

**THE  
NATIONAL  
LIBRARY  
OF  
MEDICINE**

**PROGRAMS and SERVICES  
FISCAL YEAR 1972**



# NATIONAL LIBRARY OF MEDICINE

## THE EARLY YEARS

In 1836 the U.S. Army's first surgeon general included an item in his estimate of official expenditures for the following year that read: "Medical Books for Office, \$150." Viewed retrospectively, this commitment by Dr. Joseph Lovell of nearly seven per cent of his annual office budget for this purpose may have been the most significant decision of his professional career.

For it is from that year and the bulging bookshelves in Lovell's two-room office in a long-forgotten building in Washington City that the National Library of Medicine officially traces its historic origins. No medical prophet could have foreseen the inevitable course that followed until now, nearly a century and a half later, this great library holds the most prestigious and important collection of health sciences literature ever assembled.

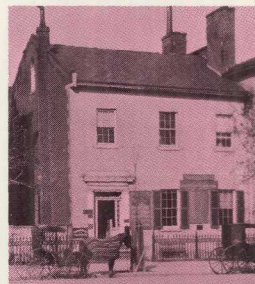


Dr. Joseph Lovell

A Bostonian and Harvard graduate, Lovell had served as an Army medical officer for only six years when in 1818 at the age of 29 he was appointed surgeon general, a new staff position in Washington established in a Congressional reorganization of the Army. He initiated the policy of providing his officers in the field, as well as those assigned to hospitals, with medical textbooks and professional journals. Copies were also retained in his office for the use of his small staff.

By 1840 Lovell's successor, Dr. Thomas Lawson, listed "some 130 titles and about 200 volumes" in a handwritten report by a member of his staff that is now a precious archive, "A Catalogue of Books in the Library of the Surgeon General's Office." Lovell's

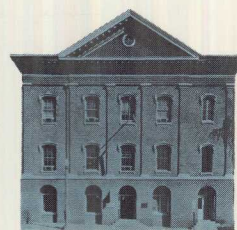
random collection of books was officially a library. Actually it became a mobile library that accompanied the surgeon general's office around early Washington in its frequent moves to borrowed or rented quarters, sometimes in private dwellings.



Riggs Bank Building

During Lawson's 25-year tenure as surgeon general—the longest on record—an increasing number of expenditures for medical books, journal subscriptions, bindings, and bookcases began to appear in his office records. When the first printed catalog of the Library's holdings appeared in 1864 it listed 1,365 volumes under nine classes of literature, and included the date and place of publication of each title. By this time the surgeon general's office was in a brick building, formerly a residence, adjacent to the Riggs Bank on the northwest corner of Fifteenth Street and Pennsylvania Avenue, N.W. The Library occupied the front parlor of the house.

After the assassination of President Lincoln in Ford's Theater on April 14, 1865, the government bought the ill-fated three-story building and assigned it to the War Department as

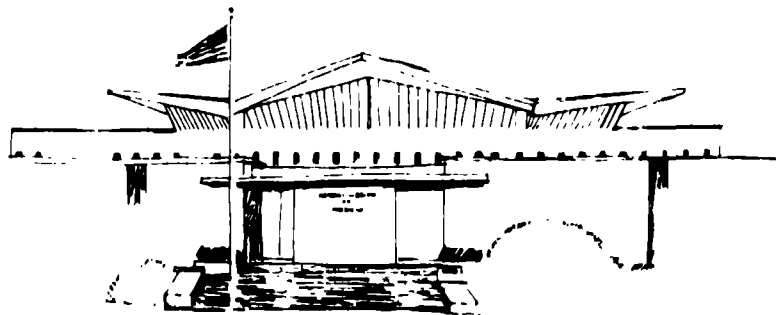


Ford's Theater

an annex of the surgeon general's office. The structure that was to become a Lincoln shrine was refurbished to provide quarters and facilities for a new medical museum, a chemical laboratory, mortuary records, and the books and periodicals of the surgeon general's library, now numbering more than 2,000 volumes. The library had found its first "permanent" home and would not move again for 20 years.

# **THE NATIONAL LIBRARY OF MEDICINE**

**PROGRAMS AND SERVICES  
FISCAL YEAR 1972**



**U.S. Department of Health, Education, and Welfare  
Public Health Service  
National Institutes of Health**

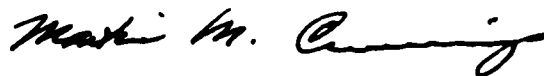
**DHEW Publication No. (NIH) 73-256**

# Foreword

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This edition of the annual report of the National Library of Medicine highlights our activities for fiscal year 1972 in a new format. Previously the publication consisted of separate sections devoted to the accomplishments of each of the principal organizational units, usually the area of responsibility of an associate director. This procedure has served the Library well in the past. But now our expanding programs and services have become more complex and far-reaching, cutting across traditional organizational boundaries and requiring interdisciplinary skills and talents. Our new MEDLINE system is an example of such diverse staff involvement. So, in reviewing the year, we have attempted a departure from a functionally presented report to one that is more mission-oriented. We hope you will agree that it tells our story more coherently and effectively.

We believe that this has been a year of continuing progress. Surely it was one that the most astute of our early founders, who are recalled in the cover notes, scarcely could have foreseen in the Library's future. A great share of my gratitude goes to our Board of Regents for their judicious and decisive actions. I also thank the loyal and industrious members of the Library staff for their dedication and support. Medical libraries exist to serve the health of our people and we exist to assist medical librarians in this effort. We will strive to continue to serve faithfully all members of the health professions who, in the words of Dr. John Shaw Billings, "remain close, heart and hands, to the problems of disease."



Martin M. Cummings, M.D.  
*Director*

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**MARTIN M. CUMMINGS, M.D.**  
Director, National Library of Medicine

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# POLICY AND DIRECTION

The 136th year of the National Library of Medicine was significant for three notable but quite diverse occurrences, each of which will affect in various ways this institution's future programs and services. They are the release by the President of long-awaited appropriated funds for design and planning of an impressive 15-story communications annex; the introduction and wide acceptance of the nationwide MEDLINE network for rapid literature searching; and continued litigation between a commercial publisher and the Government on the use of photocopies of copyrighted medical publications.

The ten Presidentially-appointed members of the Board of Regents and seven high government officials serving as *ex officio* members also faced policy decisions of increasing gravity as the Library's role in national and international medical communication activities continued to expand. At the second of the Board's three meetings in November 1971, Dr. William G. Anlyan, chairman and vice president for health affairs of Duke University, welcomed four new members: Dr. J. Stanley Marshall, president of Florida State University, to fill the unexpired term until August 1974 of Dr. James C. Fletcher, who had resigned earlier to head the National Aeronautics and Space Administration; Dr. Susan N. Crawford of Chicago, director of the Archive-Library Department of the American Medical Association; Bernice M. Hetzner of Omaha, professor of library science, University of Nebraska College of Medicine; and Dr. Angelo M. May, San Francisco physician, who will serve until August 1975.

Regents whose terms expire in August 1972 include: Dr. Max Michael, Jr., of Jacksonville; Dr. George W. Teuscher of Chicago; and Dr. Anlyan, who will be succeeded as chairman by Dr. Jack M. Layton of Tucson. Dr. Layton, chairman of the department of pathology of the University of Arizona College of Medicine in Tucson, is also acting dean and director of the University's medical center during the absence of Dr. Merlin K.

DuVal, who is serving as HEW assistant secretary for health and scientific affairs. Now president-elect of the American Society of Clinical Pathologists, Dr. Layton will be inducted as president during the society's annual meeting in San Francisco in October 1972. He was elected chairman of the Board by unanimous vote.

## Board of Regents Decisions

During fiscal year 1972 the Board of Regents reviewed numerous recommendations of its various committees, and made these major policy decisions:

- Approved recommendations to initiate implementation of a detailed report\* of the Association of American Medical Colleges to expand the development of a national biomedical communications network which eventually may result in rendering "obsolete the current systems of libraries, textbooks, medical school curricula, and total dependence on memory and pattern recognition in clinical decision-making and problem-solving."

- Instituted revised guidelines governing the purpose and use of resource grant funds approved by the Library's Extramural Programs.

- Redirected programs supporting training for careers in biomedical communication toward postgraduate training and doctorates in biomedical communication rather than to master's degrees in medical library science.

- Amended the guidelines for review and approval of applications for extramural support of publications.

- Appointed Drs. Fred L. Soper and Harry F. Dowling the first National Library of Medicine Scholars in Residence (visiting scholars) under a program previously established.

\*Educational Technology for Medicine: Roles for the Lister Hill Center. Edited by Eugene A. Snead, Jr., Cheves McC. Smythe, C. G. Gunn, and Mary H. Littlemeyer. *J. Med. Educ.*: 46, No. 7, July 1971, part 2.



**Table 1. Financial Resources and Allocations  
Fiscal Year 1972**

|  |                     |
|--|---------------------|
| Amounts Available for Obligation                                   |                     |
| Appropriation, NLM -----   | \$24,086,000        |
| Unobligated balance brought forward, start of year -----           | 45,550              |
| Unobligated balance brought forward, end of year (1972/1973) ----- | -54,808             |
| Pay cost supplements -----   | 41,000              |
| Earned reimbursements -----  | 1,033,666           |
| <b>Total -----</b>   | <b>\$25,151,408</b> |

|  |                     |
|--|---------------------|
| Amounts Obligated by Extramural Programs |                     |
| Training grants -----                    | 1,233,000           |
| Special scientific project grants -----  | 100,000             |
| Research grants -----                    | 640,000             |
| Library resources grants -----           | 2,508,000           |
| Regional medical library grants -----    | 2,093,000           |
| Publications support grants -----        | 311,000             |
| <b>Subtotal, grants -----</b>            | <b>\$ 6,885,000</b> |

|  |                     |
|--|---------------------|
| Amounts for Direct Operations                                |                     |
| Lister Hill National Center for Biomedical Communications -- | 1,883,000           |
| National Medical Audiovisual Center -----                    | 3,235,666           |
| Office of Computer and Engineering Services -----            | 3,066,000           |
| Library Operations -----                                     | 4,900,000           |
| Toxicology Information Program -----                         | 1,315,000           |
| Review and Approval -----                                    | 760,000             |
| Program Direction -----                                      | 2,848,000           |
| <b>Subtotal, direct operations -----</b>                     | <b>\$18,007,666</b> |
| <b>Total, National Library of Medicine -----</b>             | <b>\$24,892,666</b> |



3. Members of the Board of Regents pose at meeting in Atlanta, from left, front row: Dr. Faye G. Abdallah, Capt. Edward J. Rupnik, USN, Dr. James Pittman, Dr. Harve J. Carlson, Mrs. Bernice M. Hetzner, Dr. William G. Anlyan, and Dr. Susan N. Crawford. Rear row: Brig. Gen. Gerrit L. Hekhuis, USAF, Dr. G. Burroughs Mider, Lt. Gen. Hal B. Jennings, Jr., USA, Dr. Martin M. Cummings, Dr. J. Stanley Marshall, Dr. Angelo M. May, Dr. John P. McGovern, Dr. William O. Baker, Dr. Jack M. Layton, Dr. George W. Teuscher and Dr. Max Michael, Jr.

## Federal Appropriations

On January 24, 1972 the President submitted to Congress the administration's fiscal 1973 budget. The amount requested for the National Institutes of Health totalled \$2.18 billion, an increase of \$7 million. Within the proposed NIH budget, the Library's request is for \$28 million, which is about \$4 million above the fiscal 1972 appropriation (Table 1).

If appropriated, the increase in funds will be used primarily for additional support of Regional Medical Libraries and medical library training programs, and for biomedical communications activities of the Lister Hill Center. Emphasis also will be given to a cooperative NASA-NLM project to test two-way TV satellite communications for health care and medical education via the Application Technology Satellite, which is to be launched in 1973.

The Library's Extramural Programs would receive \$1.6 million of the total NLM increase, and the Lister Hill Center \$1.2 million. Additional amounts would appear in the budgets of other components of the Library.

Established by law in 1968 as a component of the National Library of Medicine, the Lister Hill National Center for Biomedical Communications will occupy a structure to be built adjacent to the Library. The Office of Management and Budget during the fiscal year apportioned planning funds, appropriated in 1970, in the amount of \$765,000 to the General Services Administration to contract for the architectural and engineering design of this new building.

In addition to the staff and facilities for the Lister Hill Center, this annex to the Library will also house the National Medical Audiovisual Center, now in Atlanta, and the operations of the Extramural Programs and Specialized Information Services.

## Copyright Suit

On February 16, 1972, in the suit *Williams & Wilkins v. United States*, a commissioner of the United States Court of Claims filed a report recommending that plaintiff pub-



Flanking recently unveiled bust of President Kennedy, Dr. Jack M. Layton, left, chairman-elect of Board of Regents, accepts gavel from Dr. William G. Anlyan, retiring chairman.

lisher "is entitled to recover reasonable and entire compensation for infringement of copyright" involving medical journals published by it. The agencies specified in the complaint, which was filed in February 1968, are the National Library of Medicine and the staff library of the National Institutes of Health.

The commissioner's report states that the National Library of Medicine infringed the publisher's copyright by providing inter-library loans of single photocopies of journal articles to medical libraries for the use of physicians, and of scientists and students in the biomedical fields, and that NIH infringed the plaintiff's copyright by supplying photocopies of medical journal articles to its staff. This photocopying, the report states, diminishes the publisher's potential market, and the plaintiff is, therefore, entitled to compensation.

The commissioner's report was promptly excepted to by the United States. The Government's brief, expressing in detail its objections to this report, was filed on August 2, 1972. The American Library Association, the National Education Association, and the Association of Research Libraries jointly with the American Medical Association, the Medical Library Association, and other national societies filed "friend of the court" briefs in support of the Government's posi-

tion. A decision by the full seven-judge Court of Claims, which may be appealed to the Supreme Court, is not expected until 1973. Meanwhile, the National Library of Medicine, on the advice of the Department of Justice, is continuing its thirty-year policy of providing photocopied material in interlibrary loans.

The commissioner's report received wide attention in the medical and library presses. The *Journal of Medical Education* revised its masthead in the May issue to read: "Copyright by the Association of American Medical Colleges. All material subject to this copyright may be photocopied for the non-commercial purpose of scientific or educational advancement." At the same time, AAMC president Dr. John A. D. Cooper, in a letter to Williams & Wilkins' president, stated that "this Association vigorously opposes any action which would tax or otherwise inhibit the free distribution of necessary information to scientific investigation."

In an editorial upholding the right of scientific and scholarly communities to gain access to the intellectual resources of this country, in its June 5 issue, the *Journal of the American Medical Association* reminded its readers that "the Association reiterates its position that the scientific community may continue to reproduce single articles from the AMA publications."

Dr. Franz J. Ingelfinger, editor of the *New England Journal of Medicine*, told his readers that *NEJM* "joins in this protest against a move that threatens a communication mechanism evolving in response to today's and tomorrow's needs. The *Journal* reaffirms its policy with respect to photocopying: libraries and other nonprofit institutions may photocopy *Journal* articles at will."

The director of one of the nation's most prestigious university medical libraries probably spoke for most medical librarians when he wrote in the institution's newsletter, "... a final ruling against 'fair use' (policy of single photocopying) would have catastrophic effect upon the use of scholarly libraries and, in turn, upon the use of the literature in health care institutions and by their staffs."

Most librarians and medical educators

favor a section of the commissioner's report which states that the copyright issue should be resolved through the legislative process rather than through the courts. Library associations reportedly are urging their members to await a decision by the Court of Claims and to shun publishers' offers of granting licenses for photocopying privileges in return for payment of increased subscription rates for their journals—a practice that, if adopted by all publishers, might increase acquisition costs of academic and public libraries, it has been estimated, by several million dollars a year.

### Staffing Activities

The major staff change in the Library for this fiscal year was the retirement on June 30 of G. Burroughs Mider, M.D., a distinguished pathologist and administrator who has served as deputy director since 1968.



At retirement reception, Dr. G. Burroughs Mider, left, shares a laugh with NIH Director Robert Q. Marston.

Prior to his assignment to the Library, he had served in senior staff positions in the National Institutes of Health for 24 years, most recently as director of laboratories and clinics. Dr. Mider, who accepted a position in Bethesda, Maryland as executive officer jointly for the Universities Associated for Research and Education in Pathology and the American Society for Experimental Pathology, will be succeeded in the fall of 1972 by Melvin S. Day, head of the National Science Foundation's Office of Science Information Service. Previously, Mr. Day

served ten years in technical information posts at the National Aeronautics and Space Administration, rising to deputy assistant administrator.



Melvin S. Day is new deputy director of National Library of Medicine.

Early in the year Ralph A. Simmons, associate director for Computer and Engineering Services, was succeeded by Davis B. McCarn, formerly deputy director of the Lister Hill Center. Mr. Simmons is now staff assistant for international computer technology at the National Bureau of Standards' Center for Computer Sciences and Technology. In June George E. Mitchell, D.M.D., chief of audiovisual development of the NIH Bureau of Health Manpower Education, was appointed deputy director of the National Medical Audiovisual Center. During the same month Morton J. Oppenheimer, M.D., previously chairman of the department of physiology at Temple University School of Medicine, joined the Center's staff as chief of the educational research and training branch.

Formerly director of libraries of the Bowman Gray School of Medicine of Wake Forest University, Erika B. Love was named deputy associate director for Library Operations.

