Technical Information Activities of the Department of Defense

Prepared by the Special Committee on Technical Information
Research and Development Board, Department of Defense

THE VOLUME OF SCIENTIFIC AND TECHNICAL INFORMATION generated by the many agencies of the Department of Defense represents a significant contribution to the national store of scientific knowledge. It has been estimated that the research and development programs of the Army, Navy, and Air Force agencies produce from 100,000 to 150,000 scientific and technical reports each year. As is true of all scientific literature, the principal problems created by this mass of material are prompt dissemination to all those who need it and its effective organization for retrospective search.

The Research and Development Board, with its responsibility for coordinating the military research and development programs, has a special interest in the technical information problem. In 1948, a Special Committee on Technical Information was established by the board to study methods of effectively reporting, reproducing, organizing, and disseminating information on research and development of interest to the Department of Defense and to encourage research on the application of new methods and techniques to problems of information organization. The first task the committee set for itself was the compilation of an inventory of technical information activities within the military establishment. The third edition of that inventory, issued on September 15, 1951, for limited distribution to Department of Defense agencies and contractors, is condensed here.

Technical intelligence is in a separate category and is not discussed in this paper. This type of information is handled by the intelligence offices of the three military departments and by the Central Intelligence Agency.

Office of the Secretary of Defense

Within the office of the Secretary of Defense, the Research and Development Board (RDB) provides an effective means for the informal exchange of technical information among the military departments. Each meeting, conference, or symposium of the RDB committees and panels is attended by departmental members and representatives who are familiar with the pertinent portions of the research and development programs of their respective military departments.

The Reports and Statistics Branch of the RDB collects and organizes for the use of RDB committees and staff complete descriptions of, and periodic progress reports on, all current research and development projects of the Army, Navy, and Air Force. For each project the title, project number, strategic and technological classification code numbers, fiscal and budget data, etc., are coded on IBM punched cards. It is thus possible for the branch to correlate rapidly the project information in a number of ways.

Early in 1951, a Metallurgical Advisory Board was established within the National Research Council to function as a clearinghouse for metallurgical information from all government sources and to supply such information to the RDB.

Joint Technical Information Activities of the Military Departments

As a result of a study and recommendation of the RDB Special Committee on Technical Information, the Secretary of Defense in May 1951 issued a directive establishing an Armed Services Technical Information Agency (ASTIA). This agency is to provide an integrated program of scientific and technical report services for the Department of Defense and its contractors. ASTIA is to be formed by merging two existing services, the Central Air Documents Office at Dayton, Ohio, and the Navy Research Section at the Library of Congress. It will operate under the policy direction of the Research and Development Board and under the management control of the Department of the Air Force. The agency will collect, index, catalogue, and provide storage for scientific and technical reports of the military departments and their contractors, and reports from certain other sources; prepare and distribute digests and abstracts of the reports; and provide bibliographical and reference services and copies of the reports on either a loan or a retention basis. It will also coordinate the activities of local technical information services in the Department of Defense with its own activities. The precise mode of operation of the agency has not yet been worked out.

This unified technical information agency for the Department of Defense represents a long step forward toward ready accessibility of the technical information produced by the defense agencies. Its functions will continue to be supplemented by those of the smaller centers and libraries within the military departments, or maintained jointly by the departments, which provide immediate, local, detailed, and expert reference assistance in specialized fields of science and technology.

The Central Air Documents Office (CADO), Dayton, Ohio, is a joint activity of the Air Force, the

Navy Bureau of Aeronautics, and the Army. It collects, catalogues, abstracts, reproduces, and distributes on request research and development reports of Army and Air Force agencies, the Bureau of Aeronautics, and their contractors. Its field is not restricted to reports of aeronautical interest—as the name of the agency would imply—for it handles documents in all fields of science and technology. It publishes the monthly *Technical Data Digest,* which contains feature articles on new developments and abstracts of articles of aeronautical interest that have appeared in the open literature. As noted above, CADO is to be merged with the Navy Research Section, Library of Congress, to form the Armed Services Technical Information Agency.

The Chemical-Biological Coordination Center at the National Research Council is supported by the Army, Navy, National Institutes of Health, and American Cancer Society. Information on the biological action of chemical agents is collected from many sources, is coded by means of chemical and biological codes developed by the center, and transferred to IBM punched cards in order to make the information readily available and to discover correlations between chemical structures and biological activity. Bimonthly the center issues a series of *Summary Tables of Biological Tests,* which contain the collected results of tests made on compounds by the center's screening agencies. Reviews covering specific topics have been or are being prepared and printed, and the chemical code mentioned here has also been published. The data in the files of the center are available to representatives of its sponsoring and screening agencies and, upon request, to authorized scientists.

