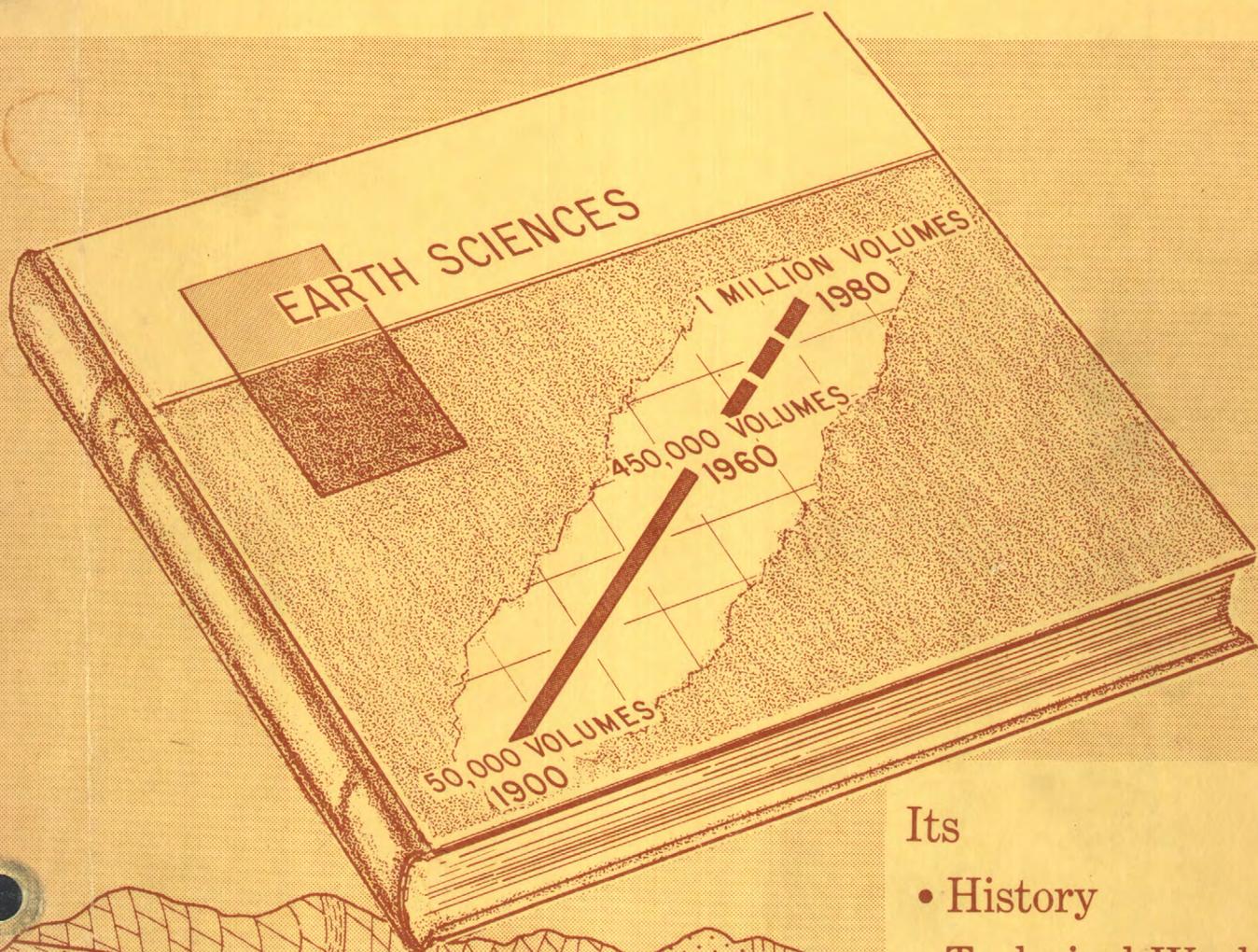


REPORT ON THE

# GEOLOGICAL SURVEY LIBRARY



Its

- History
- Technical Work
- Resources
- Management

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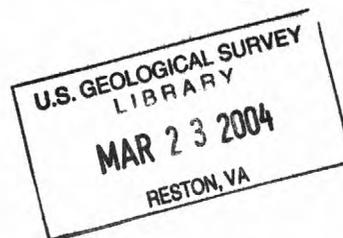


REPORT ON THE GEOLOGICAL SURVEY LIBRARY

"...It is essential that the geologic investigator, if he seeks to maintain a place in the foremost ranks of the science, shall keep himself constantly familiar with the current geologic literature of this and other countries..."

(Statement by Major John Wesley Powell in the Eighth Annual Report of the Director, Geological Survey, 1886-87, pp. 54-55)

W. C. Irving  
Office of the Chief Geologist  
April 16, 1962



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## I. INTRODUCTION

One of the limitations under which any library operates is the image it creates as a storehouse. This aspect can obscure the purposes and activities which make one library differ from another. In an institutional library, like the Survey's, the library purposes are related to the changing life of the organization, and to the world of ideas and facts it mirrors.

What goes on inside the Survey Library is understandable only in part from the standard practices it shares with other libraries as we view them today. For the other part, deeply rooted in the history and traditions of the organization, the understanding arises from the history that has made it what it is. This report will first provide, therefore, an historical sketch of the Survey Library with particular reference to its development over three-quarters of a century, to the philosophy of librarianship that has animated it, and to the future growth to which it is committed.

By design and history, the Survey Library is a special library, maintained primarily for the benefit of Survey workers. This report will review the main routines and characteristics of the "special" aspects of the library operations.

Personnel and funds of the library have increased many-fold during the past decade, roughly parallel to the growth of the Geological Survey.

This expansion is in sharp contrast to a long span of lean years when the library piled up a backlog of tasks partly finished or not done at all because of limited funds and staff. This report will describe the resources in personnel, funds, equipment and space available in the past and now to the library, their sufficiency, and the outlook for future growth. It will be demonstrated that the library's need for resources will continue to expand for reasons that are partly independent of any future growth of Survey employment.

Finally, against the background of history, functions, resources and problems described, the report will attempt to express some measure of effectiveness for the management of the library. A measure of effectiveness is simply an expression of the degree to which a system fulfills its objectives.

Throughout this study, the aim has been to develop a body of systematic information about the various activities of the library for uses and judgements that go beyond immediate concerns. No such examination of this important area of the Survey's activities has been undertaken in recent decades, and none whatever in a context of changes such as those of the past decade. Yet the period of most profound change seems to lie ahead, seeded by explorations in the field of information storage and retrieval and forced by the volume of information in the various branches of science.

Acknowledgment of the cooperation given by the Chief Librarian and members of the library staff during the preparation of this report is gratefully made. It is not an easy task for members of an organization to open up their operating field to the questions and judgments of a

staff member outside that organization. The willingness to do so, in the face of queries which have often suggested the need of change, is itself favorable to change when it becomes due and when it is sought by management.

## II CONCLUSIONS AND RECOMMENDATIONS

The history of the library provides many insights into its growth and support pattern. They help to define its changing role in the life of the Survey and the commitment in resources which has made it such an outstanding collection. Since the library was established in 1882, the collection has grown in the manner of large university libraries doubling in size every 15 to 20 years until it has now close to a half million volumes. Financial support for the library lagged seriously behind Survey growth until the late 1940's when it was transferred to the Geologic Division, its heaviest user. Up to that time its staff had not exceeded 9 members, but expanded rapidly with the opening of two field branches, to a peak of around 70 employees. While the library has enjoyed growing support for its traditional functions, it is faced with new problems arising from greatly increased volume and user demand for more rapid retrieval of more detailed information than heretofore.

The prospect for the Survey Library in the 1960's, though brightened by a liberal policy of support during the 1950's, may be more objectively seen in relation to developments in the scientific information field outside the library. The ability of the leadership in the library, now and in the future, to gauge the appropriateness of new concepts, systems, and devices, and of qualified staff to apply them in library management, will be crucial as it has been in earlier stages of the library's development.

The principal conclusions and recommendations which follow are presented under headings which parallel the main divisions of the report.

#### Technical work of the library

Emerging from the present ferment in the fields of documentation, data processing, and librarianship, it is already possible to visualize a whole new set of professional skills, systems, and work processes embracing the three fields. Within the present decade, it is desirable, therefore, to explore actively the means-ends relationships of our traditional library activities with a view to developing what might become a Geological Survey Science Information Center with the Survey Library as its core. In such a Center, each of the traditional functions of the Survey Library would acquire a new orientation to user requirements based on a closer integration of the needs of research with the programming for retrieval of the rich and ever-growing store of information in the collection. Facing the virtual certainty of profound changes in the science information field, the need of the Survey Library is for management's continued support and real understanding of its existing technical work, and encouragement to intensify the analysis of its present services as a prelude to changes that can be made.

Selection and acquisition The acquisition of material by exchange is expected to continue as the principal channel of growth for the collection. But acquisitions by purchase have increased to a point where they reflect reader preferences of a more distinctive type, in

in contrast to exchanges which are less selective. Control over, and communication of, the information about reader preferences needs to be established at the purchase, reference inquiry, and circulation stages.

RECOMMENDED that the Survey Library issue a monthly Accessions List and compile a list of current exchanges and periodical subscriptions for selective distribution.

RECOMMENDED that the present latitude given professional personnel in the technical Divisions for the requisitioning of books to be purchased for the library be continued.

Classification and cataloguing. The classification scheme in the library has undergone relatively slight change since it was devised five decades ago. To one fully habituated to its use, and to those who take the trouble to inquire into its organization, it is a useful tool. But its value, like the value of the classified shelf arrangement of materials it supports, has been seriously reduced by the crowded conditions in the library. Support for the impression gained in this study that the classification scheme may have been outgrown in many subject areas is found in the still skeletal nature of its divisions and classes. Between 1930 and the time when the last detailed list of subject entries was compiled in 1954, only 17 new subject entries were found among the 400 or so in the scheme. The lack of definition of the content of the classes will pose even greater problems in the future when semantic and syntactical differences build up in the more specialized literature of all disciplines. Without fuller definition of the scheme's classes,

without a record of precedent-forming decisions on what goes where, incremental changes in policy and practice are not realized as such. Future workers in the library will lack, therefore, a means of correct interpretation of past practice, as well as a constructive basis for revision of the scheme as needed.

The Chief Librarian has cited the need for fuller analytics (description) of the subject content of books on catalogue cards. This is a desirable improvement which will require more time and more subject specialization. At the same time, fuller analytics has become an indispensable condition of faster retrieval, especially for search in the duplicate catalogue files maintained in the branch libraries at Denver and Menlo Park, apart from the main collection in Washington.

RECOMMENDED that the classification scheme be critically reviewed, by subject specialists of the Survey, outside the library, in the main subject divisions it embraces, for needed revisions; and that the content of the subject divisions and classes be more fully defined.

RECOMMENDED that, when revised, the classification scheme be printed for wider distribution and use by readers.

RECOMMENDED that efforts to provide fuller descriptive cataloguing be intensified, and that support be given for staff and space to accomplish this end.

Reference service. Both the reference and the circulation activities in a library provide opportunity for gaining unique perspectives over the range of reader requirements and interests. It is in the reference activity, however, that the interaction between the reader and collection comes alive in ways that are discoverable by some rather

simple records of inquiries. The reference group in the library keeps a record of only the number of requests received. In the present study, they cooperated willingly in the planning and collection of data on 1300 reference inquiries. The analysis of these inquiries, received over a 3-month period, establishes a basis for some significant conclusions and recommendations relating to the reference activity, including the one that either a continuing record or a sampling method of gathering similar data during the year would be advantageous.

The advantage of a record of reference inquiries lies not only with the reference staff, in their increased capability to assess the effectiveness of their own efforts; it also provides one of the few means at the library's disposal for giving concreteness and purpose to its task of getting the information its readers want. At the same time, the reference service operates (or should operate) as a sensing device to tell the library what the reader cannot or does not do for himself, what the reader needs to know to help himself when he actually prefers to, what information is most often requested, what time and method is required to handle various types of requests, and what economy of time, method, and arrangement proves itself in the organization of the collection. Without some such feedback from user to librarian, any particular organization of the collection can become stereotyped, outmoded, or inaccessible in important part.

The current widespread interest in new approaches to information storage and retrieval often centers upon reference experience because, for reasons already described, it provides many of the indicators of success or failure elsewhere in the library system.

The Chief Librarian was the first to recognize the need for specialization in the reference service of the Survey Library and has developed the activity creditably. But the collection and analysis of data concerning the substance of inquiries, for their implications elsewhere in the library system, has been passed over in favor of a service that has become, in some respects, routine. It feeds too little information back into the planning of library work, especially for changes that could increase its effectiveness.

RECOMMENDED that a sufficient record of reference inquiries be kept to provide for analysis of inquiries by type, point of origin, language of material requested, methods other than routine used, and approximate time spent if greater than 15 minutes per request.

Inquiries received during the survey made as part of the present study were handled in 88 per cent of the 1300 cases--in less than 15 minutes.

RECOMMENDED that the reference staff participate in the analysis of the record of reference inquiries, and that their research into the feasibility of new retrieval methods be encouraged.

RECOMMENDED that the foreign language capability of the reference staff, especially in Russian, be increased by training, and by the requirement of a broader language qualification for future personnel assigned to this activity.

RECOMMENDED that the servicing of reference inquiries be more fully used as an occasion to disseminate systematically information on the plan and organization of the collection in the library, the classification scheme (when updated and more fully defined), the exchange

publications, the periodicals, and other aids to self-help by readers both in presenting inquiries and in making their own searches.

Bibliography of North American Geology. Since 1886 the Bibliography has served a purpose for the geologic profession which gives it a unique claim upon any of the Survey's resources needed to bring it quickly into the hands of its users everywhere. This indispensable key to the geologic literature of North America was the work of single compilers until the late 1940's. At that time, its preparation started to lag. A three-fold or greater increase in personnel failed to lead it out of a cycle of publication delays extending to the third year after the Bibliography year. In spite of the large increase in staff engaged in compilation, problems of planning and reviewing the work continued to move along the track of routines developed and employed when there was but a single compiler. An accumulation of unresolved problems affecting the staffing, editorial policies, working space, and the increase in the volume of work hovered persistently over the operation.

The transfer of the Bibliography, under new direction, from the library to the office of the Staff Geologist for Publications, in February 1960, and the introduction of machine processing to some of the more arduous work in preparing the Bibliography were steps which Division management believed would lead to the correction of the deficiencies. A closer working relationship in the early stages with the Division of Publications, and the harnessing of machine equipment for the purely manipulative steps in compilation give promise of an improved schedule for publications. The Bibliography for 1959 was

released to the public in late 1961. The Bibliography for 1960 is expected to appear in 1962. The schedule of publication is likely to be shortened again to one year, as was common during the earlier history of its publication. Because of machine help, the preparation of the 1950-1959 cumulative volume is expected to be a less formidable task than the 1940-1949 volume which did not appear until 8 years had elapsed.

The outlook for the future of the Bibliography is improved, but will always be jeopardized by the relentless demands for increased work capacity in a literature field that is itself increasing each year. Major needed improvements yet to come, such as the preparation of more frequent cumulative volumes starting with a 5-year cumulation, and the annotation of the volumes listed (as was done for the 1950 Bibliography), are possible benefits from new developments in data processing. Finally, the integration of the bibliographic work with the library, and of both activities with a possible Science Information Center of the Survey-- present strong challenges for the future.

RECOMMENDED that the work on the Bibliography of North American Geology continue to receive the close following and full support of top Division management during its transition to a shorter publication schedule after the Bibliography year.

RECOMMENDED that the possibilities for machine processing of the manipulative steps in compilation be fully exploited.

RECOMMENDED that the Bibliographic work be returned to the jurisdiction of the Survey Library, with which it is historically and functionally allied, and that the transfer be effective when suitable space arrangements can be provided in the library wing.

Circulation. Like the reference activity, circulation can provide a measure of reader interest that is highly pertinent to other technical work of the library. Circulation, more than reference work, however, gives a cross-section of the utility of the collection in ways that have implications for past and future acquisitions, reader habits, the layout of the collection physically in the library, the storage suitable for little used volumes, and the physical control of the collection.

The present study has raised a number of questions about the reading habits of users of the Survey Library, about their subject interests, about the publication age of materials they consult, ~~and~~ about the frequency and duration of loans, and about the trends in circulation over the last half century. Answers to these and other questions have been sought from existing but hitherto un-analyzed circulation records. The answers have value not only in characterizing the library in use--as distinguished from the library as a static collection--but also to demonstrate that the circulation function can and should be something more than a well run, over-the-counter exchange of books in return for the credentials or identity of borrowers. The preoccupation with the manipulation of books on a physical security basis should be the least important part of the circulation function, time-consuming and essential as it is.

The importance of the circulation function is to be found in what it can tell about the nature of reader interests across the whole sweep of the collection. It makes little point to gather statistics on the gross circulation per month (as has been done faithfully for

years) if the fact is not brought out at the same time that up to 50 per cent of the loans are to a handful (3 per cent in the sample taken) of the borrowers, and that there is a frequency pattern in the subject matter and age of publications borrowed which has meaning for other library activities. Few members of the library staff have a grasp of circulation patterns because the feedback from circulation to other technical work in the library which it should influence is a mere trickle.

RECOMMENDED that the circulation function be broadened to include responsibility for analysis of reader use of the collection in terms of: The topical areas in demand, the organization elements served, the language form of publications circulated, the frequency of circulation by publication age, and similar characteristics of user and material. The record basis for such analysis is already at hand

RECOMMENDED that information derived from the analysis of circulation output be weighed more heavily in decisions affecting acquisitions, layout of material within the library, depth of classification and indexing, and productivity of the total library effort.

RECOMMENDED that developments in automation of book-charging and discharging, and processing of over-due books, be followed with a view to adoption by the Survey Library when they become technically feasible.

#### Resources of the library

Space in the Washington Area is the library's most crucial, single need, both to house suitably the present collection and to organize its badly crowded and scattered staff. Without a prompt

and substantial increase in space, returns over the next decade from promising developments in information storage and retrieval technology cannot receive orderly and effective treatment. By 1965, the present shelf space in Washington will be completely filled, but it is already filled beyond an efficient capacity for expansion, while space for effective use of its greatly expanded staff has brought further growth almost to a standstill. The library wing in the General Services Administration Building is the most economical and efficient area in which to provide needed space. Two alternatives have been presented for immediate action.

Authorization by Congress, any time in the near future, for construction of a new Survey building should not deter a decision to improve the library space situation before a new building becomes available. The stage through which the library is passing can be a throughway to ordered growth or a detour delaying by many years the tie-in with technological improvements that are due. Space in Washington is the library's most critical problem.

RECOMMENDED that the location of space elsewhere for the Military Geology Branch operations now on the ground floor of the library wing be given high priority as a means of freeing the remainder of the ground floor space for use of the library not later than fiscal 1963.

RECOMMENDED that the relocation of operations on the basement floor of the library wing be given study with a view to occupancy of that space by the library as part of a new Science Information Center of the Survey, starting between 1965 and 1970.

RECOMMENDED that space planning for science information and library services in a future, new Survey building be continuously re-appraised for changing specifications that technological developments in science information may suggest.

Personnel. The library staff have increased in numbers and specialization over the past 15 years to a level where their professional relationships and development in satisfying careers require systematic evaluation of present performance and future potential. The high median age of the library staff points to a larger than normal loss in the 1960's by retirement. The adjustments to future changes expected from a changing information technology need the seasoned judgments and tie with past efforts that experienced personnel can provide. At the same time, future staffing must provide new combinations of bibliographic with other skills, oriented to reader requirements for faster retrieval from more varied and more complicated subject areas, in highly diverse lingual and symbolic patterns. Future staffing also must provide new managerial skills to guide the procurement and allocation of space, equipment, and funds, and to direct business operations for a collection that will exceed a million volumes in the foreseeable future. The neglect of staffing which occurred in earlier decades of the library's history would be almost fatal in any future decade. Now that the library staff is numerically close to an optimum level--for the present--the effort to sustain and replenish it should be a vigorous one realistically geared to the collection's growth rate and to expectable innovations in services it can render to its readers.

RECOMMENDED that 5-year and 10-year projections of staffing of library and other information services be developed in the framework of the Survey's programs for the period. Long-range projections of budget requirements for all programs is a present objective of the Bureau of the Budget.

RECOMMENDED that a position classification survey be made to determine whether grade are in full step with the expanding nature of the professional work of the library.

RECOMMENDED that new positions be established to provide staff assistance to the Chief Librarian in the field of information storage and retrieval; and a staff librarian to engage in the continuous analysis of reader requirements and use of the collection.

#### Management of the library

The structure of the library's organization, though relatively stable during its manyfold expansion since 1948, has become specialized in its technical work to a point where the perspective of key personnel over the whole library operation and over changing Survey programs has narrowed. In spite of ample funds for the purpose, the scant provision of staff to develop new techniques, together with the largely informal nature of plans, policies, and operating procedures, deter changes. Technical operations are set in directions and routines of long standing.

Management analysis and planning in the library are short-term and unspecialized, but are hampered, too, by serious overcrowding of staff at the Washington headquarters. Numerous examples of needed continuous analysis of the actual use made of the collection, and of the characteristics and habits of its readers, are given in the present

study in an effort to define the management role in relation to the collection, and to the staff.

The presence of control over library operations and library growth is difficult to establish because reporting is largely through routine statistical records which lack interpretation in relation to past and expectable future trends.

Outward communications by the library to inform, to guide, and to stimulate members of the Survey are weak. Communications with the scientific program leadership lack a channel since the discontinuance of monthly Branch Chiefs meetings in the sponsoring Division, and the dissolution of the Survey Library Committee. Improved outward communication by the library, to members of the Survey concerning its information resources and services, and to top management in the Survey about its performance and future requirements, have become crucial as the library enters a decade of rapid change in information technology.

Recruitment and training need the spur of higher grades for work that will require broader academic preparation and in-service training in new or advanced knowledge and skills. The high median age of the present corps of professional librarians points to the need to plan the transition to new leadership in the present decade. Training and career development should be designed to draw a new generation of librarians more deeply into the stream of thinking about programs and operations in the Survey, outside the library, in order to provide a perspective over the community it serves. But the experience and dedication of the present library staff should season the new staff. It has served the Survey well.

RECOMMEND that the Survey Library Committee be re-established, with representation from each Division, and that its terms of reference be broadened to include responsibility for informational and advisory services on storage and retrieval systems.

RECOMMENDED that the history, policies, rules, and sequences of the main operating procedures of the library be systematically recorded as an aid to future planning and development of an integrated Science Information Center in the Survey.

RECOMMENDED that a monthly interpretative report of library activities be prepared by the Chief Librarian for higher levels of management, and that the report provide basic information on trends in reader interest and use of the collection, on the growth of the collection, on steps taken or planned to broaden and improve the library's services, and on the status of the library's resources in personnel, space, funds, and equipment.