Robert B. Mehnert, former NLM staff member, and more recently an information officer in the National Institute of Mental Health, returned as chief of the Office of Public Information and Publications Management. Robert H. Cross transferred from NIH to the position of NLM personnel officer.

Promotions among key staff members during the year included the appointment of Albert M. Berkowitz to chief of the References Services Division and Edith D. Blair to head of the reference section of the division. Fred Buschmeyer, Jr., formerly of the National Medical Audiovisual Center, was named special assistant for audiovisual communications on the retirement of Dr. Malcolm S. Ferguson after 30 years of government service. Dr. Roger W. Dahlen transferred from the National Heart and Lung Institute to join the staff as chief of the Research, Training and Publications Division for Extramural Programs, and Nina Woo Matheson, formerly librarian and faculty member of the University of Missouri Institute of Psychiatry in St. Louis, was appointed a project officer. Dr. Galina Zarechnak was reassigned from the Technical Services Division to the International Programs Division.

The Library's full-time staff of 465 has not increased significantly in the past three fiscal years (Table 2). Of this total, 331 persons are assigned to the Library on the NIH campus, 104 are in the National Medical Audiovisual Center in Atlanta, and 30 in Extramural Programs are located in a government office building in Bethesda, Maryland.

Two associate directors of the Library, Dr. Joseph Leiter and Davis B. McCarn, received the HEW Superior Service Honor Award from NIH Director Robert Q. Marston at the ceremonies in the Clinical Center's Jack Masur Auditorium.

Thelma G. Charen was chosen the third recipient of the Regents' Award for Scholarship or Technical Achievement "for conceiving, developing and implementing the Medlars indexing manual and training program." Mrs. Charen is a technical information spe-

cialist in the indexing section of the Bibliographic Services Division.

Dr. John B. Blake, chief of the History of Medicine Division, was installed as president of the American Association for the History of Medicine at the society's 45th annual meeting in Montreal in May.

The director of the Library, Dr. Martin M. Cummings, received the honorary degree of doctor of medicine from the Karolinska Institute following his presentation of the honors convocation address in Stockholm.

### Visitors to the Library

The National Library of Medicine attracts scholars, scientists, public health officials and students in increasing numbers from all parts of the United States and from scores of foreign countries. Hundreds of interested travelers visit the Library each year seeking guided tours and information about their special areas of interest. These visitors, of course, are in addition to the thousands of patrons of the Library who spend days, and even weeks, in continuous study and research.

The past fiscal year was no exception in bringing to the Library a variety of interesting and interested visitors. In scanning the records of tours, the names of an endocrinologist from Lisbon, a Moscow professor of pediatrics, a University of Zambia medical librarian, Egypt's minister of health planning, an official of the Japanese ministry of edu-

cation, a reference librarian from Tel Aviv, a Finnish computer specialist, a Bucharest physician, the Netherlands minister of health, and an ophthalmologist from India appear, along with many others.

Groups of visitors have ranged from 30 Japanese pharmacists to the wives of White House Fellows, and from students from Gallaudet College for the Deaf to a jurisprudence class of Air Force legal officers and the regional laboratory librarians of the Environmental Protection Agency. The majority of larger groups visiting the library, however, are students from U.S. schools of medicine, dentistry, pharmacy, nursing, and library science.

In addition to an orientation tour of the main reading room, catalog, and reference areas, visitors are given an opportunity to see the Library's computerized Medlars system in action, witness a demonstration of the new MEDLINE rapid retrieval of literature citations, and observe the entire process of the Library's unique photocopying service.

### Educational and Historical Exhibits

The entrance foyer of the building provides a natural setting for the Library's continuing exhibit series depicting educational and historical subjects of medical significance. Each exhibit is based on displays of related literature from the Library's vast collections. The year 1971 marking the Li-

Table 2. Assignment of Personnel on Duty (June 30)

|   | FY 1970 | FY 1971 | FY 1972 |
|---|---------|---------|---------|
| Office of the Director                                    | 11      | 13      | 13      |
| Office of Public Information and Publications Management  | 5       | 5       | 5       |
| Office of Administrative Management                       | 30      | 33      | 37      |
| Office of Computer and Engineering Services               | 53      | 54      | 54      |
| Extramural Programs                                       | 31      | 34      | 30      |
| Lister Hill National Center for Biomedical Communications | 10      | 14      | 15      |
| Specialized Information Services                          | 17      | 16      | 16      |
| National Medical Audiovisual Center                       | 109     | 99      | 104     |
| Library Operations  | 195     | 194     | 191     |
| Total full-time permanent positions occupied              | 461     | 462     | 465     |

brary's 135th anniversary was observed by an historical exhibit depicting its transition from modest beginnings to the present computerized programs.



Mrs. Paula Scherer-Goossens, left, visiting documents systems analyst from Brussels, is shown points of interest in Library by Ruth E. Armstrong, NLM tour director.

Another exhibit, "Pathology: The Science of Disease," featured selections from a remarkable collection of portrait photographs of distinguished American pathologists, made by Dr. William H. Feldman of the Mayo Clinic emeritus staff as an outgrowth of a boyhood camera hobby that had led him to improvise equipment and make some of his own early photomicrographs. Dr. and Mrs. Feldman were present for ceremonies opening the exhibit.

The third exhibit of the year paid tribute to Dr. Abraham Jacobi, the founder of American pediatrics, and to other physicians concerned with the health of children in a era prior to the acceptance of pasteurization of milk, preschool medical examinations, and proper care for the blind, deaf, and mentally



Col. James L. Hansen, USA, right, deputy director of the Armed Forces Institute of Pathology, greets Dr. William Hugh Feldman, of the emeritus staff of the Mayo Clinic, whose portrait photographs of noted pathologists were feature of Library exhibit.

ill. Entitled "The Emergence of Modern Child Health Care in America," the exhibit traced developments from 1873, when the American Medical Association established a section on obstetrics and diseases of women and children, until 1931, when the American Academy of Pediatrics held its first meeting.

### Medical Press Reports

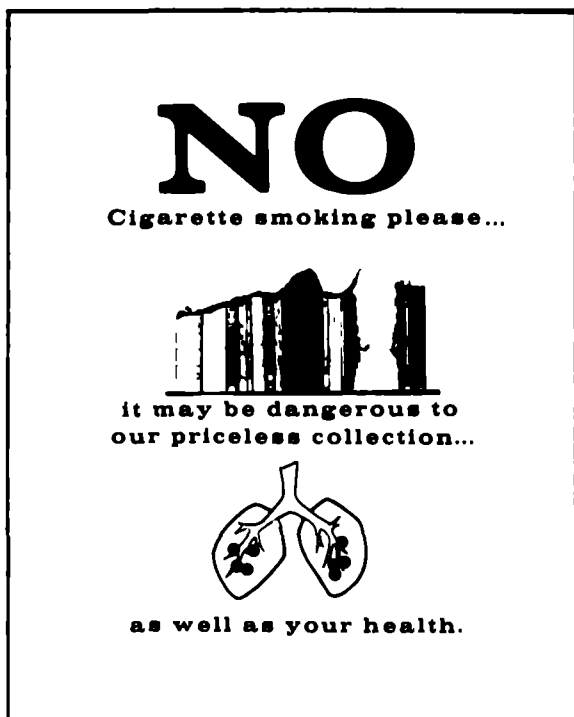
Editors of biomedical journals joined in the observance of the recent 135th anniversary of the National Library of Medicine by commenting in editorials on the institution's long and steady growth toward its modern role, as outlined in the cover notes of this publication.

Dr. Dwight L. Wilbur, editor of *Postgraduate Medicine*, wrote that "the Library is no mere repository of medical literature; it can be looked upon almost as a merchant of all recorded medical knowledge."

The *Journal of Dental Education*, edited by Dr. George W. Teuscher, predicted that the Library, "in addition to being the world's greatest repository of books in health and medical fields . . . is destined to become the research center in biomedical communications . . ." The *Journal of the American Medical Association* called the Library "one of the nation's prime biomedical resources" and added that "its importance to the health professions grows steadily as the years pass."

An editorial in the *Medical Annals of the District of Columbia* said: "Improved com-

puterized systems, remote information systems, data transmission via satellite, and other products of electronic communication are transforming medical libraries into living, vibrant information centers to meet the



Following announcement of HEW smoking restrictions, this warning sign appeared in many areas of the Library.

increasing demands of bioscientific progress. The hub of this worldwide network is the National Library of Medicine." The *Journal of Medical Education* stated that "the National Library of Medicine and its regional libraries give us the example of a (communications) network in operation."

Dr. Irvine H. Page, editor of *Modern Medicine*, after a visit to the Library, concluded:

"It is unwise to promise physicians that within a short time they will painlessly be made highly educated men with all available—and assumedly reliable—information at their fingertips. There are already more than enough excellent ways of learning and communicating. The *Abridged Index Medicus* makes an excellent key to this literature. Comprehensive and even rare bits of information can now be gotten from Medlars. One of the best libraries with a generous loan service is available through the National Library of Medicine and the network of regional libraries . . . The National Library of Medicine and its staff at the Lister Hill National Center for Biomedical Communications will experiment but will not promise Utopia or education without effort."

A "no smoking" sign used in the Library, that attracted attention because it protects books as well as health, was reproduced in *Medical World News*.

# SERVICES AND OPERATIONS

It was a year marked by the advent of MEDLINE and its emerging progeny, additional refinements in the Regional Medical Library system, and a sobering appraisal of literature copyright in the wake of a U.S. Court of Claims report. Paradoxically, patrons of the National Library of Medicine borrowed more original materials than previously from the collections and at the same time requested the loan of more than 100,000 photocopies of journal articles. Medlars searches dropped slightly below the past year, while MEDLINE search requests increased explosively.

To support the operation of a total library network, the Library began to strengthen its own resources. A revision of the Scope and Coverage Manual produced a new working document providing the basis for a thorough revision of the reference collection. A major effort was initiated to fill gaps in the collection, and to increase activity in acquisitions. The document collection also underwent a thorough scrutiny and recommendations are being developed for plans to enhance its usefulness.

An agreement was reached with the Library of Congress to participate in the Cataloging in Publication Program. Because of the concentration of biomedical publications in a few publishing houses, it will be possible to provide cataloging information to libraries for most of the important titles prior to actual publication. This will reduce the need for original cataloging in many libraries.

The Library conducted numerous educational activities, such as in-service training programs, regional and national workshops, and seminars. A one-year postgraduate library associate training program, begun in 1966, continued a well-rounded curriculum of formal presentations, practical experience, and concentrated, individually supervised research in preparation for a career in biomedical communication services and medical library management. More than 200 inquiries were received concerning a special library associate program scheduled to begin on September 1, 1972. Five candidates were selected after a review of 64 applications submitted by graduates of 28 academic institutions.

**Table 3. Summary of Bibliographic Services**

|   | FY 1970 | FY 1971 | FY 1972 |
|---|---------|---------|---------|
| Number of Journals Indexed in<br><i>Index Medicus</i> | 2,251   | 2,199   | 2,246   |
| Articles Indexed                                      |         |         |         |
| NLM   | 90,859  | 65,885  | 39,869  |
| Other U.S.  | 75,528  | 82,224  | 120,739 |
| Foreign   | 43,613  | 76,510  | 72,769  |
| Total   | 210,000 | 224,619 | 233,377 |
| Medlars Searches Performed                            |         |         |         |
| NLM   | 3,550   | 3,889   | 2,401   |
| U.S. Centers  | 10,737  | 14,180  | 10,800  |
| Foreign   | 6,453   | 5,648   | 5,808   |
| Total   | 20,740  | 23,717  | 19,015  |
| MEDLINE Searches Performed                            | —       | —       | 6,277   |
| Recurring Bibliographies                              | 18      | 23      | 24      |
| Literature Searches Distributed                       | 23,351  | 36,570  | 34,054  |



## Bibliographic Services

About 233,000 articles were indexed for Medlars during fiscal year 1972, an increase of 5 percent over 1971. Indexing performed for the Library under contracts and through agreements with cooperating agencies contributed more than four-fifths of the total production (Table 3).

Despite restrictions placed upon the number of search requests accepted after May 1971, more than 13,000 Medlars demand searches were conducted for domestic users. At the beginning of the fiscal year searches were being conducted at a rate which would have reached an estimated 25,000 searches annually. The restrictions placed upon the number of searches accepted by the Medlars centers, coupled with the increasing availability of the MEDLINE service, reduced the annual rate of Medlars searches to about 7,000 by the end of the fiscal year.

Continuing feedback was obtained from all institutions participating in MEDLINE, and coordination of all technical aspects of the use of the Library's bibliographic data base by a national network of medical institutions was maintained.

## Technical Services

During this reporting period, revision of the Library's Scope and Coverage Policy

produced a working document that reflects the current needs of the health community. A committee of senior staff members and the director of the National Institutes of Health Library completed the revision of this working paper. The revised edition was approved by the NLM director on January 25, 1972.

The sexennial cumulation (1965-1970) of the National Library of Medicine *Current Catalog* was published in November 1971. The published set contains the complete store of the Library's machine-readable cataloging for the six-year period, and represents a complete update of the file to conform to the Anglo-American rules for cataloging and the 1970 Medical Subject Headings.

Participation in the Library of Congress's Cataloging in Publication Program began this year. The program is designed to provide U.S. trade publishers with cataloging data printed in the book at the time of publication. During the first year of operation, more than 200 publishers joined the program. The Library's role is to supply cataloging data using NLM classification and subject headings for each biomedical title included. The Library also has the responsibility to identify, contact, and encourage biomedical publishers to join the program.

Table 4. Growth of Collections in Fiscal Year 1972

|                          | Volumes<br>Added | Total Volumes<br>in Collections |
|--------------------------|------------------|---------------------------------|
| <b>Book Material</b>     |                  |                                 |
| Bound monographs         |                  |                                 |
| Prior to 1800            | 626              | 38,698                          |
| 1801 to 1913             | 278              | 89,591                          |
| 1914 to present          | 11,599           | 248,589                         |
| Bound issues             | 14,984           | 395,212                         |
| Unbound issues (volumes) | 23,132           | 45,203                          |
| Theses                   | 6,300            | 334,110                         |
| Pamphlets                | 142              | 171,901                         |
| Total book material      | 57,061           | 1,323,394                       |
| <b>Non-Book Material</b> |                  |                                 |
| Microfilms (archival)    | 341              | 12,173                          |
| Microfiche               | 325              | 4,270                           |
| Pictures                 | 475              | 68,338                          |
| Total non-book material  | 1,141            | 84,781                          |
| Grand Total              | 58,202           | 1,408,175                       |

**Table 5. Summary of Acquisition Statistics**

|                              | FY 1970   | FY 1971   | FY 1972   |
|------------------------------|-----------|-----------|-----------|
| Serial Record*               |           |           |           |
| New titles added             | 2,114     | 1,534     | 1,172     |
| Discontinued titles          | 598       | 337       | 201       |
| Current titles received      | 20,964    | 22,161    | 23,132    |
| Publications Processed       |           |           |           |
| Serial pieces                | 94,175    | 97,816    | 87,995    |
| Other                        | 27,767    | 25,499    | 20,323    |
| Total                        | 121,942   | 123,315   | 108,318   |
| Obligations for Publications | \$355,000 | \$370,438 | \$430,000 |
| Included for rare books      | 60,212    | 57,945    | 79,583    |

\* Figures for serial titles have been corrected for titles that have been deleted or ceased publication.

**Table 6. Summary of Cataloging Activities**

|                      | FY 1970 | FY 1971 | FY 1972 |
|----------------------|---------|---------|---------|
| Completed Cataloging |         |         |         |
| New titles           | 16,344  | 15,862  | 12,515  |
| Recataloged titles   | 1,423   | 933     | 1,080   |
| Total                | 17,767  | 16,795  | 13,595  |
| Catalog Cards Filed  | 113,080 | 114,786 | 105,236 |
| Volumes Shelf-listed | 10,441  | 10,996  | 8,549   |

A major gap-filling project was initiated. Contracts were made with three commercial firms and the United States Book Exchange to fill identified gaps in the periodical collection. Beginning with *Index Medicus* titles, and proceeding through the entire serial record file, missing issues were ordered through these contractual arrangements. In addition, special arrangements were established with the Exchange for daily pickup and delivery of available publications required to fill inter-library loan requests.

Another contract with the Medical Library Center of New York provides for production

of a Regional Medical Library serial locator index for medical periodicals. About 5,000 substantive journals were identified in the Union Catalog of Medical Periodicals master file as the initial data base for this locator tool, showing serial holdings of the regional medical and resource libraries. The total file will be placed on-line in the MEDLINE system before the end of 1972.

Plans were completed for a Keyword-out-of-Context Index (KWOC) to the entire NLM serial record file. An average of four keywords is assigned to each title, and under each keyword are listed the appropriate journal titles and NLM call numbers. Thus, this index will provide a fast lookup for interlibrary loan operations. It is expected to be published in 1972.

The Library has instituted a number of blanket-order arrangements with many of the major book dealers over the past few years. The Library now has shared cataloging arrangements in Great Britain, Sweden, Belgium, France, Germany, and Italy. With

**Table 7. Binding Statistics**

|                   | FY<br>1970 | FY<br>1971 | FY<br>1972 |
|-------------------|------------|------------|------------|
| Number of Volumes |            |            |            |
| Sent to binder    | 15,361     | 16,807     | 20,619     |
| Bound at NLM      | 5,551      | 5,623      | 6,627      |
| Repaired at NLM   | 4,683      | 3,150      | 3,323      |
| Obligations       | \$52,093   | \$55,526   | \$64,852   |

the selection of the Porter Libros Company, Spain was added to the blanket-order program and shared cataloging arrangements with the Library of Congress.

