GIS newsletter

Published bi-monthly by the Geoscience Information Society
Number 30 ISSN 0046-5801 June 1974

Reminder

Plan to attend the annual meeting of the Geological Society of America and its associated societies in Miami Beach, Fla., November 18-20.

1973 GIS Proceedings to be Distributed

Ms. Marjorie Wheeler, 1973 GIS Program Chairman, has announced that GIS members will soon be receiving volume 4 of the *GIS Proceedings,* based on the eighth annual meeting in Dallas, November 1973. The publication is available to non-members for $10.00 *prepaid* from GIS Secretary, c/o American Geological Institute, 5205 Leesburg Pike, Falls Church, Va. 22041. Volume 3 ($5.00) is also available. Checks should be made payable to Geoscience Information Society. If any member in good standing does not receive his copy by the end of August, he should contact Ms. Wheeler (Lamar University Library, Box 10021, Beaumont, Texas 77710) or Ms. Ruth Keefer, GIS Secretary.

In Memoriam

The *Newsletter* regrets to inform GIS members of the passing of Bill M. Woods, prominent GIS charter member and former Executive Director of Engineering Index, Inc. Mr. Woods died May 1 of cancer. He was highly regarded and widely known, both nationally and internationally.

Prior to his five-year service with Engineering Index, he had served from 1957 to 1967 as Executive Director and Secretary of Special Libraries Association. He was Map and Geography Librarian and Assistant Professor of Library Science at the University of Illinois from 1949 to 1958. Mr. Woods was a member of many professional organizations and was elected President, National Federation of Abstracting and Indexing Services, in 1971. He also served as Adjunct Professor, C.W. Post Center, Long Island University, and in his spare time authored numerous books, reports and journal articles. As a result of his management study, Engineering Index was reorganized in 1968 and in 1972 its internal production was computerized. Mr. Woods also presided over the establishment of the first computer-readable version (COMPENDEX) of the EI information base in 1969.

His dedication and forward-looking leadership will be greatly missed. GIS extends its sympathy to the Woods family.

Bibliographic Guide For Editors and Authors

Chemical Abstracts Service, BioSciences Information Service of Biological Abstracts and Engineering Index, Inc. have announced plans to publish a *Bibliographic guide for editors and authors* in September 1974. The guide contains 20,000 scientific and technical periodical titles monitored by the three services, their abbreviations (in accordance with international organizations' standards), American Society for Testing and Materials coden and international standard serial numbers (if available). Each title entry will be coded to indicate which of the sponsoring secondary services monitors it. The guide will also provide an annotated bibliography of national and international documentation standards of potential interest to journal editors and instructions on the use of the "bibliographic strip" to identify both journal issues and individual articles through a compact code. The publication is priced at $9.50 for one to five copies; $8.00 for six to ten; $7.00 for eleven to twenty; and $6.00 for twenty-one or more copies. Send payment with order to Subscriptions Services Dept., Chemical Abstracts Service, 2540 Olentangy River Rd., Columbus, Ohio 43202.

NFAIS Seminar on Computer Based Services

National Federation of Abstracting and Indexing Services has announced it will sponsor a seminar "Utilization of Computer Based Services" on September 9-10. The seminar will focus on the utilization of machine-readable abstracting and indexing services based on actual operating experience and the integration of these services into individual information systems.

Further details may be obtained from NFAIS, 3401 Market St., Philadelphia, Pa. 19104.

Water Resources Referral Center

International Water Resources Association is planning an International Water Resources Referral Center, which will be a clearinghouse of information: the availability of products and professional services; important projects, planned or under construction; educational programs and research facilities; memberships of affiliated societies and associations; and employment opportunities, domestic and foreign. The center plans to compile the *International water resources register,* a "who's who" in the field. Additional information may be obtained from G.M. Karadi, IWRA, Science Complex Building, University of Wisconsin, Milwaukee 53201.

New Address For Geophysical And Polar Research Center

Geophysical and Polar Research Center, Middleton, Wisconsin, will relocate July 1, 1974. Their new address:

Geophysical and Polar Research Center
Dept. of Geology and Geophysics
University of Wisconsin
1215 West Dayton Street
Madison, Wisc. 53706.