RECOMMENDED that a training and career development program in library and allied information work be initiated, with assistance of the Survey Training Officer, to provide the broader orientation and high professional standards needed in science information work of the scope being fostered by the National Science Foundation (See its bi-monthly publication "Science Information Notes.")

RECOMMENDED that the closer integration of library and information services with the scientific and technical work of the Survey be affirmed as an aim of Bureau-wide program planning and that the Chief Librarian be invited to attend such meetings of Division and Bureau staff as will further this aim.

## III HISTORY OF THE LIBRARY

A glance at the organization tables of the Geological Survey during the first three years of its life would have shown a strange omission. There was no mention of a library or of a librarian. This, in spite of the fact that The Congress recognized the need for a library by authorizing the new organization to use its future publications as exchanges. Whatever the reasons for the oversight or lack, it was soon remedied by the designation of scholarly Charles C. Darwin, in 1882, as the Survey's first librarian.

Charles C. Darwin 1882-1902

Starting with a modest collection of 1400 volumes inherited from the early exploratory type surveys which the U. S. Geological Survey displaced, the library had grown by 1884 through exchanges, donations, and purchases to about 11,500 books and 6900 pamphlets. The acquisition of material by exchange, however, accounted for most of the growth in that period, as it has down to the present day.

A statement in the Eighth Annual Report of the Director (1886-87, pages 54-55, by Major John Wesley Powell, is outstanding for its vision and keen understanding of the role planned for the library in the institutional life of the Survey. In it we may discern the philosophy that was to imbue Charles Darwin during the library's formative years. It was a philosophy that needed little change over the years and is still good for the future growth to which the library is committed.

"... It is essential that the geologic investigator, if he seeks to maintain a place in the foremost ranks of the science, shall keep himself constantly familiar with the current geologic literature of this and other countries...

"... Since it is the policy of the Survey to employ the ablest geologists it is important that the means of keeping well abreast of geologic science shall be afforded them. Accordingly provision has been made for securing the publications of foreign institutions of learning and science and of scientific specialists as promptly as possible, both by exchange in the manner already set forth and by purchase. No effort is made, however, to build up a general scientific library, but only to make such a collection of scientific books, periodicals, pamphlets, and maps as related especially to geology or will be of use in the prosecution of the work of the Survey...

"... Certain scientific books and periodicals being of a general character, including contributions to geology in connection with matters relating to other subjects, it is sometimes necessary to obtain publications devoted to general scientific subjects in order to secure the geologic matter. Thus the library of the Survey is fairly supplied with current scientific literature in general and is especially rich in current geologic literature.

"The operations of the Geological Survey extend over the entire country; and in order to avoid duplication of labor it is necessary that geologists shall be acquainted with the work of other students in the regions upon which they are engaged. It is therefore important that the library of the Survey shall include all publications upon the geology of the country, whether reports of investigations undertaken by the Federal Government, reports of State surveys, or memoirs embodying the results of the work of unofficial geologists. Great efforts have been made to render the Survey Library as complete as possible with respect to these domestic publications and all the more important ones are now on its shelves.

"The general principles of geologic science and of geologic technology are best set forth in the standard treatises and manuals, of which some are classic and invaluable to the student, while many are of high value, and all contain more or less information of use to the investigator in special subjects. It is desirable that the geologist shall have ready access to these standard publications, by the use of which the value of his work is greatly increased, and provision has been made for obtaining such standard treatises on geology as have already been published, as well as those which appear from time to time...

"Although the most important publications in geology as in other sciences are made either in the form of considerable volumes or in that of articles in standard periodicals, many treatises of considerable importance are either privately printed or published in small editions, generally in pamphlet form; and in order that the Library shall be complete it is necessary that these scattered and ephemeral publications shall be collected and preserved. The library is rich in geologic literature of this character."

Charles C. Darwin, aided by a staff that did not exceed three people, guided the library's growth beyond the turn of the century to a size of approximately 50,000 volumes, about 80,000 pamphlets, and 29,000 maps. A later librarian, Miss Julia L. V. McCord, was to comment upon the book acquisitions of this early period of Darwin's librarianship as opportune for the Survey because the great university endowments were still in the making. The \$2000 allowed by the Congress annually for so many years for the purchase of books enabled the library to bring together the works of the first geological writers. These early works were collected, Miss McCord stated, "not as bibliographic rarities but in order that students might have access to original statements and discussion of their problems". Such were the 1900 volumes comprising a full series of early American geological reports purchased from the collection of Robert Clark of Cincinnati, and the 2,300 books and pamphlets, largely foreign works, purchased in Paris from the Desnoyers collection. It was an auspicious beginning for what has become the largest and most complete collection of geologic materials in the world, numbering over 450,000 bound volumes and a comparable number of pamphlets, maps, negatives and photographs.

Fred B. Weeks 1903-1908

Fred B. Weeks succeeded Darwin as librarian on January 1, 1903. While a bibliographer in the library, Weeks had made a study of the methods employed by the Library of Congress and other libraries. It comes as something of a surprise to the users of modern libraries to learn that the Survey Library had developed up to this time without an acceptable classification scheme and without a complete catalogue of the still moderate collection of books on its shelves. The Dewey

Decimal classification scheme for geologic materials had not been developed to a point where it could cover the range of specialized material in the Survey Library and the Library of Congress scheme was not yet published. Weeks and bibliographer John M. Nickles of the library staff, aided by 3 consultants from the N. Y. Public Library, devised the classification scheme which has continued in use to the present with only slight modifications. The scheme features a geographical arrangement of material under the various specialized branches of geology and its allied sciences.

Fortified, perhaps, by the plan for this large undertaking, Weeks was able to report a library staff of 8 people, in addition to the librarian, in the Annual Report of the Director for 1904. In the same year, a memo dated January 4, 1904, from Weeks to the Director had estimated the collection at 75,000 volumes, 20,000 of which had still to be formally accessioned. The arrangement of the books on the shelves according to subject matter was nearly completed at the close of 1904, but the task of completing the cataloguing by author and subject was not to be finished until 1915 under Weeks' successor, Miss McCord.

In the 6 years of his administration, Weeks revised the book exchange lists which consisted of 400 foreign and 350 domestic exchanges; entered into arrangements with the Library of Congress for printing catalogue cards from manuscript copy supplied by the Survey Library (a practice which has continued to the present time); replaced the wooden shelves with steel shelving after a fire in 1905 caused some damage to books; felt the pinch of space and disposed of an unspecified number of books by transfer to the Library of Congress "to make room for works more frequently consulted"; and completed about one-sixth of the cataloguing project under the new classification scheme. He

apparently remained active for a time as a scientific investigator because among other mention of his activities in the Annual Reports of the Director is one in 1904 that "a portion of the time of the librarian was devoted to field and office work on the underground waters of New York State, and about three months were consumed in field work in the west, principally in Utah and Nevada."

#### Julia L. V. McCord 1908-1929

In April 1908, Weeks was succeeded by Julia L. V. McCord who served through a number of important episodes in Survey life, including two fires, one in 1910 and another more serious one in 1913. Both fires damaged the collection, but the 1913 fire seriously threatened the entire building in which the Survey was then housed (Hoe Building, 1330 F. St., Washington, D. C.) while destroying 60,000 books representing most of the publications reserve collection and 175,000 copies of the latest topographic maps. Under Miss McCord's administration, the cataloguing of the library's older collections was completed just as the impact of World War I was felt in the exchange of publications with countries at war. It soon became extremely difficult or impossible to obtain European publications and the files of technical and scientific serials which she had labored so diligently to complete were broken.

In May 1917, the Survey moved into its new quarters in a New Interior Department Building (now General Services Administration Building). A wing in the new building housing the Survey Library provided the first instance in which a library unit was specially designed and constructed in a U. S. Government office building to meet library needs. Throughout the years of World War I the library was used extensively by other government agencies but the library staff continued to be of moderate

size -- 7 people, consisting of the librarian, and assistant librarian, two cataloguers, and three clerks.

After War I and throughout the 1920's the Annual Reports of the Director contain only routine mention of library activities. It was, however, a period of continuous growth. The 60,000 volumes at the start of Miss McCord's administration had expanded to 100,000 by 1916 and had more than tripled in size to reach 200,000 volumes by 1929 when she retired after 21 years of service.

#### Guy Elliott Mitchell 1929-1940

When Guy Elliott Mitchell became the fourth Librarian of the Survey in September 1929, he brought to the position the viewpoint of the working geologist. Much extraneous material had been accumulated, he felt, which was better placed in other libraries. Accordingly, he reported in the Annual Report of the Director for 1930: "... some 5500 books and periodicals have been disposed of to the Library of Congress and elsewhere permitting a reorganization of shelving space on all three floors that has given much needed relief from shelf crowding. Several out-of-town university geologic libraries have been supplied with more than 600 surplus publications -- books of which the library has duplicate or triplicate copies." More careful inspections of accessions, and a revision of exchange lists were actions taken as a corollary of the disposal of books to other libraries.

Mitchell made a special point of the service rendered to the public by the library. He said, "The Library of the Geological Survey, which forms the greater part of the Interior Department scientific library, is a public library, as provided by law. It serves the members of the Geological Survey, but its service to others is numerically greater..."

By a form of persuasion his predecessors had not used successfully, Mitchell succeeded in obtaining an increase in the limitation of funds for the purchase of books. Although it was only an increase of \$500 in one year and \$1000 in another, it was a break from the 50-year pattern of the meager \$2000 a year that had been allowed for this purpose. The size of the library was becoming such that in many years more was spent on binding (e.g. \$7500 in 1932) than on purchase of books. The costs of cataloguing, shelving, repairing, and binding books over the years, even when the bulk of the collection is obtained under the exchange arrangement, prove the truth of the statement made by librarians everywhere that "no book is ever free by the time it rests on a library shelf."

The Depression of the early 1930's caused a reduction in funds to the Survey (in the Geologic Branch a reduction of 37 per cent in 1933) necessitating curtailment of most field work and administrative furloughs for many. But the period was a beneficial one for the library. Under the Civil Works Administration a project was established in the library employing about 50 workers on a program for physical rehabilitation of the collection. An inventory of books at this time showed a count of about 186,000 bound volumes. This was an actual count in contrast to what was probably an estimate of 200,000 volumes cited in an earlier paragraph during 1929 under Miss McCord. It is a fair surmise, however, that the collection had been actually reduced by the assiduous culling of less essential materials by Mitchell.

At another stage in the Depression Years, a project employing over 100 workers under the Emergency Relief Administration did a great amount of necessary work not possible for the skeletal library

staff regularly employed. It included such tasks as mending and labelling books, sorting duplicate material, and classifying and cataloguing most of the Kunz Collection of works on precious stones, gems, and jewels, acquired in 1933.

The 1935 Annual Report of the Director noted an increasing use of the library by the newer agencies of government. The same source mentioned the predominance of non-survey members in the count of readers in the library throughout the 1930's.

#### 1882-1940 in retrospect

The end of Guy Elliott Mitchell's administration as librarian, in April 1940, provides a good point at which to review the growth and state of the library in the first half-century of its existence. The purpose of the present study will be served if we characterize the library in certain ways that can be compared with the library's history since 1940 under the direction of the present librarian.

1) Growth of collection Perhaps the most striking, single fact is the growth of the collection in the span of years between 1916 and 1929; in 13 years the library doubled in size from 100,000 to 200,000 volumes. As already noted, during Mitchell's administration the collection was reduced after 1929 by the disposal of less essential volumes and the further expansion of the library was held in check until 1940 when it again attained 200,000 volumes (see Exhibit 1 ). The growth of the library collection in the course plotted by former Director Powell and Charles C. Darwin was a deliberate one, and by wide testimony, a successful one. In fact, a retrospective mood may have prompted the statement made in the 1919 Annual Report of the Director: "It may be stated with confidence that the library contains practically

all the important scientific and technical publications treating of the subjects included in the Survey's work, as well as the necessary guides and bibliographic aids and reference works."

2) Growth of the Survey Since its origin, the Survey had grown from its 39 "charter members" to about 1450 members in 1940. In the area corresponding to the present Geologic Division, which has always had the heaviest concentration of scientist personnel, the membership had grown steadily but slowly to a peak close to 400 in 1920, had contracted in the Depression Years to almost half that number, and was awaiting the explosive effects of World War II and its aftermath.

3) Size of Library staff During the whole period of expansion of the collection up to half of its present size, reached in 1929, the regular staff of the library had not exceeded 9 or 10 people including those responsible for the compilation of the Bibliography of North American Geology. After due recognition is given to the high sense of dedication and the diligence of this small staff, it must be conceded that they accomplished this feat of growth of the collection only by neglecting large areas of work in the library to which there were simply not enough hands to turn. The fact that the part time services of approximately 150 workers could be employed profitably during the Depression Years in a program of physical rehabilitation of the collection and reduction of large arrears in cataloguing is itself evidence that the postponement of essential tasks could prove costly in man hours, or tragic for the physical state of the collection if it had not been caught up by the assignment of additional, regular workers to these tasks. Still, we can look back with something like incredulity, and certainly with admiration and respect, at the fruits of the labors of these earlier generations of library workers.

4) Library leadership It is of some interest to note that three of the four librarians up to this time were men with scholarly approaches to the Survey's scientific work. Weeks and Mitchell apparently cast an especially critical eye at the content of the material being accessioned, with the result that substantial numbers of volumes were removed from the collection. It is understandable, perhaps, that Miss McCord, who was librarian at the time the Survey moved into its first specially designed library quarters, in what is now the General Services Administration Building, should have felt less pressure to control the collection which grew at its most rapid rate during her term. That she struggled, as did the others, with the meager staff of assistants, is evident from the statement in the 1922 Annual Report of the Director: "The small staff of the library did its best to make this great, highly special, and almost priceless collection of books and maps fill the full measure of service which it should render to students and specialists."

5) Public library role of the Survey library A point stressed by Mitchell and supported by the statistics on library use since his time is that the Survey Library is a public library. This is evidenced by the large number of loans made to non-Survey members and to other libraries, exceeding in some years the loans made to Survey members.

6) Library use. The main source of data on the use of the library, as evidenced by the number of readers and the number of loans, is found in the Annual Reports of the Director. Although there are some gaps in the data for the early years, there seems to have been a closer relationship of loans to the employment level of the Geologic Division than to the continual growth of the collection. The middle 1920's and

the middle 1930's were periods of recession for the employment of geologists and of circulation by loan in decades that saw annual loans averaging 7600 and 9100 loans respectively. The number of readers visiting the library exceeded the number of loans for most years through the 1930's by up to 50 per cent. This pattern of larger number of readers than of loans was to be reversed, however, in the 1940's when loans came to exceed readers visiting the library. At present the spread between loans and readers is on the order of 2:1 in the library in Washington.

7) Book exchange From the beginning, the arrangement for the exchange of foreign and domestic publications in areas of Survey interest had been extensive and very carefully cultivated. The bulk of the correspondence in which the library engaged was on matters affecting exchange arrangements. As early as 1906 all the book publications of the Survey were regularly sent to 400 foreign and 350 domestic exchanges. This volume exceeded the number of present-day exchanges, although the library continues to obtain the majority of its acquisitions by exchange.

8) Classification and cataloging The classification scheme, devised in 1904, received little modification in the years after its establishment. Its defects, like the defects of any arrangement in a highly specialized collection, could be minimized by library staff and readers who have acquired an habitual and almost intuitive grasp of subject relationships and shelf arrangement. There was no larger collection of geologic materials in the Nation to compare with it, and the Library of Congress had yielded to the Survey Library's authority and service in the preparation of manuscript copy on geologic works for its own library catalogue.

9) Reference service The concept of reference work as a specialized service to be performed by library staff who had this function as their principal duty was yet to be established. When individual requests for information were received, it can be surmised that means of providing them were considered by the librarian or a staff member at the circulation desk, and that they did their best to ferret out the information wanted. With the limited staff available there simply was not time, however, to aid the reader to become acquainted with the full resources of the library dealing with his problem. It was simpler to locate what was requested than to find out what was needed.

10) Limitations upon library operations Several constraints had operated over many decades to hinder the adjustments in staffing and expenditures for other purposes required by the growth of the library collection: a) There were the appropriation limitations on the amounts to be spent for the purchase of books, for binding of books, and for personal services in the District of Columbia. b) There was, perhaps, some reluctance by the Director's Office to increase the costs of that Office for a service activity that had one Division (Geology) and many outside agencies as the principal users. c) And, finally, there was the very age and familiarity of the image of library operations - plodding, undramatic, static in outward appearance, singular and personal to the scientists who used it rather than cooperative and integrated with the program thinking of the whole organization. Space problems in the General Services Administration Building were soon to separate more scientists from points of access to the library by removal of their headquarters

from Washington, D. C. to scattered points in the field. Operating branches, especially in the Geologic Division, were to be seriously taxed by such scattering in their efforts to do necessary library research.

11) Library administration and routines During almost 60 years of library activity, most of the basic routines by which the library even today carries on its work had become well established by standards that were surprisingly high considering the resources in personnel and funds available to carry on the production. The substantial overhead cost of the library staff as we now know it could then be represented as part of one man year. Austerity had provided a degree of stabilization -- or stagnation in some areas -- which had some rewards for the Chief Librarian. Pressure for change was slight and the high rate of growth of the collection consumed all the energy of the staff.

In spite of the meager staff available to do its job, the library had achieved a vital place in Survey life, in the period 1882-1940, and had earned everywhere the esteem of scientists and students who consulted its collection. Let us examine its growth and the numerous changes that have occurred since 1940.

#### William H. Heers 1940

In 1940 when William H. Heers became the fifth Chief Librarian, the Survey entered the first of two decades which were to mark its most rapid growth in history. Although the library was to experience a similarly rapid growth, breaking out of a pattern of staffing that had changed little in over 40 years, there was a lag of about 7 years during which pressures of work in the library mounted as a result of

World War II. Nevertheless, in his first year as librarian Heers recorded his estimate of staffing needs in a memorandum to the Director, and requested that 5 additional personnel be provided the library: an assistant cataloguer, an assistant bibliographer, a map cataloguer, a reference librarian, and a messenger. In justification of this increase over the existing staff of 7, he pointed out that the general cataloguing was seriously in arrears, the map collection had never been adequately catalogued or listed, there was no messenger for the library, and work on the Bibliography of North American Geology could not be kept current without borrowing personnel from other organizations. But relief was not be provided for these problems until after War II, the impact of which we will now briefly examine as it affected the library.

The 62nd Annual Report (1941) of the Director noted that accessions for the library had decreased since the outbreak of the war. By 1943, most of the publications received through foreign exchange had been cut off creating gaps in many serial publications which it would prove costly to close in the post-war years. While this led to a reduction of immediate work in the processing of new material, work in other library departments increased, notably in circulation which mounted to a record high of 56,000 pieces of material in 1942. In the latter year, a new branch of Military Geology was established in the Geologic Division and during the war became the largest single consumer of library information within or outside the Survey. In the first year of its operation, the Military Geology group withdrew over 30,000 books and maps from the Survey Library, and through it from other government libraries.

The growth of the Military Geology group to 75 professional people by 1944, necessitated the assignment of 5 people with bibliographic training to the work of that branch. The library's bibliographic and reference service, never adequately staffed, for extra demands was unable to meet the extraordinary ones now made upon it. By 1943, the circulation in the library was at the level of 75,000 almost double a normal year. The work of the Military Geology group required the major part of the time of the library staff during the war through 1945, when it began to diminish. The Military Geology program has continued up to the present as a heavy claimant upon library materials and services.

A turning point was reached for the library in 1947 when Director Wrather agreed to proposals of the chiefs of the operating Divisions for the transfer of certain activities from Bureau level to the operating Divisions. Effective on July 1, 1947, the library was transferred from the Office of the Chief Clerk of the Survey to the Geologic Division. Certain activities concerned with common technical services performed at Bureau level were transferred to other Divisions.

On the same date, starting fiscal year 1948, the limitation on the purchase of books, which had been present in appropriation to the Survey from its beginning, was removed, thus opening the way to the more selective acquisition of books. Under the book exchange arrangement, the acquisition of a certain amount of extraneous material has always been unavoidable. Purchases are needed to round out the collection and to expand the library in areas not covered by exchange materials. Although exchange continued to be the principal means of obtaining new published material, the removal of the legal restriction

on the amount of funds that could be spent for book purchases permitted the strengthening of the reference collection in physics, chemistry, mathematics, and electronics, all fields in which the work of the Survey was expanding. It also permitted the technical branches and field offices to purchase books needed for day-to-day references.

With the way cleared for purchase of books and **periodicals** without legal limitation, the Engineering Geology Branch of the Geologic Division, with headquarters at Denver, requested and received assistance from the library in organizing a reference collection for its personnel. The need now recognized for working collections for other Branches planned in the Denver area provided the impetus for opening the first field branch of the Survey Library; such a library was established at the Denver Federal Center in 1948.

When the Geologic Division assumed financial support of the library in July 1947, the existing library budget for personal services was \$29,021. The library was allowed 4 additions to the staff in fiscal year 1948 under an allotment totalling \$45,850. This was the largest increase in staff in any year of the library's history up to this time. In justification of the requested increase, the librarian could point to the wider use of the library during the war years which had continued at a higher than pre-war level with a circulation of 83,000 (readers and loans combined); the backlog of binding needed to preserve many irreplaceable volumes in the library; the increased rate of acquisitions to be anticipated as foreign exchange was restored and efforts were made to fill in gaps that had occurred in published series; the opening of a branch of the library at Denver; and the fore-shadowing of still greater demands upon the meager library staff by the doubling of Survey

rolls in the period since 1942 when it became active in the War effort.

By 1950, the allotment to the library had more than doubled over 1947 to reach \$108,500. Liberal amounts annually for binding (\$14,000), and purchases of books (\$10,000 or more) now approached the amount allotted to the library for all its operations only a few years earlier. Removal of the appropriation limitation on the amount of funds available for binding books, effective July 1, 1949, had eliminated one more hindrance to proper maintenance of the valuable and growing collection.

Late in 1950, the Survey's Photographic Library, consisting of about 100,000 prints and negatives depicting various technical aspects of the geology studied in Surveys since 1869, was transferred from the Map Reproduction Branch to the Survey Library. Survey Order No. 206, effective December 22, 1950, stated in accomplishing the transfer:

"This change in organization location is made in recognition of the fact that approximately 90 percent of the collection has been contributed by the Geologic Division. As a part of the Survey Library collection, the Photographic Library collection will continue to be the official depository of glass plate and film negatives, prints, color transparencies, and catalog lists of individual collections."

No immediate benefit was realized by the transfer of the Photographic Library to the Survey Library. Actually, the situation worsened within a year or two as the pressure for space led to the removal of the photographic collection from the main Survey quarters in the General Services Administration Building, which was air-conditioned, to renovated but undersirable space in the basement of the nearby Washinton Auditorium where heat and humidity did some damage to the negatives.