### Reference Services

The number of requests for reference services reached a three-year high, exceeding 22,000 during fiscal year 1972, with increased activity in mail and telephone inquiries (Table 8). A stabilizing trend, however, in the number of health sciences practitioners and students using the Library's facilities on-site became apparent.

MEDLINE service was made available to the Library's patrons on computer terminals located in the reading room. Additional staff members received training in use of the system and, in February, a second terminal was added to accommodate the increasing requests for the service. The availability of MEDLINE was extended to include Wednesday evenings, Saturdays, and additional hours of daily service.

Following completion and approval of the Library's Scope and Coverage Manual in January 1972, a detailed study of the reference collection was initiated. This is expected to extend over the better part of a year. Identification was made of portions of the general collection requiring strengthening, in

addition to the updating of the reference collection and setting the base for a shelf list. Benefits of the study include streamlining and increased efficiency in selection procedures, identifying areas in the catalogs requiring maintenance, and developing a means for announcing selections to users.

There was a sharp rise in the number of filled interlibrary loan requests (Table 9). The upward trend, which topped the figures for the past two years, reached the level of activity recorded in fiscal year 1969. Notable was an increase of more than 46 percent in the number of loans filled by lending monographs in the original form. This upsurge in original loan activity may have resulted, in part, from the steady rise in medical book prices, and limited funds available to academic institutions.

During fiscal year 1972 the Library completed negotiation of a contract for commercial filming of 1.5 million pages of the serial collection for preservation. The availability of funds for this vital program permits continuing fulfillment of archival responsibility.

During the year the installation of a new positive printmaker enhanced photographic services available to users. This equipment includes a fully automated, positive-to-positive photostatic processor with the capability of producing prescreened prints from photographs, ready for reproduction, in a matter of minutes.

Table 8. Summary of Reference Services

|                       | FY 1970 | FY 1971 | FY 1972 |
|-----------------------|---------|---------|---------|
| Requests by Telephone | 10,715  | 10,027  | 11,505  |
| Government            | 5,281   | 4,653   | 4,922   |
| Non-Government        | 5,434   | 5,374   | 6,583   |
| Requests by Mail      | 1,218   | 1,391   | 1,570   |
| Government            | 145     | 133     | 104     |
| Non-Government        | 1,073   | 1,258   | 1,466   |
| Readers Assisted      | 9,768   | 8,868   | 9,347   |
| Government            | 3,487   | 3,219   | 3,393   |
| Non-Government        | 6,282   | 5,649   | 5,954   |
| Total                 | 21,702  | 20,286  | 22,422  |
| Government            | 8,913   | 8,005   | 8,419   |
| Non-Government        | 12,789  | 12,281  | 14,003  |
| Readers Counted       | 25,786  | 22,382  | 20,350  |

**Table 9. Summary of Circulation Activities**

|                            | FY 1970 | FY 1971 | FY 1972 |
|----------------------------|---------|---------|---------|
| <b>Number of Requests</b>  |         |         |         |
| Received -----             | 219,229 | 218,982 | 241,824 |
| Filled -----               | 179,390 | 186,144 | 193,009 |
| For readers -----          | 78,779  | 83,585  | 72,892  |
| By interlibrary loan ----- | 100,611 | 102,559 | 120,117 |
| Photocopy -----            | 93,746  | 95,559  | 110,081 |
| Original -----             | 6,865   | 7,000   | 10,036  |
| Unfilled -----             | 39,839  | 32,838  | 48,815  |
| Rejected -----             | 14,244  | 9,273   | 10,558  |
| Unavailable -----          | 25,595  | 23,565  | 38,257  |

### History of Medicine

The year was marked by a number of outstanding acquisitions in the field of the history of medicine and related sciences. For the first time in several years, the collection of early Western manuscripts was strengthened by the addition of three Spanish manuscripts of the 14th and 15th centuries and a 13th century Oxford manuscript. The last is particularly notable for its fine illuminated initials. Four incunabula were also added to the Library's holdings, and over 650 works of the 16th through 18th centuries. Among the latter were such notable landmarks in the history of medicine and science as first editions of John Graunt's "Natural and Political Observations . . . Made Upon the Bills of Mortality" (1662) and René Descartes' "Discours de la Méthode Pour Bien Conduire Sa Raison" (1637).

During the course of the year, more than 5,000 books, manuscript boxes, and oral history memoirs were provided to readers by the History of Medicine Division. About 1,700 items were furnished on interlibrary loan or in photocopy, and nearly 2,000 photographs and slides were supplied in response to requests for pictorial material (Table 10). As part of a continuing effort to preserve the valuable books in the historical collection for future scholars, 114 volumes were restored or rebound by skilled hand-craftsmen. To inform present and future scholars of the wealth of research material available in the Library, a supplement to existing catalogs of incunabula and 16th century books was published and about 3,000 books were cataloged in anticipation of the printing of additional catalogs in the future.

**Table 10. History of Medicine Activities**

|                                    | FY 1970 | FY 1971 | FY 1972 |
|------------------------------------|---------|---------|---------|
| <b>Acquisitions</b>                |         |         |         |
| Books -----                        | 1,538   | 1,284   | 1,265   |
| Modern manuscripts -----           | 159,627 | 141,142 | 36,325  |
| Oral history hours -----           | 66      | 10      | 43      |
| Prints and photographs -----       | 634     | 753     | 479     |
| <b>Processing</b>                  |         |         |         |
| Titles cataloged -----             | 3,132   | 1,618   | 3,002   |
| Modern manuscripts cataloged ----- | 39,070  | 41,441  | 20,362  |
| Pictures indexed -----             | 430     | 205     | 571     |
| Articles indexed -----             | 5,327   | 3,114   | 2,892   |
| Pages microfilmed -----            | 160,704 | 173,733 | 153,441 |
| <b>Public Services</b>             |         |         |         |
| Reference questions answered ----- | 1,461   | 1,755   | 2,113   |
| ILL and pay orders filled -----    | 1,985   | 1,880   | 1,821   |
| Reader requests filled -----       | 3,876   | 4,717   | 5,784   |
| Pictures supplied -----            | 1,094   | 2,010   | 1,888   |

## Specialized Information Services

The Library's Specialized Information Services administers the Toxicology Information Program, established in 1967, with the objectives of creating computerized toxicology data bases with information from cooperating governmental, industrial, and academic institutions and providing these toxicology information services to the scientific community. The Library's program operates in close collaboration with its affiliated Toxicology Information Response Center of the Oak Ridge National Laboratory. Together, they create data bases and provide services by using input from the scientific literature, specialized files, and contributions by subject experts. The program brings services in three modes: response to queries, publications, and an on-line interactive information retrieval system.

During 1972, the Center at Oak Ridge became fully operational. It is funded by the Library through an NLM-AEC interagency agreement. About 480 comprehensive literature searches were performed in response to requests from scientists in many organizations. (Fig. 1). These searches covered various segments of toxicology, with a heavy emphasis on environmental toxicology.

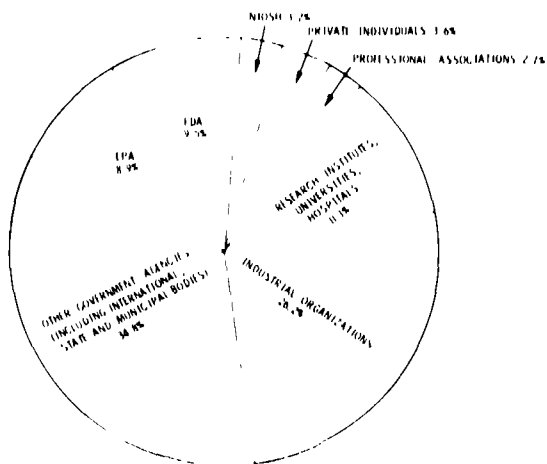


Figure 1. Sources of toxicology search requests processed from July 1, 1971 to June 30, 1972.

The output of a search usually consists of a bibliography assembled through computer searches combined with searches through conventional secondary literature services, such as *Chemical Abstracts* or *Biological Abstracts*. Some of the more extensive and important bibliographies created through this activity will be further distributed by the National Technical Information Service. During the start-up year, these query response activities were performed without charge to the requester. However, in the future, a modest fee-for-service will be imposed to recover some of the costs.

The program has begun work with a large chemical manufacturer to acquire published toxicology data on the products of that company, formatted for input into the Library's computer system. Several computerized literature files have been established in the field of pesticide toxicology and a data base is being compiled for the toxicology data contained in the pesticide petitions submitted by manufacturers and approved by the Environmental Protection Agency. Preliminary permission to use the toxicology sections of these petitions has been obtained and planning activities for work on a computerized data file have begun.

Endeavors to link Medlars with certain computerized files of *Chemical Abstracts Service* have continued. As part of this effort, the entire name-match module of the CAS chemical registry system was modified to a "stand-alone" system and installed in NLM's computer. In this system it is possible to match, in several sequential computer operations, names of substances found in the scientific literature against a CAS file of over two million names. Successful matches provide the user with CAS registry numbers and preferred nomenclature.

The Common Data Base, a subset of the CAS registry files, containing more than 27,000 unique chemical substances in several computer files, is being updated at regular intervals. Input of new substances to the file comes from the Library and the Food and Drug Administration.

# GRANTS FOR LIBRARY ACHIEVEMENT

The dedication in the spring of 1973 of the Himmelfarb Medical Library of the new George Washington University Medical Center in the Foggy Bottom section of the District of Columbia will mark the formal opening of the eleventh and final health sciences library funded in part by construction grants from the National Library of Medicine.

Enacted by Congress in 1965, the Medical Library Assistance Act (Public Law 89-291) by 1969 had provided only 0.03 percent of the government's total expenditures for health care, and medical research and communications. But the funds the law did provide were the only means available for the exclusive improvement of the resources and services of the nation's medical libraries. The Act, extended in 1970 by Congress and administered from its inception by the Library's Extramural Programs, has provided more than \$54 million for the following programs:

- Construction of facilities\*
- Training in medical library science
- Special scientific projects
- Research and development in medical library science and related fields
- Improvement and expansion of the basic resources of medical libraries and related instrumentalities
- Establishment of regional medical libraries
- Biomedical publications.

\*This authority was transferred in December 1968 to the Division of Physician and Health Professions Education, National Institutes of Health.

## New Library Construction

Of these first new libraries aided by the Act, nine are in medical schools, and one each in a veterinary medicine and an optometry school. These structures have added more than 300,000 square feet of floor space for nearly 1.5 million volumes in completed facilities at: Auburn University School of Veterinary Medicine, Boston University

School of Medicine, Brown University Division of Biological and Medical Sciences, George Washington University School of Medicine, Jefferson Medical College of Thomas Jefferson University, Rutgers Medical School of the State University of New Jersey, Southern College of Optometry, University of Nebraska College of Medicine, University of Texas Medical Branch at Galveston, University of Utah Medical Center, and Wayne State University School of Medicine. Photographs of many of these new libraries are included in this report.

During fiscal year 1972 the Library supported various grants in the amount of \$6.9 million (Table 11).

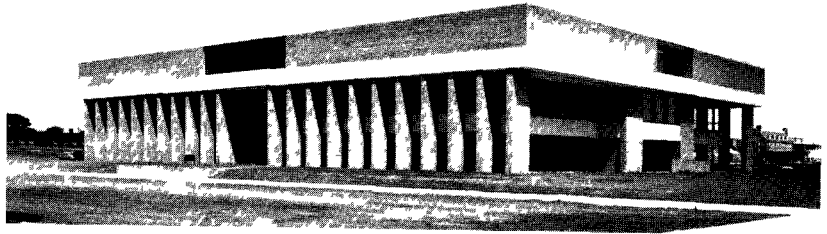
## Resource Grants

Resource grants are made to establish, improve, and expand the basic resources and services of health science libraries. There are two types of grants available: a \$3,000 improvement grant for one year, and a project grant available for from one to three years. The improvement grant is intended to assist in the acquisition of basic resources needed by the library and to induce the institution to make a commitment for future library support. The purpose of the project grant is to establish new services or improve and expand existing ones.

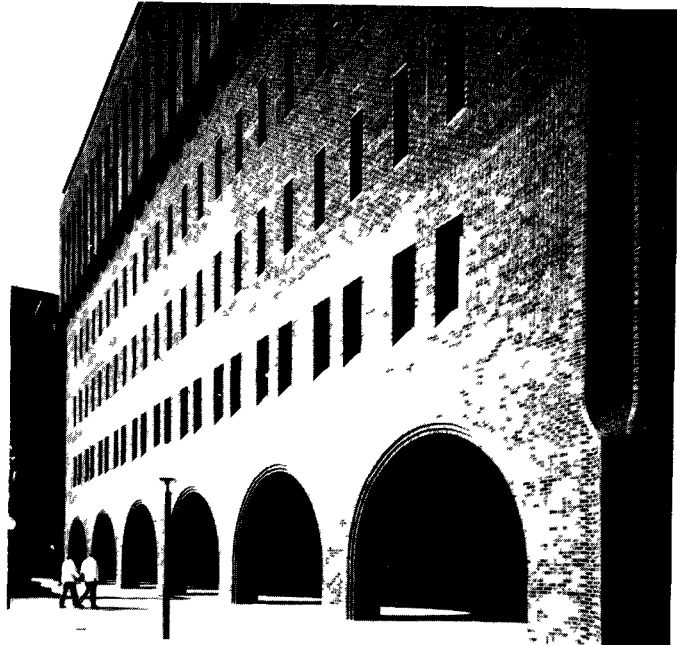
In fiscal year 1972, resource grants continued to increase in popularity. A total of 140 project grant applications and 187 improvement grant applications were received during this period. There has also been evidence of the need to coordinate this program more closely with the regional medical library activities.

Of the \$2.5 million appropriated, \$1.7 million was available for the resource grants. Of the remaining funds, \$353,281 was used to support commitments for continuation grants initially made under the original Act, and \$441,388 for the continuation of 19 project

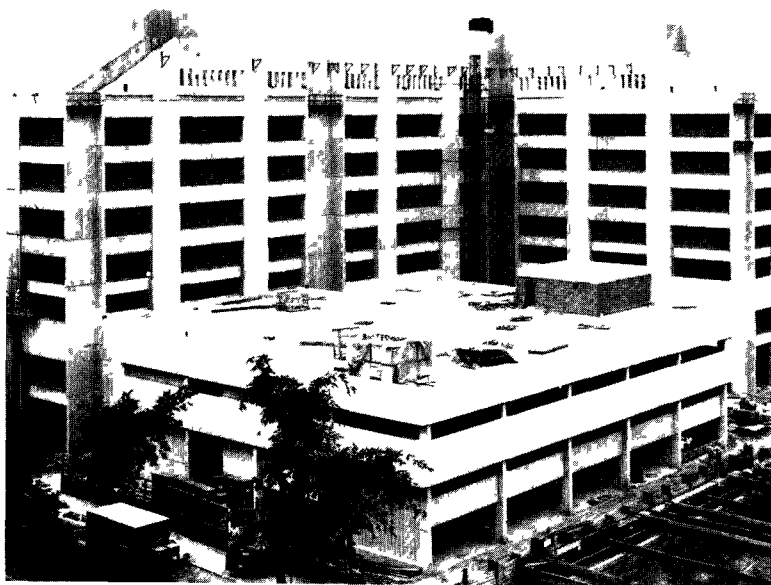
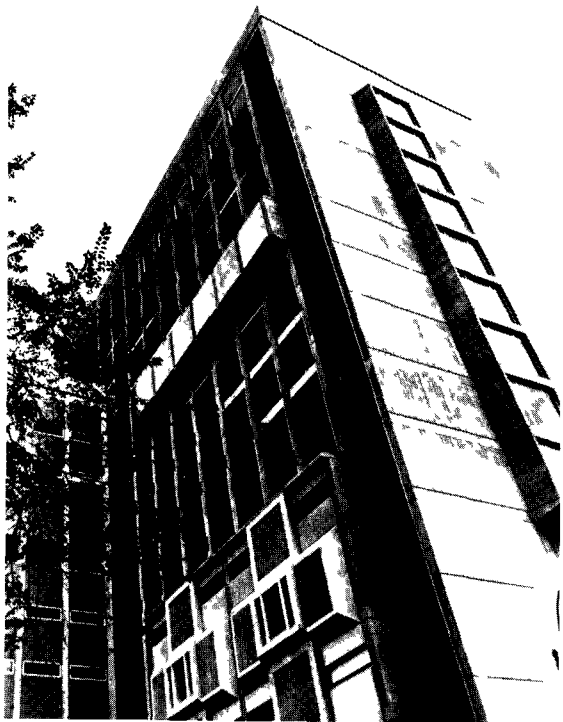
# NEWLY CONSTRUCTED



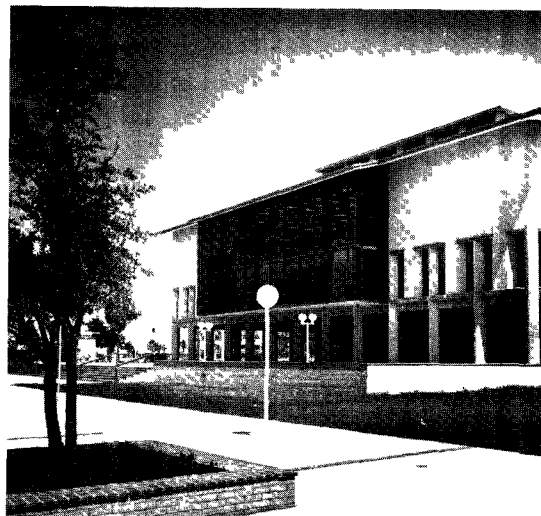
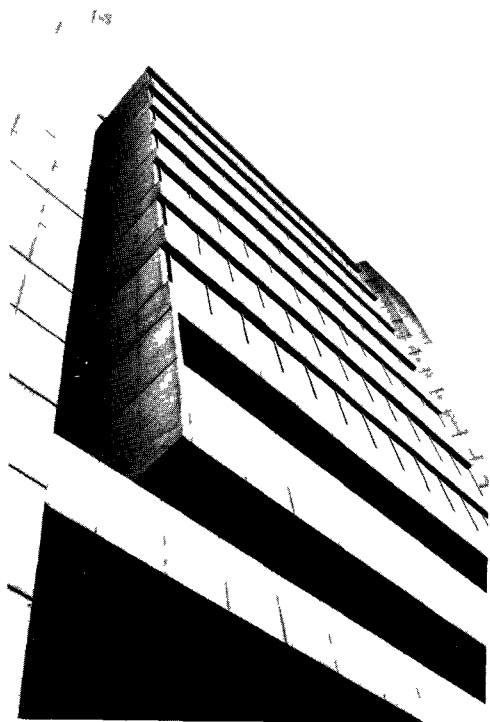
Above: Library of Science and Medicine, Rutgers Medical School of the State University of New Jersey. Upper left: Scott Memorial Library, Jefferson Medical College. Lower left: dedication ceremonies of Eccles Medical Sciences Library, University of Utah College of Medicine. Below: Sciences Library of Brown University Division of Biological and Medical Sciences.