The Army, Navy, and Air Force jointly support the Prevention of Deterioration Center at the National Research Council. The center collects information in its field from government agencies, industrial and academic institutions, and from published literature and patents; it issues *Prevention of Deterioration Abstracts* monthly (approximately 2,000 pages a year) and compiles annual indexes. The subscription fee is $50 a year, and for an additional $10 a year there is available an *Advance List,* which is a monthly bibliography of all reports received by the center. A file of information is being assembled on all compounds tested for fungicidal and bactericidal activity, to facilitate the correlation of chemical structure with biological activity. The services of the center are available for searching the literature to meet the needs of any agency of the Department of Defense.

The work of the Medical Records Section of the Division of Medical Sciences, NRC, is supported in large part by Army, Navy, Air Force, and Veterans Administration contracts. The section has an indexed collection of medical research reports of the four supporting agencies and of the Civil Aeronautics Administration, as well as wartime reports of the Committee on Medical Research and many British medical reports.

The Medical Sciences Information Exchange, NRC, which superseded the Office of Exchange of Information, Public Health Service, was established on July 2, 1950, to serve as a central clearinghouse for information on all current medical research projects supported by grants and contracts of government agencies. It is financed by the agencies concerned (Atomic Energy Commission, Department of Defense, Public Health Service, and Veterans Administration). Similar information is collected from about 50 nonfederal organizations, and summaries of the research in progress are prepared by the investigators performing the work. More than 3,000 active research projects are recorded in the exchange. The information, which is made available to authorized recipients, is indexed to show the subject of investigation, the source and extent of support, and the institutions and investigators responsible for the work.

The Armed Forces Medical Publication Agency, located in the Bureau of Medicine and Surgery, Department of the Navy, publishes the *United States Armed Forces Medical Journal,* which includes original scientific articles on subjects in the fields of medicine, dentistry, and the sciences allied to medicine; articles containing administrative information of interest to military medical personnel; and notices and reviews of recently published books. It is prepared and edited jointly by the Army, Navy, and Air Force, with the position of editor-in-chief rotating among the three departments. The agency also publishes the *Medical Technicians' Bulletin.*

Arctic Roster and Bibliography Project. Under an ONR contract, to which the Army and Air Force also contribute, the Arctic Institute of North America is preparing a comprehensive bibliography on the Arctic and is compiling a roster of personnel who have had firsthand expert knowledge of arctic areas. The bibliography will be published soon in five volumes containing over 20,000 titles and 106,000 cross references.

The RDB Centralizing Activity for Shock and Vibration at the Naval Research Laboratory conducts quarterly symposia on behalf of the board and in the common interest of the three military departments, and serves as a center for the coordination and exchange of technical information in the field of shock and vibration. The Army contributes funds for the support of the activity. The center also makes an annual nation-wide survey of all known research and development in the field.

Department of the Army

Army research and development reports originate in the various technical service agencies, as a result either of contracts with civilian organizations or of research projects in Army laboratories. Each report is first screened locally by the appropriate agency to determine its technical competence. The local agency prepares a distribution list based upon known related projects in other services and departments, and upon requests from other interested agencies. As soon as the list is approved by the chief of the technical ser-

vice concerned, the report is reproduced and distributed directly to all agencies on the list.

The Army Library has an extensive collection—approximately 400,000 volumes and 1,600 periodicals—on military science, military history, science and technology, law, and other subjects. Emphasis is placed on current information useful to the Department of Defense, but special collections of military documents, technical reports, and captured enemy material are maintained.

The Research Branch of the Research and Development Division, G-4 (Logistics), General Staff, has worked on the experimental "Spectrum Analysis" project for coding statistical and fiscal information relative to Army projects on IBM punched cards. Each project has been subdivided to show the proportion of effort expended on every component item and technological development.

The General Reference Branch, Office of the Chief of Military History, Special Staff, maintains an extensive collection of military historical manuscripts prepared by Department of the Army agencies.

The Office of the Adjutant General operates three records centers, located in Washington, D. C., and Kansas City and St. Louis, Mo., to which all defense agencies (except naval) periodically retire noncurrent records that have continuing value. The Washington center, the Departmental Records Branch, now has the records of headquarters agencies for the World War II period and some for the early postwar years, including technical and administrative reports and related correspondence of the military agencies engaged in research and development. The records are catalogued under organizational, geographical, functional, and other subject headings; guides to them are prepared and disseminated; and reference service is provided to persons with authorized, written credentials. A two-volume handbook, *Federal Records of World War II,* published in 1950 by the National Archives and Records Service, contains a general description of the wartime collections in the three centers.

In the Chemical Corps, the Technical Library at the Army Chemical Center, Edgewood, Md., has a comprehensive collection of books and reports on chemical warfare and military chemistry.

The Library of the Office of the Chief of Engineers is a working library for the Corps of Engineers, maintaining a collection of technical and scientific books, periodicals, and reports, and issuing accessions lists periodically. The Engineer School Library, Fort Belvoir, Va., for professional reference work, is the depository for the Corps of Engineers. It issues a periodic book-accessions list, and it publishes a *Weekly Periodical Index,* which covers pertinent engineering articles appearing in journals received in the library and reports from sources such as the Engineer School and experimental stations. At the Engineer Research and Development Laboratories, Fort Belvoir, the Technical Library maintains a technical and scientific collection of books and periodicals, and publishes a monthly accessions list; the Reports Section keeps a file of all reports published by ERDL or received from the various test stations. The Research Center Library of the U. S. Waterways Experiment Station at Vicksburg, Miss., maintains technical and scientific publications and extensive files on hydraulics and concrete, and issues periodic accessions lists. The Library Branch, Army Map Service, specializes in books, topographic maps, and documents pertaining to its field of interest.