Alterations of space at the new Federal Center in Denver, which included ample space for the branch of the main library, led to the recommendation by the librarian, in January 1954, that the photographic collection be transferred to Denver. The transfer was approved by the Chief Geologist in June 1954, and accomplished by July 1, 1954.

At the time the photographic collection was being established as a part of the Survey Library in 1949, a secure haven was being planned for another old and valuable collection---field records dating back to some of the earliest geological investigations made by the Survey. The collection of field records consists of field notebooks, field maps, plane-table sheets, aerial photographs containing geology, compilation sheets for structural contour, and similar data that are the foundation for most published geologic reports. For an undetermined period, these records had accumulated as a part of the Geologic Division files but had now (1949) reached a volume and state of physical decline requiring special care and preservation. Like the photographic collection, they had been relegated to second-class space and the staff needed to gather and organize them systematically had not been appreciated for the more than part-time job that it had become. Early in 1950, the field records collection was transferred to the Denver Federal Center to be maintained by staff in the Geologic Division Office until they could be transferred to the Denver Branch of the Survey Library, which they were.

A shortage of space in Washington, D. C. had been responsible more than any one factor for the decisions to transfer the photographic and field records collections to Denver. The new Denver library facilities were well suited to the purpose and urgently needed. But the shift had

other hoped-for advantages. Many Survey employees had neglected to deposit records accumulated during investigations long since published. Older employees needed reminders and a new generation of investigators needed indoctrination in the reference value of their original field notes and photographs. By the evidence of many earnest memoranda from the Chief Librarian and the Chief Geologist on the subject, the incentive for depositing such records, once lost, was not to prove an easy one to re-establish.

In a memorandum of December 21, 1950 to the Secretary of Interior, the Director had stated his desire that the Survey work toward the fullest practicable consolidation of its personnel at several field centers. The establishment of a branch of the Survey library at Denver was followed by plans for another at Menlo Park, California. With this development in mind, the purchase of sets of basic reference works and standard texts was started and a Librarian was assigned to the Survey office at San Francisco. The aim for both field libraries was to develop a working collection of materials which would be available locally without the necessity of shipment of all loans from the Washington, D. C. library. The wide scattering of Survey personnel to scores of different field locations, as a result of the rapid Survey growth after 1940, had enormously increased the cost of circulation. Added to the cost of handling and the delay occasioned by mail shipments, were the more rapid deterioration of the volumes themselves and the reduced time when most-wanted works could be available.

The decision to establish field branches of the library was timely and fully in accord with the principle that had guided the library's growth -- to have available as complete a collection as possible of the

most important domestic and foreign works. But what does it mean to say "to have available"? Should or could the whole of the main Washington, D. C. library collection be duplicated in the field? Obviously not. A practical step was taken, however, to extend the utility of the collection at all three installations by photographically reproducing the main card catalog for use at all the field libraries. When this was accomplished, over a 2-year period (1956-1957), the integration of all material was fairly complete and the wealth of the library's store could be drawn upon by several hundred professional employees who had never enjoyed ready access to it.

The opening up of the field branches of the library increased the effectiveness of the whole library. So did it increase its cost. In 1948 the allotment for library operations, including purchase of books and binding on a more liberal scale than previously, was slightly above three-quarters of one percent of the total funds allotted for the Geologic Division's program. By 1959, with outlays for books at the field centers no longer a major factor, the library's operations were slightly above 2 per cent of total Geologic Division funds. In a decade, library personnel including work on the Bibliography, had increased to 60 members on January 1, 1959.

#### A new concept of library support

If we look again at the characteristics of the library as described for its first half-century (pp. 26-31) to compare them with those resulting from changes during the past decade, of the 1950's there is little alteration to be noted in the technical work. What has emerged in the recent period is a new concept of library support to meet the fundamental changes in Survey program and size brought about by War II

and its Cold War aftermath. In summary, the changes are the following:

1) The collection has doubled since 1940 in a growth pattern that is a function of the growth of scientific information throughout the World, as much as, or more than, the growth of the Survey.

2) The library staff has increased by a factor of 7 since 1948, due in part to the creation of two branch libraries at the new field centers. More important, the increase in staff has come about in recognition of the inadequate staffing standards in the library from about the end of the first quarter-century to 1948 when the first significant staff increases in 40 years occurred.

3) Statutory limitations on the number of personnel it was possible to employ in Washington, D. C., and on the amount of funds available for the purchase and binding of books, have been removed.

4) The classification scheme developed for the library has fared no worse, but probably no better, than other possible schemes in the face of the unprecedented demands for information service in the world of science. It confronts, in common with schemes of other large technical libraries, problems of storage and retrieval that are still unanswered in the science information field.

5) Reference services have been established and developed to a point where the appraisal of reader requirements and practices in the library can be made more successfully, if the effort is put forth.

6) Circulation in the library has reached higher levels than ever before, which is not surprising. What is important for the aims of the library is that it has been opened up to field employees on a scale that their increasing numbers, exceeding personnel in Washington, D. C., made imperative.

7) The division of technical and administrative work has become more specialized--in Washington, D. C. at least--reflecting the greater complexity and scale of services to be performed.

#### Summary and prospect

In concluding this history of the Geological Survey Library, its special purpose in the present study should be recalled and here joined with some questions for which the study seeks answers or consideration.

The history has stressed:

- The clarity of the Survey Library's original aims;
- The dedication and the remarkable achievement of the handful of people who guided the library during the major stages of its growth down to World War II;
- The extraordinary expansion of staff the library experienced in the last decade;
- The essentially unchanged nature of the basic routines in the library in recent decades;
- The extension of library facilities into the field at two major centers;
- The growth pattern to which the library is committed as the foremost collection of geologic materials in the Nation, with no alternative but to continue its growth if the Survey is to continue its research functions, scientific leadership, and public service role.

A host of questions arise out of such a history as its flow reaches the estuary of a rising tide of problems of scientific information which have gained world-wide recognition. The Papers of

the International Conference on Scientific Information covering sessions held at Washington, D. C. in November 1958 reveal the extent to which the literature and reference needs of scientists in the modern world have outrun the provisions in storage and retrieval systems for filling them.

From publications of the Office of Science Information Service established on December 11, 1958 in the National Science Foundation, in which are reported new research and development in scientific documentation, it is possible to envisage a new era for the scientific library containing some of the following features:

- High-reduction microphotographic storage;
- Direct-access photomemory selection mechanisms;
- Open or closed circuit television techniques for transmission of information to selected points;
- A common language or series of compatible languages for machine searching and translation to make possible the use of automatic equipment for searching, selecting, correlating and translating scientific and technical literature;
- New understanding of the structure of communication systems and research behavior, within and between the various scientific disciplines;
- Cooperative purchasing and book storage plans aimed at the reduction of duplicate materials;
- Readership surveys to furnish information helpful in the design of selective book retirement programs.

The prospect for the Survey Library in the next decade, though brightened by a liberal policy of support over the past decade, in traditional activities, may be more objectively seen in relation to developments in the scientific information field outside the library. The ability of the leadership in the library, now and in the future, to gauge the appropriateness of new concepts, systems, devices, and of qualified staff to apply them in library management, will be crucial, as it has been in earlier stages of the library's development.

## IV TECHNICAL WORK OF THE LIBRARY

In the account of the library's technical work which follows, the emphasis will be upon the practices which have acquired special significance for the Survey Library, rather than upon the details of the work processes which it shares with libraries generally. The activities to be described will include: selection and acquisition, classifying and cataloguing, reference service, bibliography, and circulation.

Selection and acquisition

Beyond the broad role defined for the Library in the Eighth Annual Report of the Director (1886-87) (see page 20 of this report), there appears to have been little formal policy guidance in the selection of books, periodicals and other materials to be acquired by the Library. We will return to the subject of selection after a review of the book exchange program which accounted for almost the entire library collection until 1948 when the limitation on funds for the purchase of books was removed and acquisition by purchase began to increase rapidly.

At present the Library has exchange arrangements with about 180 domestic and 520 foreign professional organizations as well as state and national agencies. When the Survey was established in 1879, the exchange procedure was already in operation as a result of the efforts a few years earlier of Dr. F. V. Hayden, who headed one of the predecessor organizations, the U. S. Geological Survey of the Territories. Dr. Hayden issued a circular of invitation-to-exchange to various organizations in foreign states and to professional societies in the United States and abroad. The response must have been great because by 1906 the exchange list numbered 750 entries. The exchange network has continued as a system of mutual cooperation that has enriched the collections of all the participants.

More specifically, the exchange operates in the Survey from a working list of organizations to whom copies of all regular Survey publications are sent, and we receive copies of their publications in return. The mechanics of transportation are taken care of for the Survey by the Government Printing Office (packaging) and the Smithsonian International Book Exchange Service (shipping). This is a service rendered by the Smithsonian for all federal agencies.

The general increase in publishing costs since the start of World War II has resulted in some falling off in the quantity of material we receive by exchange, the Chief Librarian reports. A tendency for some organizations to offer publications for sale, instead of by exchange, is to be noted during recent years while the rate of publications by the Survey has been increasing. This is one reason the library is required to expend more for book purchases to continue its collection of published series started earlier without expenditure under the book exchange program.

Placing the sale price of Survey publications distributed by exchange against the purchase price of materials we receive by exchange, the Survey is probably giving more dollar value than it receives. But, as the Chief Librarian realistically discerns, the cost in personal services that would be required to locate and purchase the books we receive by exchange would far exceed the difference in price. In other words, it is still cheaper to give more dollar value in purchase price of Survey publications, and by so doing receive automatically the publications of 700 other producers of information we want.

Although the physical distribution of materials under the book exchange arrangement is relatively effortless to the Survey, the maintenance of the exchange lists and the processing of the material when it is received require continuous effort. With such a wide range of subject matter and release times in the material received, it is possible for breaks to occur in the continuity of material in the many serial publications. Decisions must be reached, too, about when to enter into new exchange arrangements or to discontinue existing ones. The correspondence on this subject with other organizations occupies a substantial part of the time of the Assistant Chief Librarian and a part of the Chief Librarian's time.

By reason of the large volume of book materials received by exchange and the unique character of much of the material for the professional workers of the Survey, the book exchange program has been and will continue to be an indispensable one.

Acquisition by purchase was a relatively minor activity throughout the library's history until the late 1940's. When the limitation on funds for the purchase of books was removed in 1948, it opened up what amounted to a new specialty in the Survey Library --the purchase of books. What had been a part-time activity, because of the \$2,000 annual limitation on book purchases, has gradually expanded to one now requiring the full-time services of a trained librarian and 3 clerical assistants.

The selection of materials for purchase is widely diffused among the operating Divisions with the Library retaining no more than a nominal responsibility for the choice of material to be purchased.

Actually, however, the choice between a single arbiter of the need to purchase a book or periodical subscription, and a shared responsibility such as exists, is not difficult to make. No individual would be likely to possess the basis for independent judgment over the whole span of literature embraced by the Survey's technical work. The policy and practice to be followed are better left, it seems, to the dictates of common prudence, to checks against existing stocks to avoid needless duplication (which is not to say that purchase of extra copies cannot be justified), and to the exercise of care in the choice of the source and method of procurement.

The library makes direct purchase of all books, subscriptions, and other printed materials for its collection, and of most materials for deposit with the operating Divisions. At the Field Centers, however, books and subscriptions may be purchased by the Administrative Division purchasing offices, for Divisions other than the Geologic Division. During fiscal 1959, total purchases by the library amounted to 9878 books and serials, 1075 subscriptions or renewals to periodicals, and 320 pieces of other material. Approximately three-fourths of the material purchased was for deposit in operating Divisions for continuing laboratory and field office use.

The typical steps in purchasing under current library practice are as follows:

- 1) Requisitions are received by the Acquisitions Section of the library from library staff, and from operating Divisions.

- 2) Description of published material given in the requisition is checked for accuracy and completeness (title, edition, author, publisher,

date of publication, and estimated cost), against records of previous orders placed, book catalogues, bibliography lists, etc. The description is supplemented when necessary.

3) If material requisitioned is for the library collection, a search is made to determine whether it is already in the collection or on order. If found, information is given the requestor. If not found, the purchase is scheduled.

4) If the material is for deposit with the operating Divisions, no check by the library on its availability in the library collection is made. In a memorandum of February 17, 1956, the Chief Geologist placed responsibility with operating units to ascertain whether their needs could be met from the library collection before purchasing books for deposit outside the library. Some branches certify on the requisition that the material is not available from the library or is needed beyond a reasonable loan period. The practice is not general, however, and the rule lacks review or control.

5) The actual purchase document takes various forms: (a) If the price and availability of the material are known, a standard purchase form (9-1134) is used. Copies are sent to the Branch of Budget and Finance and, depending on where the request originated, to the requisitioning Branch or to the library administrative assistant. (b) If the price or availability is not known, or if other factors make the purchase a contingent one a specially composed "purchase letter" is used. (c) If the purchase is made under the Department of Interior's book purchase contract plan (contract not in effect at this writing) a form letter designed by the Survey Library is used. The

purchase letter and the contract order form are not treated as obligation documents; charges arising from them do not enter the accounting records until delivery of the material is made and the vendor's invoice is received and cleared for payment. This means that from \$1,000 to \$4,000 in obligations may be outstanding at any time during the year. As already stated, the library regards the purchase letter as an inquiry of availability in transactions where the outcome is indeterminate. Actually, however, by requesting delivery under certain conditions which can usually be met by the vendor, the purchase letter is for all intents an obligation document. Sound purchasing and fiscal practice would require the treatment of the purchase letter and the contract purchase form as obligation documents for which an estimated cost would be made and entered in the official accounting records of the Survey. As a minimum, the fund commitment represented by these documents should be reported monthly on Form 9-803 "Report of Outstanding Obligations," in the manner described in section 332.3.3B of the Survey Manual.

6) As shipments are received, they are noted on the purchase document before processing in the library. When invoices are received, they are compared with the purchase documents before certification that the material has been received as ordered. The amount of the invoice chargeable to each fund is notified to the library administrative officer, or to the operating branch for whom the purchase was made, through an internal dittoed memorandum of obligation developed by the library. This notice is the means of adjusting for any amount by which the invoiced price differs from an estimated price in the requisition.

But it may also be the first information an operating branch has for its memorandum accounts, on the amount of the obligation incurred as a result of its original requisition.

In concluding this review of the purchase of book materials by the library, it should be remarked that because the operation is one which can and does extend to many foreign and domestic suppliers, it presents a number of problems that make it an off-beat activity. The search for out-of-print, limited editions, and specialized subject matter publications sought by the library is not always effectively conducted by using the standard purchase form, useful as it is for purchasing such items as text books and dictionaries. The purchase letter came into use to provide flexibility in communication. Book sellers as a class are not the best merchandisers; a certain amount of indifference to transactions with government establishments must be overcome, and a not-easily acquired knowledge of values in the used book market must be developed. Together, these factors make the tie-in of book purchases with other library operations a sound one. An examination of the run of purchase letters in the library files illustrates the wide variety of materials, specifications, and trade practices which must be taken into account. Yet, the criticism made of the rather loose system of recording obligations, under present practices, remains. Steps are being taken to enter all obligations on the official accounting records of the Survey, on a monthly "outstanding obligations" report basis, if not through regular purchase order forms.

When hard-bound material is acquired by purchase for the library, it is formally accessioned by making a descriptive entry in an accessions

register in which entries are consecutively numbered. The accession number is stamped on the title page of the book and a stamp of ownership with the accession date is impressed.

Bound volumes purchased for deposit with the operating Branches are stamped to show Survey ownership and are given a property number. The accession and property numbers are also noted on a 3 x 5 card prepared during the purchasing process and bearing all information pertinent to the purchase.

Paper-bound materials are not formally accessioned by number until they are bound in hard covers, after one or more years depending on the frequency of issue. When first received, they are stamped on the cover to show ownership and the date received.

A record of the arrival and scheduled circulation of issues of periodicals under approximately 1600 current subscriptions purchased for the library is combined with a record of over 300 serials received by exchange. Both types of material are recorded in the commercial equipment sold as WHEELDEX (8 x 5 cards mounted on the rim of a wheel which rotates in its cabinet to give access to any one of 4,000 cards.). The WHEELDEX file is the principal source of information in the library for quickly determining the expected or actual arrival dates of subscription and exchange (serial) material, and for the names of the readers to whom they are regularly circulated.

The selection and acquisition work has increased many times over during past decade. The increase may be attributed partly to the increase in earth science publications, partly to the enlargement of survey interest in periferal fields of research, but in even larger measure to the wider choice afforded by unrestricted funds available for the purpose. In the Survey Library, the basic routines in this

area of selection and acquisition appear to be well established and effectively conducted.

### Classification and cataloguing

Classifying and cataloguing are performed for the whole library by staff in Washington, D. C., as a general rule. The main inflow at this point by purchase and exchange makes it the logical center for control of classification and cataloguing. Some of the final steps in preparation of books for shelving, or classifying the small number of books purchased directly by the field libraries, can be and are performed in the field. Machine duplication (by Flex-o-writer) of catalogue cards has made it even more feasible to centralize the preparation in Washington of cards fed to the current catalogues of the entire collection maintained at the three library installations.

For newly received material at any of the libraries, the steps in classifying and cataloguing are those found in most libraries:

- 1) Collating to establish the identity and completeness of the material;

- 2) Searching the catalogue to see if the material is new to the collection;

- 3) Classifying the material, if it is new, by determining its place and call number in the classification scheme;

- 4) Preparing the analytical statement of subject matter on cards to aid in locating material by author, title, subject, or shelf position.

- 5) Preparing the material for the shelves by lettering or labelling the call number, inserting bookplates or stamping to show ownership, cutting pages, adding pamphlet covers, and so forth.

In all these steps, judging the appropriateness of the classification and cataloguing systems, and making changes in practice and policy when necessary, are essential processes if the library is to continue to be in a position to provide the reader with information on the recorded knowledge applicable to his interest.

As already noted, the classification scheme developed for the Survey Library in 1904 by Weeks and Nickles had the benefit of the advice and guidance of 3 consultants from the New York City Public Library. The scheme has a unique aspect to the library user acquainted with the more comprehensive Dewey Decimal and Library of Congress schemes. All but one of its 10 primary classes are identified with geology and its allied disciplines, as follows:

- 000 General works
- 100 Mineralogy and petrology
- 200 General, dynamic and structural geology
- 300 Historical geology
- 400 Economic geology
- 500 Physiography, and geography and description
- 600 Paleontology
- 700 Astronomy, mathematics, engineering and surveying
- 800 Chemistry and physics
- 900 Biology, including botany and zoology.

The divisions of subject matter below the 10 primary classes exceed 400 entries in an analytic pattern that is expansible, after the decimal point, to finer subsections beyond any need yet recognized.

Associated with the subject matter classification is a scheme of geographic symbols (numbers, always enclosed in curves in the notation) which may be added after any subject number where arrangement by geographic or political subdivisions is desirable. Included also in the general scheme of classification is an index of subject entries, arranged alphabetically, as an aid to the location of classified entries.

Compared with the older Dewey Decimal system (developed in 1876) and the later Library of Congress system (developed in 1914), the scheme of the Survey Library has a simplicity of notation for call numbers that it is not achieved for geologic subjects under the two more common schemes. An example of the call number for the subject "History of tertiary period in Texas", under the Survey Library and the Dewey Decimal systems follows:

Survey Library Classification:

351 (245)

3 Historical geology

5 Cenozoic

1 Tertiary

(2 United States or North America

4 Southern States, Western section

5) Texas

Dewey Decimal Classification:

551.789764

5 Science

5 Geology

1 Physical and dynamic geology

.7 Stratigraphic geology

8 Tertiary, cenozoic

9 History

7 North America

6 South Central States

4 Texas

In the examples given, the Survey Library call number is shorter because the Dewey Decimal numbers for "Science" (500), and "Geology" are unnecessary in a library devoted to this subject field. The enclosure of the number for geographic location in curves ( ), as practiced in the Survey scheme, makes it simpler to grasp than in the Dewey Decimal scheme. For the user who makes the small effort needed to understand them, a variety of mnemonic figures and letters help to distinguish the extensive periodical literature from the single volumes of non-serials; the regular-sized volumes from the over-sized volumes (separately shelved for space economy), and geologic works from all others—to mention only a few of the particulars of the scheme.

Since its development over 5 decades ago, the Survey Library's classification scheme has undergone little change. A close comparison of the typed classification scheme used by the Survey Library

in 1930 with the one used in 1954, shows only 17 new subject entries among the more than 400 in the scheme, plus about 30 revisions of a geographic nature. Among the new subject entries to appear are: administrative management, astrophysics, bacteriology, engineering geology, impounding (storage, reservoirs), magnetochemistry, micropaleontology, military geology, permafrost, photomicrography, several sub-divisions of petroleum, and radio chemistry. For some of these new entries, the dates of first use are given and are found helpful. Taken together, the number of changes is smaller than might be expected from the expansion of the literature and the new conceptual schemes which give science its dynamic quality.

This little change in the classification scheme can mean that it was so well conceived at the outset that it has proven highly adaptable to the changing concepts and subject matter of the fields it was designed to cover. It can also mean, however, that changes due as the result of advances in theoretical and applied knowledge in the fields its collection embraces were often not made. If the latter were true, the adverse effect on the library user would be minimal as long as the experience of the library staff could provide him what he wanted by search methods and knowledge of relationships in book classification that were not already implicit in the classification scheme itself.

Support for the impression gained in this study that the classification scheme may have been outgrown in some subject areas is found in the still skeletal nature of the scheme itself. It is scarcely conceivable that the accumulated knowledge in the field of geology

deposited in several hundred thousand volumes since the scheme was devised would not have brought a steadily increasing complexity to the classification of the material for use. Yet, the titles of the classes and divisions of the scheme continue to stand alone; that is, what the titles denote is rarely described in the explanatory detail needed to define the scope of the subject classes.

The absence of a "Decisions File" in the classification scheme has not developed with the years as might be expected in an active and growing literature field. A decisions file, as the name suggests and as commonly employed in library practice, is simply a means of recording significant departures from established classification practice through concise statements of the reasons therefor. Without such a record, incremental changes in classification policy and practice are not realized as such. Future workers in the library lack, therefor, a means of correct interpretation of current practice as well as a constructive basis for revision of the scheme when other changes are contemplated.

One reason for minimizing the practical consequences of not revising the classification more often, or for the general treatment of subject matter in the card catalog, may be the reliance placed upon the highly developed bibliographic aids available to geologists. The principal source, The Bibliography of North American Geology, traditionally prepared by the Survey Library but now outside its jurisdiction, contains a classified index and is cumulated every 10 years. A complementary work is the Bibliography and Index of

Geology Exclusive of North America, published by the Geological Society of America. The staffs and current working card files for both of these bibliographies are housed in Survey quarters and are available to library staff and geologists alike.

