the system will be available through a nationwide telecommunications network.

Using LADB, a scientist may: (1) select and examine base-line data for various physiologic and pathologic values; (2) determine the environmental and husbandry conditions for each animal group selected; (3) statistically analyze the retrieved data; and (4) print out the data as distributions (such as histograms or data tables) and as complete reports. Data are contributed to LADB voluntarily by industrial, academic, and government laboratories. At present the file

contains data from 117 colonies—17,925 animals of 22 strains/species on which over 201,000 observations were recorded. Formal testing of LADB has been completed and it is expected that the file will be ready for public service during FY 1979.

The LADB project is sponsored by the DHEW Committee to Coordinate Toxicology and Related Programs, the National Center for Toxicological Research, the National Cancer Institute, the National Library of Medicine and the Interagency Regulatory Liaison Group (made up of representatives from the Consumer Product Safety Commission, Environmental Protection Agency, Food and Drug Administration, and Occupational Safety and Health Administration).

Collaborative Activities with Other Agencies

NLM's Toxicology Information Program continues to manage the Toxicology Information Subcommittee of the DHEW Committee to Coordinate Toxicology and Related Programs and several of the projects which this group sponsors. Included among these are the aforementioned Laboratory Animal Data Bank project and the publications *TOX-TIPS* and the *Toxicology Research Projects Directory*.

In 1978, the TIP—working in close association with the Council on Environmental Quality and the Environmental Protection Agency—began to develop a prototype Chemical Data Base Directory. This online directory file will be an entry point into a proposed multifile information and data retrieval system—the Chemical Substances Information Network. This network, being developed in response to the requirements of the Toxic Substances Control Act, is under the direction of the Interagency Toxic Substances Data Committee (which is managed by the Council on Environmental Quality and the Environmental Protection Agency and has representation from the Federal agencies concerned with toxic substances, including NLM).

The Chemical Substances Information Network, as planned, will consist of a set of data bases containing information related to chemicals. Most of these data bases would be linked through communications media, searchable online, and provide for retrieving coordinated sets of data. It is planned that the Chemical Data Base Directory, the first step in developing the network, will consist of a descriptive catalog which describes the content, structure, location, and accessibility of network component data bases, and a subject catalog which contains terms representative of the concepts covered by these data bases. The Toxicology Information Program is developing the detailed design of the Chemical Data Base Directory and is planning for a prototype to be operational in FY 1979.

Chapter 5: Audiovisual Programs

Myron J. Adams, Jr., M.D., Director
National Medical Audiovisual Center



Students at the National Medical Audiovisual Center participate in a three-day workshop on ' Designing Learning Spaces

The National Medical Audiovisual Center (NMAC) is responsible for planning and administering a national program to improve the quality and utilization of learning materials in the health professional community. The Center conducts an intramural program and supports extramural activities to apply audiovisual and educational technology to complement NLM's efforts to aid in the dissemination of information important to the progress of medicine and to the public health.

Currently located in Atlanta, Georgia, NMAC will move to the new Lister Hill Center, scheduled for completion in 1980. Efforts are now underway to integrate NMAC with the Lister Hill National Center for Biomedical Communications (LHNCBC) to form one Library component responsible for research and development in the dissemination of information.

In the report that follows, NMAC's programs are divided under two main headings: Research and the Application of Research, and Services. Under the first heading are activities dealing with the development of audiovisuals, the utilization of technology, and planning information transfer systems. Under Services are described NMAC's distribution and consultation activities.

Research and the Application of Research

Development of Audiovisuals

During FY 1978, the National Medical Audiovisual Center continued its support of extramural development of audiovisuals, including the two series "Leaders in American Medicine" and "Leaders in American Nursing," and the development of high-quality prototypes for audiovisual teaching materials.

Efforts to provide standards and guidelines for all aspects of audiovisual development and evaluation were emphasized in FY 1978. One approach seeks to develop guidelines for selecting appropriate segments from the total curriculum—determining what factors influence their selection and how to achieve widespread acceptance and application of this information.

A complementary effort is aimed at how to select and validate professional content in audiovisual instructional materials. Accuracy, currency, and adaptability to audiovisual formats are primary considerations. Guidelines for the design of instructional formats, as they relate to audiovisual development and use, are also being studied. Matching content, stated objectives, and test materials, and the appropriate selection of media, are essential ingredients in this effort.

NMAC's sponsorship of extramural development of audiovisual materials has uncovered specific production shortcomings within schools of the health professions. This has led NMAC to formulate and promote a comprehensive set of standards for technological requirements of all audiovisual productions. Also prompted by these experiences is a project to devise guidelines for revising partially obsolete audiovisual materials—those in which certain data are no longer valid but which are, otherwise, highly valuable and perhaps irreplaceable.

The evaluation of audiovisual teaching materials is being addressed by three major research and development efforts. Their objectives are (1) to devise techniques for obtaining student test data from a national program of field testing of completed audiovisual projects, (2) to obtain useful data for assessing the effectiveness of audiovisual teaching materials while they are in early stages of development (so that revisions can be made without major investment), and (3) to obtain subjective reactions to audiovisual instruction for use in predicting student performance as a result of each instruction.

In FY 1978, through a combination of contractual, collaborative, and in-house efforts, NMAC has developed 80 products: 3 motion pictures, 30 videotapes, 39 slide/tape units, 5 filmstrips, 2 journal articles, and 1 exhibit.

Utilizing Audiovisual and Educational Technology

Many health professions faculty have had little preparation for their teaching responsibilities, and they express interest in acquiring more information and skills in educational methodology. To assist them, NMAC's Educational Training and Consultation Program develops innovative teaching approaches, evaluates their effectiveness, and provides training in audiovisual and instructional technology to health professions faculty.

This is done largely through a program of workshops and seminars that demonstrate a variety of training methodologies for health professional educators. When evaluated and found effective, these workshops are shared with NMAC's regional centers. In these centers, evaluation is continued to determine how effective the training is in improving the quality of teaching in schools of the health professions.

Faculty training at NMAC and its nine regional centers has increased steadily during recent years. In FY 1976, 500 received training, in FY 1977, 659 received training, and in this fiscal year, 889 received training. The total number of workshops and seminars held at NMAC and its centers also increased in the last year from 26 to 40.

The primary goal of the NMAC regional training center program is to develop a network of regional centers, staffed by experienced faculty, that can (1) use NMAC-packaged faculty training materials effectively, (2) make training more widespread through the multiplier effect, and (3) provide a laboratory setting in which to study the process of faculty training.

Three new regional training centers were added to the network this year, bringing the total to nine. The three new centers are located at the University of Florida's J. Hillis Miller Health Center, the University of Texas Health Science Center at San Antonio, and the University of California at San Francisco. The number of regional-based workshops has risen from four in 1975-1976 to a scheduled 38 in 1978-1979. Attendance at these workshops has been from all of the major health professions.