An annotated bibliography on snow, ice, permafrost, and allied subjects is being prepared by the Science Division, Library of Congress, under contract with the Corps of Engineers. The search for material includes all pertinent literature, exclusive of fiction and travel.

The Army Medical Library has the largest reference collection in the United States covering the field of medicine and, in reality, it serves as the national medical library. It publishes monthly the *Current List of Medical Literature,* with coverage of 1,430 journals. Each issue comprises a list of articles and an author and subject index. The indexes are cumulated annually. In a large measure and on a current basis, the *List* fills the place of the *Index-Catalogue of the Surgeon General's Library,* which is being discontinued with the volume now in preparation.

The Research Branch of the Medical Research and Development Board, Office of the Surgeon General, has complete files of medical research reports submitted by investigators under contract to the Army and by Army medical research installations.

A Committee of Consultants for the Study of Indexes to Medical Literature Published by the Army Medical Library, established by the Surgeon General, has been investigating the problems of medical indexing as they affect medical research and has made the decision to discontinue publication of the *Index-Catalogue.* To assist the committee in its work, a contract was established with The Johns Hopkins University, under which the Welch Medical Library is studying methods of organizing medical information.

The Technical Reports Section of the Ordnance Research and Development Division has the responsibility for an indexed collection of all Army Ordnance technical reports, as well as reports from other sources of interest to the Ordnance Corps. "Ordnance Technical Index of Environmental Factors" is the name of a project established at Aberdeen Proving Ground, Aberdeen, Md., to collect, organize, and make available information regarding environmental factors and their effect on ordnance material, field operations, and related matters.

In the Quartermaster Corps, the Research and Development Branch of the Military Planning Division has a Technical Library at the Philadelphia Quartermaster Depot, a Technical Information Section at the Chicago Quartermaster Depot, and a Research Information Section in Washington. The three combined have a nearly complete collection of the quartermaster research and development reports. A quarterly *Activi-*

ties Report, prepared and distributed by the Technical Information Section in Chicago, outlines the unclassified projects on subsistence and packaging.

A *Survey of Food and Nutrition Research in the United States, 1948 to 1949* (2nd ed.) has been issued by the Committee on Survey of Food and Nutrition Research, of the Food and Nutrition Board, NRC. This survey was partially supported by the Quartermaster Corps, and the publication may be obtained from the Office of Technical Services, Department of Commerce, at $1.75. The current edition lists approximately 4,500 projects, which are supported by some 650 organizations, and approximately 6,000 persons who are engaged on the projects.

The Signal Corps research and development program is conducted at the Signal Corps Engineering Laboratories, Fort Monmouth, N. J. The library at Evans Signal Laboratory keeps a file of technical reports pertinent to Signal Corps interests, including those reports prepared at SCEL. Twice a month the library publishes *Science Briefs,* which contains abstracts of periodical articles; and a *Library Bulletin,* an accessions list, is issued approximately three times every two months.

Department of the Navy

The Department of the Navy encourages as wide a distribution of general technical information as is practicable through the publication of articles in scientific journals. Distribution of scientific reports, however, is based on a "need-to-know" policy because of security restrictions and the high cost of reproduction and distribution. Figs. 1 and 2 show graphically the extensive crossflow of material within the departmental organization. The bureau designation serves as a convenient division of the stock of technical information—e.g., *Aeronautics* for naval air information; *Ships* for machinery, hulls, and equipment; and *Ordnance* for explosives and guns. Information under these broad categories is supplied by the bureaus, upon request, to interested persons and agencies.

Research Reviews, published monthly by the Office of Naval Research, for official use only, contains semitechnical articles summarizing research developments in various fields. It is distributed to the fleet, to colleges and universities performing basic research under ONR contracts, and to members of the Naval Research Reserve. Information on current developments in various digital-computer projects within the Department of Defense is published by ONR in an unclassified *Digital Computer Newsletter,* which is distributed periodically to persons interested in this topic.

The Navy Research Section of the Science Division, Library of Congress, is operated under a contract between the ONR and the library. It collects, catalogues, and abstracts technical reports issued by the various bureaus, offices, and contractors of the Department of Defense, and provides them loan and reference service.