In summary, the staff engaged in classification and cataloguing work has expanded, along with other functions of the library, but without any clear indicators of the policy and practice needed to guide these functions as parts of the library's total bibliographic system. The retrieval or location of particular items in the collection proceeds by about the same methods as were used decades ago, notwithstanding an enormous growth in the size and complexity of the collection, and the knowledge it contains.

#### Reference Service

Reference work in a library has two unique aspects. First, it provides a perspective over the whole range of reader requirements and interests, not only as it is developed by requests for material that can be located in the Survey Library, but also for material that can be borrowed from other libraries. Second, the reference librarian is in a position to exercise imaginative enterprise in furthering the library purposes by providing the unfamiliar reader with the keys to its wealth of knowledge.

It is in the second role-- as searcher after facts -- that the reference librarian is most often pictured, whether the request is for aid in locating a simple fact or volume, or for assistance in developing sources for an exhaustive bibliography.

As already noted in the summing up of the Survey Library's first 60 years, whatever reference work was done in that earlier state of its work fell to the Chief Librarian or to the circulation desk. The present Chief Librarian introduced the concept of specialized reference service in 1940 by including in his first budget request the new position of reference librarian. Today, there are 3 regular, full-time reference librarians on the Washington staff and the chief librarian maintains an especially active interest in this phase of library work. He believes that the addition of more reference librarians to the staff would bring returns in savings of time of scientists now spent in tracking down literature sources and in material gathering.

All three of the Survey's reference librarians provide general reference services; but one specializes in the extensive map collection, including its cataloguing. In varying degrees according to education and experience all specialize in areas into which they have been carried by the tides of reader inquires and Survey specialization.

A profile of reference requests What are some of the characteristics of the reference service in terms of sources and manner of requests, tasks performed, language of material, library search resources used, dispositions made, and time spent on requests? In order to find answers to these questions, raised in the course of the present study, the reference librarians were invited to draw upon their experience in day-to-day activity to design a schedule for the collection of data during a 3 month period. Exhibit 2 gives the statistical results.

Requests for reference aid received

during the period October 1 through December 31, 1959 were recorded on the schedule. A summary of the data collected, which are believed to give a representative picture of some of the quantifiable aspects of reference work, follows.

Who requests and how? Requests for reference service arise in about the same proportion from outside and from within the Survey. The large number of outside requests (50%) may account in part for the fact that most requests are received by telephone (53%) and letter (33%). With fewer requests by visit (14%), the reference librarians are free to organize their time and movement about the library. The Geologic Division accounts for a large majority of the requests (65%) received within the Survey. Water Resources Division is the only other substantial user of the service (24%) among the divisions.

What material and service are requested? The material or information most often sought is found in book form (94%) and may be supplied by factual answers to questions. But more commonly, the response given or desired is through the loan of library material. Foreign language material is included in a substantial number (37%) of requests, with Russian or Slavic second to the English language in frequency. Among the many types of reference services the library can offer, a large majority (71%) of requests require only routine material gathering. "Routine" is here defined arbitrarily as a search that can be completed in 10 minutes or less by simple, established search methods, conducted by one thoroughly familiar with the collection. Non-routine material gathering and subject searches are required for 21% of requests. Requests to prepare or to complete bibliographic citations occur in 7% of the inquiries. Among all the purposes the reference librarians are

equipped to serve, the one least called for is: To explain the organization and use of the library (1%):

What reference aids are used? As he pursues his search for information or material requested, the reference librarian in the Survey Library finds that he can answer most calls by use of the catalog and by an intimate knowledge of shelf arrangement. But for 15% of requests, aid is sought from published bibliographies, from other libraries, or from subject specialists elsewhere in the Survey. A large majority (90%) of requests can be completed entirely from within the comprehensive collection of the Survey Library, while about 10% lead to other collections, mostly other federal libraries with whom inter-library loans are arranged.

What is the distribution of time among requests? Some striking contrasts arise when we examine the time to complete reference requests. There is not an even gradation between the shortest and the longest time. The bulk (88%) of the 1300-odd requests recorded for this study each required less than 15 minutes, and accounted for only 43% of the time spent on all requests. But 3% of the requests, each requiring upwards of 60 minutes to several days to complete, consumed almost 40% of the time taken for all requests. So it is that the economy of the reference librarian's time is very largely under the control of the users he serves. Who but the user can judge the value of 5 minutes spent in locating a given volume compared with an hour spent in locating another volume?

The examination of the reference service has answered some questions posed earlier. At the same time, it has raised other questions

for which answers are not so easily found:

1) How should the small proportion (15%) of reference requests made by users visiting the library be interpreted? How much of a factor is the crowded space situation in discouraging more visits to the library? Would the economy of reader and reference librarians be better served if the requests were made more often by visit and the cooperative effort of user and librarian were joined? Seeing the use made of search devices in the library, would the user learn more about them himself and be able to make more effective use of the collection?

2) If the reference service is a fair measure of library use, is the library properly funded under the Geologic Division activity in the annual appropriation when almost 70% of its use is by other divisions in the Survey, by other federal agencies, and by the general public?

3) Does the small proportion (1%) of inquiries about the organization and use of the collection mean that the average Survey scientist who uses the collection knows how to use it effectively? Do the large proportion of requests which require only routine material gathering reflect a tendency to avoid literature search in the library in favor of other sources, and to think of the library as a storehouse from which advertised articles may be requisitioned?

4) Is sufficient emphasis given bibliographic preparation and indexes, based on recurrent reference inquiries?

5) With no Russian language specialist on the reference staff of the library, can there be adequate servicing of the growing Russian literature?

6) What is an optimum number of trained and experienced reference librarians to carry the present workload efficiently? (The Survey Library now has three in this category and some others who can handle simple requests.) What is an optimum number if the criterion is effectiveness, that is, the level of results, rather than the cost only - - and if the time and skill of scientist personnel are compared with that of reference librarians against some standard of results desired for the work of the Survey? (Some scientists dismiss the notion that the reference librarian should aid them in bibliographic research, others seek out the assistance, and there are many variations between).

7) Has the complexity of searching geologic literature come to a point, reached long ago in the literature of chemistry, where literature specialists trained also as geologists are needed?

By these and other similar questions, the reference service in the library takes on some of the aspects of an observation post at which the outputs of information, elaborately collected and stored earlier, can be seen as they meet their intended purpose. The circulation desk activity, which will be examined in a later section of this report, is the other observation post for the main outflow of material. Before reviewing that activity, however, let us examine the history and present state of the Bibliography of North American Geology which is a special form of reference service of prime importance to users of geologic literature everywhere.

### Bibliography of North American Geology

Since the appearance of the first volume of the Bibliography of North American Geology (U. S. Geological Survey Bulletin, vol. 44., 1887), the series has continued to be published at more or less regular intervals in what now aggregates 59 volumes. The most recent was the Bibliography for 1959, published in 1961. Cumulative volumes published at 10 year intervals have reduced the number of volumes to which reference is required.

Until the late 1940's, this indispensable key to the geologic literature of North America was the work of single compilers, each of whom carried out alone, with few exceptions so far as the published record discloses, the meticulous task of examining hundreds of current periodicals and serials, and preparing the thousands of author, title, and subject entries which made up the representative volume. During the 1950's the compilation came to be spread among six collaborators. The additional staff, whose aid they acknowledged in introductions to the Bibliography, came to 7 library and clerical assistants (see Exhibit 3).

A review of the history of bibliographic preparation, as seen from an examination of the texts of all past publications, was made as part of the present study. Some of the questions brought to the review were the following:

- What was the format and scope of the early Bibliographies?
- What changes in format have appeared over the years?
- What was the actual schedule of publication and what regularity did it show?

- What are some of the measures of changing complexity of the work during the years since it was first undertaken?
- What was novel, and what was already established practice, in the features of the Bibliography as it was being compiled in the early 1950's when the staff increased manifold to its present pattern?

Answers to these questions will provide a view of the present work in a perspective which the description of current activities, alone, can not reveal.

The early compilers: Nelson Horatio Darton, a geologist, compiled the first 5 volumes of the Bibliography for the years 1886-91, including as his last volume a comprehensive list of contributions to North American geology for the period 1732-1891. His work as bibliographer fell within a longer span of years in which he produced over a score of technical publications in his field.

Fred Boughton Weeks, like Darton a geologist, compiled 14 volumes covering the period 1892-1905, introduced a number of new features into the Bibliography, and trained John M. Nickles as a successor. Weeks commanded a broad view of the literature as evidenced by his appointment as Chief Librarian of the Survey in 1903 and by his work with Nickles in devising the scheme for classification of books in the Survey Library. While serving as Librarian, he continued to be active in field work the results of which were published.

John Milton Nickles, a paleontologist, was joint author with Weeks of the Bibliography for 1906-07, but the sole compiler of the ensuing 20 volumes covering the years 1908-32. He left the Survey shortly after

1932 for a position with the Geological Society of America where he joined with Robert M. Miller in compiling the first volume of the Society's Bibliography and Index of Geology Exclusive of North America published in 1934. Although this companion series was patterned closely after the Survey's Bibliography of North American Geology, it has provided an interesting counterpoint in organization and format as it has continued its parallel growth. Nickles' main published work in paleontology appeared in 1900, shortly before he became active as assistant to Weeks. For 8 years, overlapping his service with the Survey and the Geological Society of America, he was editor of Annotated Bibliography of Economic Geology, published by the Society for Economic Geology, but later and at present by the Geological Society of America.

Emma Merton Thom was mentioned in the last of the Bibliographies compiled by Nickles (1931-32) as his assistant. She succeeded him as compiler starting with the volume for 1933-34, then issued biennially, and carried the work alone through 6 volumes until the 1946-47 issue when the transition to the present pattern of multiple authors and a large supporting staff began.

Although not a scientist in the tradition of the early compilers, Miss Thom was a dedicated worker, possessed an M.A. in Geology, and had many aspirations for a better Bibliography which the prevailing standards for staffing and the competing demands for funds did not advance. After more than a decade as compiler, in a memorandum of August 28, 1946 to the Chief Geologist, she recorded a number of

recommendations about the Bibliography which are here summarized for the further consideration they may yet receive. First, she made the recommendation that several assistants ("at least three or four") be added to make possible the annotation of the Bibliography, a practice started by Darton in the early volumes but abandoned by Weeks. The size of the proposed staff increase she estimated would be needed may have deflected attention from consideration of the merit of the idea of an annotated volume. Actually, the annotated Bibliography of 1950 was essentially compiled by one person. A second recommendation was that the cumulative volumes be issued every five years instead of at the customary ten-year intervals. Her proposal has gained support, as the volume of scientific publications since War II has increased exponentially, with growth almost out of hand in some fields. A third, and the most ambitious, recommendation was that the whole series of Bibliographies be revised and reprinted, starting with the 1785-1918 cumulative volume by Nickles. The revision would include proper annotations, the insertion of material that had been previously omitted, convenient-sized volumes for the Bibliography and separate volumes for the index, all in a format like the one then used (mid 1940's).

Among the early compilers, Darton, Weeks, and Nickles were alike in their approach to bibliographic work in at least one significant respect: They were all imbued with the point of view of the working scientist who saw the bibliographic needs of the investigator and tried, by a variety of innovations, to meet them at a scholarly level. Together, they introduced most of the features of the organization, format,

and balance of the Bibliography as it is published today--and some that were not retained such as the list of rocks described which were keyed to the bibliographic entries.

Schedule of publications of the Bibliography During its first 32 years, the Bibliography was published annually, with only a few exceptions. In the cumulative issue for 1892-1900 (U. S. Geological Survey Bulletin 188), Weeks stated his expectation "that these volumes will continue to be published yearly, and that every ten years they will be brought together in a form similar to the one now presented." This annual pattern was replaced, however, by a schedule of biennial publications starting with the Bibliography for 1919-20 and continuing through 1947.

Among the possible explanations of the change-over to a biennial volume can be included: (a) the expected reduction in the work of preparation for printing (editing, preparation of copy, proofreading), and the time and cost of the extra volume saved; (b) the fuller coverage of the first year of the biennium afforded by the lapse of time to publication. That incomplete coverage was a cause for concern is evident from the "Addenda" sometimes used to carry listings (150 or more in some earlier annual issues) that had not come to attention when the Bibliography was first compiled.

Any expectation that a biennial issue would permit adherence to a proportionally shorter time of preparation and publication was not realized. The annual issues had, with exceptions that were rare, appeared with a printing date of the year immediately following the year

for which the Bibliography was compiled (See Exhibit 3). For the biennial issues, 4 of the 13 published between 1922 and 1953 appeared in one year, 7 in 2 years, and 2 issues took 3 years after the Bibliography year.

The Bibliography for 1948 resumed the annual schedule which has continued to the present except for the 1952-53 issue. The time to publication, however, has exceeded that taken for annual issues in any earlier period, in spite of a three- to fourfold increase in personnel assigned to bibliographic work during most of the past decade.

The editing, and the Government Printing Office time required for the final stages of publication undoubtedly contain elements of delay over which the staff of compilers and their assistants have had little control. But the widening gap between the time when current literature is published and its appearance in so basic a source book as the Bibliography of North American Geology is crucial for the Survey's whole research effort, and its public reputation in this area.

Variations in title of the Bibliography The Bibliography of North American Geology appeared under that title in the first issue for 1886. Several variations in title that were used in the following decades are of interest. They show the emphasis given the index when it first appeared. The inclusion of "paleontology, petrology, mineralogy" in the title during 1892-1905 suggests that special recognition was being given to those specialties, or that some reinforcement of their integral bond with geology was being attempted. The point seems trivial today, as it may have been after 1905 when a reference to these specialties in the introduction was deemed sufficient.

The various titles used were as follows:

Bibliography of North American Geology  
(1886, 1906-07, 1908, 1921 to present)

North American Geology  
1887-89, 1890)

Record of North American Geology  
(1891)

Catalog and Index of Contributions to North American  
Geology (1732-1891, cumulative volume)

Bibliography and Index of North American Geology, Paleontology,  
Petrology and Mineralogy (1892-1905)

Bibliography of North American Geology with Subject Index  
(1909-20)

Geologic Literature of North America  
(1785-1918, cumulative volume)

Form and Scope of the Bibliography Over the years of its publica-  
tion since 1887, the Bibliography has had enough variety in format to  
warrant a review of what seem to have been the principal changes  
culminating in the current volumes. The introduction, the section  
containing the citation of publications, and the index are discussed  
separately in the following paragraphs.

Introduction to the Bibliography The first volume of the Biblio-  
graphy, by Dalton, was modest in size and tentative in plan. The  
introduction included a list of 51 serials and periodicals which had been  
examined. A similar list appeared as a separate section in the next  
issue and has continued as a permanent feature of the plan of organization  
for the volume. The introduction, usually a page or less, has commonly  
described the geographic coverage and makeup of each volume, listed the  
previous Survey Bulletins comprising the complete Bibliography already

published, and acknowledged assistance given to the compiler by others. The annotated volume for 1950, by Marjorie Hooker, contained as part of the introduction a 4-page exposition of the scheme of indexing. Discontinuance of this guide to the use of the index for a number of issues after 1951 was unfortunate in view of the complexity the index section had acquired over the years, but its restoration in the 1958 and 1959 volumes promises to be permanent.

Citations in the Bibliography The section of bibliography containing authors and title citations has had many transformations. In the early volumes, it combined author and subject entries in a single alphabetical arrangement--there was no separate subject index. After the title, in author entries, an informative abstract or note appeared. As the volumes increased in size, the abstracts decreased in length and were all but eliminated by the volume for 1895 prepared by Weeks who commented at the time that "abstracts appearing in regular periodicals have been omitted in this volume." The only comparable, annotated volume to appear since Darton was that for 1950. Another feature to be noted is that the page format of the section on bibliography was double column until it was given its present across-the-page form by Weeks, in the volume for 1892-93. In the same volume Weeks introduced the feature of numbering the titles consecutively, without regard to author. The aim stated was ease of reference from the separate subject index which first appeared in the same volume. The scheme of consecutive numbering of titles must have present difficulties in the large cumulative volumes, because it was omitted in the issue for

1785-1918 in favor of a chronological arrangement, by author. In the cumulative volume for 1919-28, a numbered order (also chronological) by author was used; it was this form that was finally adopted in the early 1940's by Thom, and has continued to the present.

Subject Index of the Bibliography As already noted, the subject index as a separate section of the Bibliography, was introduced in the first volume compiled by Weeks. It appeared in a double column format. Under Weeks and Nickles, the index averaged a little over one-half (56%) the number of pages of bibliography. Since 1940, starting during the period when Thom was compiler, the number of pages of index, compared with the pages of bibliography, has been increasing. In this later period it averages about 30-35% greater length. In 4 volumes, including the 1940-49 cumulative issue, the number of index pages exceeded the number of pages of bibliography. This shift toward a more detailed subject index may have had a bearing upon the longer time to publication and the consumption of more man-years in the preparation of the Bibliography.

Present status of work on the Bibliography. As already noted at the outset of this review, during the 1950's the number of compilers and the clerical assistants engaged in preparation of the Bibliography increased to a staff of 13. But the increase failed to lead the work out of a cycle of delays extending to the third year after the Bibliography year. An accumulation of problems affecting staffing, editorial policies, working space, and direction hovered persistently over the operation.

On February 1, 1960, the staff and function of the Bibliography were transferred, under new direction, from the library to the Office of the Staff Geologist for Publication, Geologic Division. Since then, machine processing (Flex-o-writer) has been introduced to speed and lighten the burden of purely manipulative steps in compilation, and a closer working relationship with the Division of Publications has been established in the early stages of manuscript preparation. The Bibliography for 1959 was released to the public in late 1961. The Bibliography for 1960 is expected to appear in 1962. The schedule of publication is likely to be shortened again to one year, as was common during the earlier history of its publication. Because of machine help, the preparation of the 1950-1959 cumulative volume is expected to be a less formidable task than the 1940-1949 volume which did not appear until 8 years had elapsed.

The outlook for the future of the Bibliography is improved, but will always be jeopardized by the relentless demands for increased work capacity in a literature field that is itself increasing year by year. Major needed improvements yet to come, such as the preparation of more frequent cumulative volumes starting with a 5-year cumulation, and the annotation of the volumes listed (as was done for the 1950 Bibliography), are possible benefits from new developments in data processing. Finally, the integration of the bibliographic work with the library, and of both activities with a possible Science Information Center of the Survey--present strong challenges for the future.

### Circulation in the Library

In a sense, the circulation activity is at the same time the most plain to see, the most routine, and the most significant part of the work of the library. Almost every other task in the library is performed in anticipation of circulation. The daily issue of information is an unceasing demonstration of the sole purpose of the storage plan under which retrieval is made.

In the research community, the continuing analysis of circulation can provide insight concerning reader habits, the use of acquisitions made over the years, and the changing course of reader interest within and outside the Survey. The administration of the loan policy and the service attitudes of the circulation staff can, and often do, condition the whole library activity because they are among the strongest impressions the visitors take away from the library, apart from impressions of the library materials themselves.

In addition to the loan function, circulation in a library usually includes the physical control of the collection; that is, the shifting of material on the shelves to make optimum use of available space, the preparation of new book displays, and a continuing schedule of shelving new books or those returned by users. In the Survey Library, probably one-half of the total number of volumes in the collection, though not of the actual volumes, are handled in some way each year as part of the circulation process. From the point of view of costs, circulation is perhaps the least blameworthy in the picture of mounting costs everywhere because it is the end process of library activity, is so demonstrably user-oriented, and is so

manifestly "here and now" as the goal of library activity.

The focus of the present study is upon the circulation of material by loan from the Washington Library. Loan is to be distinguished from circulation which broadly includes, also, the use of material by readers visiting the library to consult material in the stacks or in the extensive periodical bins. Circulation within the library has been estimated by the Chief Librarian to be three to four times the number of readers who visit the library, but it has not been feasible to attempt to record such use for comparative examination. Some of the questions raised in the study of loans were these:

How many books are on loan on an arbitrarily chosen date, to what community of readers?

What, if any, pattern of reader specialization is evident from an examination of the subject classification of material on loan?

What is the frequency of interlibrary loans made by the Survey Library and of books borrowed from other libraries?

How long are books on loan?

How does the system of recall of overdue books work?

What is the annual cycle of loans, and what relationship does it appear to have to growth patterns such as Survey employment level, size of the library collection, or to changes in program?

What is the age since publication of materials loaned?

What is the relationship of loans to the economy of stack space? That is, is the material most often borrowed the most accessible, in a general way at least?

Information bearing upon most of these questions was not available for the asking, but the librarian in charge of circulation was extremely helpful in developing much of it from the loan records which reflected careful and faithful attention to the daily movement of materials over the loan desk.

A quite detailed examination of the record of material on loan from the Washington Library, as of April 1 and 13, 1960 was made. The dates were arbitrarily chosen. The data provide the basis for some interesting and even some surprising generalizations about the number of volumes on loan, the subject classification of the material, the duration of loans, the age of publications (date published). The source used was the loan record maintained at the circulation desk which carries the call number, author and title, date of publication, name of borrower, and the loan dates. A single card has the capacity to record 10 loans.

Loans outstanding on April 13, 1960 numbered 9027, representing about 2 1/4 per cent of the 400,000 volumes available in the Washington Library. Expressed in other terms, the loans were the equivalent of 9-10 books in each stack of the library if both sides of a stack are included and the average stack capacity is taken to be 4000 volumes.

Borrowers of loans outstanding on April 13, 1960 numbered 929, of whom about 18 per cent were from outside the Survey. Any impression gained by averaging the loans among all borrowers--which comes to about 10 books per borrower--would be misleading because approximately 50 per cent of the volumes were on loan to only 3 per cent of the

borrowers. Most of this small percentage of heavy borrowers were in the Geologic Division; each of the borrowers had 50 or more volumes and some had up to several hundred volumes. The explanation given by the library for the high incidence of long-term loans to this small group of borrowers was generally confirmed by the writer's visit to selected borrowers of a large number of volumes. They were found to be mostly specialized works in the field of the borrower's interest. Usually under the immediate custody of the responsible borrowers, loans of this type may be assumed to have a significantly large, though undetermined, secondary circulation to co-workers of the borrower, or to others by referral from the library as they are needed for brief reference. If the loans made to users in the group just described are excluded, the average loan is about 3-4 volumes per borrower. Although precise information was not obtainable for 35 per cent of the loans among the various Divisions within the Survey, the highest frequency for loans that could be identified by the organization location of the borrowers was in the Geologic Division, with Water Resources and Topographic Division distant followers. Borrowers from outside the Survey--that is, other Federal Agencies and the public-- had only 558 publications, about 11 per cent of the normal-term, 30-day loans (excluding, of course, the heavy, long-term borrowers within the Survey.)