# HEALTH SCIENCES LIBRARIES



Above: Paul Himmelfarb Medical Library, in foreground, during construction of new George Washington University School of Medicine. Upper left: Boston University School of Medicine's new library occupies top three floors of the Instructional Building. Lower left: New library is on the fifth floor of the Southern College of Optometry in Memphis. Below: Moody Medical Library of the University of Texas Medical Branch in Galveston.





grants awarded during fiscal year 1971 under the Medical Library Assistance Extension Act of 1970. There were 179 new improvement grant awards and 40 new project grant awards made during the year. The projects supported ranged from renovation of the physical facilities of a community hospital library to the implementation of an automated cataloging project.

### Training Grants

Training of biomedical librarians and information specialists has included master's and doctoral degree as well as advanced on-the-job programs. Training in biomedical communications and information sciences, medical history, and health science writing was also supported.

A decision was made to phase out programs which provide the basic library degree, and instead emphasize those that provide advanced training. The Library and the Bureau of Health Manpower Education agreed cooperatively to support training of physicians and other health scientists in the use of computer technology for medical education and the provisions of health care. Three such training programs were approved and funded in fiscal year 1972, with training scheduled to begin in July 1972.

On June 30, 1972, there were 17 active programs supporting 131 trainees. Two of the programs are to start this year. Direct fellowships, awarded to individuals, are included in the training category. Support is available for study in the same general categories for which training grants are available, with the exception that fellowships are not provided for the attainment of the basic library degree. Three fellowships were active during this fiscal year.

### Special Projects

Special scientific projects may be funded to aid recognized scholars in the production of comprehensive treatises in their areas of competence. This may include monographs in scholarly documentation, and evaluation or analysis of social, cultural, or scientific

**Table 11. Summary of Extramural Programs**

| Program                                 | New Grants FY 1972 | Active Grants & Contracts |
|---|--------------------|---------------------------|
| Regional Medical Library -----          | 5                  | 17                        |
| Medical Library Resource Grants -----   | 219                | 396                       |
| Training Grants and Fellowships -----   | 9                  | 20                        |
| Special Scientific Projects -----       | 4                  | 6                         |
| Research Grants -----                   | 8                  | 30                        |
| Total -----                             | 8                  | 23                        |
| Publication Grants -----                | 253                | 492                       |
| Special Foreign Currency Projects ----- | 46                 | 117                       |
| Total -----                             | 299                | 609                       |

advances. Six projects, including four new awards, were active during the year. The new awards cover the following topics:

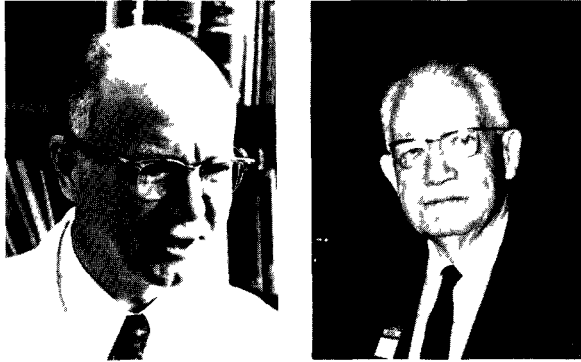
- Development of medical education in the United States.
- The provision of health care during the French Revolution.
- Critical review of literature on the pathophysiology of respiratory disease.
- The control of infectious diseases in the 20th century.

An example of a special scientific project is the preparation of a monograph on graduate education in occupational medicine. Chapters of this book will present the history of occupational medicine, updating the subject to current occupational health practices and programs, including a description and analysis of occupational medicine courses at selected universities.

### Research Grants

Research, development, and demonstration projects are undertaken in library services to improve

- The flow of health information.
- Health communication tools.
- Manpower and training in biomedical librarianship and other health-information specialties.
- Historical research in health fields.



Drs. Harry F. Dowling, left, and Fred L. Soper were named the first National Library of Medicine scholars in residence by Board of Regents.

There were 30 active research grants during the reporting period, including eight new awards. These projects included a study of the cost-effectiveness of different methods of selectively disseminating biomedical literature and a related project concerned with the development of an automatic document retrieval system and comparing it with more conventional methods. Another project in computer-aided medical decision-making seeks to quantify subjective judgments related to tests and treatment which a physician must make. The results, where valid and

appropriate, will be translated into general concepts of clinical decision-making. A research study in pre-Listerian antiseptic surgical practices provides an excellent example of a medical history project concerned with wound management, prior to



Kathy Wurdeman adds citations to the Medlars data base using the Keymatic Encoder.

and during the evolution of antiseptics and asepsis, up to the emergence of present-day surgery.

Evaluation of training and manpower needs is a timely and important research area. A project designed to obtain data on



Monitoring the Medlars master console and high-speed printers are, from left, Charles Heath, Mike Mock, and Jim Goldsmith.

the relationship of the hospital library to the hospital's educational functions is of interest to medical educators. This information will provide a basis for developing appropriate and feasible instructional techniques and courses, and a methodology to test their validity.

### **Publication Grants**

Publication grants are made to support

- Studies in the fields of medical librarianship, health-information science, and biomedical communications.
- Critical reviews of the present state of knowledge in health-science fields.
- Publication of abstracts, bibliographies, handbooks, atlases, dictionaries, indices, and other secondary works in the broad health sciences.
- Serial publications in the development of experimental and innovative approaches to information packaging.

There were 23 active grants, eight of which were new awards, at the close of the fiscal year. Books prepared or published with grant support during the year included an

atlas of brain structures to facilitate studies on the exact localization of brain functions; comprehensive surveys on medically important lower organisms, such as poisonous reptiles found in the Southwest, and a group of insects that parasitize other insects; and a study on the development of 20th century American medicine, especially public health aspects, as revealed by the history of one state.

Support was provided to eight serial publications including: a guide to the world's literature on health problems in the Arctic; a periodical for allied health personnel concerned with nutrition education in the community and in institutions; an innovative journal on legal medicine printed only in microform; and a unique atlas illustrating the molecular structure of proteins, which serves as a standard reference for the rapidly growing fields of inborn metabolic disease and molecular genetics.

Titles and authors of all scientific and literary works supported by the Library's grant program, that were published during the fiscal year, are included in the chapter, **The Library Publisher**.

# MEDLINE AND THE LIBRARY NETWORK

MEDLINE is a new computerized service for physicians and other biomedical scientists, developed by the National Library of Medicine, that provides almost instantaneous bibliographic searching of current medical literature. It's as close as a telephone.

Since MEDLINE was inaugurated in November 1971, more than 100 biomedical information centers, including the libraries of

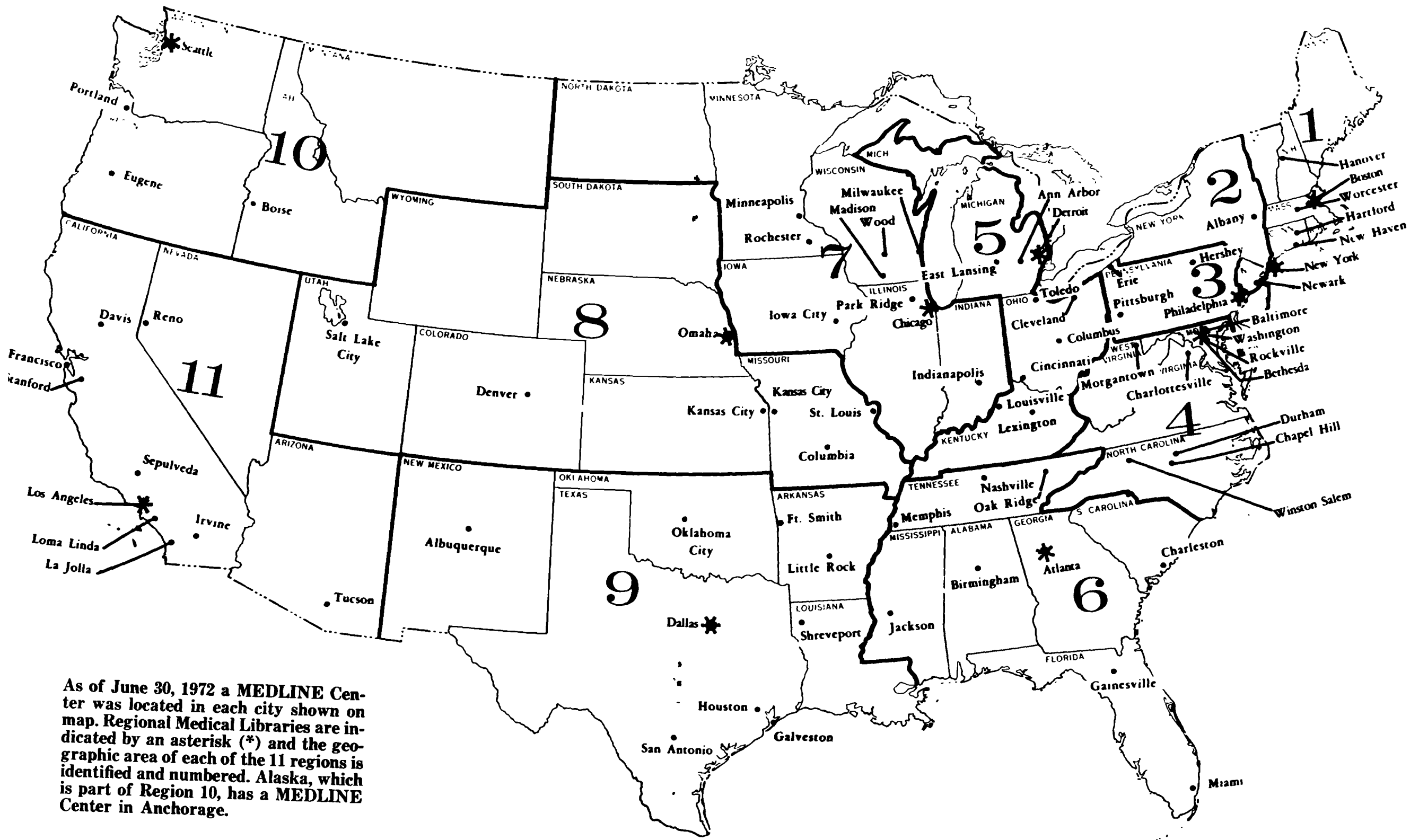
71 medical schools, have installed on-line terminals that connect with the system to search the Medlars data base in Bethesda, Maryland. By the end of 1972, it is anticipated that this number will be increased to about 150 in this country and to other centers in foreign countries.

The MEDLINE system enables a librarian or health professional to search the Medlars



The five government members of the House of Delegates of the American Medical Association were an interested audience when William H. Caldwell, center, deputy director of NLM's Bibliographic Services Division, demonstrated rapid retrieval of literature citations at a MEDLINE terminal in the NLM exhibit at the 1972 AMA annual meeting in San Francisco. Shown from left are: J. Herbert Brown, M.D., Veterans Administration; Lt. Gen. Hal B. Jennings, Jr., Army Surgeon General; S. Paul Ehrlich, Jr., M.D., Public Health Service; Lt. Gen. Alonzo A. Towner, Air Force Surgeon General; and Vice Adm. George M. Davis, Navy Surgeon General.

# MEDLINE CENTERS IN THE UNITED STATES



As of June 30, 1972 a MEDLINE Center was located in each city shown on map. Regional Medical Libraries are indicated by an asterisk (\*) and the geographic area of each of the 11 regions is identified and numbered. Alaska, which is part of Region 10, has a MEDLINE Center in Anchorage.

files for bibliographic information, using a remote computer entry terminal. The result of the search may be printed directly on the user's terminal (on-line) or, if a large number of citations is involved, it may be printed by the central computer (off-line) and mailed to the user. MEDLINE service provided more than 2,200 off-line searches in June. When added to the on-line searches, MEDLINE is now providing more than 70,000 searches per year.

The presently available data base consists of citations from *Index Medicus*, referencing articles in more than a thousand of the world's leading medical journals. The data base covers the period of time from January 1969 through the latest issue of *Index Medicus*. The data base in the Library's computer now contains about half a million citations and is growing at the rate of about 12,000 citations per month.

MEDLINE service is available to qualified health sciences practitioners, teachers, and students through cooperating medical institutions. Coordination with and assistance to these institutions is provided both directly and through the eleven Regional Medical Libraries.

Development of MEDLINE was spurred by the success of AIM-TWX (*Abridged Index Medicus* via the Teletypewriter Exchange Network), an experimental service inaugurated by the Library in early 1970. The result of three years' development by the Lister Hill Center, AIM-TWX demonstrated the value of on-line retrieval, particularly in hospitals. Citations to articles published during the last five years in more than 100 clinical medicine journals were stored in a large, time-sharing computer of the System Development Corporation in Santa Monica, California. This original version of the MEDLINE program was only able to access a single data base. Modifications are now nearing completion that will enable a user to access any of several data bases, including the *Current Catalog*, the audiovisual catalog, and a serials locator file, as well as Medlars data covering an extended period of time.

MEDLINE service is available through a nationwide communications network. The cost of the network is borne by the Library, while the cost of connecting the user to the network is borne by the user. Toll-free access may be gained in about 35 major population centers. Transmission rates of 10, 15, and 30 characters per second are available. Entry to the computer can also be gained through the familiar TWX network, if desired. The initial network of leased telephone lines, which was replaced in part by Western Union's Datacom Service, is being phased out. The present communications system consists of a network of message-switching computers which automatically route transmission over an optimum path from the user's terminals to the NLM computer in Bethesda.

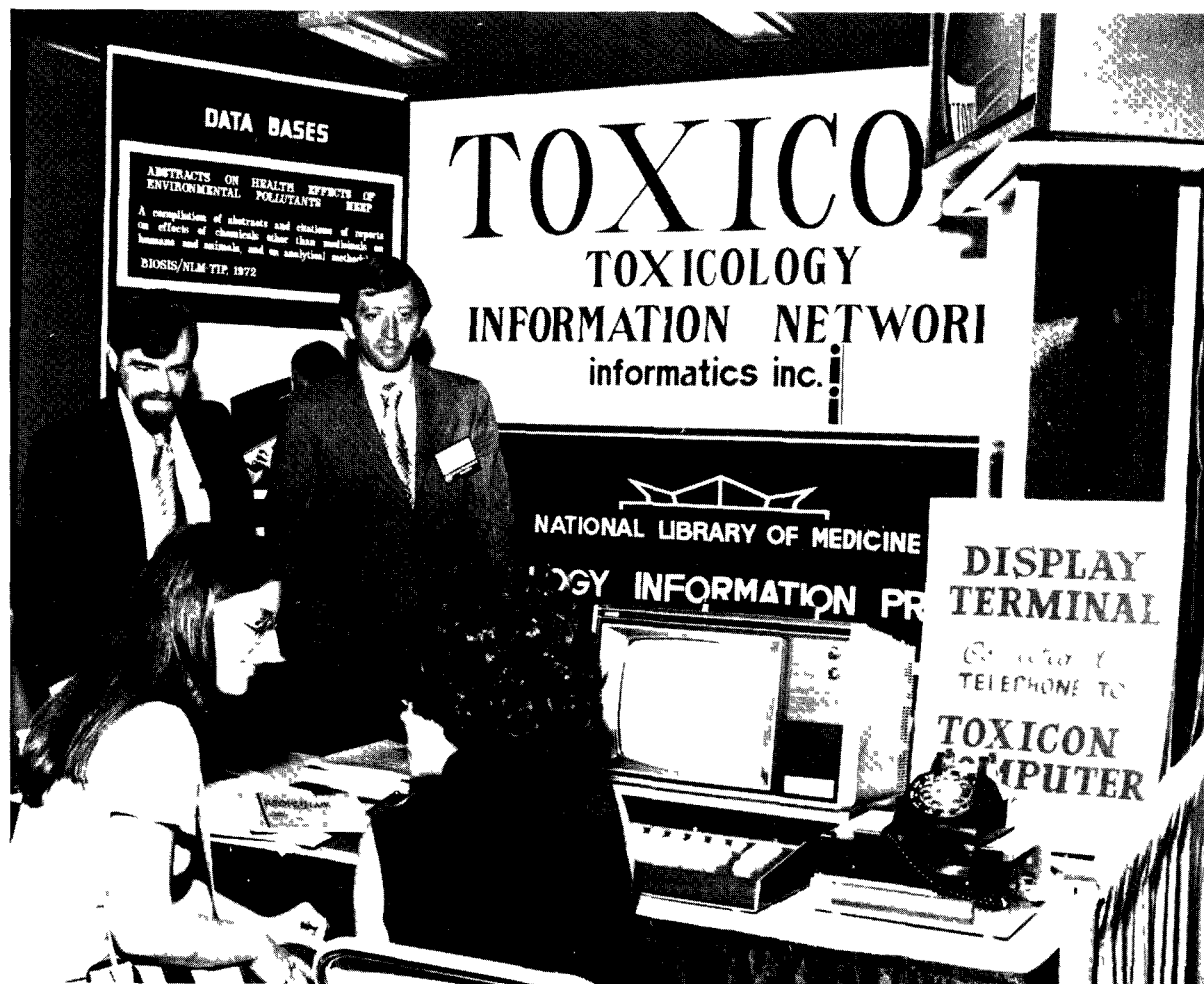
## TOXICON

A second information retrieval system, initiated early in 1972 and scheduled to become operational for users later in the year, is known as TOXICON, an acronym derived from *Toxicology Information Conversational On-line Network*. This is another rapid retrieval service, developed by the Library's Specialized Information Services to support the requirements of environmental and health scientists for toxicology information and data.