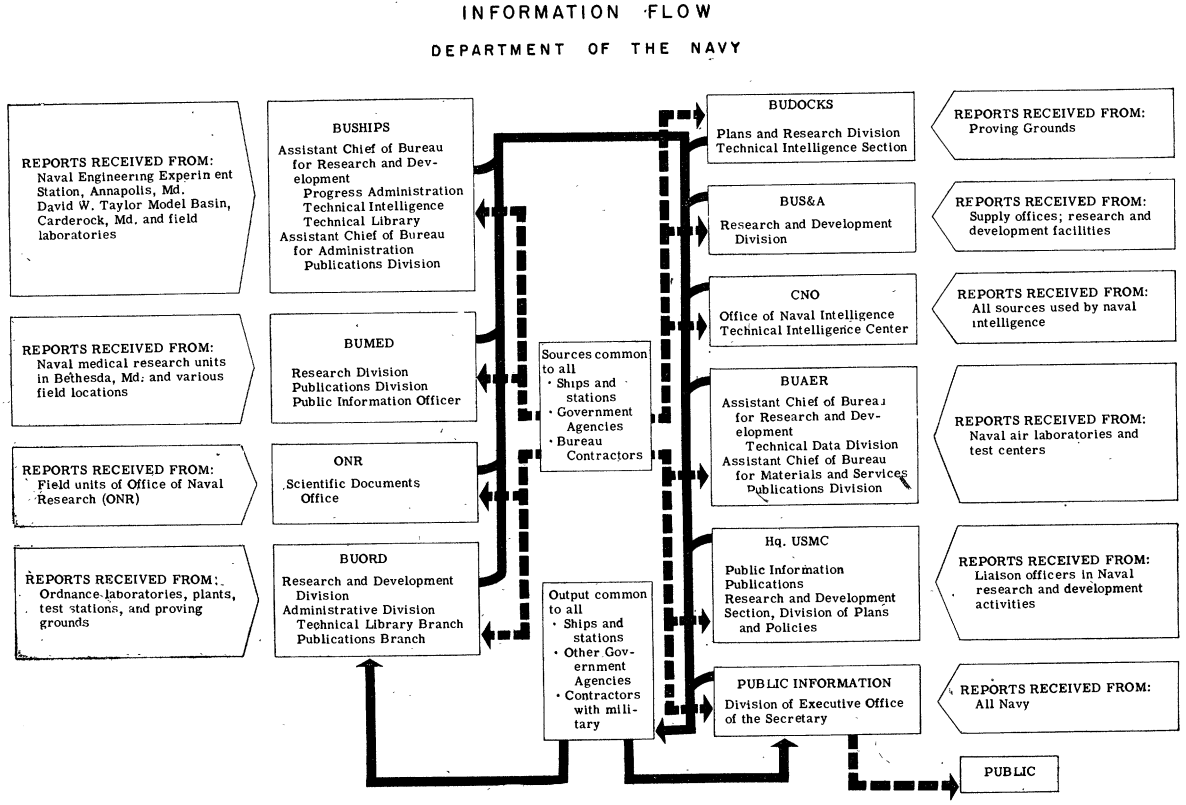

FIG. 1.