Duration of loan The normal loan period provided under regulations of the library is 30 days. New books are limited to a 14-day loan until they have completed circulation among the "green-slip" list of readers

who make selections from books on the "New-Book Shelf" where they are displayed for one week after accession (a practice that was mentioned as early as 1909 in the Annual Reports of the Director). New-book loans, and regular loans to Survey personnel outside the Washington, D. C. area, or to other libraries, or to the general public, are followed up on the due date by written notices. Regular loans may be renewed; new-book loans may not be renewed until the original list of subscribers has been circulated.

Since approximately 300 loans are made from the new-book shelf weekly, and upwards of 500 loans in this category are outstanding at any one time, this phase of circulation receives a substantial part of the time of the circulation staff. An examination of the loan record of 450 books and periodicals which had completed the round of circulation from the new-book shelf in May 1961 disclosed that they averaged 2.6 borrowers and that 218 of the 450 pieces of material were loaned only once. On the other hand, 25 per cent of the pieces of material which completed circulation from the new-book shelf in the same period accounted for about two-thirds of all loans from the batch examined. This high frequency of loans for a small proportion of the material suggests that a pattern of frequency for loans may exist which a fuller examination, over a longer period of time, would disclose. If it could be discovered and related to particular subject matter or periodical preferences, it might suggest an arrangement of the new book shelf which would save readers the time of going through the bulk of new material, now mostly in piles of randomly assorted journals and pamphlets.

Continuing study of reader habits seen from this vantage point might also suggest the areas in which preferences occur or are changing.

Thirty-day loans to Survey personnel in the Washington, D. C. area are administered more liberally; a quarterly or semi-annual list of loans outstanding is sent to these borrowers. The rationale for a more relaxed control of loans to local Survey personnel seems to be due to a combination of factors: The limited staff available for follow up, the rapid communication possible by telephone if a volume is needed by another borrower, and a recognition that too precise control can lead to more books on the shelf without any assurance of more use from the books. The Chief Librarian has remarked that if all the books on loan were returned at any one time, there would not be shelf space to accommodate them! Nonetheless, it is interesting to speculate on the psychological effect upon new-book borrowers (a majority of whom do not voluntarily return books when due) of a rule thus liberally administered for 30 day loans. The same borrower will often have new-book loans and regular loans on his shelf at the same time.

Subject classification of material on loan In order to obtain some idea of the type of material on loan on April 13, 1960, the date chosen for examination, a tally was made of all outstanding loans by subject class. It was soon apparent that a majority (63%) of the loans were of material not classified under the library's decimal system. Not only a majority of the loans, but a majority of the volumes in the library collection, it was learned, fall into the category of serial and periodical publications. Although a catalog card is made for each

periodical title (not the articles in the issues), such material is not usually analyzed further except for arrangement in one of several board categories, each of which has a special designation in the call number, as will be described below. Monographic reports in a publication series, such as U. S. G. S. Bulletins and Professional Papers, are cataloged by author, title and subject like a book, however, as well as noted in the series title. Serial and periodical publications are designated, then:

a) As to geographic coverage, by number in the series 100-900 appearing in curves ( ) with the call number;

b) As to geologic content or interest, by the letter "G" preceding the number in curves denoting geographic coverage (except that official geological surveys of countries and their political subdivisions are designated simply by the geographic number in curves);

c) As to general scientific content, by the letter "S" in the same position described for "G"; and

d) As publications by governments throughout the world by the letter "P" in the same position.

Survey scientists borrow more heavily from ~~serial~~ publications than do general readers. But even for general readers, the circulation by loan of serial and periodical works predominates over material in the decimal scheme of classification with 58 per cent of the loans in serial or periodical categories compared with 69 per cent for heavy Survey borrowers, and 63 per cent for all types of borrowers combined.

Focusing now upon loans of classified material, which can be grouped by subject, if we exclude the loans of 3 per cent of borrowers

who each have more than 50 volumes charged to them, because they represent a special aspect of library use, the remaining volumes can be considered to have more "normal" use, as one thinks of number and duration of loans. What is the distribution of subject matter, as expressed by classification of these normal loans in the Survey Library's scheme? This is how it appeared -

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Loans outstanding on April 13, 1960, by subject divisions,  
exclusive of loans held by borrowers of 50 or more volumes

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Subject divisions	No. vols.	Per cent	Cumulative per cent
Economic geology	297	15.7	15.7
General geology	278	14.7	30.4
Geography, physiography	265	14.0	44.4
Mathematics, engineering, surveying	222	11.7	56.1
Physics and chemistry	209	11.0	67.1
Paleontology	177	9.3	76.4
General works	162	8.5	84.9
Mineralogy and petrology	118	6.2	91.1
Biology and natural history	116	6.1	97.2
Historical geology	53	2.8	100.0
	1897	100.0	---

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The most striking fact, perhaps, is the absence of any strongly predominant class of subject matter, unless it be the broader, descriptive classes over the laboratory-oriented classes. A similar ordering among

the small percentage of heavy borrowers within the Survey was them made, as follows -

Loans outstanding on April 13, 1960, by subject divisions, among borrowers of 50 or more volumes			
Subject division	No. vols.	Per cent	Cumulative per cent
Paleontology	239	17.7	17.7
General geology	224	16.6	34.3
Economic geology	201	14.8	49.1
Physics and chemistry	187	13.8	62.9
Geography, physiography	103	7.6	70.5
Mathematics, engineering, surveying	92	6.8	77.3
Mineralogy and petrology	87	6.4	83.7
Biology and natural history	85	6.3	90.0
General works	81	6.0	96.0
Historical geology	55	4.0	100.0
	1354	100.0	---

A comparison of the two groups of borrowers shows the higher frequency of paleontology, and physics and chemistry loans to be a characteristic of the loans among long-term, heavy Survey borrowers. But general geology and economic geology continue to hold prominent positions in the rank order, also.

As guides to library administration, this examination of the incidence of loans by subject divisions may not prove to be very meaningful at this stage. What it lacks is comparable data on reader interest for a longer period. It is known, for example, that the literature of chemistry and

physics has been expanding markedly in the collection over the past decade, and that mathematics and engineering have stronger claims on Survey resources for acquisition of basic works than heretofore. It is a fair surmise that works on biology and natural history may take a larger place in future acquisitions as the earth sciences find new applications to the study of national health problems in relation to man's natural environment. All these developments suggest that an annual re-examination of the circulation output would provide a feedback of information that would have relevance to plans for the library's future acquisitions, for the type of literature or information specialists it will need, for a program of book disposals, and for space utilization.

Age of publications on loan As the collection in a library ages, the question of the use made of its acquisitions arises. When its size presses upon the limits of available space, as it now does in the Survey Library, the questions--"How many of the older books are really used? How frequently?"--become more insistent. No compiled data are available on the age of books in the Survey Library, but the growth curve for the collection building up since 1879 can mean only one thing: There are many scores of thousands of volumes which are 30 years or more old, and the rate of future accumulation and aging will increase unless a vigorous retirement and disposal program is planned, soon. Retirement of selected works to less costly space is one of the measures, costly in itself. But what insight about the general problem, even though it be a small one, can be gained from examining the age span of publications currently on loan? The loans outstanding on June 21, 1960 were analyzed

for publication dates and the data were grouped as follows:

Loans outstanding on June 21, 1960, by period in which published					
Period in which published	Number of loans	Per centage by age group	Cumulative per centage (read down)	Cumulative per centage (read up)	
1951 - 1960	3447	44	44	100	
1941 - 1950	1257	16	60	56	
1931 - 1940	1083	13	73	40	
1921 - 1930	543	7	80	27	
1901 - 1920	747	9	89	20	
1900 & earlier	851	11	100	11	
	7928	100	--	--	

The median age of publications on loan fell somewhere in the 1940's. The distribution within the most recent decade (1951 - 1960) was further examined for the number of loans in the most recent 5-year period and found to be 2189 volumes, or 28 per cent of the total. It should be recalled here that approximately 500 loans are accounted for as loans from the new-book shelf, most of which are assumed to fall in this most recent period. The percentage might be changed somewhat, therefor, if one were interested in loans taken to meet specific information requirements rather than those to keep abreast of new literature. As already mentioned, there are no compiled data available on the age distribution of books in the general collection. The examination of loans outstanding on a fixed date does not establish a use pattern for the books in the collection. But it does give pause to any decision to dispose of publications merely on the basis of age. At the turn of the Century, there were 50,000 volumes in the Survey collection. Sixty years later, 11 per cent of the loans outstanding

were from that early publication era. It would be more significant for a book disposal program in the library to know how many volumes published before 1930--when the collection was half its present size--were used in the course of a current year. This topic will have greater meaning as the library continues to grow and as the economy of shelf space and staff compel attention to reader habits in relation to the aging collection. The purpose of the present study is served if the problem is brought to attention as one deserving further data gathering and analysis.

Books "on deposit" The circulation picture is not complete without mention of the practice of placing material "on deposit" with employees of the Survey. On April 1, 1960, an arbitrarily chosen date, there were 4811 items in this category. The practice dates back to an early stage of the library's history when this type of loan, on an indefinite date-of-return basis was apparently instituted in recognition of the fact that certain volumes found more or less continuous use by some Survey scientists. The practice of placing books on deposit has diminished over the past decade, with the more liberal authority for purchase of books from Branch allotments outside the library, and is now discouraged. Notices were sent to all holders of books on deposit in 1954 and again in 1958 as a reminder that this material was still charged by the library. About one-half of the holders of books on deposit failed, however, to report their holdings. Books on deposit may be recalled for use by others who need them. When the user of books held on deposit no longer has need of them on a continuous basis, he is expected to return them to the library. Without a more explicit

policy or review to govern their retention, however, it may be doubted that the conditions justifying the original deposit are still present in many cases. Yet, in the hands of subject matter specialists who have made the principal use of them, they may be as fully utilized as they would be if returned to the crowded shelves of the library. The question of their loss or misplacement by long-term borrowers remains.

Books lost or misplaced The records of the Circulation Section include a file of publications that have been reported "lost or misplaced." Established in 1933, the file contained 1512 cases when examined in April 1960. The number is remarkably small for the size of the collection and the increasing rate of circulation. Indeed, one may question, in the absence in recent years of any systematic check of the "shelf list" against actual volumes on the shelf or on loan, whether the record does accurately reflect the number of books unaccounted for. In the previous discussion of books on deposit, it was noted that replies were not received to about one-half of the notices sent to borrowers who held 4000-odd books under that arrangement. How many of the unreported books were lost or misplaced?

Circulation trends. Circulation by loan has proceeded over the past 60 years in a pattern that does not yield to any simple explanation. It invites speculation in relation to other trends by which loans might be expected to be affected. First, there is the essentially linear growth of the collection from 50,000 volumes in 1900 to the present approximately 400,000 volumes in the Washington Area. As stated earlier, this growth conforms closely with the tendency of large university libraries---a doubling every 15-20 years. Such growth might be expected

to attract a larger number of readers from outside the Survey as the diversity and geographic coverage of the collection increased.

A second trend is the growth of the employment level in Survey from about 600 employees in 1900 to over 6500 by 1960. In these two trends, increase of the collection and of Survey employment, the growth factor is close to ten over the 60 year period. But as already emphasized, the use of the library by the Geologic Division far exceeds the combined use of all other groups within or outside the Survey. While the growth of the Geologic Division has followed a continuous upward trend from the late 1930's until about the mid-1950's, this was not true for the period 1900-1935. In that earlier period, there was a build-up from 40 employees in 1900 to a peak of 92 employees in 1911, then a decline to 60 employees in the mid-1920's, followed by a more rapid rise to 93 employees in 1930. Although these levels are small absolutely by comparison with today, two or three generations ago they were significant shifts in staffing for a scientist group still small enough for each member to greet every newcomer, and for the Chief Librarian to personally know just about every Survey borrower.

Bearing in mind the fluctuating employment level of geologists, a third trend to be noted, then, is the rate of loans themselves during the period of growth of the collection and of the general Survey employment level. Did the loans reflect the decline of Geologic Division employment in a period of continuous growth of the collection, and in the presence of a fourth, indeterminate factor, loans to the public? It seems that they did in the presence of all others factors operating to

increase loans. Exhibit 4, showing the rate of change on semilogarithmic scales for employment in the Geologic Division and for loans, reveals rather strikingly the similarity of these two trends-- employment level of the Geologic Division and loans.

The hard data on other variables which might have affected both loans and Geologic Division employment are admittedly thin: The influence on library use of World War I and its aftermath with its shift to the publication of results which were the product of years of field and office work, rather than in new research directions; the inevitable disruption of operations by the preparations for and recovery from the move of the entire Survey to a new building; changes in the technical leadership of the Survey as many of its first- decade members reached retirement age and the drive for basic research was slowed; and even more significant, the loss of over a score of able geologists between 1914 and 1921 to private employment because of the comparatively low government salary scales. The struggle to retain or rebuild staff to meet the competition from mining companies, in the face of the widening field of endeavor opened up to the Survey by World War I, is recounted in the Annual Reports of the Director and in a report ("Brief for the Geological Service", by E. S. Bastin, D. F. Hewett, and W. C. Mendenhall, 1921, mimeographed 12 pages) circulated by a committee of geologists. By the late 1920's, the tide had turned upward for both employment and loans. The increase continued unabated, except for a lapse in the Depression Years of the mid-1930's, until employment began to level out in the mid 1950's. Loans in the

Washington Area reached 61,734 in 1960, double the 1950 level, and three times the level of 1940. The opening up of branches of the library at Denver and Menlo Park has added approximately 20,000 loans annually to the total for the main library in Washington, D. C.

One of the most interesting circulation trends has been the decline and then the reversal of the relationship between the number of readers visiting the library in Washington and the number of loans. Until 1940, the trend was toward increased circulation by loan until loans came to exceed and then double the number of readers visiting the library. This trend is probably to be accounted for by a number of factors; chief among them, however, is the dispersal of employees to the field and the crowded conditions in the library in Washington.

## IV RESOURCES OF THE LIBRARY

The store of books, maps, and other documents that bulk so large in a collection as old as the Survey's are among the first images that come to mind with the word...library. But what and where are the units that comprise the collection without the library's other resources-- trained personnel, funds, space, and equipment? Step into the library, check the catalogue, or go to an already familiar section of its shelves. Run your eye over the titles or call numbers until you find the book you are looking for. Reflect for a moment upon the fact that every one of the 450,000 volumes, every map, every document, is placed where it is in the collection because it was the focus of the attention of members of the library staff at least once, and for many volumes several or even scores of times. Run through the search procedure for another volume and fail to find it. What then? You go to a reference librarian, tell him your problem, and the experience of thousands of searches he has conducted, under an ordered storage and circulation plan, is available to you. The volume sought may be on loan, at the bindery, in the file of lost or missing volumes, catalogued under an author or title different than the one you remembered, or not in the collection after all, but available from one of a score or more of other libraries on an inter-library loan basis.

Consider then the cost of staffing this library installation for the 75 years the Survey library has been in operation. As a rough approximation we can say that the cost of servicing the entire

collection since 1947 (approximately \$3,000,000) would, if spread over the entire collection, average about \$6.50 per volume. Project the costs backward to cover the smaller staff and salaries of 60 earlier years (about one-fourth of the man-years expended since 1947) and the cost rises to about \$8.00 per volume. As a further rough approximation, the total effort expended on the development of the entire Survey collection may be thought of as on the order of 1000 man-years. Taking, then, the higher average annual staffing level for the past 5 years, which is 65 man-years, and project it over the next 15 years: the library services can be expected to require at least as many man-years in such a future period as they have in the entire 75 years to date. Actually, the man-years will be greater in the next 15 years because the staff will have to be increased substantially as the collection doubles in size in the pattern of the growth which has occurred over the past.

Unlike almost any other branch of the Survey's operations, the library collection is a reflection of what is happening in the whole scientific realm. Its growth is a direct response to developments cutting across every political, cultural, and intellectual boundary of its subject fields.

With this general perspective over the whole Survey Library enterprise, in time and cost, the examination of some of the data on the library's past and present resources and the commitment to its future growth acquire special meaning.

### Personnel in the Library

The Survey library staff will be examined, first, in brief historical review to gain some understanding of its composition over the years in relation to growth of the collection and other developments; second, as it exists at present in relation to the main functions of the library in Washington and the field. Finally, the future outlook for change in size and specialization of staff will be considered.

History of personnel growth in the library. In the whole history of the library down to 1947, from all indications in annual reports of the Director, its staff did not exceed a total of 9 regular members. This was a period in which the collection developed to about one-half its present size. The Chief Librarian, 5 professional and subprofessional workers, and 2 clerks made up the staff in 1932, according to the Director's annual report which included an organization chart of the Survey as of June 30, 1932. By 1947, when the present Chief Librarian was seeking an increase in staff, the justification listed 9 filled positions, including, in addition to the Chief Librarian, 6 professional and subprofessional positions, one clerk, and a messenger. The justification stated that the staff was the same size as 40 years earlier. By 1948 the staff had increased to 31 members, by 1950 had reached 48, and by 1958 stood at a peak of 72.

The growth between 1947 and the mid-1950's reflected bold measures to correct the severe inadequacy of the small staff which attempted to cope with the burst of war-time demands upon the library, particularly in the military geology program. Of equal or greater significance in the same

period was the large expansion of Geologic Division program, funds, and personnel as a result of work undertaken in the continuing program for the Atomic Energy Commission. After the library was transferred to the Geologic Division in 1947 it enjoyed ample funds and the paternal interest of its heaviest group of users. For several years after 1953, the chief stimulus for expansion of the library was the need to staff the newly created branch libraries at Denver and Menlo Park which together now comprise 25 people, one-half of all library personnel exclusive of staff compiling the Bibliography of North American Geology.

Looking back upon the extraordinary expansion of the library staff since 1947 in relation to its essentially stationary level for decades, two questions arise insistently:

(a) How did the library carry on its essential functions with a staff of 9 or fewer people during the most rapid period of the collection's growth up to 1930?

(b) What differences in the extent and quality of library services have occurred since 1947 to warrant so great an increase? It should be stated again that between 1930 and 1945 the collection apparently did not increase substantially. It experienced, instead, a thorough inventory and culling of superfluous volumes during the Depression years which largely offset the new accessions.

Without depreciating one whit the dedication and perseverance that the early librarians and their staff brought to their jobs, the evidence points to a vast underestimation of the roles they were called upon to play in laying the foundation for such a unique and growing collection.

The staffing pattern already described for 1947 and inherited by the present Chief Librarian when he assumed his duties in 1940 was about the same as was reported in response to a 1911 Inquiry of the President's Commission on Economy and Efficiency (a forerunner of the more modern Hoover Commission Reports). The staff was so skeletal that its energies were by necessity aimed heavily at the processing of exchange acquisitions, at a minimum level of recording. Acquisition by purchase was at the minor stage allowed by an annual limitation of \$2000 for new book purchases. Cataloguing was, therefore, to a large extent in serial, periodical, and monographic categories, into which exchange material commonly falls, outside the library's decimal system. But even for books requiring classification under the decimal system, the more time-consuming task of preparing analytical statements for each book was done scantily. In periods of large arrears of work, temporary (blue) catalogue cards were made with no certainty that they would be replaced by cards with fuller analytical statements in the near future. (In the early 1930's a Federal relief project occupied 20 professional library cataloguers for 6 months or more in the reduction of backlogs of cataloguing.) Reference service was non-existent as a specialized function. Readers used the library largely on a "self-service" basis. Binding of serial and periodical material was a neglected task for which funds were inadequately provided; as a result, the binding of thousands of volumes was postponed until a later period when costs were higher. Control of loans was necessarily light because staff for follow-up was so limited. The still highly centralized nature of Survey operations

may be credited with the small proportion of losses that occurred. Maintenance of the collection on the shelves by reading for correct order (a necessary measure when stacks are open to readers), re-labelling or revising classifications in the light of new developments in concepts of the subject classes--were all incidental tasks for which little time was available and no specialized role of staff to perform them was yet recognized. Work on compilation of The Bibliography of North American Geology, a traditional and still proper function of the library, was one of the few areas in which the small staff remained reasonably current with the work; but only because of their prodigious labors and the stability of the work during Nickles long tenure as bibliographer.

One may discern in the pattern of library work described for this early period through 1947 evidence of the same struggle that was going on in other areas supporting government research. It was a struggle for identity with the procession of events that was bringing growth on an unprecedented scale in scientific research effort everywhere. Publications support lagged behind support for research activity, and library support lagged behind support for publications activity. It took time to demonstrate that first-rate research requires first-rate research libraries and staff. The two are reciprocally related and turn about the need to publish and to disseminate information.

Consider now the second question posed above: What differences in extent and quality of library services have occurred since 1947 to warrant so great an increase? An answer leads first to a current assessment of each of the main functional areas described for the

earlier period. In each area--acquisitions, cataloguing, reference, circulation and stack maintenance, and bibliography--the present staff exceeds the total library staff of the earlier period. And in each area the work has become specialized not only to the area, but in most cases to functions of subject material within the area. Reference work, for example, includes: A specialist on the map collection; a specialist on scientific periodicals and serials received by exchange; and a reference librarian who is developing intimate knowledge of Russian literature in the collection. Annual purchasing, on a scale 25 times greater than any single year preceding World War II, has replaced exchange as a method of acquisition of many serial publications. Classifying and cataloguing is more complete and current, though the level of analytical description, while improved, is still short of standards sought by the Chief Librarian. Binding is reasonably current for the whole collection. Physical maintenance of the shelves is excellent under a schedule of periodic arrangement and cleaning. Progress is being made in reducing a backlog of cataloguing in the map collection. Large arrears of work, which existed in about every section of the library, are reduced to a normal level.

In addition to these improvements in the extent and quality of traditional services, approximately one-half of the increase in library staff since 1947 is accounted for as additions to provide for establishing new library facilities at Denver and Menlo Park. At Denver, the increase provided for the organization and maintenance of the photolibrary and geologists' field notebook collections, neither of which had been adequately cared for in the crowded space available in Washington, D. C. But the branch libraries at Denver and Menlo Park are not be regarded as

autonomous; they are extensions of the library system. Most of the preparatory steps in accessioning, classifying, and cataloguing books are done at Washington, D. C. where purchasing is also centered. Requests for reference and loan material, not available at the field centers or their neighboring libraries, are often referred to Washington, D. C. because of the wealth of materials in other libraries at the seat of Government.