DeGolyer Collection Donated to SMU

The trustees of the E. DeGolyer Foundation have donated properties valued at $14 million to the libraries of Southern Methodist University, Dallas. These include 90,000 books, $2.5 million in endowment for library acquisitions, the DeGolyer mansion, 42 acres of residential property, and the DeGolyer Geological Library. The library's collection is strong in petroleum and regional geology and the history of the geological sciences and contains first editions of nearly all of the classical works. SMU has also received the personal library of Lewis W. MacNaughton, DeGolyer's partner in a consulting firm. These 25,000 volumes complement the DeGolyer collection.

Translations of Chinese Geoscience Journals

Plenum Publishing Corporation has announced plans to publish cover-to-cover translations into English of major Chinese scientific journals. Among those scheduled to be issued in early 1974 are *Acta geologica sinica, Acta geophysica sinica, Geochimica, and Scientia geologica sinica.* The translations will be available within six months following the appearance of the original Chinese edition. For further information, contact Plenum/China Program, Plenum Publishing Corp., 227 W. 17 St., New York, N.Y. 10011.

Members in the News

WILLIAM W. EASTON presented a paper entitled *"A brief history of portolan charts"* at the Geography and Map Division's session of the Special Libraries Association Convention, Toronto, June 10, 1974. Mr. Easton is a member of the Illinois Association of College and Research Libraries, Library Status and Development Committee, The University of Illinois Graduate School of Library Science Advisory Council and General Manager, Illinois State University Ice Hockey Club.

H. ROBERT MALINOWSKY, Assistant Director of Libraries for Public Services, University of Kansas Libraries, Lawrence, has been elected Chairman-Elect of the Advisory Council, Special Libraries Association.

New Geoscience Publications

Guide to the coalfields 1974; a comprehensive directory of the British coal mining industry. June 1974. Fuel and Metallurgical Journals, Ltd., 17-19 John Adam St., London, WC2N 6 JH. £ 3.50. (ISBN 0 9019943 6 7)

Maher, J.C. *Geological literature on the San Joaquin Valley of California,* by J.C. Maher et al. Prepared by the USGS in cooperation with the U.S. Dept. of the Navy, Office of Naval Petroleum and Oil Shale Reserves. San Francisco, Northern Calif. Geological Society and Pacific Section, American Association of Petroleum Geologists, 1973, 291 p. $9.00 (postpaid within the U.S.). Available from: Pacific Section, AAPG (Don Hallinger, Pacific Lighting and Gas Development Company, 720 West 8th St., Mail location 1106, Los Angeles, Calif. 90017).

"Contains over 3200 references to published works and college theses prior to January 1, 1973. The area covered, extending from the Sierra Nevada to the coast ranges and San Andreas Fault of Central California, is of particular significance in studies of stratigraphy and paleontology, tectonics, engineering geology, geophysics, hydrology, and petroleum geology. The 72-page index contains listings by subject, geographic area and geologic age."

Sammons, Vivian O., comp. *Earthquakes and earthquake prediction. LC science tracer bullet TB 74-1.* April 1974, 8 p. (ISSN 0090-5232) (Available free of charge from Reference Section, Science and Technology Division, Library of Congress, 10 First St., S.E., Washington, D.C. 20540).

Zisa, Arnold C., et al. *Georgia Geological Survey ERTS mosaic of the state of Georgia, Band 5 (Red).* Scale 1:1,000,000. Georgia Dept. of Natural Resources, Earth and Water Div., 19 Hunter Street, S.W., Atlanta 30334. $1.00 plus 50 cents for postage and handling.

. . . . . *Georgia Geological Survey ERTS mosaic of the state of Georgia, Band 7 (infrared).* Scale 1:1,000,000. Georgia Dept. of Natural Resources, Earth and Water Div. $1.00 plus 50 cents for postage and handling.

Literature Citations

(GIS members are in CAPS)

BROWN, REGINA. *Resources for malacological research in Orton Memorial Library of Geology, Sterkiana,* no. 54, June 1974, p. 29-50.

HALL, VIVIAN S. *Commentary on the special librarian's role in the current environmental crisis. Special libraries,* vol. 65, no. 5-6, May-June 1974, p. 242.