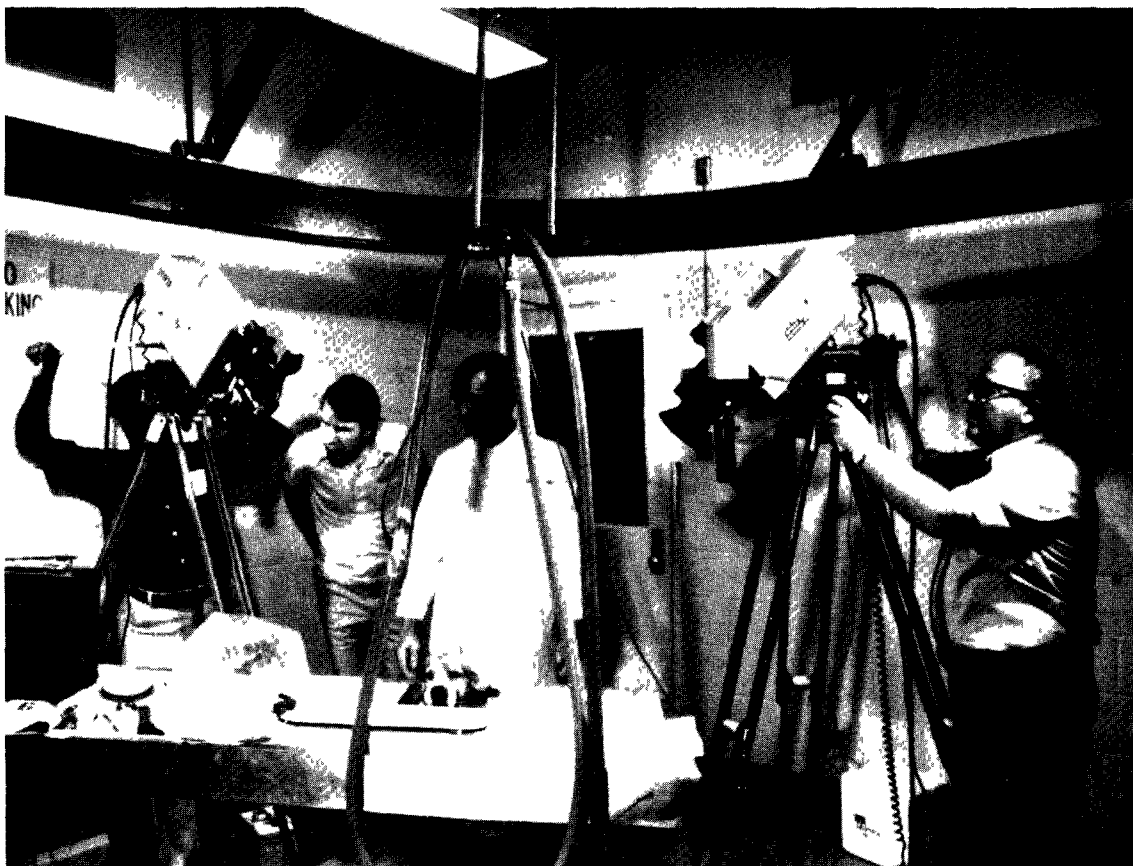
Topics covered during workshops and seminars include test construction, instructional technology and innovations in teaching, development, and evaluation of audiovisual instructional materials, simulation, television production, learning space, basic graphic art for the health science teacher, effective use of media, basic photography, and how to teach and use interpersonal skills.

NMAC is planning to develop new and modify existing workshops for a new constituency—directors of continuing education programs in schools of the health professions, hospitals, etc.

Planning and Evaluating Information Transfer Systems

NMAC is involved in developing prototype information transfer systems, including evaluating their effectiveness and disseminating information about them to the health sciences community. The Center has worked with a number of professional groups in an attempt to develop component parts of information transfer systems. One of these projects compares various techniques for defining content in a given area. Four approaches, ranging from analyzing lecture notes to simulated job analysis, are being compared.

In FY 1978, NMAC completed a survey of the utilization of instructional technology in schools of the health professions. A final



NMAC crew on location records a scene for the videotape "Removal of Animal Brains for Rabies Testing"

report*—describing the purpose and methodology of the project, a detailed analysis and interpretation of the data, and conclusions and recommendations—was sent to the schools that participated in the survey and to other interested organizations and individuals.

In May 1978, NMAC invited consultants in medical education and instructional development programs to discuss with a special study group how to develop models for evaluating such programs. Also during this year, a contract was given to the Ohio Regional Medical

Audiovisual Consortium (ORMAC) to evaluate its impact on participating schools.

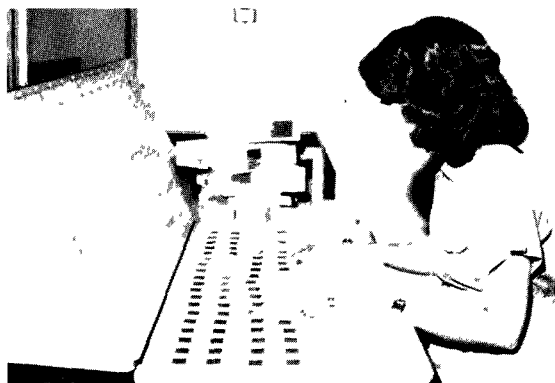
Services

Audiovisual Distribution

The NMAC free-loan collection consists of 898 16mm motion picture titles and 277 3/4-inch videotape titles. During FY 1978, the Center received and processed 54,176 requests and shipped 49,482 films and videotapes. The number of requests increased by 15 percent this year. Several factors contributed to this increase—the distribution of a revised catalog (July 1977), individual announcements of all new titles added, and the increasing popularity of the 3/4-inch videotape format.

*"Instructional Technology in the Health Sciences, Final Report 1977, available on request from the National Medical Audiovisual Center 1600 Clifton Road, N.E., Atlanta Georgia 30333

Original edited master videotapes were inventoried and 3/4-inch duplicate masters were prepared to protect this valuable collection. All original 16mm preprint material has been inventoried, placed in new containers, and filed in the automatic storage and retrieval system.



Center staff member Carole Horton checks an audiovisual instructional unit for delivery to the National Audiovisual Center

Twenty-eight self-instructional teaching packages, 16 motion picture titles, and 37 videotape titles were placed in the Sales Program of the National Audiovisual Center, General Services Administration. These new titles are in the fields of dentistry, nursing, anatomy, pediatrics, forensic medicine, and history of medicine. During this year, 3,008 teaching packages, 228 motion pictures, and 119 videotapes were sold. Also, 2,737 duplicate audiotapes were produced. Most of these were used in NMAC's loan and sales programs.

From the 1,125 programs in the historical collection, 126 selected titles have been transferred to videotape; an abstract for each is being

written. The Center is developing a method to determine which titles of the collection have lasting historical value.

Consultation

On request, this program assists health educational institutions by collecting data and providing recommendations regarding the development, implementation, and management of instructional resources or biomedical communication programs.

Several on-site consultations and one in-depth survey were conducted during FY 1978. The survey, at the New Jersey College of Medicine and Dentistry, was to evaluate the biomedical communication operations in the schools of medicine and dentistry and to provide recommendations on how the two resources could be organized to maximize their efficiency in responding to the needs of faculty in both schools. The on-site consultations were provided to the American Psychiatric Association, the Chicago Dental Society, and the University of Texas Medical Branch in Galveston.

One hundred twenty-nine consultations were provided to administrators, faculty, and staff from schools of the health sciences, universities, and hospitals, and representatives of Ghana, West Germany, Iran, New Zealand, Holland, Cuba, Chile, Israel, and Canada. Subjects covered included continuing education; evaluation of audiovisual teaching programs; organization, staffing, operation, and budgeting for a biomedical communications program; facilities planning; and the design and development of learning materials.

Table 13. Selected Statistics, NMAC
(FY 1978)

| | FY 1978 |
|--|---------|
| Audiovisuals requested | 54,176 |
| Audiovisuals shipped | 49,482 |
| Titles added (film and videotape) | 95 |
| Audiotape duplication | 2,737 |
| Titles to NAC for sale | 81 |
| Teaching packages sold through NAC | 3,008 |
| On-site consultations | 5 |
| NMAC-based consultations | 129 |
| Monographs distributed | 1,887 |
| NMAC-based workshops (362 attendees) | 16 |
| Regional workshops (527 attendees) | 24 |
| Audiovisual units completed | 80 |

Chapter 6: Lister Hill National Center for Biomedical Communications

Lionel M. Bernstein, M.D., Director



Representative Dan Rostenkowski (D Ill) address a hospital group in Cleveland via satellite from the Lister Hill Center s CTS studio facility. Joining in the live, two way discussion on March 16 were (left to right) Alexander McMahon, President of the American Hospital Association, Dr Robert B Hunter, Chairman of the Board of the American Medical Association, and Thomas H Sherlock President of Blue Cross of Maryland. Operating the camera is Liz R Somogyi.