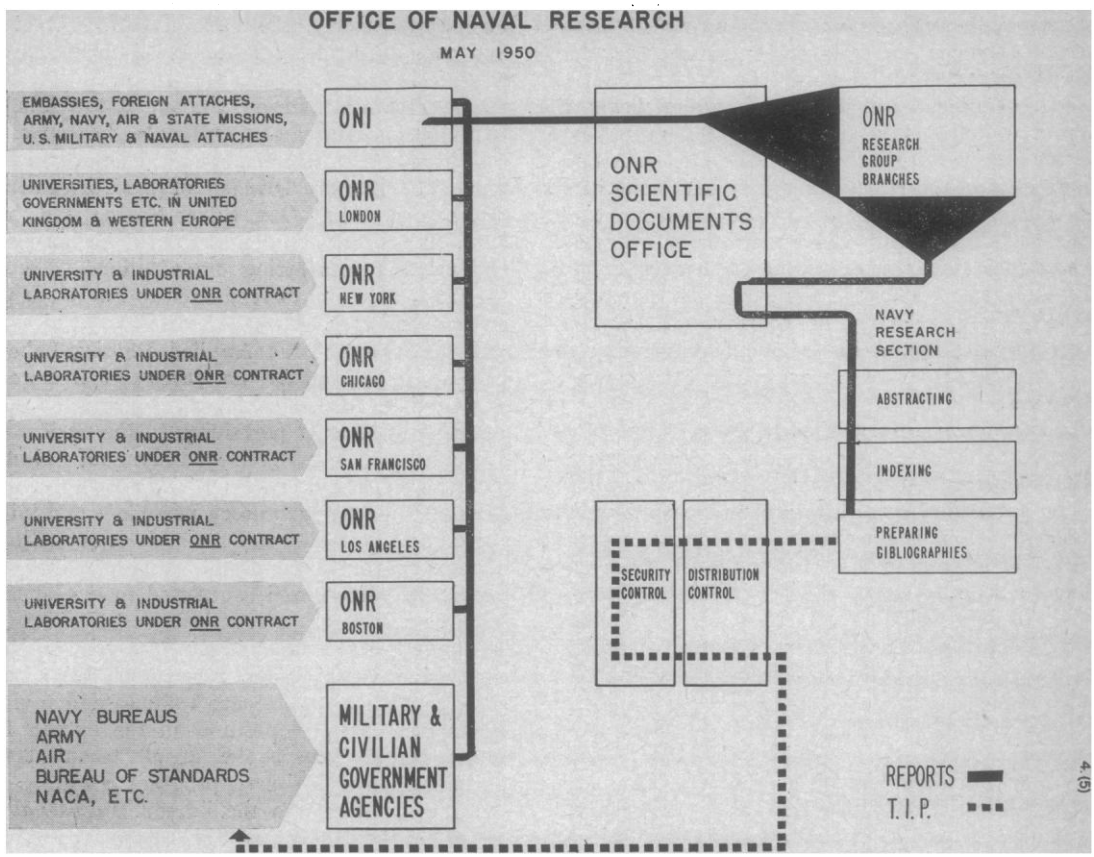

FIG. 2.

Abstracts of the reports are published and distributed in a journal entitled *Technical Information Pilot* (TIP) and also on catalogue cards called TIP cards. TIP cards backed with a microcard copy of the entire report are available, on request, to recipients of TIP. A comprehensive catalogue of all reports of the Office of Scientific Research and Development is being prepared. The Documentation Research Unit of NRS is conducting or planning studies in microreproduction techniques, coding systems and their use in mechanical searching devices, adaptation of facsimile and comparable developments to remote "browsing" and to the recording of transmitted information, etc. NRS is soon to be merged with the Central Air Documents Office to form the Armed Services Technical Information Agency.

The Special Devices Center, Port Washington, N. Y., an ONR facility, receives reports resulting from the research and development work of contractors to the center and of center engineers and project supervisors. The *Bibliography of Human Engineering Reports*, NavExos P-530-B, issued November 1, 1949, and its periodic supplements list the reports of contractors working on various human engineering projects.

The Committee on Undersea Warfare of the NRC, supported by an ONR contract, collects and indexes reports on many aspects of undersea and antisubmarine warfare. From time to time its panels prepare compilations of the most up-to-date scientific and technical information in their respective fields of interest. Each year in May, the committee sponsors a two-day symposium, which brings together experts in the field for the purpose of exchanging information and discussing problems.

Under an ONR contract, the Research Analysis Group in the Physics Department of Brown University maintains a relatively complete collection of reports and documents covering research in underwater sound. The Ohio State University Research Foundation is making a Survey of the Literature on Nitro Aliphatic Chemistry. The work is supported by ONR, the Bureau of Aeronautics, and the Bureau of Ordnance. Abstracts of all pertinent articles and reports are being prepared and will be organized into serialized sets of convenient volumes. A code is being developed, and IBM cards and equipment will be used for mechanical sorting of the material by subject matter.

Under an ONR contract, to which the Atomic

Energy Commission also contributes, the National Research Council is preparing for publication in nine sections a *Glossary of Terms Used in Nuclear Science and Technology*; six sections of this glossary have already appeared. It is published by the American Society of Mechanical Engineers, which bears the expense of publication and sells the volumes at cost.

Under contract with the ONR, the Psycho-Acoustic Laboratory of Harvard University has compiled a two-volume bibliography on audition, which includes some 5,500 titles. The bibliography is supplemented by a topical index with six major headings: basic references, the anatomy of the ear, the physiology of the ear, the psychology of hearing, deafness, and theories of hearing. A limited number of copies can be purchased from the Harvard University Press at $3.00 each.

The Technical Information Division of the Naval Research Laboratory serves as a clearinghouse for both incoming and outgoing technical information and prepares the formal laboratory reports. A weekly *Library Bulletin* lists accessions and abstracts papers that are of interest to laboratory scientists from some 600 periodicals.

The Hydrographic Office, Office of the Chief of Naval Operations, functions as a central depository for oceanographic, hydrographic, and charting data, including much polar information in the geophysical sciences. A circular which lists the navigational books and charts published and sold by the office is available. The Hydrographic Office Library has an extensive collection of books, periodicals, and documents on navigation, oceanography, geophysical sciences, chemistry, cartography, photogrammetry, arctic and antarctic expeditions, and related subjects. An accessions list is published about every ten days.

The Woods Hole Oceanographic Institution and the Scripps Institution of Oceanography have a number of contracts with the Department of the Navy to collect and analyze oceanographic data. They keep duplicate files of all bathythermographic information submitted to the Hydrographic Office. Woods Hole submits information on the Atlantic Ocean, and Scripps handles data on the Pacific and Indian oceans. A card index is prepared by Woods Hole for published documents and its own manuscripts. An extensive library of oceanographic publications is maintained by the Scripps Institution.

The Technical Information Branch of the Technical Data Division has two sections that provide reference service for the Bureau of Aeronautics. The Library Section has a collection of scientific books and periodicals. The Bibliographic Research Section collects technical reports covering the bureau's research and development program, as well as many reports of interest received from other sources. This section prepares brief abstracts covering the portions of reports received that are applicable to the work of the bureau.