RATHBUN, LOYD. *The small library's large problem: "I'm ready and eager, but where are the clients?" Special libraries,* vol. 65, no. 5-6, May-June 1974, p. 223-226.

New Members

DERRY, THOMAS J.
Supervisor, Technical Information Services
Chevron Oil Field Research Company
3282 Beach Blvd.
La Habra, Calif. 90631

MAYERS, CLAIRE
Geoscience Librarian, Geoscience Library
Lamont-Doherty Geological Observatory
Columbia University
Palisades, New York 10964

SPRENTALL, ARDEEN
4500 Jackson Hill Road
Montour Falls, New York 14865

Four GIS Members Testify Before NCLIS

The National Commission on Libraries and Information Science, established in 1970, is charged with "primary responsibility for developing and recommending overall plans for library and information services adequate to meet the needs of the people of the United States." NCLIS invited Geoscience Information Society to testify when the Commission convened in San Antonio, April 23. Four GIS members—Marjorie Wheeler, Dederick Ward, Julie Bichteler and Sara Aull—submitted documentation (the text herewith reproduced in its entirety). Using this written documentation as a basis for discussion, Robert Wheeler, Marjorie Wheeler, Aphrodite Mamoulides, and Julie Bichteler testified for thirty minutes before the Commission.

Dr. Bichteler informed the *Newsletter* that "some of the issues and proposals discussed included: (1) a national network for the geosciences—necessity for such a network, institutions involved, possibilities for organization, role of the federal government; (2) geoscience literature—unique characteristics, factors contributing to its use by the geoscientist, critical summary of bibliographic sources, needs and recommendations; (3) GEO•REF—opinions of users, problems of coverage, access, and funding. Commission members had many questions and comments concerning GEO•REF and its present funding problems and requested additional details on its finances, both income and expenses. Other points of interest to the Commission were the lack of a comprehensive, English-language abstracting service and discontinuance os specialized ones such as *Geophysical abstracts;* accessibility (and inaccessibility) of information sources; and significance, problems, and policies of the U.S.G.S. Library and its role in a national program. Commission members suggested that if geoscientists were *really* concerned about their information problems, they should organize and lobby more effectively and make their needs known to Congress, as have other scientific user groups."

Geoscience Information and User Needs

Testimony Submitted to the

NATIONAL COMMISSION ON LIBRARIES AND INFORMATION SCIENCE

by the

GEOSCIENCE INFORMATION SOCIETY

Julie Bichteler, Editor
March 12, 1974

Julie Bichteler is Assistant Professor, Graduate School of Library Science, The University of Texas at Austin, Austin, Texas 78712.

INTRODUCTION

Julie Bichteler

The earth sciences are of ever increasing importance in today's society. To them we turn for solutions of the more and more critical problems of energy sources, mineral and other natural resources, and the environment. One of the most important factors toward the advancement of the geosciences and their application to national and world-wide needs is easily accessible, relevant information.

In 1965 the Geoscience Information Society (GIS) was founded by a group of geoscientists, librarians, editors, and others concerned with information needs in the earth sciences. The Society has since initiated and improved information exchange in geosciences by sponsoring the publication of needed information sources; promotion and financial support of GEO•REF, the international data base of the geosciences; cooperation with other societies to attain mutual goals, etc.

In this testimony for the National Commission on Libraries and Information Science, GIS members have endeavored to clarify and present some of their current concerns and problems with geoscience information. Intensive efforts were made to obtain as much feedback as possible from *users,* who included both members and nonmembers of GIS. The contributors are grateful for the cooperation and interest of those who were contacted; the final product represents the opinions of many individuals concerned with geoscience information.

A sample of the issues and proposals discussed in the various sections of this testimony include:

1. A national network for the geosciences; necessity for such a network; institutions involved; possibilities for organization; role of the federal government.
2. Geoscience literature; unique characteristics; factors contributing to its use by the geoscientist; critical summary of bibliographic sources; needs and recommendations.
3. GEO•REF: opinions of users; problems of coverage, access, and funding.

These are critical issues which the federal government must consider. What will be the effects of the National Science Foundation's cutting off funds to GEO•REF in 1975? This data base is of major national and international significance, particularly in view of its relevance to the many current problems suggested above. How does the lack of a comprehensive, English-language abstracting service affect research and development relating to these same problems? Where does an information network for the geosciences fit in with the Commission's proposal for a national network?