This annual report is written, for the first time, in the actual shadow of the new Lister Hill Center building. During the period of this report the Center acquired a new Director and a new branch, the Health Professions Applications Branch. A subcommittee of the Board of Regents, chaired by Dr. S. Richardson Hill, and a group of outside consultants reviewed the programs of both the Lister Hill National Center and the National Medical Audiovisual Center.

The PHS/CTS satellite program demonstrated the power and flexibility of a satellite-based broadband biomedical communications system in its first full year of operation. Computer-conferencing is being used to bring the opinions of experts to bear on validating and updating the Hepatitis Data Base. A new Advanced Terminal System promises to combine the best features of several previously incompatible computer/terminal systems. Investigations were started on the potential of a powerful new device, the optical video-disc, for high density storage and retrieval of both digital data and audiovisual materials.

PHS/CTS Program

The Public Health Service/Communications Technology Satellite Program is an outgrowth of earlier Lister Hill Center satellite-based programs. In 1971, the first such program, via ATS-1* satellite, introduced interference-free voice communications to approximately two dozen locations in various parts of Alaska. In 1974, the launch of ATS-6 gave the Lister Hill Center the opportunity to introduce video as a communications medium for biomedical experimenters in Alaska and the Pacific Northwest.

The launch of the Communications Technology Satellite (CTS) in 1976 provided the first opportunity to experiment with a truly national broadband interactive communications net-

work for health education programs, and dissemination of NIH research results providing full-duplex color video and audio capability. CTS also represents a step forward in technology since it operates at the relatively available super high frequencies and possesses an exceptionally powerful transmitter.

The National Library of Medicine has designed and installed a network of six small earth terminals. This network functions both as a demonstration laboratory for the PHS health agencies and as a technology test laboratory for the Lister Hill Center. In light of this multipurpose function, objectives for the PHS/CTS program are developed in three areas: a demonstration project, a network operation and maintenance support activity, and a technology project.

The experiment, which has reached as high as 70 hours per month and has averaged 44 hours of broadcast over the past 18 months, originally was to have been concluded in December 1978. In response to appeals from the health community, the National Library of Medicine has agreed to continue its involvement in maintaining the network and providing technical support to the participating health agencies through June 1979.

The PHS/CTS program has three aims; to

- Promote the dissemination of information among members of the health community.
- Promote increased access to continuing education programs for health professionals.
- Promote the sharing of faculty and curriculum as a form of resource sharing among health educational institutions.

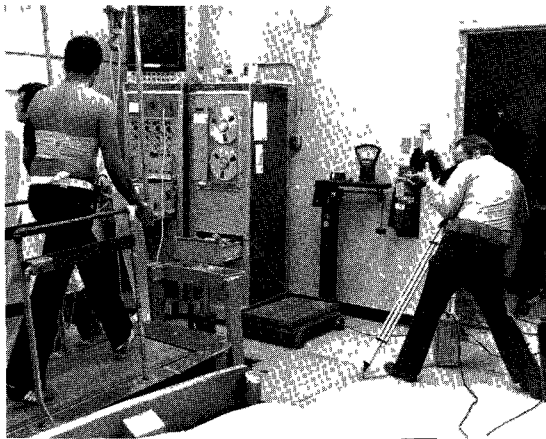
Wilbur Cohen, then Secretary, Department of Health, Education, and Welfare, established the Lister Hill National Center for Biomedical Communications in a memorandum dated September 18, 1968. This memorandum stated, in part,

*ATS Applications Technology Satellite

that: Substantive materials and information to be transmitted (over the Biomedical Communications Network) will remain the responsibility of the program missions involved." To date, more than 13 projects have been conducted using the PHS/CTS network. A list of some of these projects and the PHS agencies sponsoring them is given in Table 14.

Network Operation and Maintenance Project

The Lister Hill Center has assumed the roles of network coordinator and technical support group for the PHS/CTS program. The PHS/CTS network consists of six earth terminals located in Bethesda, Maryland; Lexington, Kentucky; Denver, Colorado; Bozeman, Montana; Seattle, Washington; and Fairbanks, Alaska. These six stations provide interactive video and audio communications for the health programs that are being demonstrated.



A treadmill test, taped at the National Institute on Aging's Gerontology Research Center in Baltimore, was used by Institute Director Dr. Robert N. Butler during a CTS telecast to the University of Colorado Medical Center on February 16.

The Center's responsibilities in assuming this role are to coordinate the scheduling for the PHS experiments, operate and maintain the six earth terminals, provide technical coordination

for the PHS programs, and operate the new NLM telecast facility.

The PHS/CTS network also served as a laboratory for conducting experiments to improve the cost-effectiveness and practicality of broadband communications. Two experiments, "spectrum optimization" and "spectrum sharing," explored the extent to which bandwidth can be saved, thereby reducing communications costs. It was found to be possible to frequency-multiplex two video signals into either CTS channel. "Broad area coverage" experiments explored the quality of reception under the marginal carrier-to-noise ratio signals received at the peripheries of the satellite footprints.

A practical problem, inherent in any interactive communications system that uses a satellite as a relay point, is an annoying "echo" in the audio channels. The echo can be controlled manually, but the need for extra personnel adds to system costs. Measurements of audio channel impairments led to recommending the inclusion of a voice-gate amplifier to provide a more robust threshold to the echo suppression mechanism so that speech chopping and other annoyances were substantially reduced.

Dissemination of Information to Practitioners

The overall objective of the Health Professions Applications Branch's information transfer program is to develop an easily and immediately accessible information system that will provide practitioners with information needed to deal with their day-to-day patient problems. Health practitioners encounter great difficulties in remaining current because there is little time to search out the everexpanding amounts of new biomedical information becoming available. Research and development initially will be directed toward construction of a small number of comprehensive knowledge banks by analysis,

Table 14. PHS/CTS Programs

| Project | Implementing Agency | Supporting Health Agency |
|---|--|--|
| Nursing Child Assessment Satellite Training | University of Washington, School of Nursing | Division of Nursing, Health Resources Administration |
| Dietitians Workshop | American Dietetic Association | National Library of Medicine |
| Continuing Dental Education | Consortium composed of Health Systems Research Division, University of Florida, and four Schools of Dentistry at Universities of Colorado, Kentucky, Maryland and Washington | Division of Dentistry, Health Resources Administration |
| Drug Abuse Prevention Teleconference | Participating Youth Groups | National Institute on Drug Abuse, Alcohol, Drug Abuse and Mental Health Administration |
| Drug Treatment | Drug Treatment Center | National Institute on Drug Abuse; Alcohol, Drug Abuse and Mental Health Administration |
| MEDLINE Training Seminar | National Library of Medicine | National Library of Medicine |
| Health Teleconference Seminar | National Health Associations | National Library of Medicine |
| Admissions and Minority Recruitment | Consortium of four Universities Washington, Alaska, Montana, and Idaho (WAMI) | Division of Medicine, Health Resources Administration |
| Independent Learning and Faculty Sharing | WAMI | Division of Medicine (HRA) |
| Health Consultation | WAMI | Division of Medicine, HRA |
| Legislative Process | WAMI | Division of Medicine, HRA |
| Research Dissemination | University of Colorado | National Institutes of Health |
| Teleconference | <ul style="list-style-type: none"> ● Monsour Foundation ● Society of Neuroscience ● HeSCA ● Institute of Pediatrics | National Library of Medicine |

synthesis and translation of clinically relevant information available in books and journals into compact, manageable computerized forms

A prototype computerized information transfer system using the diseases "viral hepatitis" as the initial test model has been constructed. As a comprehensive bank of information, this system (1) contains substantive answers to questions posed by practitioners (rather than bibliographic citations), (2) provides answers that are current and are the consensus of a group of ten experts, (3) is immediately responsive to inquiries (reliable, ready computer access and response), and (4) provides data supporting the answers as well as citations to primary publications for more detailed study if desired. Knowledge pertaining to aspects of viral hepatitis important to the practitioner has been synthesized using the information contained in several outstanding syntheses on the subject previously published by hepatitis experts. Relevant information has been selected, placed in a highly organized hierarchical arrangement to permit easy retrieval, and encoded into a minicomputer. The contents of the Hepatitis Data Base will be maintained current by review of selected literature by experts.