The service is designed to provide the scientist with direct access to an extensive collection of literature citations annotated with index terms or abstracts, current state-of-the-art reviews, technical reports, and referenced toxicology data.

TOXICON consists of three integral parts: a communications network, an information store, and a programmed computer system. The nationwide network, which is largely identical with that used for the MEDLINE system, provides a relatively inexpensive method of communication with the computer facility by connecting standard telephone equipment to the searcher's terminal device. The information base contains primary and secondary source documents plus selected special data files.

During 1972, about 175,000 citations with



At exhibit of the Library's new TOXICON service at the 1972 annual meeting of the American Pharmaceutical Association in Houston, Dr. Sharon Valley, center, of the NLM staff explains operation to a visitor while Donald Hummel, left, and Robert Harcharik look on.

index terms, abstracts, and other types of enrichment were built into the TOXICON data base. It now contains:

- *Toxicity Bibliography*; 56,000 citations and MeSH terms, 1968–present.
- *Health Aspects of Pesticide Abstract Bulletin*; 9,000 abstracts with *Chemical Abstracts* registry numbers, 1966–1971.
- *Chemical Biological Activities (CBAC)*; 110,000 abstracts with CAS registry numbers, 1965–1972.

Other files are being prepared for immediate addition to the system.

TOXICON was demonstrated in exhibits at the 1972 annual meetings of the American Pharmaceutical Association, Medical Library

Association, and American Medical Association. It created wide interest and drew favorable comments.

Additional progeny of MEDLINE are in the Library's planning. The National Medical Audiovisual Center is developing a computer-supported data base of information on non-print instructional materials designed to become a working element of MEDLINE, tentatively to be called AVLINE (*Audio-Visual On-Line*).

Another, CATLINE (*Catalog On-Line*), is expected to put the Library's catalog into the network, primarily to the advantage of regional libraries. SERLINE (*Serials On-Line*) will provide a listing of about 5,000

biomedical serial titles, including location symbols indicating their availability at libraries within each region. CATLINE and SERLINE are expected to be operational in fiscal year 1973.

### **Medlars I and II**

At present, the Medlars data base and the *Current Catalog* data base are generated and maintained using a Honeywell 800/200 computer system which is becoming obsolete. This computer is also used to format the Library's publications, generate magnetic tapes which control phototypesetting machines, and perform non-interactive searches of old Medlars citations. A project is now under way to enable the computer used for the MEDLINE interactive searches also to perform these functions. This will take about two years to become operational.

The Medlars I system was put into operation in 1964. It is still functioning successfully although the requirement for demand searches has been met in part by use of a computer in the Department of Defense. During this year, search programs developed at the Karolinska Institute in Stockholm became operational on the NLM IBM 370/155. Now more than half the searches are performed on this system.

Other programs were completed that have enabled the Library to use magnetic tape rather than punched-paper tape as an input medium for the Medlars file-building process. The increased reliability and productivity of the new equipment have significantly improved the cost effectiveness of this activity.

### **Computer Upgrade**

The effectiveness of the interactive search technique depends strongly on the ability of the computer to respond quickly, accurately, and in depth from a broad base of information. Analysis has indicated that the equipment used for the development work would not provide sufficiently rapid response to the potential user population. The determining factor was the speed of response of the mass storage units used to contain the MEDLINE

data base. Of lesser importance was the speed of the central processing unit. To meet performance requirements with currently available equipment, the MEDLINE computer was upgraded from an IBM 360/50 to an IBM 370/155 in December 1971.

The capacity of the mass storage units has been increased to keep pace with the expanding data base. However, the new equipment is not only more than twice as fast as previously available equipment, but it costs less per unit of storage. Thus, the operational configuration is also less expensive than the development configuration for the amount of storage required. The new system will be able to accept an additional load from the Honeywell 800/200 system when the Medlars II computer programs are complete.

### **Regional Medical Library Program**

Since the first Regional Medical Library was established in October of 1967, considerable progress has been made towards extending resources to health science libraries throughout the country. Fiscal year 1972 witnessed the completion of conversion from grant support to contract support for the established service aspects of the regional libraries. Grants, however, are made to support other Regional Medical Library activities.

Highlighting this year's regional program was the implementation of the MEDLINE system. The eleven Regional Medical Libraries form the backbone of this network in achieving rapid, nationwide geographic coverage. In the development of the network, the regional libraries were used to introduce MEDLINE to medical librarians. MEDLINE briefings and demonstration sessions were scheduled at each Regional Medical Library.

The expansion of the user network was achieved through the cooperation of the Regional Medical Library directors. Each director developed a preliminary regional bibliographic service plan and identified potential MEDLINE centers.

Besides the service functions of the regional library program, an in-depth review



of the current program was completed by three members of the Biomedical Library Review Committee. The report was presented at the June 1971 meeting of the Board of Regents and implementation of the recommendations will begin in fiscal year 1973.

The most significant contribution to the program during fiscal year 1972 was the release of the National Library of Medicine's Regional Medical Library Program Policy Statement. This policy statement, endorsed by the Board of Regents, presented program objectives with an identification of broad operational guidelines. The network operational model, identified in the policy statement, is hierarchical in structure, with four definable levels: the basic unit library, a medical school library, a regional library, and the National Library of Medicine. Each of these levels has specific responsibilities which were clearly defined in the policy statement. Implementation of the new policy was accomplished with little difficulty, because many of the specific responsibilities identified for each of the four levels already had been assumed at a particular level.

To help monitor and manage the document delivery service activity, the library network identified and standardized the data elements required in operation of the interlibrary loan service. Network standards relating to document delivery service were developed for filling interlibrary loans and for clearing unfilled requests. Other activities provided by regional libraries include education and consultation, traditional reference service, and Medlars and MEDLINE services.

The educational activities center around training programs for hospital librarians such as those given by the regional staff of the Francis A. Countway Library of Medicine in Boston and the hospital workshops of the staff of the UCLA Biomedical Library in Los Angeles. More than 300 hospital librarians have been trained through these educational programs. Besides the more formal programs, library orientation courses covering topics such as Medlars, MEDLINE, major indexing tools, and the use of library facilities have been taken by several thousand health sci-

ences practitioners and students.

Document delivery continues to be the major service activity in the regional library program. This service receives nearly 50 percent of the resource allocation of the program. During fiscal year 1972 more than 450,000 reimbursable interlibrary loans were



Five young librarians, who received postgraduate training in the NLM associate program for 1971-72 are, from left, Dr. Clair W. Gudmundsen, Jinnet F. Lewis, Arlene M. Aufderheide, Paula Meise, and Dr. Joseph A. Vignone.

provided through the library network. Since the beginning of the program five years ago, about 2 million loans have been filled.

By the end of fiscal year 1972, the contract funding mechanism was operating in ten regional libraries, of which seven were in the second year of contract funding. Only service and management components, however, are funded through the contract mechanism. Research and development, educational, and consulting activities are funded through the grant mechanism, with peer review.

### Roster of Regional Libraries

1. New England Region (Conn., Me., Mass., N.H., R.I., Vt.)  
Francis A. Countway Library of Medicine  
10 Shattuck St., Boston, Mass. 02115  
Librarian: Harold Bloomquist  
RML Director: Mary E. Feeney  
Telephone: 617-734-8900 X126  
TWX: 710-388-6702

2. **New York and Northern New Jersey Region**  
(New York and 11 northern New Jersey counties)  
New York Academy of Medicine Library  
2 East 103 St., New York, N.Y. 10029  
Librarian: Florence Lyons, acting  
Telephone: 212-876-2531  
TWX: 710-581-2531
3. **Mid-Eastern Region** (Pa., Del., and ten southern New Jersey counties)  
Library of the College of Physicians  
19 South 22 St., Philadelphia, Pa. 19103  
Librarian: Elliott H. Morse  
Telephone: 215-561-6050  
TWX: 710-670-1646
4. **Mid-Atlantic Region** (Va., W. Va., Md., D.C., N.C.)  
National Library of Medicine  
8600 Rockville Pike, Bethesda, Md. 20014  
Librarian: Martin M. Cummings, M.D.  
RML Director: Erika B. Love  
Telephone: 301-496-2370  
TWX: 710-824-9615
5. **East Central Region** (Ky., Mich., Ohio)  
Wayne State University Medical Library  
4325 Brush St., Detroit, Mich. 48201  
Librarian: Vern M. Pings, Ph.D.  
RML Director: Elizabeth G. Monroe  
Telephone: 313-577-1091  
TWX: 810-221-5163
6. **Southeastern Region** (Ala., Fla., Ga., Miss., S.C., Tenn., Puerto Rico)  
A. W. Calhoun Medical Library  
Emory University, Atlanta, Ga. 30322  
Librarian: Miriam H. Libbey  
Telephone: 404-377-9201  
TWX: 810-751-8512
7. **Midwest Region** (Ill., Ind., Iowa, Minn., N.D., Wis.)  
John Crerar Library  
35 West 33 St., Chicago, Ill. 60616  
Librarian: William S. Budington  
RML Director: Chester J. Pletzke  
Telephone: 312-225-2526 (Ext. 78, 79, or 47)  
TWX: 910-221-5131
8. **Midcontinental Region** (Colo., Kans., Mo., Neb., S.D., Utah, Wyo.)  
University of Nebraska College of Medicine  
42nd St. & Dewey Ave., Omaha, Nebr. 68105  
Librarian: Bernice M. Hetzner  
RML Director: Elizabeth A. Petgen  
Telephone: 402-541-4646  
TWX: 910-622-8353
9. **South Central Region** (Ark., La., N.M., Okla., Tex.)  
University of Texas Southwestern Medical School at Dallas  
5323 Harry Hines Blvd., Dallas, Texas 75235  
Librarian: Donald M. Hendricks  
Telephone: 214-631-1813  
TWX: 910-861-4946
10. **Pacific Northwest Region** (Alaska, Idaho, Mont., Oregon, Wash.)  
University of Washington  
Health Sciences Library  
Seattle, Wash. 98105  
Librarian: Gerald J. Oppenheimer  
Telephone: 206-543-8262  
TWX: 910-444-1385
11. **Pacific Southwest Region** (Ariz., Calif., Hawaii, Nev.)  
Center for the Health Sciences  
University of California at Los Angeles  
Los Angeles, Calif. 90024  
Librarian: Louise Darling  
Telephone: 213-825-1200  
TWX: 910-342-6897

# THE LIBRARY PUBLISHER

In the library of the Peking Academy of the Medical Sciences in the People's Republic of China, a massive, eight-volume, maroon-bound catalog of the world's most important medical literature published during the past six years occupies nearly two feet of shelf space and the attention of many of the academy's scholarly members. No other library in Mainland China has this important reference work, which lists nearly one hundred books on acupuncture alone, and there are few sets anywhere else in the Orient.

It is the *Current Catalog 1965-1970* of the National Library of Medicine, a sexennial cumulation of acquisitions and one of the largest and most comprehensive publications in the institution's 136-year history. The work contains nearly 8,000 pages listing more than 90,000 titles, weighs 60 pounds and costs \$71.75—a reasonable price tag among the best sellers of the Government Printing Office. It was presented to the Peking Academy on February 23, 1972, by Dr. Walter R. Tkach, Physician to the President, during Mr. Nixon's historic visit to China.



NLM Director Martin M. Cummings, right, welcomes Dr. Walter R. Tkach, Physician to the President, on his arrival at the Library to tell the Board of Regents of some of his medical experiences in Peking during the President's recent visit to China.

Since the first printed catalog appeared in 1864, listing the titles of the entire collection of 1,356 volumes, the Library has continued

to gain recognition as a major publisher of medical bibliographies and indexes. Its best known work, *Index Medicus*, has been a reference source to the world's bioscience literature since 1879. The *Index-Catalog*, now the *Current Catalog*, dates from 1880. Today, with rapid, computer-assisted cumulation, composition, and production, the Library's vast output includes 24 recurring bibliographies, the monthly *Abridged Index Medicus* for clinicians, an increasing number of sponsored monographs and serial publications, numerous pamphlets and brochures, and its own *NLM News*, a monthly information source about the Library directed primarily to the staffs of the nation's health sciences libraries.

## Toxicology Publications

In the specialized field of toxicology, in addition to the quarterly *Toxicity Bibliography*, four publication projects were completed during fiscal year 1972:

- "Index to the Report of the Secretary's Commission on Pesticides and their Relationship to Environmental Health." Use of this document, published in 1969, and known as the "Mrak Report" after the commission chairman, Dr. Emil M. Mrak, chancellor emeritus of the University of California at Davis, previously had been impeded by lack of a proper index, which has now been compiled by NLM staff member Sharon L. Valley, Ph.D. The 310-page volume contains a chemical substance index, subject index, and bibliography. It is available from the Government Printing Office.

- "A Bibliography of Polychlorinated Biphenyls (PCBs) and Related Chlorophenyls: Effect on Health and Environment." By Griffith E. Quimby, Wenatchee, Washington.

- "Requirements for Mathematical Models in the Toxicology Information Program." By Ernest Heilberg and Martin N. Chase of Chase, Rosen and Wallace, Inc.

• "Abstracts on the Health Effects of Environmental Pollutants." This new monthly abstract journal began publication in January 1972 with NLM support of the publisher, BioSciences Information Service. Contents of this new serial are selected from *Biological Abstracts*, *BioResearch Index*, and the Medlars data base. Each issue contains about 1,000 citations and abstracts with author and subject cross-indexing. The ancillary magnetic tape service consists of complete bibliographic citations plus search terms, but no abstracts. *Chemical Abstracts Service* registry numbers are included.



U.S. Representative Durward G. Hall, right, Missouri physician, visits the Library's stacks with his son-in-law, Dr. Monty R. Ellison of Albany, Oregon.

The Library's Specialized Information Services is cooperating with the University of Rochester School of Medicine and Dentistry and Dartmouth Medical School in the preparation and publication of a new edition of the handbook, "Clinical Toxicology of Commercial Products." A totally automated system has been designed and is being implemented at the two medical schools to support the collection, maintenance, and publication of the components and toxicology of more

than 17,000 trade name products. Computerization of the main tabular sections of the handbook will speed the flow of this information to the public in book-form and will also make the data available for use in the on-line retrieval system.

Also in preparation is a toxicology vocabulary that will be published late in 1972. It is intended to be compatible with *Medical Subject Headings (MeSH)* of the Medlars vocabulary.

### Supported Articles and Monographs

Under the provisions of the Medical Library Assistance Act, authors may be given grants to support work in the preparation of manuscripts in the broad field of biology, and the health and biomedical communication sciences. During the year the following four monographs were published as a part of this program:

*The Genera of Ichneumonidae, Part 4.* By Henry Townes. American Entomological Institute, Ann Arbor, Michigan, 1971, 372 pages.

*A History of Medicine in South Carolina, 1900-1970.* By Joseph I. Waring. South Carolina Medical Association, Charleston, South Carolina, 1971, 198 pages.

*Synopsis of the Herpetofauna of Mexico.* By Hobart Smith and Rozella B. Smith. Published by Eric Lundberg, Augusta, West Virginia, 1971, 198 pages.

*Life Cycles of Coccidia of Domestic Animals.* By Hevgeniy M. Kheysin. Edited by Kenneth S. Todd, Jr. Translated by Frederick K. Plous, Jr. University Park Press, Baltimore, 1972, 264 pages.