The Geoscience Information Society appreciates this opportunity to present testimony to the National Commission on Libraries and Information Science.

GEOSCIENTIST USER NEEDS AND INFORMATION PROBLEMS

Marjorie W. Wheeler

Marjorie W. Wheeler is Science Librarian, Lamar University, Beaumont, Texas 77710.

In the last few years several individuals and organizations have initiated or contributed to studies on the geoscience literature, including such varying aspects as its unique characteristics, its accessibility, user needs, library resources and services, and present and future problems. The basic objective of the Geoscience Information Society, organized in 1965, is to improve exchange of information in the geosciences. The American Geological Institute has an active Committee on Geoscience Information and is responsible for GEO•REF, a multipurpose data base of bibliographic references stored on magnetic tape. The Geological Society of America has been involved in the indexing services since 1933. Geosystems in London was organized to develop a geoscience information network. The International Union of Geological Sciences has a world wide membership interested in geological topics of current interest.

This report relies on publications of these organizations, and, too, on a recent informal survey of selected geoscience libraries and their users. The latter included large and small, academic and research, as well as the specialized petroleum libraries. While in no way does this purport to be an in-depth study, there is strong evidence of recurring themes on what is being done, what could be done, and what should be done to aid the geoscientist in his information needs. First will be considered the unique characteristics of the geoscience literature, secondly how the geoscientist uses the literature, thirdly needs and recommendations concerning this literature, and finally the petroleum geologist's use of the literature.

UNIQUE CHARACTERISTICS OF THE GEOSCIENCE LITERATURE

The unique characteristics of the literature of this area certainly create many of its problems, some of which are briefly considered below.

SCOPE OF THE GEOSCIENCES

The scope of the geosciences has always been broad and interdisciplinary in nature. Traditional fields included paleontology—the study of ancient life, mineralogy and petrology—the study of minerals and rocks, structural and field geology—the study of structure within and on the earth's surface, geophysics and seismology—the study of the physics of the internal earth, geomorphology—the study of the earth's physical features, and economic geology—the study of mineral and oil deposits. These fields have tended to broaden in scope. Geomorphology, for instance, overlaps into hydraulic engineering and soil science research.

In recent decades, the scope of the geosciences has expanded to include newer fields such as geochemistry—the study of the earth's chemistry, lunar and planetary geology—the study of the moon and planets, oceanography and marine geology—the study of the ocean including crustal processes and structures, engineering geology—the application of geology to engineering problems, and environmental and urban geology—the application of geological knowledge to our surroundings. If a geoscientist were an expert in all of these fields, he would need an unlimited knowledge of physics, chemistry, biology, mathematics, and computer science. However, he specializes in one or more related fields, and his expertise is thus more or less limited.

The specific problem which this creates is that one indexing or abstracting tool (The word "tool" is used here as meaning an instrument specifically designed to discover the existence and availability of library material.) cannot possibly fulfill the demands of all geoscientists. The chemist, with confidence, can use *Chemical abstracts* and feel reasonably sure he is covering a high percentage of the published chemical literature, but the *Bibliography and index of geology* cannot fill the needs of all geologists. The geochemist must also use *Chemical abstracts*, the paleontologist *Biological abstracts*, the engineer *Engineering index*, and the petroleum geologist *Petroleum abstracts*. Consequently, until a coordinated effort may attain a multidisciplinary as well as international approach to scientific literature, the geoscientist must be aware of and use many indexing and abstracting tools to the literature.

FORMATS OF GEOSCIENCE INFORMATION

The information needs of the geoscientist appear in an unusually wide variety of formats. All fields of science have commercially produced books, technical reports, proceedings and transactions, and the abstracts of papers presented at meetings. In addition, the geologist needs access to maps and atlases, aerial photographs, well logs, drill cuttings and cores, rock and mineral specimens, guidebooks of field trips, and informal field reports. For the most part these are awkward-to-handle, hard-to-store items for which most libraries are not equipped. Data banks offer services for regions and for specific types of material, but there needs to be more centrally available information about them. The International Union of Geological Sciences issued *Geological data files* in 1971. Nationally distributed union lists (alphabetical lists providing bibliographic and location information) and central or regional information bureaus would alleviate the problem of locating these hard-to-find items. Such a start has been made by various union lists, but these must constantly be updated; continuing effort of input from all sources is necessary.