The first draft of the Hepatitis Data Base (HDB) was completed in September 1977. Since then, the HDB has gone through successive refinements. The first completely updated consensus document will be published in 1979 as a supplement to *The Annals of Internal Medicine* with an invitation to readers to identify errors of omission or commission in the data base and to propose alternatives.

The consensus process is facilitated by the use of computer conferencing. Linking between the experts and the research staff of NLM is mainly by means of Electronic Information Exchange (EIE), an experimental computer conferencing network under developmental study by the National Science Foundation and maintained at the New Jersey Institute of Technology. Mail and telephone are used to supple-

ment communication as necessary. Computer conferencing provides a medium of communication that is virtually independent of the customary constraints of space and time. Use of computer-managed conferences eliminates the need to gather at a common table or to gather by separate telephones at a common time. Participation is asynchronous. Each participant uses a terminal at the time and place of his choosing and automatically receives all communications and reactions initiated by other participants since his last session at the terminal. He or she can then enter comments and new communications into the system for distribution to others. This enables participants to be in virtually constant touch with one another to exchange ideas and findings on a daily or weekly basis and allow the validation (and updating) functions to occur readily amongst geographically dispersed busy individuals.

Highly interactive data base delivery is supported by a Data General Eclipse C/330 minicomputer, using the MUMPS/MIIS operating system and the Hewlett-Packard 2648A videographics display terminal. Data base maintenance includes the capabilities to update text, table, figure and bibliographic data sets. A stand-alone microprocessor/floppy disc version of the delivery system has been developed which permits local display and retrieval of information without the need for costly communications facilities or large centralized data center supporting activities.

During the coming year initial testing and evaluation of the Hepatitis Data Base and derivative products will be conducted at the institutions of the collaborating experts. Resulting data will provide necessary feedback to guide the ongoing development and refinement of this prototype information transfer system. Emphasis will be placed upon assessing the cost-effectiveness of the methodologies used to construct, validate, and update the data base contents, and to begin to assess the utility of this mode of information transfer for medical education and medical decision making under actual practice circumstances.

Information Technology

The Computer Technology Branch (CTB) is reporting on three current projects of general interest: the Integrated Library System (ILS); the Advanced Terminal System (ATS); and the Videodisc Project, which it shares with the Communications Engineering Branch.

The *Integrated Library System* is an attempt to design and develop a minicomputer-based integrated library system with all major library functions operating on one bibliographic file. The circulation and online catalog reference subsystems are being developed first, as a collaborative effort between the National Library of Medicine and the Army Library, Pentagon. The Army Library contributes developmental funds and provides library personnel to work with the Computer Technology Branch (and Library Operations, NLM) on the requirements and functional design, while CTB designs and develops the ILS.

The system is designed to run on a wide range of equipment configurations, from \$20,000 for a small system serving one or two users to \$250,000 for a large centralized system serving 64 users. The ability to do this without any redesign would be a unique capability. Few software systems exist today that can span such a range of user populations without major revision.

The *Advanced Terminal System* is a "three-in-one" terminal system that can do things that formerly required three different, and mutually incompatible systems. (1) It works, not only with the University of Illinois PLATO system (which has always required its own plasma display terminals) but with any other CAI (computer assisted instruction) terminal that uses the standard ASCII (American Standard Code for Information Interchange) coding system; (2) It brings the versatility of the PLATO system's generated graphic displays (requiring a large computer) to other much smaller CAI systems; (3) It does not have to be connected to a major

computer, but has enough internal computing power to stand alone. A combination of two microprocessor units and two arithmetic process units, the products of high performance solid state technology, give the Advanced Terminal System the power of a minicomputer—a computer that can generate graphics in addition to using standard CAI courseware. This internal computer is powerful enough to characterize three dimensional structures and to perform other complex mathematical functions. One pre-production system has been delivered, with another on order. The later model will use a "fixed disc" which can store very much larger amounts of data.

Videodisc projects. Most, if not all, of the improvements in information technology have taken place by exploiting fortuitous advances in ancillary technologies—taking a device manufactured for one purpose and using it for another. Library microfilming, for example, came from the major business market for microfilming checks and industrial records. The 35mm film was first developed for cinematography. Another product for the entertainment industry, the *optical videodisc*, offers far-reaching potential. The videodisc was developed to provide "paper-back" versions of video programs for mass sales. Like the LP records they closely resemble, videodiscs can be turned out inexpensively in vast quantities once the expen-



Videodisc machine in the Lister Hill Center's Learning Resource Laboratory

sive master disc is made. Videodisc technology offers great potential for high density storage, rapid random access, full video bandwidth, long life expectancy, and low reproduction costs. The Library contracted for two prototype industrial versions (the industrial models offer random access to any track, as contrasted to the home entertainment models) of optical videodisc systems from MCA (formerly the Music Corporation of America). One player is being used to develop a low cost unit for the mass storage of digital data. The other is being used to explore the application of this technology to the storage, delivery and distribution of audiovisuals.

The digital data videodisc project has as its objectives the development of an intelligent minicomputer-based controller for industrial

videodisc players, and the encoding/decoding of digital information for storage and retrieval. Potential applications include the distributed delivery of large bibliographic data bases, and extension of the distributed information delivery systems to include text, randomly accessible color images, and audiovisual sequences for integration with computer-based educational systems.

The audiovisual videodisc project will extend the intelligent controller described above to develop a prototype system which will be used to demonstrate and evaluate cost effective mass storage of all forms of library audiovisuals, such as those referenced by AVLINE. This includes such techniques as variable speed playback, including speech compression, and high-resolution storage.

Chapter 7: Extramural Grants and Contracts

Ernest M. Allen, Sc.D., Associate Director
for Extramural Programs



Meeting of the Regional Medical Advisory Board for Region II (New York and New Jersey)

The Medical Library Assistance Act of 1965, as amended, authorizes the National Library of Medicine to conduct a program of grants and contracts to develop better and more accessible health information services. The most recent extension of the Act covers the period through 1981.

The NLM Office of Extramural Programs continued in 1978 to support activities related to a more effective biomedical information network, particularly through the Regional Medical Library Program. Resource Project Grants and Resource Improvement Grants that related to this purpose received high priority. Publication Grants and Special Scientific Projects awarded will facilitate the dissemination and sharing of information related to medicine and other health-related disciplines. Research Grants followed the traditional pattern of supporting projects expected to benefit biomedical communications; however, a formal review of the Research Grants Program initiated in 1977 was concluded in 1978 with several important recommendations for changes in the program.

The International Programs Division administers the Publication Grants Program authorized by the Medical Library Assistance Act as well as publications support under the Special Foreign Currency Funds, P.L. 480. The Division of Biomedical Information Support administers the other programs.