Eight serials, some published irregularly, were also given support this year. They are: *Arctic Bibliography*, published in Montreal by the Arctic Institute of North America; *Literature References to Mosquitoes and Mosquito-Borne Diseases*, American Mosquito Control Association, Albany, New York; *Journal of Nutrition Education*, Society of Nutrition Education, Berkeley, California; *International Microfilm Journal of Legal Medicine*, Milton Helpen Library of Legal Medicine, Ann Arbor, Michigan; *Current*

*Bibliography of Epidemiology*, American Public Health Association, New York; *New Jersey Mosquito Extermination Association Proceedings*, Entomological Society of America, New Brunswick, New Jersey; *International Journal of Systematic Bacteriology*, International Association of Microbiological Societies, Bethesda, Maryland; and *Atlas of Protein Sequence and Structure*, National Biomedical Research Foundation, Washington, D.C.

### Medical History

*A Catalogue of Incunabula and Sixteenth Century Printed Books in the National Library of Medicine: First Supplement*. This 51-page, casebound volume lists 27 incunabula and 272 sixteenth century books. It supplements *A Catalogue of Incunabula and Manuscripts in the Army Medical Library* (1950), prepared by Dorothy M. Schullian and Francis E. Sommer, and *A Catalogue of Sixteenth Century Printed Books in the National Library of Medicine* (1967), compiled by Richard J. Durling. The former is out of print.

*Bibliography of the History of Medicine, 1964-1969*. A cumulative volume, which covers material published from 1964 through 1969, is the fifth of its series. The volume includes and supersedes the material contained in the preceding four annual bibliographies. It also introduces citations to several thousand additional articles and monographs indexed since the appearance of *Bibliography Number 4* (1968).

### Foreign Authors' Works

In October 1971 more than 500 scientists from 28 countries met in Jerusalem to commemorate the 50th anniversary of the discovery of insulin by Banting and Best in their laboratory in Toronto. A report on the proceedings and texts of 34 papers devoted to the "Impact of Insulin on Metabolic Pathways," edited by Dr. Eleazar Shafrir, was published in the March and June 1972 issues of the *Israel Journal of Medical Sciences* as part of the Library's continuing support of foreign authors under the provisions of the

special foreign currency (P. L. 480) program. In all, 12 critical reviews were published under this program in fiscal year 1972 under agreements in Israel and Poland.

In a presentation to the Board of Regents in November, Dr. Moshe Prywes, editor of the Israeli journal, outlined the program under an agreement with his journal that has produced 45 publications since 1966. Dr. Prywes, a former vice president of the Hebrew University of Jerusalem, has served on the WHO Expert Advisory Panel on Medical Education and as a consultant in medical education to the Rockefeller Foundation.

Additional reports appearing in the *Israel Journal of Medical Sciences* included "Symposium on Cancer and Other Chronic Diseases in Migrants to Israel," edited by Drs. A. Michael Davies and Martin Sacks (December 1971): "Proceedings of the Tel Aviv University Conference on Erythropoiesis," edited by Dr. Yehuda Matoth (August 1971) and published in hard cover by Academic Press under the title, "Erythropoiesis: Regulatory Mechanisms and Developmental Aspects"; "Geographical Epidemiology of the Toxemias of Pregnancy," a critical review by Dr. A. Michael Davies (June 1971), also published as a monograph by Charles C. Thomas; and "Control System Diagrams in Physiology, Biology and Medicine" by Dr. Cecil Allweis (1971 supplement).

Dr. G. I. Poliakov was the author of a monograph, *Neuron Structure of the Brain*, edited by Dr. T. Pridan and translated by Dr. P. Robinson, that was published in Jerusalem by the Israel Program for Scientific Translations and subsequently by the Harvard University Press. A larger volume of 385 pages from the same publishers, *Loss and Restoration of Regenerative Capacity in Tissues and Organs of Animals*, reported the investigations of Dr. L. V. Polezhaev with a translation by Dr. Y. Halperin, edited by O. Weiss.

Polish scientists contributed two monographs to the program. Dr. Henryk G. Godlewski was the senior author of *The Histochemistry of Glycogen and Its Related Enzymes in Normal and Pathological Tissues*,

and Dr. Zdzislaw Rondio prepared a study of *Special Problems of Anesthesia in Infants*. Both were published in Warsaw by PZWL-Polish Medical Publishers.

Dr. Zvonimir Maretic of the Pula Medical Center in Croatia, Yugoslavia prepared a section, "Lactroductism in Mediterranean Countries, Including South Russia, Israel and North Africa," for the third volume of "Venomous Animals and Their Venoms" (Academic Press). The same publisher brought out "Light and Electron Microscopic Radioautography of Lipids: Techniques and Biological Applications," by Drs. Olga Stein and Y. Stein of the Hadassah Medical School in Jerusalem, in the 1971 edition of *Advances in Lipid Research*. "Reconstitution of Biological Membranes," by Dr. Shmuel Razin, also of the Hadassah Medical School, appeared in *Biochemica et Biophysica Acta* (Amsterdam). Two scientists of the Hebrew University in Jerusalem, Drs. Yehuda Lapidot and Nathan de Groot, published their findings of "The Chemical Synthesis and Biochemical Properties of Peptidyl-tRNA" in the 1972 edition of *Progress in Nucleic Acid Research*.

### ***NLM News***

The Library's newsletter, the monthly *NLM News*, more than tripled its circulation, beginning with the issue for January 1972,

by the addition of members of the Medical Library Association and librarians of federal hospitals not previously included, and the editors of leading medical journals. In increasing circulation to more than 3,500 copies, the NLM director told the MLA he welcomed the opportunity to "affirm the National Library of Medicine's commitment to improve information services to the health professional," and that all medical librarians should have "full knowledge" of the Library's policies and programs.

The *NLM News* is a descendent of the *Army Medical Library News Letter*, a mimeographed flyer first published in August 1945 for the Library's consultants. Three months later the publication was renamed the *News* and printed by letter-press. In June 1952 it became the *Armed Forces Medical Library News*, and in October 1956 received its present name. Editor of the *News* is Ann R. Lindsay of the Library's public information office. She is also proceedings editor of the *Bulletin of the Medical Library Association*.

Another monthly newsletter publication, the *Library Network/Medlars Technical Bulletin* since May 1969 has provided information about Medlars (and now MEDLINE) developments for interested medical library staff members. The editor is Grace T. Jenkins, head of the Library's Medlars management section.

# INNOVATIONS IN LEARNING

If "a picture is worth a thousand words," how much more informative is one that can be heard as well as seen? Not only motion pictures, but many types of audiovisual technology are playing an increasingly important role in biomedical communications.

Specialists in the Library's National Medical Audiovisual Center in Atlanta have demonstrated that this new technology can multiply the effectiveness of the individual instructor, enabling him to reach large audiences with better presentations. Self-instructional units may contribute to reducing the length of academic curricula in the health sciences. But most important and challenging is the hope that this improved technology may enable schools of medicine and related biosciences to produce graduates of higher quality in a shorter time and in greater numbers than is possible today with conventional teaching procedures.

In actual operation, the staff of the Center strengthens the educational and informational processes within the health professions by conducting the Library's national program to improve the quality and application of current instructional methodology, materials, systems, services, and functions in biomedical professional schools and among its practitioners. The various programs and activities are complemented by collaborative pooling of resources and activities by the Center and the Office of Audiovisual Educational Development of NIH's Bureau of Health Manpower Education. This unique working relationship of two government activities permits common pursuit of mutual program goals. The Center's primary contribution is its staff resources and expertise, and its broad experience in the various disciplines of nonprint instructional technology. The Office of Audiovisual Educational Development provides the resources for expanded efforts through access to peer review and expertise, budgetary supplementation, and

the vast program support available throughout its parent bureau.

Common areas of program activity have been well defined and priorities indicated by the Board of Regents. Significant progress during fiscal year 1972 included restructuring information dissemination and media distribution programs; the inception of discipline-oriented peer review efforts; the development of workshop and seminar programs most pertinent to identified instructional needs; and efforts in support of the development of instructional materials conceived by bioscience schools best equipped to effectively apply the principles of instructional methodology.

## Evaluation and Acquisition

A national evaluation and acquisition program for instructional materials has been developed by the Audiovisual Center, using product assessments to insure quality acquisitions and a continuing quality control for enriching media distribution collections.

During this initial effort, an analysis of more than 48,000 user evaluation forms indicated that the overall excellent quality of materials now distributed was generally good. A cooperative peer review system is being used to evaluate present holdings and to find and assess new materials. Cooperating national organizations actively involved are the American Association for Cancer Education, American Gastroenterological Association, American Physiological Society, Association of Medical School Pediatric Department Chairmen, Association of Professors of Gynecology and Obstetrics, Veterans Administration, American College of Radiology, American Academy of Dermatology, Society of Nuclear Medicine, American Association of Anatomists, Association of Anatomy Department Chairmen, and the Restorative Dentistry Education Development Committee.

In addition, plans are being established to expand the peer review system to include the American College of Anesthesiology, American College of Cardiology, American Diabetes Association, Association of American Medical Colleges, American Physical Therapy Association, American Academy of Orthopaedic Surgeons, American Society of Internal Medicine, American Academy of Ophthalmology and Otolaryngology, American Association of Schools of Public Health, American Association of Colleges of Pharmacy, and the American Urological Association.

One promising project in progress is an evaluation of three different methods of instruction in the same topic. The University of Texas Southwestern Medical School at Dallas has been commissioned to conduct the evaluation of second-year medical students on the teaching of ophthalmoscopy.

Three sub-groups of students chosen at random each will receive instruction, using the department's normal classroom-lecture method; a set of self-instructional materials in use for about two years; and a set of newly completed self-instructional materials. Comparative results will be carefully analyzed and evaluated.

### **Distribution of Materials**

During the second full year of operation of the automated audiovisual distribution system for the booking and scheduling of motion picture films available for loan, about 100,000 requests were received and processed, and 60,000 films were loaned. There are now 975 active titles in the collection. All have been reviewed and evaluated to verify their relevance in the support of biomedical education. During this year, arrangements were completed to transfer the remainder of the films for public audiences from the Center's loan collection to alternate distribution centers.

Instructional programs in the Center's videotape collection were reproduced and copies furnished to about 1,500 schools for use in teaching programs. The collection was

selectively increased during the year to expand the scope of content coverage, and now includes about 175 titles. Arrangements were also concluded with the General Services Administration to begin offering self-instructional materials for sale through the U.S. Government Film Sales program.

New, updated catalogs of holdings in both the film loan collection and the videotape replication collection were published during the year. They were disseminated to health professions schools and to health sciences libraries. These printed catalogs will serve temporarily in lieu of computer-generated catalogs and searches possible within the anticipated AVLINE (AudioVisuals On-LINE) system. Ultimately, computer searches will allow a far greater response to user needs than is possible now with conventional cataloging techniques.

### **Advisory Services**

Thirteen site surveys of educational institutions were conducted in the Audiovisual Center's consultation programs, including: the Medical College of Pennsylvania, University of Alabama School of Medicine, Hahnemann Medical College and Hospital, Dartmouth Medical School, University of Mississippi Medical Center, Howard University College of Medicine, University of Washington School of Medicine, University of Maryland School of Medicine, University of Texas Medical Branch at Galveston, M. J. Lewi College of Podiatry, and the Tuskegee Institute School of Veterinary Medicine.

The first of a series of post-survey assessment visits was made to the University of Vermont's division of health sciences. This return visit indicated, among other evaluative feedback, that an in-depth survey initially conducted in 1966 was instrumental in the eventual development of a successfully implemented biomedical communications program.

Consultation and advice relating to specific problems and requests were provided both at the schools and at the Center on 106 dif-



ferent occasions with representatives of 71 schools of medicine, five schools of nursing, nine hospitals, seven schools of dentistry, one school of pharmacy, one school of osteopathic medicine, one school of veterinary medicine, and 11 health-related institutions.



View of a television workshop in action on the sound stage of the Library's National Medical Audiovisual Center.

Another new program effort was initiated to send media dissemination teams for the purpose of providing on-site media awareness

and motivational faculty conferences. The first program, entitled "Media Awareness '72," was held at Howard University in May 1972 with 125 faculty members in attendance. Six medical schools and one school of nursing participated in a project of innovative educational programs to document photographically instructional media program activities that could be shared with other schools for orientation and motivational purposes.

A unique demonstration learning resource area was developed and is currently in operation at the Center to provide an opportunity for health professionals to obtain practical hands-on experience with a variety of instructional media modes, different types of learning carrels, experimental student stations, and innovative audiovisual hardware systems. This special area enables the medical educator to conduct a personal assessment of various systems before committing substantial expenditures of funds and time.

### Training Workshops

Through a series of 31 well-attended conferences, seminars, and workshops, the Audiovisual Center has provided specialized training for about 1,200 health sciences teachers and practitioners in:

- The management of audiovisual media in the library or learning resources center.
- The design of learning spaces.
- Evaluation of instructional media.
- Audiovisual production techniques.

The second national two-day conference of directors of biomedical communication, representing 74 medical schools and other health sciences institutions, was held at the Center in October 1971 and again in the fall of 1972. A series of specialized workshops in media management, held at selected locations, was presented in response to an increasing interest in recent years. Sessions were conducted at four medical library society meetings and at the annual meeting of the Medical Library Association in San Diego. Members of the Center's staff also participated as speakers in the annual meetings of the Association of Schools of Allied Health Professions and the American Association of Medical Assistants.

In a unique series of three instructional design workshops, held in cooperation with the Association of Medical School Pediatric Department Chairmen, 35 pediatricians gained familiarity with the methods of design and evaluation of self-instructional media. During a five-day workshop, effective self-instructional packages were designed and faculty participants gained the necessary expertise to develop other effective units. In a supplementary effort, a cluster of ten self-instructional units was designed to supplement medical student teaching in the newborn nursery. These are now in final finishing stages at the schools and will be shared when completed. Thus, pediatric departments will have usable material at a minimal investment to experiment with self-instructional media.

### Media Development

Pilot instructional units were produced during the year, in a three-part series, with the cooperation of the Emory University

School of Medicine department of anatomy: on the anatomy of the femoral triangle, the scapula, and the extensors of the forearm; an eight-part series on ophthalmoscopy; and a three-part series on tonometry, in cooperation with the Association of University Professors for Ophthalmology. All units involved experimental package design and a modular approach. They were evaluated through student tryouts during production, and are presently undergoing field tryouts at selected medical schools.

In the television medium, a significant development was the production of 24 units on neuroanatomy with Dr. Howard Matzke of the University of Kansas School of Medicine. Total running time of the series is nine hours. Included also are correlated slides, a textbook, atlas, and dissection manual. These, together with the tapes, form a complete multimedia teaching package.

A number of instructional design and development efforts are currently being supported by contract in medical schools. The Southern Medical School Consortium, includ-



Close-up photography during the production of a series of dental team management films at the National Medical Audiovisual Center.

ing 29 institutions, is developing 60 hours of instruction in a number of curriculum topic areas. The University of California at Irvine is producing 30 units of instructional videotape materials in the clinical neurosciences. The Society of Nuclear Medicine is planning two sample instructional units. The American Gastroenterological Association is preparing a series of 12 slide/tape lectures. The University of California at San Diego is creating a curriculum definition and a prototype module of instruction in basic medical neurology. Finally, a series of self-instructional units is being built at the University of Florida School of Dentistry. The materials developed for these projects will be disseminated and shared as widely as possible with other biosciences institutions.

### Media Reference Resource

A multimedia reference resource was developed in the reference section of the Library during fiscal years 1970 and 1971. Use of this collection has increased four-fold and requests for audiovisual materials in conjunction with books and journals has become common. In addition to personal use in the reading room, interested groups in the Washington area have used the collection for in-service training and as a supplement to classroom lectures.

The collection now includes more than 1,200 items, comprising 8mm and 16mm motion pictures, videotapes, cassette audiotapes, reel-to-reel audiotapes, and audiovisual kits. The number of media packages received from book publishers, as well as media supplements to texts, has grown steadily. Available for study and as special exhibits in the audiovisual carrels are such media packages as The Femoral Triangle, an Experimental Cooperative Media Development Project in Gross Anatomy; Introduction to the Neurovascular Examination; and Cardiovascular Self-Teaching Materials.

The Library now provides consultation service in connection with media availability, cost, selection, acquisition, cataloging, maintenance, and storage of both media and audiovisual equipment. A notable increase in

the establishment of multimedia collections in other medical libraries has become evident.

A multimedia package (slides, cassette audiotape, and booklet) for the presentation of "Medlars: What It Is, What It Does" was completed and distributed to the Regional Medical Libraries and Medlars centers for use in explaining these services to library users.

### New Techniques

Are notebooks and handwritten lecture notes obsolete? Can today's medical students learn more effectively through the use of a tape recorder, instead? Does one have to spend 45 minutes listening to a play-back of a lecture?

These are some of the questions posed in an experiment conducted by the Library's Lister Hill Center at the George Washington University School of Medicine. Two devices have made this experiment possible: the inexpensive, durable, battery-operated cassette tape recorder, and the "speech compressor," a machine that can reduce the time required to play back a recorded lecture by half.

Last fall, each entering medical student was loaned a tape recorder and encouraged to use it as if it were his own. Only two minor repairs have been needed during the year, and no replacements were necessary. Classroom-taped lectures were made available to the students upon request. Single-concept tapes and slide-sync-tapes were recorded and made available at both normal listening rates and at compressed rates. Tapes recorded in lecture halls, however, because of the high background noise, could not be reproduced at compressed rates.