The list of changes in library functions--both as improvements in the quality of services previously offered, and as new services altogether--is, therefore impressive. But when one attempts to arrive at some measure of the increase of staffing in relation to the degree of change in library services, the effort falters; there simply is no whole basis in workload units recorded for the earlier period and for the present one. Changes in the character of the library have altered the basis for comparison. It seems reasonable to assume, however, that staff increases at field level were as rapid and as numerous as they were because of the special problems of "getting underway." The big drive for effectiveness has been completed at Denver. Only now, with the library routines well established there, can a basis be found for a comparison of its efficiency in the future. At Menlo Park, where the branch library is still in the process of becoming established, the emphasis will continue to be on effectiveness. A factor contributing to the slower rate of growth of the collection at Menlo Park is the availability of the Stanford University Library and the excellent

cooperative arrangement between the two libraries for use of the combined collections by both students of the University and members of the Survey.

With this view of the growth of the library staff in response to a need to extend and improve the quality of its services--and a new willingness to provide funds to do the job--let us examine more closely the staff at present in relation to the main functions of the library in Washington and in the field.

Composition of library staff, January 1961. On January 15, 1961, the regular, full-time, library staff, including its field branches and the staff engaged in compiling the Bibliography of North American Geology, numbered 60 filled positions. Exhibit 5 presents the position detail in total, by geographic location and by library activity. In addition to its full-time staff, the library has from 10 to 12 WAE employees on the rolls at various times during the year. WAE employees are commonly students attending local colleges and universities.

What are some of the characteristics of library positions? The ratio of professional librarians to subprofessional and clerical positions was 1:1, of men to women was 1: 3.5. The median grade for professionals was GS-9, and for subprofessionals (library assistants) was GS-4. The median age of the Washington library staff was 50 years, of the Denver staff 47 years, and of the Menlo Park staff was 34 years. The length of service of personnel at the 3 centers was examined to see whether it was similar to the age pattern at the same centers. As might be expected, the Washington group had the highest median, 6 years of service, with

professionals holding a median of 9 years, and all others 5 years. Denver personnel had a median of 2.5 years of service, their professionals 5.5 years, and technicians and clerical personnel less than 1 year. At the smallest library center, Menlo Park, the librarian in charge had 6 years of service, two others had 4 years, and the remainder 3, 2, and 1 years.

Promotions came to 23 of the 60 members of the library in the 2 year period 1959-1960, an annual rate which compares with the rate of promotions of professionals throughout the Geologic Division. Compared with the promotion rate of 9 per cent for the library in fiscal 1957 (based on a study of promotions throughout the Geologic Division at that time), the rate for the period 1959-60 in the library seemed high. The Chief Librarian confirmed that it was, indeed, high and not in the pattern of normal advancement of library personnel. The explanation given was the release by the Civil Service Commission in 1957 of new position standards for library positions. The standards superseded those previously established in 1945. The effect of the standards for library positions was to recognize GS-7 as a starting level for professional librarians, rather than GS-5 which has become a training level. The same standards operated to raise the grades of personnel who had already had experience in grades GS-7 and GS-9. Promotions were about equally divided between professional librarians, and library assistants and clerical personnel. The Chief Librarian believed that a complete classification audit of library positions should have been made soon after the new standards were announced in 1957. As it developed,

the Chief Librarian states, the library has been obliged to press for every grade adjustment obtained by an amount of effort that could only discourage future endeavors to keep personnel and position descriptions properly aligned.

The turnover rate of the library in the period between January 1959 and January 1961 was 16 per cent. By service group, the turnover was 6.5 for professionals, and 25 per cent for others. These percentages correspond closely to those for the Geologic Division as a whole in 1957 (the last year for which data are available) with the exception of professionals in the library who had a lower rate than prevailed in 8 of the 10 Branches then reporting. Four of the 19 separations in the period were by retirement which included one case of disability. Among the three centers, the turnover was highest at Menlo Park, lowest at Washington D. C. The higher turnover among library personnel at the field centers is attributed by the Chief Librarian to the difficulty in recruiting career personnel. A large proportion of the library personnel at the field centers are either not interested in librarianship as a career, or are only temporarily in the labor market.

In summary, then, of the composition of library staff in January 1961: Its 31 professional members included a core of experienced employees (9 had 10 years or more of service in the library) whose average grade level was relatively low. The promotion rate of professional librarians had been somewhat improved during 1959 and 1960 by changes in Civil Service position standards. The turnover rate of the various service groups was at or below that of the Geologic Division

generally. The relative stability of employment in the library during the past few years probably reflects the high average age of its members, compared with years of service in the library, rather than full satisfaction with career opportunities. The high average age itself can be expected to present problems of transition in the 1960's which will be of a different order and difficulty than the library has faced in the past.

Future staffing requirements At several points in this presentation, the idea has been put forward that a great research library such as the Survey's is a commitment to the future as much as it is a legacy from the past. There can be no choice between a mediocre collection and a first class one without implying the same choice of value for the research program.

Projecting the growth curve for volumes in the collection ahead 5 years, 10 years, 15 years--the attainment of a collection of 1 million volumes is simple arithmetic. Not so simple, however, is the projection of staffing requirements and the inevitable increase in specialization in library activities. There are many signs that the decade of the 1960's may see some fundamental changes in library technology stemming from research on information processing systems covering the whole gamut of storage and retrieval devices in use. As a minimum, and at an early stage, the reduction of time and human energy can be expected in such routine and monotonous tasks as labelling call numbers on books, duplicating catalogue cards, recording and recall of loans, and other steps.

The big innovations in library operations, having to do with the reduction of the store of information itself to some smaller space and more readily accessible format, and the automatic searching for information by machine methods, will remain elusive for a longer time. They may never be practicable for a whole collection, but for portions of it only. But the stakes are so very large in the burgeoning problems of scientific information, and the search for solutions so intensive, that a number of fundamental changes in the composition, size, and training of library personnel can be reasonably expected. The positions of "literature scientist"--"information specialist"--"language engineer", trained in new skills and concepts of the automation era, may be added to or to some extent replace the traditional position of librarians performing traditional library work. But the prospect for early benefits to libraries moving in these new directions should not be counted until they appear. Before they arrive, there is good reason to believe that the burden of libraries will increase as abstracts, indexes, translations, and "hard copy" reproduced from selected works, find their way into the existing collections.

#### Funds for the Library

Annual library expenditures increased from approximately \$29,000 in fiscal 1947 to \$445,000 in 1961 (Exhibit 6). Expenditures in these years, including work on the Bibliography of North American Geology, aggregated \$3,458,783--a larger amount than had been spent over the whole life span of the Library down to 1947.

The increase in costs for the library will be examined to gain some understanding of the factors that have operated to produce them, and of the future commitment to library support which its unceasing growth entails.

Factors contributing to rising library costs. The increase in library expenditures has far exceeded that which may be accounted for by the numerical increase in staff alone. Unit costs tend to increase as an organization grows larger. Growth means that the library must deal with publications in increasingly diverse subjects and languages; that its catalogues and indexes become more complex; and that even the relatively simple process of circulating books grows more costly. It takes longer, for example, to reshelve a book in stacks containing several hundred thousand books than in stacks containing only a few thousand. It takes longer, too, to file or locate a catalogue card in the larger collection than in the smaller one.

A second, more tangible cost factor was the increase in Federal salary scales for the period under examination. Federal pay increases in the years 1948, 1949, 1951, 1955, and 1958 brought an increase of 50.3 per cent in base salary rates over the 1947 level. With the increase in specialization of services has come recognition of the higher degree of skill required. As skills requisite to the larger, more complex library operations have increased, grade levels for professionals have been raised.

A third factor, already mentioned, was the extension of library services to Denver and Menlo Park, the combined operations of which accounted for \$167,000 and a staff of 25 in fiscal 1961. The strengthening

of the reference service, the increase in the book purchasing staff, the expansion of the staff compiling the Bibliography of North American Geology, and the general strengthening of all services are other evidences of adjustments to a changing Survey program and scale of operations. These functions and services had either not been performed before 1947 or had been conducted on a meagre scale.

A fourth set of factors relates to increased costs for materials and services supplied from outside the library. The cost of books and periodicals, for example, has increased 50 per cent or more over a decade and the annual volume of books purchased has increased 25 times over the 1947 level or any year preceding it. Binding, which for most books exceeds the cost of the original purchase when done by the Government Printing Office, is closer to one-third that cost under outside competitive bids. Costs of library supplies and materials have increased, too, in the pattern of higher costs throughout our economy since War II. Taken together, expenditures for objects other than personal services in the library varied from 15 to 20 per cent of its annual expenditures during the past 5 years. Book or periodical purchases are by far the leading expenditure class, after personal services, while binding, supplies, and materials are distant followers (see Exhibit 7).

A factor not included in the picture presented above is the cost of remodelling and equipping new space for the library at Denver and Menlo Park, or the continuing rental cost at Menlo Park where the Survey offices occupy leased space. The continuing rental costs for Menlo Park are part of an overall cost for space shared by many Survey organizations. But it should be recorded here that the expenditure for the original altering and

equipping of library space at Denver and Menlo Park was on the order of \$150,000.

Among the cost factors described for the library over the past decade or so, it is to be noted that a majority fall in a pattern of continuing, steady expansion--costs associated with growth in size and complexity of the collection, costs of Federal pay increases, costs of higher grade staff to provide the skill and diversification of knowledge needed to match the mounting problems of technical and administrative management, and costs for new space and equipment to accommodate the expanding collection.

Future cost outlook for the library. In view of the strong prospect that the collection will have reached a million volumes by 1975, and the expansion to be expected for the facilities and staff at Menlo Park, a doubling of the annual expenditures for the library before 1970 appears realistic. A threefold increase in library costs by 1975 is probable.

#### Space and equipment in the library

To regular users of the Survey Library in Washington, the acute crowding of staff and materials does not need documentation. It is plain to see. Without being aware of the forces that have produced the situation, readers adjust to it in ways that sometimes increase their burden, sometimes increase the burden of the library staff, or both.

This adjustment, or the need for it, is evident in many ways: In the increasingly large proportion of telephone calls for loan and reference service compared with those made by visit; in the confusion of regular readers over the continual shifting of books in the stacks to make maximum use of space; in the delay occasioned by the location of

books in overflow space of the Interior Library stacks; and in the declining role of the library as an environment for creative borowsing. It will be recalled from an earlier discussion of the reference service that only 15% of the reference inquiries were made by visit to the library. The scanty provision of desk space in the reading and stack areas discourages the cultivation of first hand knowledge of the library's materials. The arrangement of books becomes, in such circumstances, a store of material, accessible perhaps, but not inviting for reader use in the manner for which it is maintained at great cost.

To the growing staff of the library in Washington, the crowding of those engaged in processing its material is a rebuke to their professional judgment that an hour's work can be done in an hour's time--they reckoned without the dimension of space in which to work effeciently. The inefficiency of operations due to completely outgrown working space for staff is difficult to calculate. The Chief Librarian, who has lived with the space situation in an acute stage for years, places the efficiency loss at 25 per cent. If his estimate were halved, the man-year cost would still be enough to pay for the average annual cost (\$43,000) of book purchases for the entire library!

The measure of space need and use has no generally accepted standard in Government. Justifications are often made, and decisions taken, without an explicit finding of what is relevant fact or policy. Yet, the library space requirements in Washington so far exceed allocated space, with resulting deficiencies in operations, that the case needs to be stated once again. With no immediate block of space up

for bid, and no policy to be accommodated, therefor, this section of the present report will present data useful for an understanding of the recent history of space developments, the amount and types of space now available to the library, and those needed for the future.

The architectural plan of the library wing in the present General Service Administration Building is pertinent to the discussion because it provides the most economical and functional space in which to resolve the severest problem of the library. The main library in Washington is located in a court wing of the General Service Administration Building. When the building was constructed 1917, the wing provided, as described by Miss McCord, Chief Librarian at the time, "the first instance in which a library unit specially designed and constructed to meet library needs had been included in a United States office building." In later years, when the building was air-conditioned, the library acquired a separate air-conditioning system (now malfunctioning). The wing has a basement floor at ground level of the court, above which are ground and first floors in the general plan of the building. Above the first or main floor of the library, with access only from a stairway of the library wing, are two additional floors or decks. The deck above the main floor of the library has the same floor dimensions as the first floor, but the top deck has a smaller area by reason of its penthouse design.

The library had its first need and opportunity to expand beyond its original space in the library wing when, after an elapse of about 18 years, in 1935, the occupants of the ground floor (the old General Land Office--now the Bureau of Land Management) moved from that space to the

main Interior Building which had just been constructed. The ground floor space was allocated to the Survey. The basement floor had already been in use by the Survey's Distribution Office for storage. The Map Distribution function needed additional space. Accordingly, the ground floor was divided for use by the library and by the Map Distribution Office; the library received the half to the south, and the Map Distribution Office the half to the north. Soon thereafter, connecting stairways were cut to join the two functions with their space above and below the ground floor. The new space was used by the library to store its duplicate or reserve copies of Survey and other geologic serial publications. The existence of this reserve, maintained over the years for negotiating exchanges and for replacement of copies outworn or lost in the main collection, was to prove of incalculable value to the Survey when it came to establish its branch libraries at Denver and Menlo Park. Lacking such a reserve, the library would have been obliged to purchase copies in the open market, if they could be found, at greatly increased cost over the original prices.

In 1942, with the entry of the United States into War II, and the creation of the Geologic Division's Military Geology Branch, the entire ground floor of the library wing was taken over by Military Geology, and the library materials there were transferred to the Washington Auditorium. In a succession of moves in the Washington Auditorium, the library materials finally reached the most undesirable space from the point of access--for the building has no elevators on the top floor. When the Military Geology Branch moved into the ground floor of the library wing, the center stairway to the basement was closed off for security reasons,

but the rear stairway remained to provide ready access to the library by Military Geology personnel who became the heaviest users of the library throughout the war period.

The occupation of the library wing by Military Geology thus appears, in retrospect, to have been a decision taken in a period of wartime emergency with the expectation that any long-term claim upon the space by the library could be considered when the war emergency had passed. The continuation of a large scale Military Geology operation, with heavy use of the library still, has aborted the plan to consolidate the collection in the library wing. As a consequence, the library collection has overflowed to space in the Department's library in the Interior Building. Let us examine the situation there; it is a temporary occupancy which growth of the collections of the Department and the Survey can be expected to terminate in a few years.

In July 1950, the Survey moved the part of its collection stored in the Washington Auditorium to space in the Interior Library. For many years, before the Interior Department created a central library in 1949, the splendid library quarters in the Interior Building had been occupied by the library of the Office of Education. When the Office of Education was moved to another location (about 1948), much of the space it had occupied in the Interior Building remained unused. The allocation of 2800 square feet on the second floor of the Interior Library to the Survey Library was followed in 1956 by a request from the Interior Library for this space for its own expansion. The Survey Library collection in the Interior Building was moved to the basement floor where it has continued to

have the use of 1750 square feet of space with stacks for approximately 45,000 volumes. By early 1962, the shelf space in this area was 75 per cent filled. In two years, or at most three years, the expedient arrangement that has prevented books from flowing out into the corridors will have just that outcome, unless plans are made for disposal of some books, or the acquisition of new space.

Two opportunities to house the library suitably in the GSA Building while it held the less convenient space in the Interior Library should be mentioned to bring the history of changing occupancy of the basement floor of the library wing to the present time. In June 1952, the Map Distribution operation was moved from the basement floor to rented space in the Acorn Building, Silver Spring, Maryland. The basement space was then allocated to the Section of Illustrations (now Branch of Technical Illustrations of the Division of Publications). The Section of Illustrations remained at this location until mid-1960 when it, too, was moved to rented space, in the "Food Barn", Silver Spring, Maryland. Although the vacated space was again sought by the library, it was allocated to other purposes. Both moves were a reflection of the increasing scale of publications effort in the Survey. But the library's growth in the same period had an even broader reflection--the increasing rate of publications in the whole scientific community.

Up to this point, the space situation in the library has been described in terms of the library's gross needs and attempts to fill them by obtaining a large block of space in the library wing. We have seen that the library has been an unsuccessful contender, thus far, for

space in the library wing below the floors now occupied. Overflow space in the Department Library, it has been pointed out, will be filled by 1963. The problem of space for the growing collection is, therefore, still pressing and will continue so until relief is obtained. Facing the need for re-justification of the Library's space requirements in the immediate future, it seems desirable to reduce those requirements to units that have like meaning for the librarian, on the one hand, and for those with authority to allocate space, on the other hand. The unit factors that will be discussed here will be divided between storage space, and working space for the library staff and readers.

Book storage. Two principal types of storage space are required in the Survey Library collection; shelf space for books, and drawer space for maps. In the Survey Library, shelves are arranged in open stacks. The number of bound volumes on any particular shelf differs from another, of course, with the thickness of a book. But the dimensions of a stack and the average book capacity of a stack section or of a whole stack can be approximately indicated by the following table.

Capacity and dimensions of book stack

(a) <u>Number of books per shelf</u> . . . . .	30
(b) <u>Number of shelves</u> in vertical section stack . . .	7
(c) Number of <u>sections per stack</u> (2 sides of stack, or 2 sides of stack aisle) . . . . .	20
(d) Number of <u>books per stack</u> (a x b x c) . . . . .	4200
(e) Number of <u>square feet of floor space per stack</u> including access space in aisle facing stack . .	150
(f) Number of <u>square feet of floor space in stacks</u> <u>per 1000 books</u> . . . . .	35

(g) Number of <u>books in stacks per 100 square feet</u> of floor space (two-thirds of (d) ).....	2800
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The book collection in Washington now comprises 84 stacks; 73 stacks in the library wing of the GSA Building, and 11 stacks in the basement of the Interior Library. The main collection is crowded to shelf limits, beyond the point for efficient interfiling of new materials, in order to make maximum use of shelf space. Now let us examine similar approximations of space used for map storage, and for working space.

Map storage. The movable map cases now standardized in the library are familiar to Survey map readers. The type most widely used is a 5-drawer, steel unit. Three cases are usually stacked vertically to provide 15 drawers on a floor space area, including access space, of approximately 37 square feet.

Capacity and dimensions of 5-drawer, movable map cases

(a) Optimum number of <u>maps per drawer</u> (active) .....	30-40
(b) Number of <u>drawers per map case</u> .....	5
(c) Number, stacked, 5-drawer <u>map cases accessible</u> from standing position of user .....	3
(d) Number of <u>maps per map case</u> (a x b) .....	150-200
(e) Number of <u>maps per 3-case stack</u> (a x b x c).....	450-600
(f) <u>Number of square feet of floor space per map case</u> including access space with drawer open. (Width of case is 53"; depth of case is 40"; depth of drawer when extended is 28"; access space is 32"; square feet of floor space with drawer extended is: 53" x (40" + 28" + 32") or 37 square feet.) .....	37

The library's map collection in Washington is housed in the equivalent of 320 cabinets (1600 drawers) spread over all floors occupied by the

library in the GSA Building. The cabinets require 2220 square feet (for 60 cabinet stacks) but actually have somewhat less than this amount because of limited access space in some areas. The original construction of the library quarters in the GSA Building included 720 map drawers which were built-in so that the map stacks are continuous vertically from the main floor up to the height of the ceiling of the deck above it. Built-in map cases have drawers 1 1/4" in height; movable cases have drawers 2" in height. The additional drawer height in movable cases cannot be used economically for active storage, however, because in the experience of the library staff an optimum number of maps in a single drawer is 30-40 sheets. Above this number, the refiling of sheets is rendered difficult by the bulk of the pile. Also, to avoid damage to the maps, the overlying sheets would often have to be removed before refiling. (The writer repeated the operations of withdrawing and refiling maps in several drawers. The observations of the library staff seem reasonable. The cloth-backed and plasticized maps take more abuse, but they are heavier. Weight of the pile then becomes a factor in determining the optimum unnumber of maps to be filed in a drawer.) If maps were in dead storage, it is estimated that a drawer would accommodate 100-125 sheets, but it would be necessary to remove the sheets above any position at which a map was to be refilled. Even the removal of a sheet below the top 25 would present difficulties unless the overlying sheets were first removed. Searching for maps in a packed drawer would be highly ineffecient and destructive of the sheets as a regular procedure.

The map storage requirement is thus seen to be a specialized one in which considerations of ease of handling and preservation of the individual sheets should be paramount. The present drawer space available will permit accession of additional maps for a few years. But the scattered location of the map cases, often obstructing aisles, is far from efficient.

Working space. Although space for the physical storage of the collection is a serious and continuing problem, the most critical, and the most immediate space problem exists in areas where the staff are assigned. The functions of acquisitioning, accessioning, classifying, and cataloguing require frequent reference to the main catalogue which is located in the lobby of the library. The working space for staff performing these functions adjoins the main catalogue, as it should. However, the average of 57 square feet per person in 3 rooms available to 15 people engaged in this work is near the minimum recommended for clerical workers engaged in operations which can be performed on a desk top. These are professional librarians whose work entails the handling and processing of large numbers of books. The operations in which they are engaged are not always sequential; books pile up around them.

Among the functions named, those of classifying and cataloguing have more frequent call to use the main catalog. Relief from overcrowding among classifiers and cataloguers has, therefore, the highest priority. Two alternatives appear to be present: The displacement of staff doing acquisition and accessioning to other nearby space; or the

removal of several stacks to enlarge the area now occupied by classifiers and cataloguers. The first alternative involves preparatory decisions about the new space to be created for acquisitions and accessions work. The space adjoining the reading room, in the southeast and southwest corners of the main floor is the only other open area on that floor, except for the public lobby. The administrative assistant to the Chief Librarian occupies the southwest corner but may be moved to an upper deck to provide more space for readers; the staff of the Geological Society of America, compiling the Bibliography and Index of Geology Exclusive of North American occupies the southeast corner. Space would have to be located for them. Survey staff compiling the Bibliography of North American Geology, who once occupied the southwest corner, moved out of the library space several years ago. The second alternative--removal of several steel stacks to make room for the classifiers--would be an extreme one, but it is possible to entertain the idea. What would be involved? It would seem to involve, after removal of the shelves, the retention of the bearing members of the stack structure or their replacement by fewer bearing members. The removal of the shelves would, of course present the problem of storage for the books they now contain, 12,000 or more volumes.

Space perspectives. In retrospect, the problem of space in the library can be seen as having offered at several earlier stages the outcome the library now experiences--crowding and inefficient dispersal--or an outcome which would have taken into account its growth as a fact of organization history. In its repeated bids for restoration of

the ground floor space (and allocation ultimately of the basement floor space) in the library wing, the library has tried to maintain the integrity of its operations in space which was well designed for its expansion. It has failed to achieve this aim.

In prospect, there is no other new space for the immediate future years which makes as much sense for the library as the space on the floors below it in the library wing. If the whole ground floor were taken over in the immediate future, several large benefits would result. It would provide space for the bibliographers of the Geological Society of America. It would relieve the senseless and costly overcrowding of the library staff. It would provide space to house the collection now located in the basement of the Interior Library, which is reaching its capacity. It would eliminate the congestion of aisles now cluttered with map cases. It would restore needed reading space on the main floor and would provide new reading and working space for readers in the center of the deck above the main floor. It would provide space in the library wing for the staff compiling the Bibliography of North American Geology. Most important, the allocation of the ground floor and, for later use, the basement floor, would enable the library to achieve an efficiency and moral which crowding has steadily syphoned off in recent years.