Regional Medical Library Program

The Regional Medical Library (RML) program is a keystone activity in that it facilitates the transfer of many NLM direct-service programs to the library and health-science communities, and that it seeks to coordinate and integrate the information services of the nation's health institutions. This national, cost-sharing activity serves as a model for information network design, and it is widely recognized for its effectiveness and efficiency.

First authorized in 1965 by the Medical Library Assistance Act, the RML program, through the efforts of the health science library community, has provided the impetus for development of a decentralized service network, which utilizes the established resources of participating institutions. Decentralized organization, as compared to a monolithic system, assures continued strengthening of local resources, a rapid response to requests for needed materials, and the ready availability of biomedical information to the nation's health workers.

There are eleven Regional Medical Libraries, including the National Library of Medicine. The NLM, which serves as the RML for the Mid-Atlantic Region, also acts as a national backup for the entire program. All RMLs maintain programs for the delivery of biomedical literature, and each provides an array of other services based on the characteristics and needs of its region.

The regional document-delivery program was implemented to supplement the interlibrary exchange which existed prior to the establishment of the RML network. Until recently, the cost-sharing aspects of this program were loosely defined and informally applied. During the last few years, however, it has become evident, because of increasing volume and costs, that a rational and explicit basis for determining fiscal responsibilities of the Federal and non-Federal sectors had to be established. In FY 1978, it was agreed with the RMLs that materials available locally are a local fiscal responsibility and that NLM would be responsible for materials not readily available locally.

The plans recognized that although the document-delivery service has always been a very important part of the RML program and will remain so, there are many other RML functions which require increased attention. Among these are the complex problem of equalizing access to audiovisual material, educational programs for library personnel who need to take better advantage of the RML network, and

increased cooperation with other library and information organizations and networks.

The Regional Medical Library Directors meet twice a year, and each RML also sponsors periodic meetings of its advisors to review and evaluate current activities and consider future directions. In an effort to promote a greater interchange among regions, it was decided in FY 1978 that one of the two annual meetings will, henceforth, be held at a Regional Medical Library.

RML obligations have averaged over three million dollars per year since FY 1976. Approximately 50 percent of these funds go for the document-delivery program, 25 percent for the administration of RML operations, and 25 percent for indirects costs and other RML activities.

Medical Library Resource Project Grants

The goal of this program is to improve access to health information by strengthening health sciences libraries and by fostering coordination and cooperation at state and local levels. Project Grants enable health institutions to improve their library facilities; to implement new programs or to augment existing ones; and to develop cooperative arrangements with other institutions. As a result of these grants, institutions should be able to function more effectively in the Regional Medical Library Network. During FY 1978, 16 new Resource Projects were initiated, totaling \$820,872.

Also during FY 1978, Resource Project Grant funds supported the development of statewide networks in Hawaii, Idaho, Maine, Nebraska, Oregon, and South Dakota. These statewide medical-library services complement the Regional Medical Library Network. Grant funds support, for up to three years, a coordinator and staff to encourage the establishment of library services in health-related institutions and to foster cooperation among existing libraries serv-

ing health personnel. The Project Grants fund the major start-up costs for these services, with the understanding that non-NLM funds will be obtained to continue them.



The audiovisual facility of the Philadelphia College of Pharmacy and Science received an NLM Resource Project Grant. Pictured are Diane Wolf, Sherry Montgomery, and Dr Daniel A. Hussar of the College.

In NLM's continuing effort to encourage cooperation among health science libraries, ten consortia received Project Grant funds in FY 1978 for establishing consortium services, developing audiovisual resources, and cooperative cataloging. As one example, a Project Grant was awarded to Mount Auburn Hospital in Cambridge, Massachusetts, to make professional health-sciences literature easily accessible to community-based health practitioners who lack hospital affiliation. Six public libraries are participating with the hospital library.

Medical Library Resource Improvement Grants

The purpose of the Medical Library Resource Improvement Grant Program is to assist the development of basic collections. Support is available to consortia and to single institutions that do not find it practicable to join a consor-

tium. At a January 1978 meeting of community hospital librarians at NLM, several recommendations were made to improve this program, and the modifications needed were approved by the NLM Board of Regents in May. These changes will: allow single institutions and consortia to compete for grants on an equal basis; eliminate the \$4,000 ceiling for consortium planning, organization, and implementation; and make the support available for purchase of books and journals the same for single institutions as for each consortium member.

In FY 1978 Resource Improvement grants were awarded to three consortia to enable their members to assess information needs and plan a cooperative acquisitions program, and six consortia received funds for their individual members to purchase materials. Three Resource Improvement grants were awarded to single institutions.

Biomedical Scientific Publication Grants

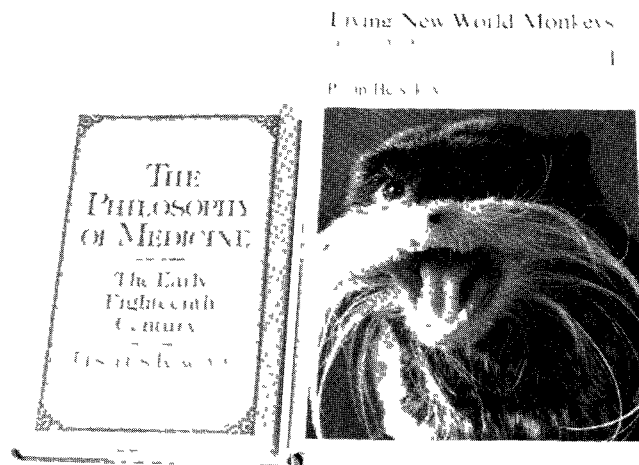
Grants for biomedical scientific publications facilitate the dissemination of information by supporting studies which are beneficial to U.S. scientists, educators, and health practitioners. The international publications program, authorized under Public Law 480 and utilizing

special U.S. - owned foreign currencies in Poland, Israel, Tunisia, Yugoslavia, India, Pakistan, and Egypt, is described in Chapter 8, International Activities.

The scope of the domestic Publication Grant Program includes the preparation and publication of critical reviews and monographs in health fields; publications in library and information science and in biomedical communication; pilot or temporary support for periodical publications; studies in the history of medicine; translations of current foreign biomedical monographs; publication of symposia proceedings; and secondary literature tools in the health sciences, such as atlases, catalogs, and bibliographies.

During FY 1978, 47 Publication Grants, totaling \$1,071,416 were funded. Of these, 27 were new awards, including a monograph on the social context of medical research, a directory of health science libraries, and a history of diabetes. Some priority is given to the award of small grants for projects which are underway and scheduled for early publication. This priority is reflected in the average amount of all Publication Grants awarded in FY 1978 — slightly over \$23,000.