A student subjective evaluation questionnaire indicated that:

- Sixty percent of the students used their recorders for medical education on an average of three hours per week.
- Eighty-seven percent of the students found the recorder good to excellent. The remaining 13 percent who found it fair to poor did not use the recorder for medical education.

- Forty percent of the students borrowed recorded cassettes from GWU's audiovisual services.

- Sixty-one percent of the students made recordings on their own.

- Forty-five percent of the students would like more compressed tapes made available.

- Sixty-seven percent of the students would like to see this program extended to the sophomore year.

This experiment will be continued for another year, using a new and improved speech compressor, with increased emphasis on training the students in the various audiovisual services available to them.

# AN INTERNATIONAL LIBRARY

The Library's international accomplishments are based in great part on cooperative arrangements for the sharing of time, talent, and resources with foreign libraries, including an acquisition and document exchange program with 700 partners in 70 countries. Under a continuing agreement with the State Department's Agency for International Development, the Library is providing specific services to medical libraries in 47 developing countries. In 1971 these services included 17,000 interlibrary loans, 265 Medlars searches, 51 reference requests, 33 audiovisual loans, and 56 periodical subscriptions.

## Medlars Conference, May 1972

The first International Medlars Policy Meeting was held at the Library with the directors of foreign institutions in which there is a Medlars center, and directors of the Medlars centers. The meeting presented an opportunity to examine the fundamental *quid-pro-quo* principle of cooperation, to assess operations and experience against this principle, and to identify common goals and specific programs for the future.

Recommendations were made on continuing the mechanism of bilateral cooperation; regional coverage; elimination of duplication of effort; the interchange of information and people; and technical cooperation and coordination in medical subject headings, journal selection, and systems cooperation. The group approved the establishment of an International Policy Advisory Group which will include policy-level representatives, accompanied by technical managers, to meet periodically to examine policy issues.

The basic conclusions were that the motivating forces for improving information handling in biomedical communications are enhanced medical research, medical education, and health care. It was recognized that, through new technologic systems, equal and more timely access to medical information can be provided to the user. Future cooper-

ation will depend more intimately on the selection and quality of information, and technology will not be the principle constraint.

Major presentations were made by Dr. Joseph Leiter, Associate Director for Library Operations, and Mary E. Corning, Special Assistant to the Director for International Programs, who reviewed a comparative summary of the various centers' organizations and operational activities. Current programs and planning within their responsibilities were discussed by Associate Directors Davis B. McCarn and Dr. Henry M. Kissman.

Representatives of the various overseas centers at the meeting included Denis Richardson, assistant librarian, and John Vaughn, Medlars center director of the National Library of Australia; Jack E. Brown, chief librarian, National Science Library, National Research Council of Canada, and Ann D. Nevill, director, Canadian Medlars service; Dr. J. F. Duplan, scientific director and Dr. J. Zeraffa, Medlars project officer, of France's Institut National de la Santé et de la Recherche Médicale; H. Theisel of the German Federal Ministry for Youth, Family Affairs and Health, and Dr. Rolf Fritz, director of the Medlars center, Deutsches Institut für Medizinische Dokumentation und Information; Yukio Yamamoto, executive director, Japan Information Center for Science and Technology; Dr. Sune Bergstrom, rector of Sweden's Karolinska Institute, and Dr. Gunvor Svartz-Malmberg of the Institute's Biomedical Documentation Center; H. T. Hookway, United Kingdom assistant under secretary of state, Department of Education and Science, and Dr. A. J. Harley, director, U. K. Medlars service, National Lending Library for Science and Technology; and E. R. Lannon of the Pan American Health Organization (representing Dr. E. Braga, director of the World Health Organization's division of education and training), and H.

A. Izant, WHO chief librarian and Medlars project officer.

### P. L. 480 Program

A 54 percent increase in major foreign projects was attained by the Library during fiscal year 1972 under the international exchange of publications provided by the Agriculture, Trade, Development and Assistance Act of 1954 (Public Law 83-480). Climaxing ten years of the Library's participation in these programs, 117 scientific writing projects were assured support using special foreign currencies in Poland, Yugoslavia, Israel, Egypt, Tunisia, India, and Pakistan.

Two members of the Library's Board of Regents, who visited Israel, Poland, and Yugoslavia during the summer of 1971 to review the P. L. 480 program and confer with the participating scientists, emphasized its important role in providing for an inter-

publication of biomedical journals to include the more selective commissioning of critical reviews of biomedical research and practice in priority health fields. Included also are the translation and publication of significant current and historical monographs in the biomedical sciences; publication of major international symposia and conference proceedings; indexing of foreign-language literature for Medlars and MEDLINE; publication of authoritative bibliographies of world literature in special public health fields; and support of a pilot audiovisual demonstration program for cross-cultural evaluation of audiovisual instructional methods at all levels of medical and paramedical learning.

In addition to the growth in numbers of projects and a rapid development of new critical reviews and biomedical monographs, sponsored under the Library's bloc grant in Poland with the Coordinating Commission for Polish-American Scientific Cooperation,



NLM Director Martin M. Cummings, center, recipient of honorary degree of doctor of medicine from the Karolinska Institute, is shown in Stockholm with Prof. Herbert Olivecrona of Stockholm, left, and Prof. Auguste-Louis Loubatieres of Montpellier, France.

national exchange of ideas and knowledge in the biomedical sciences.

Under Public Law 480, appropriations of blocked currencies are available for scientific writing projects in cooperating countries. Emphasis in this program has gradually shifted from initial support of cover-to-cover, English-language translation, and

expansion of the Library's program for the translation and publication of major historical studies was accomplished in collaboration with the American Association for the History of Medicine.

Through the continuing productive NLM multicategorical Public Law 480 Agreement with the *Israel Journal of Medical Sciences*

**Table 12. Numbers and Types of Active Public Law 480 Projects**

|   | FY 1970 | FY 1971 | FY 1972 |
|---|---------|---------|---------|
| Critical Reviews -----                                      | 19      | 34      | 56      |
| Histories of Medicine -----                                 | 3       | 6       | 9       |
| Translation and Publication of -----<br>Biomedical Journals | 13      | 13      | 13      |
| Translation of Biomedical Monographs -----                  | 1       | 5       | 8       |
| Demand Translations -----                                   | 0       | 2       | 3       |
| Monographs (Research and Publication) -----                 | 1       | 2       | 6       |
| Publication of Conference Proceedings -----                 | 0       | 2       | 5       |
| Audiovisual Programs -----                                  | 1       | 2       | 2       |
| Bibliographies -----  | 1       | 0       | 2       |
| Handbooks -----   | 2       | 3       | 2       |
| Multi-Category Projects -----                               | 4       | 4       | 9       |
| Other -----   | 3       | 3       | 2       |
| Total -----   | 48      | 76      | 117     |

in Jerusalem, 13 critical reviews and special projects were published in fiscal year 1972. The Library has also expanded its program for the translation and publication of significant current biomedical monographs and historical reports, with subsequent distribu-



Two of Poland's leading scientists, Dr. Witold Rudowski, left, chairman of the ministry of health and social welfare's scientific council, and Dr. Janusz Jeljaszewicz, right, chairman of the coordinating commission for Polish-American scientific collaboration, visit with Dr. Jeanne Brand, chief of NLM's International Programs Division.

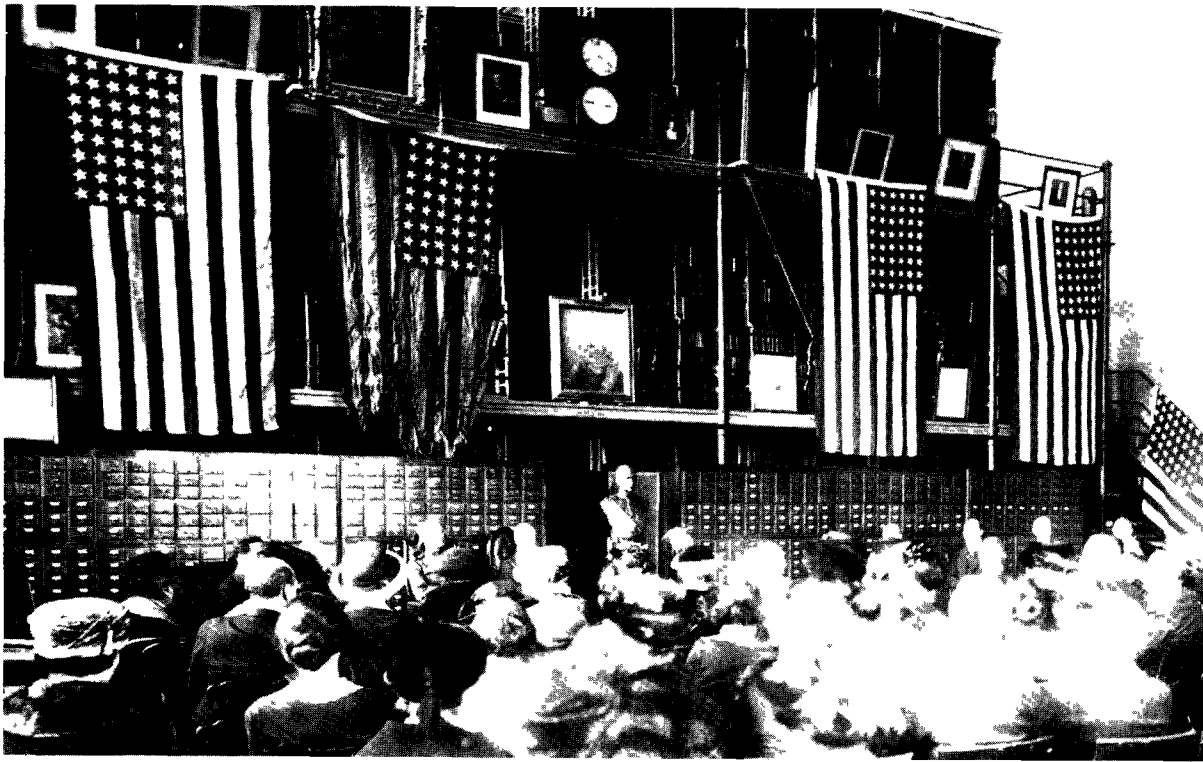
tion by collaborating U.S. university presses and other publishing houses. In developing this program, the Library's staff has worked with many professional organizations, including the American Public Health Association, American Association for the History of Medicine, American Society for Microbiology, American Society of Zoologists, Infectious Diseases Society of America, and

other scientific groups, in obtaining recommendations of priority needs for significant monograph translations.

### International Organizations

In an effort to assist Latin countries to achieve a degree of self-sufficiency in medical library services, the Library continued its cooperation with the Pan American Health Organization and its Regional Library of Medicine in Sao Paulo, Brazil. Special consultation was also provided to the Gorgas Memorial Institute in its deliberations with Central American governmental officials to determine the feasibility of a regional Health Sciences Information Center for the Central American area.

The director served as a member of the U.S. Delegation to the UNESCO intergovernmental meeting which considered the Feasibility Study of a World Science Information System (UNISIST). His special assistant represented the Library at the International Council of Scientific Unions Abstracting Board (ICSU-AB) which the Library has now joined. Both of these activities relate the Library to governmental and non-governmental international efforts in other major disciplines.



Fifty years ago, in ceremonies at the Library, a portrait of Major Gen. William C. Gorgas of yellow fever fame, who was World War I Army surgeon general, was unveiled following his death in London. Twenty-five years later, below, the same reading room, reference desk, and part of stacks looked like this on an average day.





# HEALTH COMMUNICATIONS RESEARCH

An experimental satellite radio medical voice network has been credited by Alaska physicians for helping save the lives of seven seriously ill patients in remote areas of the state by expediting their removal to a hospital or transmitting effective therapeutic advice from physicians to village health aides.

This pioneering effort in health communications research is one of many projects undertaken by the Library's Lister Hill National Center for Biomedical Communications. Envisioned in the Board of Regents 1966 recommendations that created an Office of Associate Director for Research and Development, the Center was named by Congress to honor the distinguished United States senator from Alabama.

The significance of reliable communication in the provision of health services was emphasized by a young Public Health Service physician, Dr. Brian A. Beattie, the satellite communications project officer in Alaska, when he reported recently that "the general population (now) realizes that they can have regular daily access to a physician, even though that access is remote and indirect."

If an emergency occurs, he said, a village health aide "can be almost 100 percent certain" of obtaining advice from a physician immediately, whereas previously there was no reliable method of communication. Transportation, if required, can usually be arranged within 24 hours.

"Health aides in villages with a satellite radio state that they feel much less pressure if they can talk with a physician at a regular time," Dr. Beattie said. "Some say they send fewer people to the hospital because they can talk with the doctor. Frequently, patients are asked to listen to the doctor's voice so that they will know that the health aide's advice has been supported by a physician or has come from a physician."



Dr. Brian A. Beattie, PHS physician and project officer for the Library's Alaskan satellite communications operations, at his office in Anchorage.

## Alaska Satellite Voice Link

Like Alaska, other areas in the United States may receive inadequate health service because of geographic isolation or severe climatic conditions. Shortwave radio waves can travel from a ground station, to a communications satellite, and back to another ground station with far more reliability than normal transmission routes parallel to the earth's surface. A communication satellite can reliably connect isolated communities with physicians, thus providing needed consultation and direction.

Such an experimental network was installed in Alaska, using the National Aeronautics and Space Administration's Application Technology Satellite, ATS-1. This satellite is located in stationary orbit over the

equator at 150° west longitude. It is visible 24 hours a day to more than a third of the earth. The Alaskan network consists of simple, inexpensive terminals in 26 remote villages, and in field service unit hospitals and medical centers, interconnected with a voice link operating through the satellite. Medical traffic is carried two hours a day, seven days a week and has been functioning successfully with very little time lost from ionospheric interference which makes conventional radio useless for long periods.



Health aide in Alaskan village receives medical advice from physician via satellite communication network.

The services provided include:

- Voice consultation between community health aides and physicians at Native Health Service Unit Hospitals, and between physicians and consultants at medical centers.
- Continuing education of health aides, nurses, and physicians.
- Education of villagers in personal health matters.
- Communications between hospitalized patients and their families in native villages.

The purpose of the Alaska experiment is to determine the useful services that can be provided by narrowband communications. Physicians and engineers at Stanford University, the University of Washington, and University of Wisconsin are experimentally transmitting computer-generated data, receiving print materials from unattended

terminals, and transmitting x-rays, other forms of pictures, electrocardiograms, and other physiologic data via the satellite. When the quality is judged adequate and all interfaces between equipments defined, additional services will be incorporated into the Alaskan network to ascertain their contribution to the health care and education of the native population.

A similar network is being planned for Micronesia, the Trust Territory of the Pacific Islands, and American Samoa. Ground stations on at least three islands will be linked to the major medical, educational, and library resources of the University of Hawaii via the ATS-1 satellite.

A recent successful experiment included both the ATS-1 satellite and the wireline network for remote searching of the MEDLINE data base on the Library's computer. A query was sent via the satellite from a terminal at the Anchorage Native Health Service Unit Hospital to Stanford University, where the message was transferred to the data communications network and thence to the NLM computer. The message flow was reversed in answering the query.

## New England Interactive TV Network

Impediments to the success of programs of continuing medical education planned by medical centers for those who practice in mountainous rural areas may be formidable. The harsh climate and rugged terrain of New Hampshire and Vermont encouraged the development of a patchwork of small community hospitals served by medical staffs largely isolated from major medical resources. This reduces opportunities for participation in educational efforts not directed to immediate and relevant patient problems. Younger physicians often avoid professional isolation and shun service in the smaller communities. University medical centers, therefore, must find appropriate means to extend their educational resources

to those who practice in relative isolation without compromising or seriously diverting the limited manpower of the educational institutions.

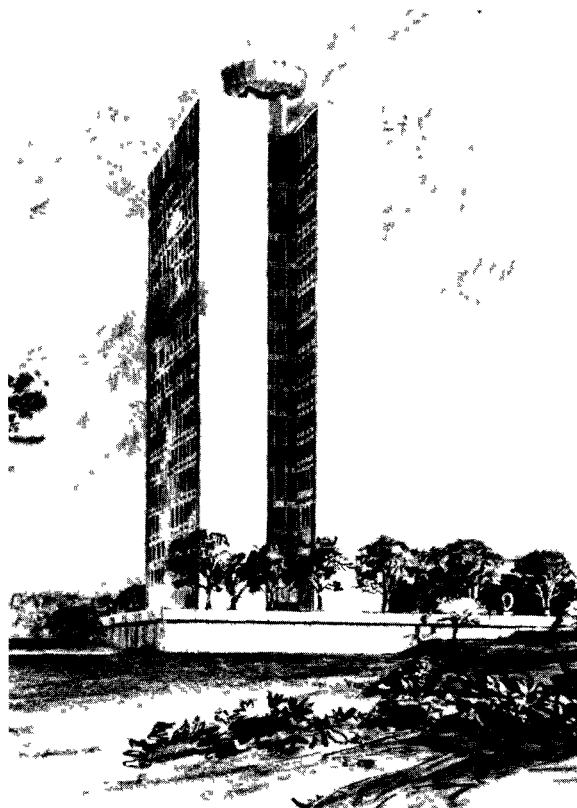
Full, two-way, interactive television is the best, and perhaps the only, method available today for bringing the medical school classroom to the small community hospital and, simultaneously, bringing the busy community practitioner to the university classroom. Physicians in community hospitals can now attend hospital rounds via television with their university colleagues. Nurses in coronary care units can share instruction and experiences in patient care. Medical school faculty members can teach nursing students at the university hospital and at a small local vocational school simultaneously.