The Research Division of the Bureau of Medicine and Surgery maintains a complete file, arranged by project, of all reports issued by naval medical research laboratories. The Library of the Naval Medical Research Institute, Bethesda, Md., receives copies of all reports covering the research work of the institute and many issued by other naval medical research facilities.

The Technical Library Branch of the Administrative Division, Bureau of Ordnance, has an extensive collection of scientific and technical reports and microfilms. The Library Division of the Naval Ordnance Laboratory, White Oak, Silver Spring, Md., receives all NOL reports and reports from the bureau's field stations and contracting organizations. The reports are catalogued and disseminated to interested persons at the laboratory.

The Library of the Applied Physics Laboratory, which is supported by the Bureau of Ordnance, has a specialized collection of books, periodicals, and unclassified documents pertaining to the various phases of guided-missile research—aerodynamics, electronics, ballistics, rocketry, etc. Its *Weekly Bulletin,* which is circulated among laboratory personnel and interested government agencies and research organizations, announces new acquisitions and contains a selected reading list of current articles related to the laboratory's research activities.

The Technical Library in the Research and Development Planning Division, Bureau of Ships, keeps a large collection of reference volumes and periodicals, and serves as the depository in the bureau for the reference and loan copies of all technical reports pertaining to its research program, as well as other reports of interest to the bureau. *Industrial Notes,* issued by the Bureau of Ships approximately every 25 days, disseminates news and information from many sources concerning modern industrial shop techniques; it frequently includes bibliographies on specific topics.

At the David W. Taylor Model Basin, Carderock, Md., the Technical Library has a collection of unclassified and RESTRICTED reports. The most recent *Catalog of David W. Taylor Model Basin Unclassified Publications* is dated February 1951 and covers reports issued through September 1950.

The U. S. Navy Electronics Laboratory Library, San Diego, Calif., receives reports from research and development laboratories, military contractors, government agencies, etc. The library prepares abstracts on catalogue cards for insertion in each technical report issued by the laboratory.

The Bureau of Supplies and Accounts produces technical literature pursuant to its research and development program in the fields of clothing, food, supply engineering (materials and cargo handling, packing, packaging, and preservation), and logistics. This literature is in the custody of the Research and Development Division of the bureau.

DEPARTMENT OF THE AIR FORCE

Several years ago, the Air Force established an Air Documents Division at Wright-Patterson Air Force

Base, to serve as a documentation center for all Air Force technical reports and for pertinent technical material collected from other sources. In October 1948, it became a joint activity of the Air Force and the Navy Bureau of Aeronautics and was renamed the Central Air Documents Office. Later, the Army made arrangements to participate in the activity. CADO is thus described as a joint technical information activity of the military departments.

The Air Force Administrative Reference Branch, Mail and Records Division, Office of the Air Adjutant General, provides offices of Headquarters, USAF, Air Force field activities, and other government agencies with documentary reference and research assistance on the general subject of aviation and on administrative, technical, current, and historical matters pertaining to Air Force activities. It does not have sufficient personnel or facilities to extend its service beyond government agencies. Its collection consists of approximately 30,000 official documents and periodicals covering the various phases of military aeronautics. Indexes, guides, and catalogues are maintained for use in servicing the records collections.

The Technical Information Branch of the Medical Research Division, Office of the Surgeon General, maintains a file of all Air Force medical research reports—namely, those of the Aero Medical Laboratory, the School of Aviation Medicine, and the Arctic Medical Laboratory. The reports are indexed by subject, author, and project number.

The Directorate of Flight Safety Research, Norton Air Force Base, San Bernardino, Calif., as a part of its program of aircraft accident prevention, prepares, publishes, and disseminates technical documents pertaining to flight safety in the Air Force.

The Arctic, Desert, Tropic Information Center, Air University Research Studies Institute, Maxwell Air Force Base, Ala., collects, catalogues, and makes available for reference all arctic, desert, and tropic information currently being compiled in federal and civilian research agencies. The information collected is scientifically evaluated and collated with other information bearing on Air Force activities and operations in the nontemperate zones. The center writes, edits, and publishes information concerning arctic, desert, and tropic areas and disseminates the published material to requesting agencies.

The Air Force Libraries listed below have specialized scientific collections. The fields covered by most of them are apparent from their names.

Radio Physics Library
Air Force Cambridge Research Laboratories
230 Albany St.
Cambridge, Mass.

Geophysical Research Library
Air Force Cambridge Research Laboratories
230 Albany St.
Cambridge, Mass.

USAF School of Aviation Medicine Library
Randolph Air Force Base, Tex.

Patrick Air Force Base Library
Cocoa, Fla.
(This is a new library for the long-range proving ground, which is just in the process of assembling a collection of books and documents.)

Rome Air Development Center Library (communications)
Griffiss Air Force Base
Rome, N. Y.

Special Weapons Command Library (atomic energy)
Kirtland Air Force Base, N. M.

The Air University Library, Maxwell Field, Montgomery, Ala., has a virtually complete collection of all Air Force reports and documents. It issues periodically a *List of Selected Accessions—Books* and has recently begun the publication of a quarterly *Periodical Index,* a subject index to articles in 24 periodicals, largely military, the majority of which are not covered by commercially published indexes.