SOURCES OF GEOSCIENCE PUBLICATIONS

Numerous federal, state, regional, and local agencies and societies publish material such as symposia, proceedings, miscellaneous publications, bulletins, and field trip guidebooks. The geologist depends on local publications for detailed descriptions and interpretations far more than other scientists. Problems of awareness and availability arise from limited numbers of publications of specific titles, frequent address changes of local societies (consequently no "standing orders"), no national announcements of publications, and lack of a consistent system of submitting published items to an indexing tool. Typical of this type of publication is the field trip guidebook which generally contains the best description of the local and regional geology. Here again are needed not only union lists but also central or regional depositories or distributing agencies where information for local society publications is available. This kind of service has been initiated by the Pacific Section of the American Association of Petroleum Geologists in Los Angeles which has offered its services to other West Coast geological societies for the purpose of advertising and marketing their publications.

INTERNAL REPORTS

A great deal of literature is generated by the exploration oriented industries which appears only in their internal report files. Duplication of effort is undoubtedly represented here, as well as much information not available to the public due to confidentiality. Under our competitive enterprise system this situation will continue except possibly for data banks cooperatively established.

USEFULNESS OF OLDER LITERATURE

There is no age limit to the usefulness of geological literature. An original description of a region, a fossil, or a mineral may be considered more informative and definitive than a recent article, and the original publication together with plates and figures may be of prime importance because it has priority status.

Location and availability of such documents is a necessity. Geoscientists need to identify material through indexing tools and then be able to locate it through union lists—regional or national. If the U.S. Geological Survey Library cannot be designated as a national library, perhaps regional depositories of earth science literature organized by special disciplines should be considered. These depositories in turn need to be

coordinated in a formal network for the servicing of all requests. All of this information must be fed into indexing tools. In a computerized system of information retrieval such as GEO•REF, the inclusion of older literature may be financially prohibitive.

HOW THE GEOSCIENTIST USES THE LITERATURE

User needs of geoscientists vary widely. In this section some of the factors contributing to these needs are discussed.

INFLUENCE OF SUBJECT SPECIALITY

The subject speciality of the geoscientist influences how he uses the literature. It has been pointed out earlier that the scope of geology requires the use of many indexing and abstracting research tools, and the needs of different fields of geological investigation vary. Subject interest will also frequently influence how much older published material one needs. The geological literature is considered to have the longest half-life of any science—much of it does not become obsolete. The paleontologist, for example, regards the original fossil description as invaluable. However, for the geochemist, the half-life of the literature has a very brief span and the investigator requires information as soon as, or before, the ink is dry.

One geoscientist, such as a mineralogist, may want the literature searched by the usual author or subject approach; another, as the oil geologist, may ask for a search by geologic time unit (e.g. Lower Permian of West Texas); or a field geologist may be interested in a local geographic or physiographic description. Seismologists investigate where, when, how, and why events occur, whereas the environmental geologist wants to know where and when human impact might affect his area of study. Indexing and abstracting reference tools for the geologist have the task of analysis from all these different approaches. Other indexing tools upon which the geologist depends usually do not approach subject matter from so many angles, especially the geographic and temporal aspects.

TYPE OF EMPLOYMENT

Employer philosophy is a strong influence on how the geologist uses the literature. Type of employment varies from some aspect of pure research in governmental and private institutions, to teaching of geosciences, to work in economic mineral and petroleum exploration. By far the largest number of geologists are in the latter category.

The academic user tends to be dependent on the indexes and bibliographies of nearby science libraries and on his own personal correspondence and collection of texts and reprints. His needs are fairly well served by interlibrary loan and copy service. Given time, his requests are usually fulfilled. The individual in pure research may have difficulty obtaining original and older publications because he is often interested in 100% coverage of the literature. He may also run into deprivation problems by being unaware of all the existing material because none of the major indexing tools in English, French, or Russian cover all of the world geological literature. Except for large libraries, the user may not have ready access to all these indexes.