The program encourages the support of projects which may contribute to the improvement



Two recent publications resulting from the NLM Publication Grant Program

of health care delivery in the U S — a primary concern of American medicine today Among the new Publication Grants activated in FY 1978 were a critical review on consensual validity in health care, pilot funds to develop a "Human Experimentation Committee Newsletter," and an analysis of public policy in relation to swine flu liability

Among the studies published in FY 1978 which had received earlier support under the Publication Grant Program was a review of the role of physicians today Stewart G Wolf and Beatrice B Berle, eds, *Limits of Medicine The Doctor's Job in the Coming Era* (New York Plenum Press, 1978) FY 1978 also saw the publication of a monograph by Philip Hershkovitz entitled, *Living New World Monkeys (Platyrrhini)*, Volume 1 (Chicago, Illinois The University of Chicago Press, 1977) This book, a monumental treatise on New World nonhuman primates in the suborder Platyrrhini, is addressed to systematists, primatologists, behaviorists, and investigators who use nonhuman primates as experimental animals in biomedical research The Library's continuing interest in the history of medicine is reflected in Dr Lester S King's *The Philosophy of Medicine, The Early Eighteenth Century* (Cambridge, Massachusetts Harvard University Press, 1978) Dr King's book is an analysis of medical theory of the eighteenth century, traced through the influence of doctrines of previous eras as far back as the fifth century B C (For a complete listing of books, periodicals, and journal articles received in FY 1978 resulting from NLM Publication Grants, see Appendix 2)

Special Scientific Projects

The Special Scientific Project Grant Program supports the preparation of authoritative treatises on major health topics The NLM Board of Regents and other advisors have recommended that the Library provide grant support for treatises which will help bridge intellectual domains in the health field, bring

together in a balanced way a growing and diffuse literature, and synthesize or organize the generally agreed-upon state of knowledge in a particular field The books that result from grant support should be cogent, perceptive analyses, written for the attention of a broad professional or multiprofessional audience

Preparing such treatises makes great demands upon scholarship, calls for the ability to organize material appropriately yet concisely, and requires the skill to write gracefully and persuasively Eminently qualified scientists or health practitioners who have these abilities are relatively few and they frequently have many conflicting demands upon their time Consequently, an objective of grant support is to help such persons prepare these treatises by enabling them to devote more time to the project than would otherwise be possible

Special Scientific Project Grants may be for one or more years Usually the period of grant support coincides with the completion of the manuscript and its delivery to a publisher At least one additional year is usually required for the publisher to complete the editing and the book production

During the last several years descriptive program materials have been developed and disseminated, and members of the scientific community have been helpful in publicizing the availability of the program and participating in the review process Consequently, there has been an increase in the number of recent applications for support The Board of Regents reviewed eight applications for Special Scientific Project Grants in FY 1978 and approved six

Four books, which had received grant support in previous years, appeared in print this year They are

- J Robert Andrews, M D, D Sc, *The Radiobiology of Human Cancer Radiotherapy*, Second Edition Baltimore, Maryland, University Park Press

- Roy Hertz, M D , Ph D , *Choriocarcinoma and Related Gestational Trophoblastic Tumors in Women* New York, N Y Raven Press
- Kelly M West, M D , *Epidemiology of Diabetes and Its Vascular Lesions* New York, N Y , Elsevier North-Holland
- Hyman J Zimmerman, M D , *Hepatotoxicity The Adverse Effects of Drugs and Other Chemicals on the Liver* New York, N Y , Appleton-Century-Crofts

mounting many of the obstacles which prevent the inexperienced user from directly accessing multiple data bases

At Beth Israel Hospital, in Boston, an online bibliographic retrieval system tailored to the needs of hospital library clientele will be developed and tested. The data base to be used will be a subset of MEDLINE that contains only citations available in the hospital library. The search procedures will be simplified so that they are virtually self-explanatory for an inexperienced user.

Research Grants

The recommendations of a task force to improve the quality of NLM-sponsored research projects and for setting future goals and directions of the Research Grants Program were presented to the NLM Board of Regents in May 1978. The Board requested that the Extramural Programs staff develop specific plans to implement the recommendations. Accordingly, new programs to support career development for research in the medical information sciences and in computer-based medicine are being proposed. The plans recognize that the phenomenal increase in knowledge about health and medicine requires vigorous research investigations into the principles and processes of the information sciences that are unique to or characteristic of the field of medicine and of health-care services. These plans will be considered by the Board of Regents at future meetings.

Several new research grants awarded in 1978 represent examples of the research that NLM wishes to promote. A research project at the Massachusetts Institute of Technology will demonstrate how simultaneous information searches of multiple online bibliographic data bases can be simplified so that the requester can personally perform the search. In essence, a special computer program will automatically translate commands and requests from a user into language required by a particular bibliographic retrieval system, thereby sur-

Another approach to information processing is the linguistic study being conducted at New York University. This project will extend certain computer techniques, which have been developed to process and format the language of medical records, to the medical literature as well. The use of computers in linguistic analysis of medical records and literature could greatly increase the data available for biomedical research and clinical decision-making. Applications of computer technology, such as the three examples cited, will result in major changes in the health-care system and create new systems for information handling.

Training Grants

The NLM's Training Grants Program in Health Science and Computer Technology was begun in 1972. One of the objectives of the program is to promote a more effective integration of computer technology into all phases of clinical medicine—teaching, practice, and research.

In FY 1978, \$1,360,383 was expended in support of this program. Approximately one half of the training funds covered direct trainee expenses (stipends, tuition, etc.) and the other half reimbursed the grantee institutions for some of the added expenses generated as a result of the training grant. These grants support training activities in 10 institutions throughout the United States: the University of California,

San Francisco; the University of Alabama; Duke University; the Ohio State University; the University of Minnesota; Case Western Reserve University; the University of Missouri-Columbia; Mt. Sinai School of Medicine; Georgia Institute of Technology; and the University of Illinois.

In FY 1978, 71 individuals received training in the 10 programs. Forty-one were predoctoral students and 30 were postdoctorals. Of the predoctoral, 16 were seeking a masters degree and 23 a doctoral degree. Of the postdoctoral trainees, 20 were physicians.

During 1978 a study was undertaken to determine the current career activities of those individuals who had previously received support from the Training Grants Program. The data

are being collected and will be analyzed and reported in the coming year. The results will determine whether the original objectives have been met and whether they are still valid or need modification.

In addition to the grants for training, a contract was awarded to the Council on Library Resources to sponsor and support management interns at selected major health science libraries. The objective of the joint NLM/CLR program is to assist in developing managers for the nation's academic health sciences libraries. Three management interns were selected in FY 1978 from among 34 applicants. They will each spend the 1978-79 academic year at a host library, working closely with the director and top administrative staff.

Table 15. Extramural Grant and Contract Programs
(in thousands)

| | July 1975- June 1976 | Transi- tional Quarter ¹ | FY 1977 | FY 1978 |
|---------------------------------|-------------------------|---|---------------|---------------|
| Research | (14)* \$1,147 | (3) \$ 206 | (15) \$1,165 | (13) \$1,111 |
| Resource Projects | (27) 663 | (2) 26 | (46) 1,696 | (39) 1,848 |
| Resource Improvement | (10) 26 | (4) 11 | (20) 77 | (13) 165 |
| Training** | (11) 1,056 | (2) 333 | (10) 1,207 | (11) 1,459 |
| Special Scientific Projects | (2) 59 | (1) 13 | (3) 109 | (7) 248 |
| Regional Medical Libraries** | (8) 2,721 | (2) 630 | (9) 3,086 | (9) 3,020 |
| Publications** | (40) 606 | (4) 62 | (42) 738 | (47) 1,071 |
| Other | | | (4) 276 | |
| Total | (112) \$6,278 | (18) \$1,281 | (149) \$8,354 | (139) \$8,922 |

¹July-Sept. 1976

* Figures in parentheses refer to number of projects
** Includes contract funding

Chapter 8: International Activities

Mary E. Corning, Assistant Director for
International Programs



The NLM is a national resource with international impact. Its international activities include: bilateral *quid-pro-quo* MEDLARS agreements; exchange of biomedical literature; collaboration with national and international organizations in their establishment of regional services; information services to the developing countries through an NLM/Agency for International Development (AID) agreement; special foreign currency program for the support of publications; participation in international organizations; providing technical consultation; and receiving non-U.S. colleagues for specialized training.