The Technical Library, Wright-Patterson Air Force Base, Dayton, Ohio, has one of the largest collections of aeronautical literature in the U. S., including material in the fields of aeromedicine, strength of materials, and electronics. It has a complete file of Air Force technical reports and many documents from other sources. A bimonthly, annotated accessions list, entitled *The Book Shelf,* is published.

The Air Proving Ground Command Library, Eglin Field, Fla., accumulates and disseminates technical reports prepared as a result of Air Proving Ground Command activities. It has an extensive file of Air Force and other research and development reports.

The Research Library, Human Resources Research Center, Lackland Air Force Base, San Antonio, Tex., has a collection of books and periodicals concerning personnel selection and classification, proficiency measurement, training methods, perceptual and motor skills, human relations and morale, etc. The library also maintains voluminous reference files of reports from military and civilian research organizations, photoprints of pertinent articles from magazines and books, military and commercial tests of aptitudes, intelligence, and personality components, and other source materials valuable to the research activities of the center.

Other Agencies

The following technical information activities of other government agencies and of one nongovernmental organization are of particular interest to defense agencies.

Complete, indexed collections of all Atomic Energy Commission scientific and technical reports are maintained by the Technical Information Service in the Washington and Oak Ridge offices. Nearly complete collections are available at all the AEC's major laboratories. In addition, complete, indexed collections of all nonsecret AEC scientific and technical reports are maintained at 40 libraries strategically located throughout the U. S. *Nuclear Science Abstracts,* published semimonthly, covers all declassified and un-

classified AEC reports and, as extensively as possible, both foreign and domestic publications pertaining to nuclear science. The "National Nuclear Energy Series," a 50–60-volume series (of which 17 volumes have already been published), presents the scientific developments of the Manhattan District and the AEC programs. Brookhaven National Laboratory prepares and publishes periodically a *Guide to Russian Scientific Literature,* which is primarily a translated title list of the articles in the Russian scientific periodicals received by the library. This *Guide,* the *Nuclear Science Abstracts,* and nonsecret AEC reports not published elsewhere are obtainable by purchase from the Office of Technical Services, Department of Commerce. A 40-page *Index to the Semiannual Reports to Congress, January 1947–January 1951,* which can be purchased for 20 cents from the Superintendent of Documents, serves as a guide to the unclassified progress and activities of the AEC as recorded in its semiannual report.

A complete collection of all National Advisory Committee for Aeronautics reports is maintained by its Office of Aeronautical Intelligence at 1724 F St., N. W., Washington, D. C. In addition, there are files of aeronautical documents received from military, industrial, and British sources since about 1918. The *Index of NACA Publications, 1915–1949* lists by subject all unclassified NACA reports issued during that period, and an author index is in the process of publication. The biweekly *NACA Research Abstracts* contains abstracts of unclassified and declassified NACA and British reports. An author index to the abstract bulletin will be issued yearly.

The Civil Aeronautics Administration Library maintains complete, indexed collections of all CAA technical reports, all reports of the National Advisory Committee for Aeronautics, and all documents, most of them technical, of the International Civil Aviation Organization.

The National Security Resources Board has established the National Scientific Register under the Office of Education, Federal Security Agency. This project is developing a comprehensive inventory of the names, locations, and skills of American scientists and technologists. It is anticipated that the function will be transferred to the National Science Foundation when that agency is in a position to take over the work. In developing the current register, the project is making full use of the roster of scientists assembled by the National Research Council and of the Engineers Joint Council survey of engineers, both prepared under contract with the Office of Naval Research. The two studies were supported jointly by the Army, Navy, and Air Force.

The Office of Technical Services, Department of Commerce, collects unclassified and declassified scientific and technical reports on wartime and postwar research by U. S. government agencies, reports on research by cooperating foreign governments, and technical documents captured in enemy countries. The *OTS Bibliography of Technical Reports* (formerly the *Bibliography of Scientific and Industrial Reports*), now in its fifth year, lists the items as they are received and abstracts most of them. The subscription price has been reduced from $10 to $5 a year. Subject indexes to most of the volumes have been published. The *Technical Reports Newsletter,* which highlights selected items considered to be of special interest to small business, may be purchased as a part of the bibliography or obtained separately at a cost of 50 cents a year. A bulletin on shop practices, entitled *Defense Production Aids,* is issued at frequent intervals for nation-wide distribution to industry.

The National Bureau of Standards publishes the monthly *Journal of Research of the National Bureau of Standards* (annual subscription, $5.50), which contains research papers in the fields of physics, mathematics, chemistry, and engineering; and the monthly *Technical News Bulletin* (annual subscription, $1.00), which contains interim reports of the bureau's current projects, summaries of completed projects, and a bibliography of all NBS publications of the preceding month.