The exploration geologist has equally demanding needs but will usually settle for less coverage and less delay because his needs are competitive, immediate, and economically motivated. The scientist who is associated with an institution or is located near a medium size science library is assured of moderate fulfillment of his needs. For a geologist with no ready access to a library, however, there is no service available to him comparable to that provided by the Engineering Societies Library whereby copy and loan service is provided for a fee. To many geologists, present coverage and availability of the literature is adequate, but to others, particularly those doing active research or working in exploration, the need for improvement is evident.

NEEDS AND RECOMMENDATIONS CONCERNING THE GEOSCIENCE LITERATURE

Typical attitudes of geoscientists in specialized disciplines are as follows:

The geophysicist: values the now deceased publication of the government-produced *Geophysical abstracts.* Nothing is considered comparable in coverage and abstracting service.

The paleontologist: feels that large gaps exist in U.S. library collections for foreign literature, particularly Russian, Chinese and East European.

The engineering geologist: would like to see more master's theses included in bibliographies.

The petrologist: needs more in-depth indexing.

The hydrologist: is satisfied with current indexing but concerned that the government publication *Selected water resources abstracts* will cease in 1974.

The coal geologist: needs more detailed indexing.

The geochemist: considers current awareness absolutely necessary to keep up with his field of work. Gaps of U.S. collections in foreign literature are a problem.

With such an obvious variety of specific needs for specialized disciplines, the following discussion concentrates on common problems and remedies within the geoscience profession.

MAPS

Many geologists reiterate the need for better cartographic bibliography, in particular, current awareness and indices by region for recently published maps. Geologic maps, as opposed to topographic maps, are difficult to obtain. Many maps are not listed in new publication lists. They are not indexed in bibliographies. They are not cataloged in many libraries. The U.S. Geological Survey monthly map listing is good, but the suggestion has been made that it would be greatly enhanced by a supplement which would include its own library acquisitions outside the U.S. Maps, of course, are hard to copy for inter-library loan purposes.

There has also been frequent expression of the need for map standardization covering paper, size, terms, quality, running titles, indexing of, and coordinate location. It is true that some of these aspects could be improved, yet, the tremendous diversity of mapping objectives precludes some forms of standardization. For example, a map may cover a standard 15 minute quadrangle on any choice of linear scale; or, a small outcrop; or, a nation, a continent, or the world. A map may show contoured topography, areal geology, surface, or sub-surface structure; stratigraphic convergence; lithofacies; palaeogeography; ore bodies; reservoir quality, and new map concepts are invented as quickly as the need arises. There is no economic motivation, and hence, no probability of a cooperative effort to standarize size, color, or symbols, since each type of map is intended to reveal as clearly and convincingly as the author's ingenuity permits, his own special interest.

AERIAL PHOTOGRAPHS AND REMOTE SENSING

Closely akin to the problems of maps are the requests for more information concerning specific regions, for source materials, and its availability in aerial photography and remote sensing. The U.S. Geological Survey Map Information Office makes every effort to coordinate regional and state map information and to direct users to the proper source to obtain suitable coverage. Possibly a regular series could be initiated with cumulated information.

SEARCH TOOLS TO IDENTIFY PUBLISHED MATERIALS

The *Bibliography and index of geology* is the major printed tool for geologists in this country. There is a general feeling that this tool of world geological literature is not as comprehensive in coverage as the indexes and abstracts which it presumably replaced. *Geotitles* (published in Great Britain) does not fill the need for more coverage or in-depth indexing. Geoscientists miss intensely the abstracting literature which was provided for them for so many years by the

U.S. Geological Survey. To the extent that abstracting tools are curtailed, the only remedy is more detailed indexing.

Geologists for the most part do favor coverage of the literature under one title with monthly issues and an annual index. However, they would like the *Bibliography and index of geology* to index articles faster, cover more material (particularly in the applied and practical fields), expand the detailed indexing, and produce cumulated indexes. The *Science citation index* has a faster publication rate but limited coverage in geology. Costs are rapidly rising, and there is a need to keep that of indexing tools within the financial limits of libraries of all sizes.