International MEDLARS Agreements

NLM has eleven international MEDLARS partners: Australia, Canada, France, Germany, Iran, Japan, Mexico, South Africa, Sweden, United Kingdom, and the Pan American Health Organization (PAHO). The Fifth Meeting of the International MEDLARS Policy Advisory Group was held October 27-28, 1977. Policy officials and Directors of the foreign MEDLARS Centers attended. This meeting provided an opportunity for joint review of policies, experiences, and future plans of NLM and the Centers.

At the meeting, Miss Corning reviewed the background of our international cooperation and discussed current issues. Issue papers were presented on Document Delivery by Sir Harry Hookway and Dr. Philip Holmes of the United Kingdom; Data Base Building by Dr. Henry Kiss-

man, NLM Associate Director for Specialized Information Services; and Networking by Dr. S. Abrahamsson and Dr. Goran Falkenberg of Stockholm, Sweden.

Of particular interest were the regional activities of the Pan American Health Organization's Regional Library of Medicine (BIREME) and the Pahlavi Library of Medicine in Iran which was designated in 1978 as the WHO Regional Library for the Eastern Mediterranean. One principal concern of the Policy Group was how to provide services to the developing countries now that WHO has terminated its MEDLINE activities. Most of the Centers are faced with limitations on personnel, and extensive free services to the developing countries could be undertaken only if sponsored and funded by the appropriate technical assistance or development agency within the providing countries.

The *quid-pro-quo* bilateral agreement which is the basis for international MEDLARS collaboration continues as an effective mechanism for cooperation. Together, these bilateral arrangements constitute essentially an international network in which the value of biomedical information is recognized as vital to the advancement of medical research, education, and the improvement of health. Table 16 summarizes the modes of access to the NLM data bases. Ten data bases — MEDLINE, TOXLINE, CHEMLINE, CATLINE, SERLINE, AVLINE, CANCERLIT, CANCERPROJ, CLINPROT, RTECS — are available to the foreign Centers, but not all Centers have chosen to search all data bases.

Table 16. International Access to MEDLARS

| Tapes | Tapes/Software | Online NLM |
|----------|-----------------|--------------|
| Germany* | Sweden* | France |
| Japan | United Kingdom* | Canada |
| | Australia* | Iran |
| | PAHO | Mexico |
| | | South Africa |

*Supplemental online access to NLM computer

International Exchanges and Services

The NLM continues its international publications exchange program with 810 institutions in 87 countries where an equitable exchange balance can be achieved. This program is in addition to NLM's regular acquisitions program and often provides both NLM and the participating country with material not easily obtained otherwise.

In FY 1978 the Assistant Director for International Programs was invited to visit Cuba by the Minister of Public Health to observe Cuba's health information activities. As a result of this visit, a cooperative program was established in the exchange of publications between the National Information Center for Medical Sciences of the Ministry of Health in Cuba and NLM. The Library also accepted for special training Pompeya Garcia, Director of the National Medical Library of Cuba and Daisy del Valle, Director, Department of Information Development of the National Information Center for Medical Science.



Mary E. Corning (center) and visitors from Cuba Daisy del Valle (left) and Pompeya Garcia

The NLM provides interlibrary loans of published and audiovisual materials internationally for a fee. Exceptions have been made for countries with which the United States

Agency for International Development has a health program. Under an agreement between AID and NLM, the Library has provided during the past year approximately 22,000 interlibrary loans, 12 reference replies, 497 MEDLINE searches, 52 subscriptions to *Index Medicus* and 48 subscriptions to *Abridged Index Medicus*. Approximately 25 percent of these were for technical support of PAHO's Regional Library of Medicine in Sao Paulo, Brazil; 36 percent to Turkey; 10 percent to India; 9 percent to Indonesia; and 7 percent to Korea. This agreement terminates at the end of FY 1978. Future international interlibrary loan of documents and loan of audiovisual material will be on a fee for services basis only.

Special Foreign Currency Program

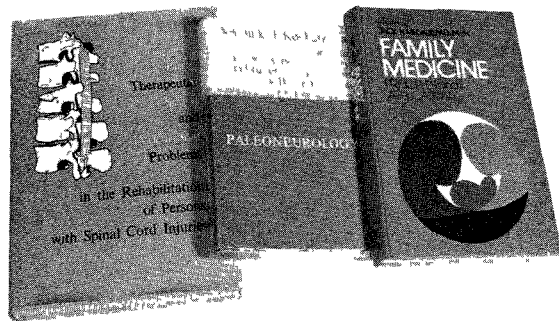
The Library's Special Foreign Currency Program, authorized by Public Law 83-480, made 20 new awards in FY 1978 for a total of 88 active projects for \$1,680,423 (equivalent). Under the NLM P.L. 480 program, appropriations of U.S.-owned, local foreign currencies are utilized for scientific writing projects in cooperating countries, including Poland, Tunisia, India, Pakistan, Egypt, and Yugoslavia. The collaborative NLM program is also continued in Israel through a bloc award from the U.S.-Israel Binational Science Foundation.

Included among the projects in the seven cooperating countries are the preparation of critical reviews and monographs analyzing biomedical research and practice; translations of foreign monographs in the health sciences; studies in the history of medicine; the publication of major international symposia and conference proceedings; and the preparation and publication of authoritative bibliographies, guides, and other literature tools in the biomedical sciences. The program makes it possible for the Library to procure and disseminate published information which is important to the progress of the biomedical sciences and

the public health, using foreign scientific personnel and resources.

Critical reviews and biomedical monographs continue to be the most frequent type of project undertaken in the program, constituting 66 percent of the funding. Fifty-five percent of all projects active in FY 1978 were undertaken in two countries — Poland and Israel. During FY 1978 Dr. Saul Jarcho, Consultant to the NLM Board of Regents, accompanied by Dr. Jeanne Brand, Chief of NLM's International Programs Division, carried out a program review of the Library's publication activities in Egypt. Among other projects currently being developed in that country is a series of studies in the history of Arabic medicine.

Examples of new projects activated in FY 1978 include a critical review on surgery of the spleen; a translation of a Russian study of emotional stress and arterial hypertension, and a catalogue of manuscripts on medicine and pharmacy in the National Library of Cairo and the Municipal Library of Alexandria, Egypt.



Recent publications resulting from the NLM Special Foreign Currency Program (P.L. 480)

Among the books published in FY 1978 under this program was *Early Therapeutic, Social and Vocational Problems in the Rehabilitation of Persons with Spinal Cord Injuries* (New York: Plenum Press, 1977),

edited by Professor Marian Weiss, Director of the internationally recognized Rehabilitation Clinic at Konstancin, Poland. Another significant study, funded in the NLM program in Israel, reviews current development in family medical practice — Jack H. Medalie, ed., *Family Medicine — Principles and Applications* (Baltimore: The Williams and Wilkins Co., 1978). (For a complete listing of books and journal articles resulting from the NLM P.L. 480 program received in FY 1978, see Appendix 3).

Regional Resources and Biomedical Information

The PAHO Regional Library of Medicine (BIREME) continues as a model activity in serving as a regional biomedical and health information resource. Its extensive activities include exchange of materials, reference services, interlibrary loans, computer-based information services from the MEDLARS data base, and developing a library network.

About 16 percent of BIREME's annual budget is provided by PAHO's regular budget, 7 percent from WHO, and 77 percent from external sources including federal, state, and local governments of Brazil and from philanthropic agencies. The staff of the Library has increased from 23 in 1969 to 71 in 1978. The most significant aspect of this increase is the addition of physicians and especially trained professional personnel. Since 1969, BIREME has performed 288,000 loan services; prepared 8,255 special bibliographies; obtained and donated 309,000 journal issues to other Latin American libraries to strengthen their collections; and has provided specialized training to 324 Latin librarians.