Equipment in the library. In the matter of equipment, the Survey Library is neither a showcase, nor is it altogether without lustre. Its basic physical plant in Washington is good, "traditional" in the better sense of the term, but more a reflection of the state of the architectural

and equipment art of an earlier period. The physical layout and equipment in Washington were first rate when the library was constructed in a new government building in 1917. The conversion of space for the branch library at Denver brought more modern furniture, better lighting, and movable stacks which provide more flexibility in arrangement, but it, too, is equipped along traditional lines. The Menlo Park branch is still in transition to a size, physical layout, and equipment stage which may provide options not open to Washington and Denver.

The whole pattern of the physical environment in which library work has been performed for decades is receiving fresh attention as part of a current inquiry into the problem of information storage and retrieval. One center for such review of traditional processing of library materials is the Council of Library Resources, Inc., Washington, D. C. The Council, an independent, non-profit organization, was established in 1956 under a grant by the Ford Foundation of 5 million dollars to be expended over a 5-year period. The aim of the grant, stated in the Council's First Annual Report, is toward "the solution of library problems, to coordinate research in, develop and demonstrate new techniques and methods, and to disseminate through any means the results thereof."

The Council on Library Resources makes grants to other institutions and persons in furtherance of its aims. Already, the variety of research endeavors it is supporting, in projects having to do with the physical-mechanical work of libraries, is impressive. As stated in the First Annual Report of the Council (period ending June 30, 1957, pp. 19-20): "A large library in these days is replete with mechanisms--for moving

materials in bulk or in piece; for copying, composing, duplicating and marking; for numerous operations of binding, mounting, laminating and fumigating; for the service of materials by optical and acoustical means; for book-charging, accounting and other business operations; for communication in various forms." Mention of a few of the problems and approaches being followed by the Council will give some idea of existing needs for change in which new types of equipment is part of the solution.

- The "cataloguer's camera" --a device which would reproduce the unit catalogue card, and have a second optical system through which the filing entries printed at the bottom of the unit card might be transferred to the top margin of individual cards during the process of reproduction. The device would eliminate the separate operation of manually typing the filing entries at the top of each card.

- Punched-tape operated typewriter--reproduction from punched-card or paper-tape storage by automatic typing in a programmed sequence.

- "Teleference" --a name coined by the Council on Library Resources to designate a system for consulting card catalogues from remote points by television.

- Mechanization of bibliographic compilation--a process employing punched-cards or tape for automatic typewritten reproduction and photo-listing to prepare final copy for printing the bibliography.

- Small hand-readers, to replace bulky, stationary-readers for microtext--a simple inexpensive device which would enable the private reader away from the library, anywhere, to read microtext as conveniently as the original. Some journals are now published in microtext.

- High density (100 diameters or more) storage of library materials by photographic techniques of reduction and enlargement.
- Direct access, photo-memory selection devices combined with methods of printing out hard copy of high definition.
- Book-marking process, by which call numbers, now lettered by hand on the spines of books, would have the operation performed mechanically.
- Testing and standardization of common types of library supplies and equipment.

From the foregoing mention of a few of the many types of equipment undergoing experiment and development, it can be believed that the traditional equipment and processes in libraries may benefit to a significant degree. In the Survey Library, for example, a punched-tape operated typewriter, placed in use in August 1961, now does the automatic reproduction of about 16 catalogue cards which were formerly typed manually, and each proofread as an additional step, for each volume entering the collection. The library has microfilm readers at Denver and Menlo Park. But the list of equipment innovations is soon exhausted, for--among other significant reasons--the lack of space in which to house it. One type of equipment which the Chief Librarian believes is needed, but space is lacking to install it at Washington, is that for reproduction by photocopy. Microfilm reader equipment in the Washington library would find use, too, if there were room for it.

We leave this discussion of space and equipment with the firm conclusion that they represent areas of neglect which can not be left

unheeded much longer. The means of correcting the space situation may be difficult to work out, but the problem should have wider recognition and the library's needs a higher priority than heretofore.

## V. MANAGEMENT OF THE LIBRARY

The aim of this section of the study is to present a review of the arrangements for conducting the work of the library--its management. In what has been presented earlier, the chief emphasis has been upon the operations of the library. Implicit in these operations we can find a body of supporting organizational principles, policies, systems, and administrative procedures which need to be understood. They may not be formally recorded, but they are inherent, nonetheless, in all that goes on in the library.

### Organization

The structure of the library's organization has remained relatively stable during its manifold expansion starting in 1948. No part of its organization plan, only its size, would surprise one of its earlier administrators were he to revisit it today. This familiarity which the library retains is because the division of work follows the pattern of functions common to all libraries: Acquisition, preparation for storage, the actual physical storage, and retrieval for reader use. The basic routines of a generation ago, applied to a more diverse and vastly increased collection, are essentially the same. The extension of some of the same services to the field and the increase in specialization within the traditional functional groupings are at the edge of changes they might comment upon. (See Exhibit 8 "Organization of the Geological Survey Library")

Specialization in activities has become necessary to cope with the increased volume of work. Purchasing and acquisition by exchange can no

longer be handled by one person as they once were, but require seven or more. Reference and circulation, once performed by one person, are separately staffed. Further specialization in reference service may be foreseen in the near future as a cost of the increasing volume and changing character of materials and reader requirements. Classification and cataloguing tend to be specialized along lines of the difficulty of material.

One of the results of specialization, familiar in the growth pattern of large organizations, is some lessening among key staff members of perspective over a whole function or a group of functions. The Chief Librarian expresses awareness of this tendency and its implications for more effort needed to coordinate the work of individuals. The informal, largely unwritten nature of plans, policies, work routines, and internal operating procedures in the library thus become more susceptible to change without due deliberation. For example: The "authority" for the continuing classification of material under a scheme the entries of which were not explicitly defined at the outset; the discretion exercised in the purchase of books for use by the branches outside library control; the flexibility to be applied to the loan policy. As long as the staffing of the library remains relatively stable, and the experience of many older members is distributed over its main functions, the oral transmission of policies and procedures to new members may be accomplished successfully. But consideration of the age distribution of key library personnel should cause concern that so much is left to informal arrangements. The turnover of personnel in the 1960's by retirement alone can be expected to break many of the lines tying oral policy to experience.

More important, perhaps, for the future changes that technological innovations in the library arts might bring, the evaluation of new practices in relation to old ones may be slowed.

It is in the area of investigation of new library techniques used elsewhere, and the critical study of existing practices, that arrangements in the present organization seem most deficient. The absence of any staff member, with advanced library training or experience, who is free and disposed to follow new developments in library technology places the main burden upon the Chief Librarian. The tasks of initiating and conducting research into the entire process of bibliographic organization in the library have become too numerous and time-consuming for the Chief Librarian, alone, to carry along with other duties. What is required is a more detailed following of the offerings of numerous library seminars and conferences being offered, and of published reports in the fields of librarianship, documentation, and automatic data processing. Some of these come to attention; but the management need is for arrangements to seek out the ones that have relevance to the library at this or later states in its growth, to evaluate them, and to bring them to the attention of key supervisors throughout the organization.

Each of the approaches to the use of published information has something to contribute to the libraries of tomorrow. The researcher demands greater physical and content accessibility, at more detailed levels, than conventional library methods can provide. The lag between new theoretical advances in science and their practical applications has narrowed, while the identification of such advances in published form is increasingly at

the mercy of retrieval methods that have experienced little change in decades.

The need for change and reconstruction of library and associated information processing practices is not peculiar to the Survey Library, of course. Many changes it will adopt in time may not be of its own devising. The point is that highly significant developments in the information storage and retrieval field warrant a more concerted effort to keep abreast of them, to submit the best to trials, and thus enliven the scene of Survey library operations. This effort may take various forms. Some are: To motivate the staff to examine critically the present ways of doing things; to enter more actively into examination and judgment of the merits of new information processing and retrieval systems reported in the literature; to visit other installations and observe the application of new equipment, processing methods, and patterns of work distribution. Out of such experiences, when they involve wide participation, can evolve the readiness and willingness to change when conditions favor or dictate it. Judgement required to resist the "gadget" innovations can be formed, too.

Efficiency as an operating objective presupposes that goals are settled and that the chief resources and methods for achieving them are at hand. In the Survey Library, the goals as set forth in the Annual Report of its Director in an earlier decade, and reaffirmed since, are still valid. The service ideal in support of the scientist is strongly held by the library staff. But one of its essential resources--space--is so inadequate that it diminishes the effects of all others. If Division and Bureau management accept the premise that the library should

keep abreast of changes which can improve its efficiency and effectiveness, it must do more than add to its financial support. Some solution to the critical space problem in the Washington Library must be found. Everything that has been said here about the challenge of the new information storage and retrieval technology is idle and pointless, insofar as the library is concerned, unless a substantial block of space can be provided for the library's present Washington operations and the bulging collection itself.

#### Management planning and analysis.

Management planning and analysis in the library, for the most part, are not undertaken with any sense of necessity for the special viewpoints and techniques that the terms should imply. The technical operations of the library are so paramount as to obscure corollary management aims. The course of operations is "set" in directions and routines which are sanctioned by standards for library work extending over many years. Continuation of the library functions at an effective level is viewed, therefor, in terms of the amount of resources--funds, space, and personnel. The "what-how-when-where-why?" aspects of the use of these resources, in the planning stage, and in the consumption stage after being acquired, are not subjects for close or formal analysis.

When the prospect of funds is "easy" an almost endless want list for book and periodical purchases, binding, standard equipment items, and additional personnel can be developed over a week-end. When funds are "tight" ways can be found to continue essential functions with the staff and other resources available. When word is received of space available for allocation, a brief for the library's needs can be developed, but no

strategy of space planning which will set the wheels in motion to provide it when needed is developed. Staffing of the library at present depressed grade levels (depressed, that is, in relation to competition for scarce library skills) is an agonizing process; the Chief Librarian finds himself in the middle of it. But no plan exists for a recruitment and training program to provide a reservoir of replacements for key personnel, including the Chief and Assistant Chief Librarians who have long service records.

If the foregoing observations seem over-drawn--as to some extent they are--it is to make the point that management planning and analysis in the library are performed on an ad hoc basis serving day-to-day activities. The perspective over the history of the extraordinary expansion of the library and its resources since 1947, and the outlook for an even more rapid increase in the future, is held by few, if any, except the Chief Librarian. The result has been to place analysis of the library's operations on a basis that is short term and responsive to problems only when they reach an acute stage.

When the library consisted of only a handful of employees, the planning and analysis of its operations could be conducted out of the experience of a single person with direct access to all others. Today, with two branches of the library in the field, and the range of administrative and technical problems that are acquired with growth to 60-odd employees, a larger requirement for planning and analysis of operations exists. Everything requires more deliberate attention. Specialization of technical functions requires support by specialized planning and

analytical services. Several examples of needed analysis of a continuing nature can be offered:

(1) The reference service, established as a specialized activity in the Survey Library by the present Chief Librarian in the late 1940's, makes little systematic use, no record, and therefore no analysis of information it receives from users of the service as a guide to possible new bibliographic organization of most-wanted material. (The examination of reference inquiries over a period of 3 months, as part of the present study, was the first such systematic review of the reference service to be made.)

(2) The Circulation Section keeps records of loan activity, which are reported to the Chief Librarian monthly, but this and other loan information of record is seldom analyzed for evidence of changing reader interests, general compliance with loan policies, or the need for new policies. (The analysis of 10,000 loans outstanding on a selected date, made as part of the present study, was an attempt to demonstrate the relevance of loan data to other aspects of library operations and policy.)

(3) Monthly statistical reports on various aspects of the library's activities in Washington and the field are assembled for annual report purposes. But the trends they could portray, which would have many implications for evaluation of performance and for future program planning, are not developed for communication within and outside the library.

(4) The numerous factors contributing to rising costs of the library are capable of identification and projection to future stages

for comparison with costs of other program activities, or with other systems of storage and retrieval with which existing library systems can be compared. The systematic collection and evaluation of data on selected cost factors in the library economy can be crucial in decisions about the future planning of library facilities in a new Survey Building.

The foregoing examples of opportunities for systematic analysis of the library's operations cover only the more obvious, quantifiable aspects. It is surprising how close an approximation of the actual state of any given situation in the library can be made by the present Chief Librarian; he has a long experience and keen awareness of its many intricate details. But he is virtually alone in this awareness. The record to guide a successor, or to extend the awareness to key supervisors in the library, is tenuous, scattered, and incomplete.

Management planning and analysis in the library do deserve, then, more systematic attention, more staff time, in order to provide a measure of the library's performance, its use of resources, and a pathway to future stages in which the experience of the past will not be lost or ignored.

### Management Control

Long practice in established methods of work within a library provides a basis for control over technical work processes that becomes habitual for the staff. The procession of books into and out of their niches in the library is held to a steady course by the weight and evenness of the routines. An ordered, regulated system of work is indispensable for its effectiveness to librarians and readers alike. The inducements for

control over processing are so great, indeed, that they might be expected to foster similar efforts to control the larger environment in which the library serves.

That the internal devotion to uniformity does not extend to the services the Survey Library offers its readers--is probably a good thing. The control over loans, for example, is liberally administered for members of the Survey, more strictly enforced for other Federal Agencies through whose libraries our material is loaned, and for others is as rigidly controlled as in a public library. Purchasing, as we have seen in an earlier discussion of that process, gives wide latitude to the choices of scientist personnel over what will be acquired, within the limits of available resources in funds.

Management control has a further objective, however, beyond control over technical processes. It concerns the ability to predict or anticipate the outcome of units of effort as seen together over the whole range of activities in an organization. Control is achieved by observation of what is going on in order to create the next situation, to guide courses of action. Management control involves the integration of information about past and present operations with information about plans or expectations for the future. As a process, it compares, discusses, criticizes, and acts, with knowledge about the results of the operations under its authority.

In the Survey Library, the evidence of management control is difficult to establish. A system of monthly reports from the various section heads and from field branches of the library is used. But the evaluation of the mass of statistics they contain is not, as far as the

writer could learn, evaluated or related to past and projected future performance in any way that justifies the amount of detail in such reports. The reports probably do provide one means by which the Chief Librarian can judge the general progress of the work, the amount of funds remaining to be obligated, and the levels of staffing. Impressions of the rate and nature of change in the state of various library activities, however, are the result of intuitive judgments rather than the product of formal analysis of recorded experience. The emphasis in the present study upon the collection and interpretation of data about the quantifiable aspects of the library's activities has had two purposes: (a) To acquire understanding of the extent and nature of certain long-term, continuing changes at work in the library; (b) to demonstrate the relevance of such data to the library's management and to the community of readers it serves.

Control over the whole library enterprise is to be seen, therefore, as more than a feeling that things are going along satisfactorily, or are not. It is more than reporting statistics on its activities, or reporting only when things go wrong. Unless the information about its activities is gathered systematically, evaluated, and communicated in a form that can evoke action needed to sustain the library activities, it fails to achieve the purpose of gathering it in the first place. Management at higher levels (Division and Bureau) is unlikely to respond to requests for action unless open channels of communication have prepared it to understand the difference between routine and critical incidents.

### Communications in the library

As with the concept of control, just discussed, the meaning of communications in the library can be sought in the network of information exchanges of the purely technical activities of the library, or in the broader context of its total management. If we were to attempt to trace the lines of communication for technical work within the library, and in its relations with other technical libraries, they would prove complicated indeed. The emphasis here will be, therefore, upon: (a) Communication between the Chief Librarian and the library staff; (b) communication of the library with the community it serves; and (c) communication with the higher levels of management from which it derives its authority and its current program emphasis.

Communications between the Chief Librarian and key supervisory members of the staff are informal and individual. He visits their desk, they visit his, as each feels the need. The practice of holding staff meetings, where there can be some interplay of ideas in a group situation, is seldom employed. While no imperative exists that staff meetings be a part of good communication, their absence may be contributing to a growing isolation among members of the library staff from organization life, within and outside the library. Specialization of function, as has already been noted, has increased greatly in the library during the period of its expansion over the past decade. The variety of skills that may be acquired by one individual performing, as was once possible, cataloguing, reference service, and circulation operations, in a single day--is now all but impossible. The vision of the whole library operation, with many paths to career development, is easily narrowed to a

small sphere of its activity in which initiative is limited. The writer was impressed by the large number of matters that come to the Chief Librarian for decision which seem to reflect a lack of breadth of knowledge, or of initiative, among even experienced members of the library staff. The planned staff meeting, as a device for transmitting information on current problems or policies and on the future outlook for the library's program should, perhaps, receive fresh consideration. What is at issue, really, is the growth of leadership within the library's ranks for tomorrow's needs. Specialization, unrelieved by purposeful group communications, can stifle leadership growth.

A second area of communication is that between the library and the community of users, both active and potential, it can serve. Survey users of the library are, of course, the largest group of readers. The image they have of the library is formed partly by their visits to it, partly by the knowledge they have acquired of its bibliographic organization, and in part by the impression they have of its substantive worth. In the course of such visits or other means of contact, they receive individual impressions of the attitudes of the library staff. The impression about the library conveyed by its more deliberate outward communications to Survey members, however, is vague and undefined; the library has very little planned communication with Survey members who have not taken the trouble to ask for information, and even these may get only what they ask for, by the nature of the request. Instead of stating negatively the evidence for weak communication between the library and members of the Survey, let us list some of the evidence that would be present for its communications to be strong and active.

(1) The unique history, traditionally high standards of acquisition of materials, and a more than general description of the nature of the collection would be communicated to all employees, especially new professional employees.

(2) Regularly scheduled orientation sessions of at least a day would be offered to interested Survey employees by the library to explain the organization and rules governing the use of the collection, the scope of its materials, and the physical plan of the library layout.

(3) A list of monthly accessions would be issued, including brief abstracts of more important publications. Along with the list of accessions, concise information would be presented on the services offered by the library, and information on who is to be called for what services.

(4) The policies and rules of the library would be clearly and simply written and distributed to all users. They would cover such matters as the funding of acquisitions by purchase, duration of loans (more flexible than in public libraries), accountability of users, the use of "on deposit" procedures, gifts and exchanges, special advisory services to professional personnel using the library, and other matters which need explicit statement because they concern recurrent questions or problems in the administration of the library.

(5) Significant past and current changes in the role of the library in Survey life, as reflected in studies of reader interest, and as they appear in the trends of consumption of its funds or in the use of personal services and facilities, would be made known more widely at levels of decision affecting the library's future.

For each of the foregoing acts of communication, either little is done at present, or something more should be done to improve communications. The results of a more active, outward communication effort by the library can be predicted with some confidence: There would be a wider understanding of its facilities and services, a lessening of time spent in orientation of individual users, a written list of its acquisitions with call numbers to aid prompt retrieval, wider observance of basic policies and rules in the interest of the whole library-user economy, and a fuller awareness by management at higher levels regarding the library as a changing rather than a static enterprise.

The third area of communication to be mentioned is between the library and higher levels of Survey management. If outward communication by the library is weak, some part of the responsibility may be said to lie outside the library itself. When management at higher levels fails to integrate plans of the library with plans of other program areas which are dependent upon its services for their vitality, the library is left to its own judgment concerning the allocation of its resources in funds and personnel, and the direction and rate of changes it makes. Examples of attempted integration of planning in library and other program areas do not come to mind readily, except for the highly successful one involving the establishment of the Field Centers at Denver and Menlo Park. In these two field situations, with the alteration of space and the movement of large numbers of employees to the Field Centers as a spur to action, the sustained and mutually beneficial exchanges of information between a representative group of users of the

library, Division and Bureau management, and the Chief Librarian were all instrumental in getting the job done well. The Denver Library Committee continued to provide support, in the form of recommendations to Division management, for building up the staff and the collection.

In the Washington Area, the discontinuance of a Library Committee some years ago, and of monthly staff meetings with Branch Chiefs following the 1960 reorganization of the Geologic Division, have deprived the Chief Librarian of regular contact points with groups within the Geologic Division who are immersed in program affairs. No forum now exists in which the library can discuss program developments in other Divisions which may foreshadow changing information interests, needed revisions in bibliographic practices, or other changes which have implications for the library.

The problem of management of communications by and to the library may thus be seen as a relating of its historical role to the changing missions of the many new programs within the Survey that have arisen, particularly in the past decade. The lag between financial support for the library compared with support for scientific activities has been largely removed, but the mapping of its future development in relation to the changing pattern of scientific activities remains. The growing interest in information storage and retrieval systems among scientific and technical personnel outside the library may soon provide some impetus to establish new lines of communication into the library, and responses from the library in pace with its fuller potential for service.

### Training and career development

One of the problems of staffing in the library--and it becomes increasingly acute with the passage of time--is the recruitment of academically well-prepared, that is professional, librarians. The grade structure, though somewhat improved in recent years, simply does not attract the best people from colleges and universities. There is the further complication that the Survey Library is a technical library possessing a highly specialized collection of works published in the principal languages of the world. It may be necessary to provide special training at non-governmental facilities for those who have completed degrees in other fields and have the interest and potential for library work.

Simultaneous with efforts to upgrade library positions, starting with the position of the Chief Librarian, there would seem to be a place for a program of intensive training for key staff in new or advanced skills and knowledge associated with library activities. Supplementing the customary on-the-job training in techniques peculiar to the Survey Library's own operations--on which reliance is now chiefly centered--there would appear to be need, too, for additional formal training of selected members of the staff in experiences such as the following:

(1) Reading improvement Increasingly wide testimony on the benefits of courses in reading improvement warrants investigation of the probable returns to librarians. More than for many other professions, the librarian's work requires a sure sense of the pace at which he reads and the comprehension of the written word.

(2) Foreign language instruction Among the languages in which some proficiency is required by the Survey librarian is one, Russian, which was not offered widely when most of our librarians received their formal training. The increasing volume of scientific publications in Russian makes the study of that language a more compelling requirement for current classification and reference work in the library. Basic vocabulary training in other languages, sufficient to aid sight recognition of common terms, should be provided as needed.

(3) Automatic data processing Although the future impact of automatic data processing on large technical libraries is still moot, the librarians themselves will be the ones to make decisions as to when, how, and to what degree its techniques can be made operational in libraries. Librarians need to acquire precise knowledge of the unfolding capabilities of machine processing in documentation fields allied to library work.

(4) Attendance at professional meetings A liberal policy regarding attendance on official time and at government expense at conferences, workshops, and meetings of professional societies in fields not only of library work, but of scientific work as well, can add to the motivation of the library staff for obtaining wider perspectives than a particular on-the-job experience affords.