The Science Division of the Library of Congress has initiated a program to promote fuller utilization of the library's resources in science and technology. Surveys to identify the holdings in these fields are being made, and this information will be brought to the attention of scientists and librarians. Improvements in the organization and servicing of this material are being undertaken in consultation with specialists and librarians in various scientific disciplines. A central catalogue of English translations and abstracts of Slavic publications and documents is also being maintained by the Library of Congress experimentally for the benefit of government agencies. The library's services in connection with this catalogue are extended to any interested persons or organizations.

The Library of the Institute of the Aeronautical Sciences, 2 E. 64th St., New York 21, receives many aeronautical reports and translations from U. S. government agencies and from many foreign countries. The library maintains a complete card index, supplied by the Central Air Documents Office, covering 55,000 captured enemy documents, and has on file microfilm or full-sized copies of about 25,000 of these documents. Reference services are provided, and translations are prepared for members of the institute and others engaged in research. The Editorial Department produces the monthly *Aeronautical Engineering Review* and the annual *Aeronautical Engineering Index,* available by subscription and sale. These publications contain annually about 5,000 abstracts and cover some 400 books.

The Pacific Aeronautical Library of the Institute of the Aeronautical Sciences, 7660 Beverly Blvd., Los Angeles, Calif., which is supported by five major aircraft companies on the West Coast, has in its collection reports issued by the National Advisory Committee for Aeronautics, the Civil Aeronautics Administration, and the British Air Ministry; many foreign reports, pamphlets, and preprints; the papers of

many technical societies; the Joint Army-Navy-Air Documents Foreign Index, a card file on some 55,000 captured German and Japanese reports, together with two million feet of film covering the original documents and several thousand of the translated reports. The library issues a semiweekly checklist of magazine articles arranged by subject and a weekly magazine index on cards, covering material of particular interest to the aircraft industry and material not indexed by the *Industrial Arts Index*. A catalogue service covering all reports received is provided. These are available to any qualified person through subscription, at cost.

The information services and libraries, which have been described briefly, are making every effort to ensure that administrators, scientists, and contractors of the agencies they serve are provided with the technical information they need. Thus, they are all making important contributions toward the success of current research and development programs. The exchange of reports between the document-handling agencies is in many cases nearly adequate, yet more channels of communication between them should be established. It is hoped that the Armed Services Technical Information Agency will try to solve many of the communication problems. A precise description of the holdings of the various agencies would also be of assistance. They do not have all the personnel and equipment that might be desired in order to perform their tasks as effectively as possible. As time goes on, it is hoped that improved methods and techniques for organizing and disseminating technical information will permit these agencies to provide better and more prompt service with the present facilities. A thorough analysis of the users' needs for various types of information services is urgently needed. The science of technical information management offers a virgin field for research on basic principles of information organization. The development of new and more effective methods and techniques of dissemination and control would make it possible for the country to realize even greater returns from the hundreds of millions of dollars spent yearly for research and development.

Technical Papers

Does the Mangrove Really Plant Its Seedlings?

Carl D. La Rue and Thomas J. Muzik

University of Michigan, Ann Arbor, and *Federal Experiment Station, Mayaguez, Puerto Rico*

The old story of the manner in which the viviparous embryos of the mangrove germinate on the parent plant, grow to a length of 35 cm or more, and eventually break loose and plunge their root tips into the mud below, thus successfully planting themselves, has been called in question by Egler (*1*) and Lawrence (*2*), who reported that seedlings that fell flat in the mud could curve so that their stems grew upright, and that very few were naturally planted upright.

The authors have had an excellent opportunity to study the seedlings of *Rhizophora mangle* L., the black mangrove, and have tried to find out whether the old story is true. In three areas of a typical mangrove swamp, counts were made of straight seedlings that had planted themselves in the mud and of those that had fallen flat in the mud and had bent so as to bring the stem tip into a vertical position. The results are shown in Table 1.

TABLE 1

STRAIGHT AND CURVED SEEDLINGS OF BLACK MANGROVE

Lot	Straight	Curved	Total	Curved (%)
A	96	4	100	4.0
B	48	2	50	4.0
C	131	7	138	5.1

It appears that the percentage of seedlings planted vertically in the mud is very high. Tidal action was not very strong, and little washing around of seedlings was observed during frequent visits over a period of more than 3 months. Very few embryos were found lying in the ground or entangled among the interwoven roots of the mangrove plants. The greater number are undoubtedly planted directly upon falling from the tree.

Seedlings were dropped into the tidal mud to see whether they would thus be planted deep enough to resist being floated free by the tide (Table 2). Each of the test drops drove the root tip deeply enough into the mud to offer sufficient resistance to withdrawal to prevent floating away even by fairly high

TABLE 2

DEPTH OF PLANTING OF MANGROVE SEEDLINGS

Distance of drop (meters)	Wt of seedling (grams)	No. trials	Depth of planting (cm)		
			Least	Greatest	Av
1	27.9	10	3.0	4.4	3.8
2	26.8	6	3.8	7.3	4.9
2	24.0	12	3.8	5.7	4.3
2	29.1	5	4.2	5.8	5.0
2	24.8	15	3.9	6.5	5.2