Dr. Cummings, Director of NLM and Chairman of the Scientific Advisory Committee for BIREME, attended the Tenth Meeting of the Committee in Sao Paulo, Brazil. The Committee reviewed both policy considerations and the operational status of BIREME.

The Pahlavi Library of Medicine, established in Tehran, Iran, in 1975, has recruited and trained additional staff. It has also initiated an audiovisual program to assist the health community and has increased its specialized staff. In January 1978 the World Health Organization (WHO) designated the Pahlavi Library of Medicine as a WHO Regional Center for providing biomedical information services to the WHO Eastern Mediterranean region.

Cooperation is being initiated between the World Health Organization's Advisory Committee on Medical Research and the National Library of Medicine. The National Library of Medicine will produce a specialized recurring bibliography in those tropical diseases selected by WHO for primary emphasis. The Pahlavi Library of Medicine will print it and the WHO will distribute approximately 10,000 copies. This model activity, when tested, may serve as a basis for developing further specialized information services and products significant for developing countries.

Visitors and Specialized Training

NLM receives about 1,000 international visitors annually. During FY 1978 these individuals represented 49 countries and many interests such as medical research and education, health care, information and library science, administration and development of biomedical and health information programs, and construction of new library buildings.

Formal delegations from Japan included representatives of the Ministry of Health and Welfare, the Diet Library, and computer and information organizations. Groups of Librarians came from Brazil, Spain, Germany and Colombia. Delegations from Italy were from the Ministry of Health and the National Federation of Medicine which included the Chief of the Cabinet of the Ministry of Health, members of the Italian Parliament, and physicians. Australian visitors have included Senator David-

son; Mr. K. W. Edmondson, Secretary of the National Health and Medical Research Council; Mr. J. G. Burt, the Assistant Director General, Department of Health; Dr. G.N. Lance, the Chief Research Scientist, Commonwealth Scientific and Industrial Research Organization; and, from the National Library of Australia, Mr. Bryan Yates, the Deputy Director, Mr. A. Ellis, the Assistant Director General for Networks and Coordination, and Mr. T. Barley, the Chief of Computer systems. NLM also assists other agencies in receiving and preparing programs for information specialists from other countries.

In connection with NLM's bilateral MEDLARS agreements, NLM has received a number of individuals for specialized programs. They include: George Milligan of the Institute for Medical Literature, South African Medical Research Council, for training in indexing medical literature and searching the various NLM data bases; Fahimeh Shafaie of the Pahlavi Library of Medicine in Iran for training in audiovisuals; Dr. Cesar Macias of the National Center for Information and Documentation in Health of the Ministry of Health, Mexico, for advanced training as a search analyst; and Caterina Vollono of the Istituto Superiore di Sanita in Rome, Italy, for training in searching the various NLM data bases.

The NLM does not have nor does it fund a formal program for trainees from abroad. It does, however, try to respond to special requests from other governments or institutions where a person's experience qualifies him for specialized training which can be applied upon his return home. Some of those in such programs were: Pompeya Garcia, Director of the National Medical Library in Cuba; Daisy del Valle, Director of the Department of Information Development of the National Information Center for Medical Sciences, Ministry of Public Health, Cuba; Dr. med. Oystein Wendelbo, Deputy Librarian, University Library of Bergen, Norway; and Dr. Reinhard Bradler from the German State Library, Berlin, East Germany.

In June, Miss Corning served as a consultant to the Subcommittee on Health Manpower and Medical Education of the U.S.-Egyptian Working Group on Health during the latter's meetings in Egypt. She discussed with Egyptian officials their interests, needs, and desires in biomedical and health information. The Assistant Director also reviewed, with the World

Health Organization Regional Office in Alexandria, the Egyptian medical library scene, WHO's designation of the Pahlavi Library of Medicine in Iran as a WHO Regional Library, WHO's plans for developing a medical library network in the region, and WHO's planned health information system.

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Appendix 4: NMAC Audiovisual Materials Produced

Motion Pictures

Medical Emergencies in the Dental Office
Staging the Advanced Cardiac Life Support Providers' Course
Effective Teaching

Videotapes

Distinguished Leaders in Nursing series
Mabel Keaton Staupers
Lucile P. Leone
Functional Anatomy of the Hypothalamus
Acromegaly, Concepts in Diagnosis and Treatment
Build Your Own Copy Stand (for less than \$100.00)
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Diagnosis and Treatment Planning in Endodontics
Part 1: Clinical Pulp Testing
Oral Surgery Clinic Routine
Part 1: Sterilizing Oral Surgery Instruments
Part 2: Patient Positioning and Preparation of the Instrument Tray for Clinical Oral Surgery
Part 3: Hand Scrub and Basic Protocol for Clinical Oral Surgery
Part 4: Establishing an Uninterrupted Intra-Oral Field
Cavitron Ultrasonic Dental Unit Series
Part 2: Techniques of Operation
Clinical Procedures for Dental Assistants
Part 1: The Anesthetic Syringe
Root Canal Therapy on an Extracted Lower Molar
Part 1: Access and Length Determination
Part 2: Instrumentation
Part 3: Obturation
Sharpening Periodontal Instruments
Periodontal Packs
Standard Clinical Oral Surgery Instrument Pack
Patient-Operator Positioning in Dental Hygiene
The Reshaping, Characterization and Glazing of Anterior Ceramo-Metal Restorations
Dam Kids: Techniques of Rubber Dam Use With Children
Measurement of Blood Pressure in Dental Practice
Removal of Animal Brains for Rabies Testing
Health Hazard Appraisal
Handling the Tools of Your Trade
Symposium — Exercise 1
Symposium — Exercise 2
Designing Medical Organizations (Underlying Concepts)
Designing Medical Organizations (To Matrix or Not)
Type-B Viral Hepatitis

Slide/Tapes

Gross Anatomy Series

- Male External Genitalia
- Female Pelvic Viscera
- Peritoneum and Endopelvic Fascia of the Female Pelvis
- The Perineum Part I
- The Perineum. Part II
- Female External Genitalia
- The Thoracic Wall Part I
- The Thoracic Wall Part II
- The Thoracic Wall Part III
- The Thoracic Wall Part IV
- The Breast

Human Physiology Series

- Renal Function I
- Renal Function II
- The Physiology of Cell Membranes and Biological Transport
- The Regulation and Control of Peripheral Circulation
- The Anatomy and Physiology of the Arterial System
- Acid-Base Balance: General Principles
- Mechanisms of Hemostasis and Fibrinolysis

Early Diagnosis of Pregnancy

- Spontaneous Abortion
- The Menstrual History
- Ectopic Pregnancy
- The Complete Gynecologic History
- The Obstetrical History

Evaluation of a Child with a Heart Murmur Series

- Evaluation of the Murmur
- The Basis of the Pediatric Cardiovascular Examination
- Differential Diagnosis

Evaluation of Cyanosis in the Newborn

- Planning for Pediatric Screening

Fundamentals of Malaria

Health Science Consortium Dental Units

Normal Periodontium

- Part 1 Gingiva
- Part 2 Periodontal Ligament, Cementum and Alveolar Bone

Diagnosis and Treatment Planning in Endodontics

- Part 2 Pulp Pathosis
- Part 3 Periapical Pathosis

Cavitron Ultrasonic Dental Unit Series

- Part 1 Introduction

- Signs and Symptoms of Gingivitis
- Signs and Symptoms of Periodontitis
- Laterally Positioned Flap
- Gingivectomy/Gingivoplasty

Print

Fundamentals of Malaria

The Female Reproductive System

Filmstrips

Captura Y Preparacion De Animales De Laboratorio

El Diagnostico De La Tuberculosis

Manifacion De Animales De Laboratorio

La Participacion De La Comunidad

Saniamento En El Matadero

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