These activities are under way through an experimental microwave television link connecting Dartmouth Medical School and University Hospital in Hanover, New Hampshire, with Claremont General Hospital 30 road-miles away. The link was initiated under the sponsorship of the National Institute of Mental Health to provide psychiatric consultation by Dartmouth psychiatrists with general practitioners and their patients in Claremont.

Since July 1970, when the Library assumed sponsorship, uses of the television link have grown and expanded until there are now ten hours of daily scheduled operation for six days a week. All programs are interactive. Staff members at each end of the system actively participate with their colleagues. Prerecorded and one-way programs are not scheduled. Some Claremont physicians are credited with four hours of continuing education a week; the average is 2.5 hours. Nineteen out of 20 of the staff members participate at least once a month. This is a significant increase over the average participation rate in the New England community hospitals reported in other studies.

Construction of a mountaintop microwave network was begun in the spring of 1972, extending 150 miles to the northwest, linking Dartmouth with the University of Vermont College of Medicine in Burlington. Central

Vermont Hospital in Berlin will also join this network. Plans are underway for the resident physicians at the University of Vermont to obtain some of their clinical training in this hospital via television.

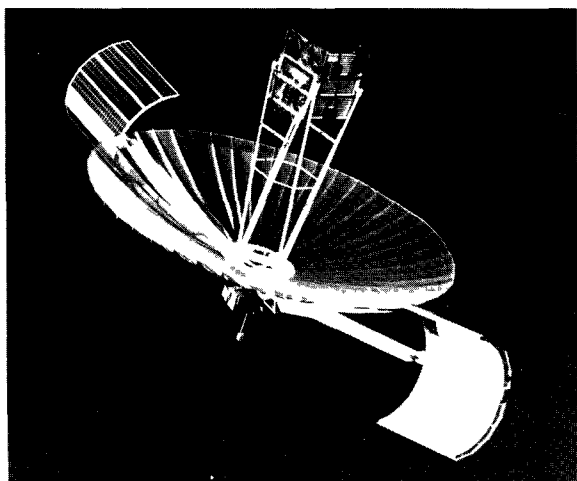


Artist's rendering of annex to National Library of Medicine to be constructed for Lister Hill National Center for Biomedical Communications and other staff operations.

Beginning in fiscal year 1973, television service will be extended to other institutions, including smaller hospitals not requiring programs as often as seven days a week. A van-mounted microwave unit is being designed to provide television service to several community hospitals and clinics within line of sight of one of the network's relay points. The van will carry the television equipment to connect these smaller hospitals to the network on a regularly scheduled basis. This innovative approach should make it possible to provide needed services in areas that do not justify the cost of a fixed installation.

## New NASA ATS-F Satellite

The low-powered ATS-1 satellite used in Alaska is capable only of transmitting narrow-band information. Use of this satellite for television transmission would require large, complex, and costly ground terminals. However, to evaluate the useful services that could be carried via satellite, a full video capability is essential. In 1974, NASA will launch the ATS-F, sixth in a series of experimental satellites designed to explore communications, navigation, and scientific phenomena in space. Recently, receiver and transmitter terminals, specifically for experimentation in health and educational projects, were added to plans for this satellite to provide quality television with simple, inexpensive ground terminals.



NASA's ATS-F satellite which is scheduled to be launched in 1974.

Experiments in this program have not yet been developed fully, but will probably include:

- Medical consultation between physicians and their aides serving Indian populations, and nurses and physicians' assistants working in remote areas.
- Programmed instruction between medical schools, and between medical schools and remote field sites, to explore the feasibility of sharing faculty talents and experience in providing a well-balanced program.
- A combined education and health pro-

gram for migrant workers and their families, using a mobile terminal.

- Continuation of the Alaskan experimental services to remote villages with the addition of video.

In addition to the obvious benefits accruing to health education and patient care, an important objective of satellite experimentation is to develop experience and knowledge in support of biomedical communications requirements for the planning, design, and ultimate development of national communication systems.

## Cable Television Project

During 1971 considerable national attention was focused on cable television. Federal agencies directly concerned with health care planning and professional education developed programs and plans for application of this communication medium to the improvement of the nation's health. The Library's Lister Hill Center supported efforts to establish useful pilot projects in which cable television is incorporated into health care and educational programs.

Several possible sites were examined for trials of cable television among residents of urban ghettos. Ethnic background, population densities, existing health services, and other factors influencing patient care were studied. Rather than attempt to establish new health care methods that use cable television, the communications system initially will be introduced and evaluated in existing health and educational settings where acceptance is already established.

The Mount Sinai-East Harlem project presents an opportunity to develop a unique medical information and education system. The Mount Sinai School of Medicine has responsibility for the health care of the East Harlem section of New York City, which has a population of about 250,000 persons of whom 90 percent are black or Puerto Rican. Many persons are elderly and confined to their homes. Almost one-third live in public housing. This area has almost all the inherent inner-city problems. The residents depend to a large degree on commercial television for

information about the world in which they live. Mount Sinai officials anticipate that two-way interaction with occupants of apartment complexes in East Harlem via cable TV will greatly improve their ability to provide the improved services that are needed.

### Computer Simulation

The computer has been likened to a medical school faculty assistant, a willing, tireless colleague ready 24 hours a day, seven days a week, to teach, review, conduct, and score examinations and even simulate patients with various common or complex conditions. This new service constitutes the biomedical data network portion of the larger Data Communication Service.

Two institutions experienced in the application of computers to undergraduate and continuing medical education, Ohio State University Medical Center and the Laboratory of Computer Sciences of Massachusetts General Hospital and Harvard Medical School, will initially participate in this network. Early next year a third university computer center, at the University of Illinois, will be added to the biomedical data network.

### Lister Hill Center Report to the Congress

In April 1972, the National Library of Medicine published a résumé of current accomplishments achieved in medical communications research and development. This report, "The Lister Hill National Center for Biomedical Communications: Report to the Congress," was requested by the Senate Committee on Appropriations on July 29, 1971 in these words:

"As the success of the Center's efforts will ultimately depend on their acceptance and support by the medical and scientific communities, the Director of the National Library of Medicine and the staff of the Lister Hill Center should prepare an informative report on its prototype experiments—such

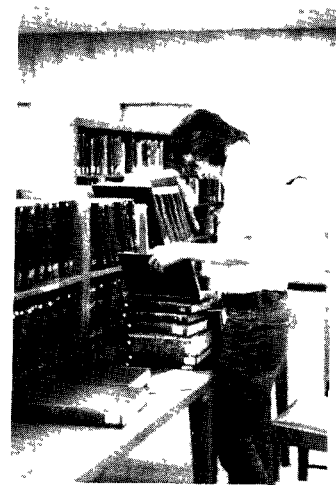


Former Senator Lister Hill, for whom the Library's biomedical communications center has been named, is shown with NLM Director Martin M. Cummings, left, and Dr. Joseph F. Volker, right, president of the University of Alabama, during dedication of the University's new Lister Hill Library of the Health Sciences in Birmingham.

as the satellite communications link with remote regions in Alaska and the two-way television network in New England—and its plans for the future. One of the purposes of the report should be to stimulate awareness of and interest in the ways in which modern communications techniques can be adapted and expanded to serve all facets of health services, biomedical research and the training of health professionals."

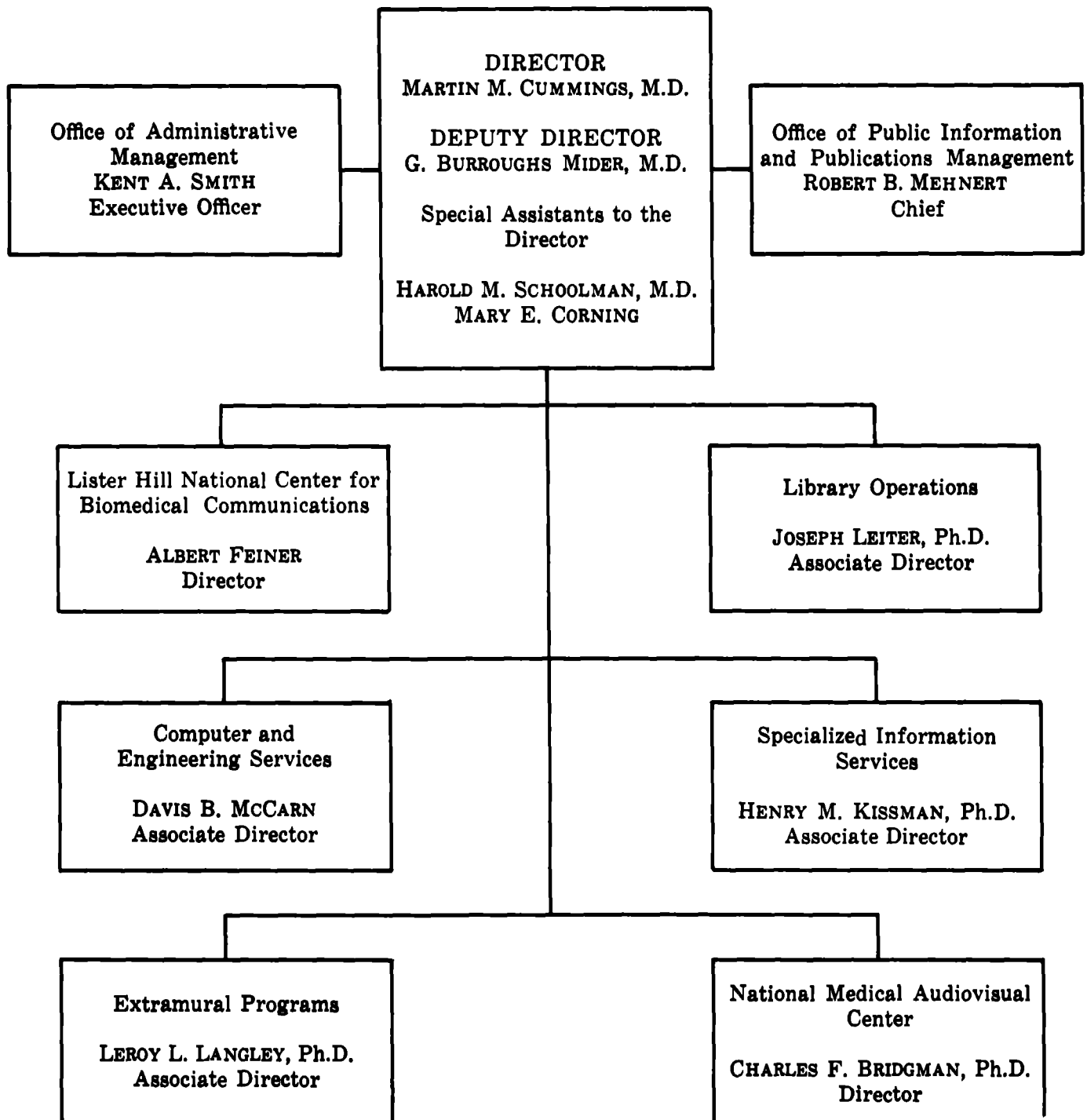
The Center was founded to give impetus and direction to a national program of biomedical communications. The first three years of the Library's Lister Hill National Center for Biomedical Communications were for planning, limited experiments, and pilot projects.

The technologies the Center was created to exploit—satellite communications, cable, microwave television, on-line computer networks—are being used. Experimental and operational networks are now providing service. The networks connect sources of medical knowledge with those who need that knowledge; the swift and certain transmission of electrical messages is substituted whenever and wherever possible for the slow, expensive, and even hazardous movement of people.





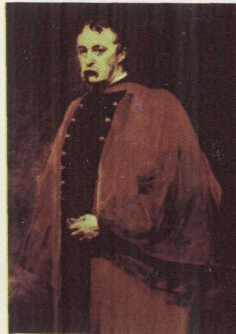
# ORGANIZATION OF NATIONAL LIBRARY OF MEDICINE





## THE BILLINGS ERA

Nearly one hundred years ago Army Surgeon General Joseph K. Barnes, in his annual report for 1873 to Secretary of War, prophetically mentioned "the interest felt by the medical profession of the country in the attempt to establish a National Medical Library worthy of the name."



Dr. John Shaw Billings

A highly professional man, Barnes had more than a passing interest in the growing collection of medical books and pamphlets already in his office when he became surgeon general. He also had the foresight to assign a rising young medical officer to his staff in 1865 and, among numerous administrative duties, to appoint him librarian. His name was John Shaw Billings, and he was to become one of the medical giants of the late nineteenth and early twentieth centuries.

Billings, who gained an international reputation in medical education, public health, hospital design and construction, and vital statistics, attained eminence in medical bibliography and librarianship during the 30 years he headed the Library. Strongly supported by Barnes, he greatly increased acquisitions by purchase, exchanges and gifts, inaugurated loans of books without fees (but required a deposit), initiated a publication program, and fought unrelentingly for a new fire-proof building to house the great collection he was assembling to be a truly National Medical Library.

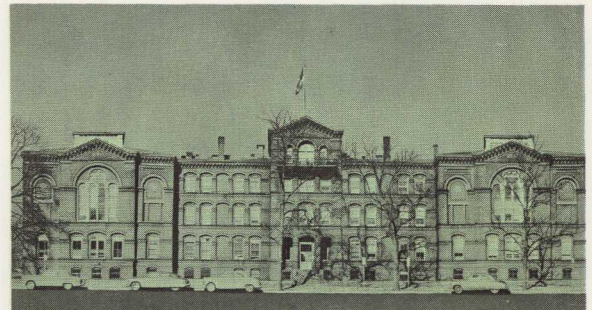


First Serial Publications

Billings' monumental achievement as a librarian was the conception and production of the *Index-Catalogue*, a colossal task of compiling the vast holdings of the library by subject and author in a single alphabet, to provide medical students and practitioners with access

to the available literature. The first of the 16 volumes that were to comprise the first series of the *Index-Catalogue* was published in 1880. The series contained citations to 116,847 books and 191,598 pamphlets, practically all of which Billings had himself added to the Library. With his long-time associate and collaborator, Dr. Robert Fletcher, he also produced the *Index Medicus*, a continuing compilation of current literature.

By the fall of 1887 a new three-story red brick building on the south side of the Mall, designed by Billings, was completed at a cost of \$200,000. This was \$50,000 less than the amount originally requested and necessitated the deletion of many needed facilities and improvisation in other areas. But the task of moving the



On the Mall, 1887-1961

collection, now grown to 51,000 books and about 57,000 pamphlets, was completed in time to belatedly celebrate the Library's fiftieth anniversary in its new home.

The Library continued to grow in resources, services and prestige under the leadership of the distinguished physicians who followed Billings. In 1922 its name was changed to the Army Medical Library. Later, during an era of unification of agencies under the new Department of Defense, it was redesignated the Armed Forces Medical Library. In 1956 an amendment to the Public Health Service Act created the National Library of Medicine under the jurisdiction of the Department of Health, Education and Welfare.

# NEW HORIZONS FOR MEDICAL LIBRARIES

The world's largest collection of health sciences literature of the National Library of Medicine is preserved in a modern, functional structure with an eye-catching, hyperbolic-paraboloid roof in Bethesda, Maryland, that was dedicated in 1961.

Two important factors contribute to the expanding services this great center of information and learning provides physicians and medical students, and other members of the health professions. One is the Library's international computerized system of compiling, storing and retrieving references to medical literature, known as Medlars. The other is the passage of the Medical Library Assistance Act under which, for the first time, grants are available to medical libraries to increase their resources and services. In addition, the law authorized the establishment of the Regional Medical Library Program to develop a nationwide biomedical communications network.

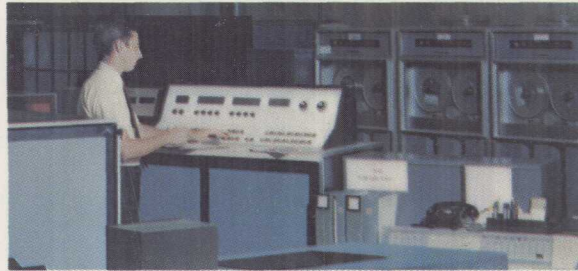
Medlars has also given impetus to the Library's unprecedented publications program. *Index Medicus*, which provides a monthly bibliography of current literature, and the *Current Catalog* are produced more promptly through the use of computer-driven phototypesetters. A popular new publication, *Abridged Index Medicus*, contains literature citations from the 100 most important clinical medical journals



Main Reading Room

printed in English. More than a score of recurring specialized bibliographies cover many of the specialized fields of medicine.

The staff and resources of the National Medical Audiovisual Center in Atlanta, Georgia, formerly a part of the Public Health Service's Center for Communicable Diseases, in 1967 were assigned to the jurisdiction of the National Library of Medicine. By a Senate Joint Resolution in 1968, the Lister Hill National Center for Bio-



Medlars Computer System

medical Communications was established within the National Library of Medicine. This new Center has broad research and development responsibilities in the application of computer and communication technology to medical communications, education and research.

But great advances in communication technology and literature retrieval have not diminished the personal gratification of visiting a library to experience sensory contact with books and their contents. Here the quest for knowledge is more pleasurable and more rewarding. Recently a physician, in concluding a list of acknowledgements in a newly-published book on heart disease, wrote: "In my opinion there is no more satisfactory source of help than librarians. They always seem overjoyed to find somebody who wants to learn something."

The National Library of Medicine is such a learning place for the health professions.



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