(5) Visits and observation, other libraries A program of visitation and observation at other technical libraries to acquire first-hand knowledge of practices which might have application in the Survey Library.

Some of the foregoing experiences have been opened to a small number of the library staff. If the opportunities do not always bring

response from others, the reasons may be worth learning. Training for what future? What is the outlook for career development in the library? What future does the library offer different from the past and present?

Another aspect of training which can provide opportunity for career enrichment is the training the library staff, itself, can provide to its users. In the previous discussion of communications in the library a point has been made of the weak outward flow of information concerning the library's resources, the organization of the collection, and the ways in which it can be of optimum value to the scientific community. In a college or university library, the training function is more clearly seen as experience shared with the faculty in achieving curriculum aims. The Survey has always had, in the minds of many of its members, some of the qualities of the large university. So much of its research accomplishment is dependent upon maintaining an environment in which new ideas can flow freely. The challenge to the library is to make its services and environment hospitable, and information in the collection accessible, to all who have need of it. This should mean more than an "open-house" atmosphere. Closer integration of program planning in the technical Divisions with program planning in the library can provide occasions for library service of a distinctive type. Developing and rendering such services is a training experience.

Examples of such experiences are:

- (1) Preparation of special bibliographies on subjects being newly developed or emphasized by the technical branches.
- (2) Planning and budgeting of funds for new book purchases in program areas in which the scientific and technical program is being

significantly accelerated.

(3) Special displays in the library of new Survey and State publications, over a period of a month or so following first release of such publications.

(4) Seminars conducted by the library staff on the history and use of the Survey Library with particular reference to the use of its special indexes, inter-library loan facilities, and resource personnel in its own and other agencies of government.

(5) Collaboration with training officers or others engaged in training efforts at Branch, Division, and Bureau levels in the selection of material for training.

As a training experience, participation in the foregoing types of activity draws the library staff into the stream of technical operations and encourages the development of sensitivity to what is being done, with what information requirements, in various program areas.

Training, like management communications, must be two-way to be effective in the library. Organization-wise, the library exists to transmit any needed part of its store, or of its bibliographic skill, to those who are engaged in shaping the Survey's publication products. But within the larger Survey organization, the library staff must be trained to know and respond to the Survey's information requirements as they change over time. Career development becomes possible in the library only when management provides training experiences in which its staff both gives and takes.

In summary of the management program in the library:

- The organization structure, though stable for many years, has become specialized in its technical work to a point where individual efforts to attain the larger goals of the library, and of the Survey, require more deliberate action by the leadership at library, Division and Bureau levels.

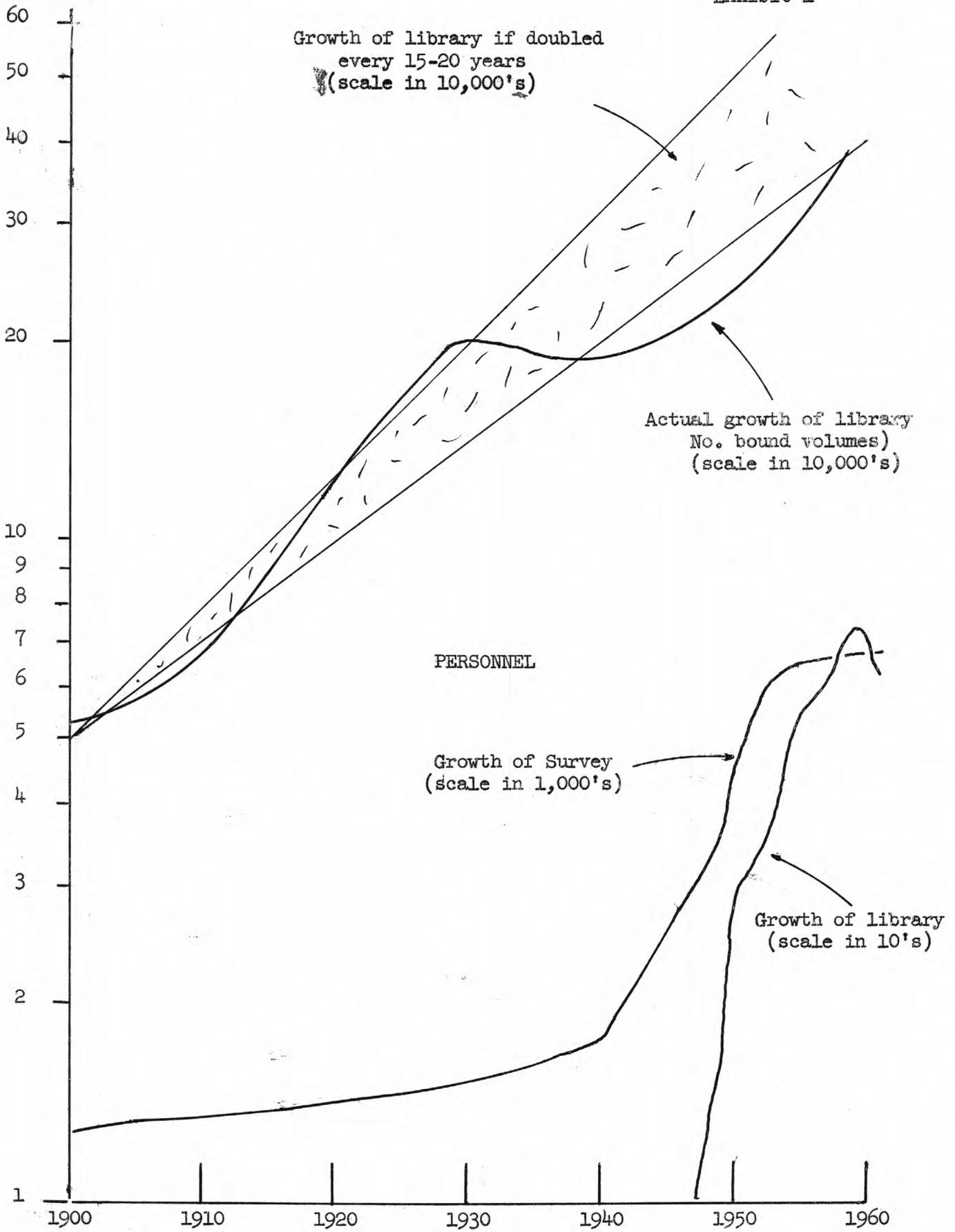
- Planning requires more systematic data gathering and formal analysis about library operations and about the reading habits and needs of its clientele.

- Control, as the ability to project trends and to anticipate the outcome of present efforts, requires more interpretation of internal reports, more discrimination between routine and critical incidents.

- Improved outward communication by the library, to members of the Survey concerning its information resources and services, and to top management about its performance and future requirements, have become crucial as it enters a decade of fast-moving changes in information technology. Conversely, channels of communication into the library, from and about major program segments of the technical Divisions, need to be opened for fuller exchange at the planning stage.

- Training and career development should be designed to draw members of the library staff more deeply into the stream of thinking about programs and operations in the Survey, outside the library, in order to provide a perspective over the whole community it serves.

In this review of the management of the Survey Library, no attempt has been made to pick over the details of housekeeping practices for the makings of some quick "improvement" broth. In the long-run, the direction given by management within and outside the library to the principles discussed, aided by the illustrations offered, is believed to be of a more fundamental nature than a prescription for changed daily routines.



Growth Trends - Survey Library collection and personnel

Survey of Reference Requests

Inquiries received over a 3-month period by the Reference staff of the Survey Library were recorded on individual work sheets designed for quick check off. The items contained in the work sheets, and the results summarized from 1311 inquiries, are shown in this Exhibit.

1. Nature of request

Books were the source of information in 94 per cent of requests and maps the source in 6 per cent of requests.

2. Origin of requests

Within USGS:

0.7 Administrative Division  
0.5 Conservation Division  
32.5 Geologic Division  
1.5 Topographic Division  
11.9 Water Resources Division  
2.9 Survey Library staff  
50.0 per cent

Outside USGS:

30.5 Other federal agencies  
(Non-federal agencies  
19.5 and  
(Private individuals  
50.0 per cent

3. Manner of request

14.0 By visit  
53.0 By telephone  
33.0 In writing  
100.0 per cent

4. Type of service

1.0 Explain use of library,  
direct to stacks, etc.  
71.0 Routine material gathering  
16.0 Non-routine material gathering  
5.0 Subject search  
7.0 Prepare bibliography, complete  
bibliog. reference  
100.0 per cent

5. Language of material

73.0 English  
23.0 Foreign/Western  
10.0 Russian, Slavic  
2.0 Other  
(Percentages non-additive)

6. Reference sources used

50.0 Main catalogue  
13.0 Shelf list  
70.0 Shelf position &  
map cases  
18.0 Charge, lost & bindery  
records  
1.0 Library of Congress  
3.0 Other libraries  
2.0 USGS subject specialist  
14.0 Published bibliographies  
(Percentages non-additive)

7. Disposition of requests

90.0 Completed entirely in  
Survey Library  
1.0 Referred elsewhere  
9.0 Completed by inter-library  
loan  
100.0 per cent

8. Time spent on request

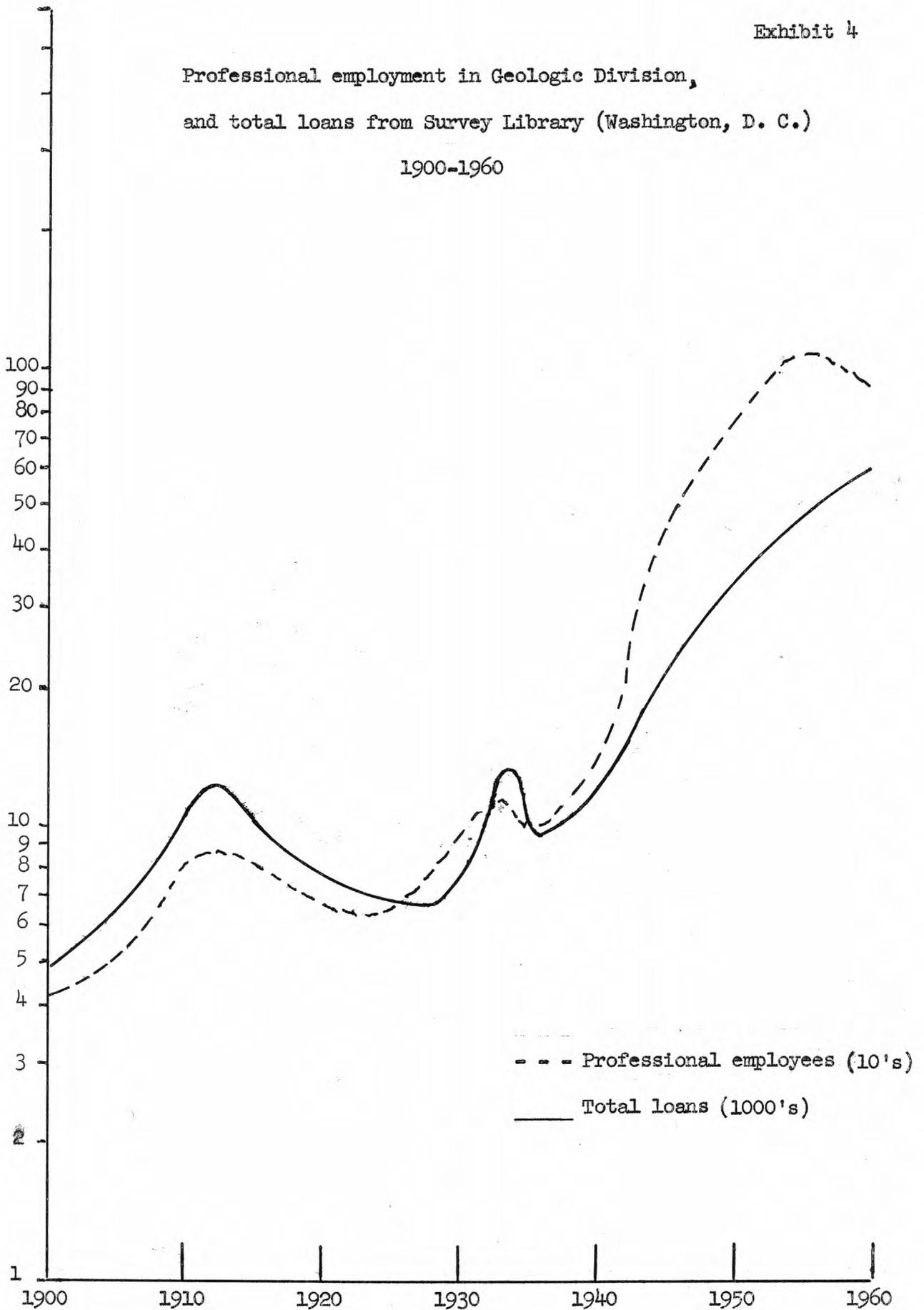
Per cent of time		Per cent of requests
39.0	Over 1 hour	2.5
5.0	31 - 60 minutes	1.5
13.0	16 - 30 minutes	8.0
28.0	6 - 15 minutes	34.0
15.0	5 minutes or less	54.0
<u>100.0</u>		<u>100.0</u>

## BIBLIOGRAPHY OF NORTH AMERICAN GEOLOGY

Number of compilers & staff cited in bibliography		Bibliography year	Number of years to publication after bibliography year			PAGES Bibliog: Index
1 5 10 5 !...!...!...!			5 10 15 ...!...!...!			
Darton	X	1886	A		A=Annual	24:0
	X	1887-89	BB		B=Biennial	160:0
	X	1890	A		C=Cumulative	77:0
	X	1891	A			60:0
	X	1732-1891	CCCC			1033:0
Weeks	X	1892-93	BBB			131:55
	X	1894	AA			32:5
	X	1895	A			65:60
	X	1896	A			82:47
	X	1897	A			70:36
	X	1898	A			90:50
	X	1899	A			73:43
	X	1892-1900	CC			898:218
	X	1901	A			81:41
Weeks, Nickles	XX	1902	A			110:61
	XX	1903	A			125:94
	XX	1904	A			118:74
	XX	1901-05	C			370:377
	XX	1906-07	BB			197:72
Nickles	X	1908	A			85:36
	X	1909	A			100:41
	X	1910	A			101:45
	X	1911	A			91:38
Nickles, Evans	XX	1912	A			102:46
	XX	1913	A			99:46
	XX	1914	A			86:41
	XX	1915	A			74:35
Nickles	X	1916	A			89:46
	X	1917	A			79:41
	X	1918	A			74:37
	X	1919-20	BB			135:91
	X	1785-1918	CCCCC			1143:655
	X	1921-22	BB			142:89
	X	1923-24	BBB			168:64
	X	1925-26	BB			176:86
	X	1919-28	CCC			687:309
	X	1929-30	B			184-84
Nickles, Thom	XX	1931-32	BB			212:77
Thom	X	1933-34	B			253:123
	X	1935-36	B			308:182
&	XXX	1929-39	CCCCC			1044:481
	XXX	1940-41	B			282:184
others	X	1942-43	BB			207:242
	XXX	1944-45	BB			199-290
	XXX	1946-47	BB			284:347
	XXX	1948	AA			168:125
	XXX	1949	AA			157:104
	XXXXXXXXXXXXXXXX	1940-49	CCCCCCCC			1018:1170
Hooker & others	XXXXX	1950	AA			273:103
King	XXXXXXXXXXXXX	1951	AAAA			187:173
	XXXXXXXXXXXXX	1952-53	BBB			370:330
&	XXXXXXXXXXXXX	1954	AAA			263:210
	XXXXXXXXXXXXX	1955	AAA			274:226
	XXXXXXXXXXXXX	1956	AAA			269:275
	XXXXXXXXXXXXX	1957	AAA			260:260
others	XXXXXXXXXXXXX	1958	AAA			312:273
	XXXXXXXXXXXXX	1959	AAA			308:280

Professional employment in Geologic Division,  
and total loans from Survey Library (Washington, D. C.)

1900-1960



Positions at all centers combined

<u>No. Pos.</u>	<u>Position title</u>	<u>Grade</u>
1	Chief Librarian	GS-13
1	Assistant Librarian	12
1	Geologist	12
5	Librarians	11
8	Librarians	9
1	Translator	9
2	Geologists	7
8	Librarians	7
4	Librarians	5
	Total professional: 31**	
3	Library Assistants	5
10	Library Assistants	4
7	Library Assistants	3
1	Library Assistant	2
	Total Subprofessional: 21***	
1	Administrative Assistant	8
1	Secretary to Chief Librarian	5
1	Editorial Clerk	4
2	Clerk Typists	4
1	Clerk Typist	3
1	Clerk Typist	2
1	Laborer	(Wage board)
	Total admin.--clerical: 8	
	Grand total in Library: 60	

\*Includes staff compiling Bibliography of North American Geology, 8 positions.

\*\*Median grade of professionals, GS-9

\*\*\*Median grade of subprofessionals, GS-4

FILLED POSITIONS IN LIBRARY ON JANUARY 15, 1961

Positions by location\*

<u>No. Pos.</u>	<u>Position title</u>	<u>Grade</u>
	WASHINGTON, D. C. : 35 positions	
1	Chief Librarian	GS-13
1	Assistant Chief Librarian	12
1	Geologist	12
3	Librarians	11
6	Librarians	9
2	Geologists	7
3	Librarians	7
3	Librarians	5
3	Library Assistants	5
4	Library Assistants	4
1	Library Assistant	3
1	Administrative Assistant	8
1	Secretary to Chief Librarian	5
2	Clerk Typists	4
1	Editorial Clerk	4
1	Clerk Typist	3
1	Laborer (Wage Board)	
	DENVER: 18 positions	
1	Librarian (in charge)	11
1	Librarian	9
1	Translator	9
4	Librarians	7
1	Librarian	5
5	Library Assistants	4
4	Library Assistants	3
1	Clerk Typist	1
	MENLO PARK: 7 positions	
1	Librarian (in charge)	11
1	Librarian	9
1	Librarian	7
1	Library Assistant	4
2	Library Assistants	3
1	Library Assistant	2

## Annual Allotments to Survey Library 1947-61

Fiscal Year	Allotment	Full-time personnel
1947	\$29,000 (Estimated)	9
1948	42,850	13 (1)
1949	55,000	16
1950	92,000	29
1951	123,000	32 (2)
1952	157,750	31
1953	227,500	38 (3)
1954	235,715	47
1955	287,500	54
1956	337,500	56
1957	330,700	64
1958	349,700	70
1959	351,664	73
1960	393,000	71
1961	445,000	60 (4)
Total	3,457,879	

- (1) Library transferred from Bureau to Geologic Division on 7-1-47 and immediately increased staff and allotment.
- (2) Photographic Library transferred from Map Reproduction to Survey Library.
- (3) Denver and Menlo Park Libraries received increases in staff.
- (4) Includes Bibliography of North American Geology, as in previous years.

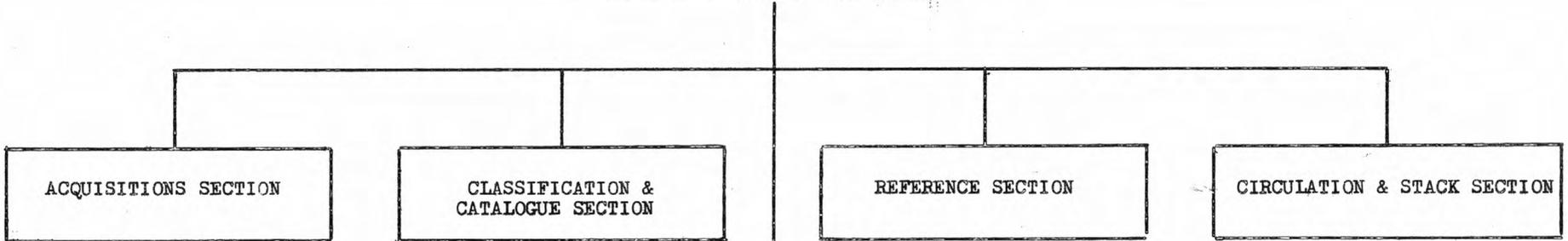
Expenditures by object class--Survey Library, Fiscal years 1955-1961

Object class	Fiscal year:						
	1961	1960	1959	1958	1957	1956	1955
01 Personal services Percentage 01	364,204 (81.00)	329,324 (85.00)	333,164 (84.75)	287,277 (79.00)	265,981 (80.75)	259,607 (76.50)	214,504 (70.00)
02 Travel	591	624	936	1,055	797	1,096	2,509
03 Transportation	300	233	140	316	763	680	1,872
06 Printing, bind., dupl.	9,450	7,700	7,430	8,226	9,854	9,654	11,959
07 Other contract. serv.	1,609	1,655	2,592	1,569	914	1,320	3,057
08 Supplies & materials	6,329	3,000	1,354	12,236	7,376	14,679	12,173
09-02 Equipment--books	51,072	40,500	44,552	41,542	37,925	45,368	54,915
09 Equipment--other	15,963	4,384	2,934	11,352	5,878	6,809	5,308
Total other objects	85,314	58,096	59,938	76,296	63,507	79,606	91,793
Percentage, other objects	(19.00)	(15.00)	(15.25)	(21.00)	(19.25)	(23.50)	(30.00)
Grand totals	449,518	387,420	393,102	363,102	363,573	329,488	306,297

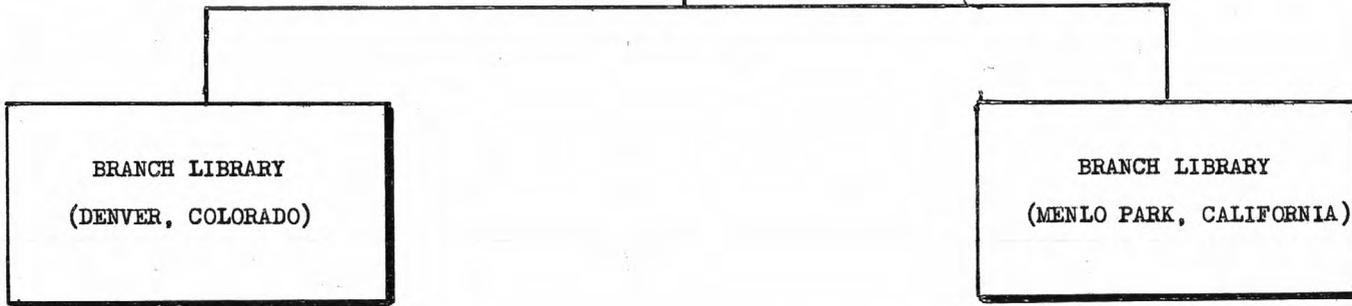
GEOLOGICAL SURVEY LIBRARY

Washington, D. C. -

OFFICE OF CHIEF LIBRARIAN



Field -



January 1962



USGS LIBRARY - RESTON



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