LOCATION AND AVAILABILITY OF MATERIAL

Problems arise not only in discovering that material exists, but also in determining its availability for either loan or copying. Frequently, such problems involve older material, foreign material, or a publication containing plates, maps, or figures not readily loaned or reproduced. Copies of plates are available from relatively few sources, and serial volumes are seldom loaned. If a national geoscience library is not feasible, regional centers and depositories with cooperative acquisition programs must be established. These regional centers should be connected by an information network to meet the needs of all earth scientists.

Regional bibliographies of non-serial materials and union list of hard-to-find items need to be produced. These, in turn, should be announced in national publications. National and regional geoscience union lists of serials also need to be encouraged and supported. Few geoscience libraries are listed in the union list, *New serial titles*.

MICROFORMS

Whereas the space advantages of microform materials are appreciated, geoscientists object to its several disadvantages: (a) difficulty in comparing illustrations, (b) necessity for special equipment which is often non-uniform in design, (c) restriction as to where it can be used, and (d) difficulty of "scanning" a journal for its personal relevance.

FOREIGN LITERATURE AND TRANSLATIONS

American geoscientists face a language barrier in their discipline, where it has been estimated that 45% of the literature is generated in Eastern Europe. Large gaps of foreign literature exist in this country, and some foreign journals are difficult to obtain. Geology is a place-oriented discipline, and foreign literature may be the only source of specific information.

Many journals, of course, are not translated and those that are, are necessarily expensive. Holdings of foreign resources should be built up in this country, and translations of geoscience material from books, serials, and symposia compiled. Information on how these translations may be obtained should be included.

TERMINOLOGY

Terminology in the geosciences can be very confusing because the same word may be used with several different meanings. When a formation, fossil, or rock is first described, it has a certain amount of "status priority". With time and/or varying localities, the meaning may evolve and change. Probably this type of terminology will never be standarized. On the other hand, geologists should not arbitrarily alter the meaning of established terms to fit their own needs.

RESEARCH AWARENESS

Specific research in progress is generally difficult to discover and locate. The exploration and research geologists are always interested in the latest work in progress. *Earth sciences research catalog* and *Earth science research in progress* are two efforts in this direction published by University of Tulsa and Academic Media respectively. A regional or central agency might devise a simple questionnaire to elicit from research institutions, for their own protection and for avoiding potential duplication, information on their individual and group research projects, which could then be compiled by discipline, objectives, current status, field work in progress, etc. Such a questionnaire could be published in the major journals and addressed to college and university departments of geoscience, the U.S. Geological Survey, the fifty state geological surveys, and selected research institutions.

RECENT PUBLICATIONS

The *Bibliography and index of geology* is too slow in indexing journal articles, and journals have such large backlogs that articles are held too long before publication to prevent inadvertent duplication of research. Thus, an investigator may be deprived of foreknowledge of work that affects his field of interest. The American Geological Institute has been considering a prepublication abstract journal to alleviate problems of current awareness.

ABSTRACTS

Abstracts of papers presented at meetings are indexed, but frequently the paper is never published. Sometimes the title is changed for publication, thus confusing or eluding the researcher.

STATE OF THE ART REVIEWS

More good review articles which include adequate references would alleviate the pressure and wasted time of individual efforts to keep up with the accelerating growth of the literature. Individual journals attempt such reviews—perhaps there needs to be a way to bring these to the attention of the user.

DELUGE OF LITERATURE

Authors and publishers must identify original and creative contributions as distinguished from minor contributions in the deluge of repetitious, mediocre-to-inconsequential geosciences literature. Many articles are made to look impressive by a large body of reference which are repeated over and over by all interest-related investigators at great cost in paper, ink and space. There is much duplication, especially within environmental and geotectonic publications compiled under an editor sponsorship. Duplication of references, data, and interpretations represents too high a percentage of the current literature.

One remedy is that publishers use better judgment in choosing their prepublication referees. They could also require that bibliographic citations be restricted by insisting on reference to a general, all-inclusive bibliography such as the one on continental drift compiled by Meyerhoff and Teichert in *Journal of geology*. (A.A. Meyerhoff and Curt Teichert, *"Continental drift . . . ,"* *Journal of geology*, LXXVIII (January, 1970), 1-51; LXXVIII (July, 1970), 406-44; LXXIX (May, 1971), 285-321.) Another remedy could be that some unbiased organization take the responsibility of enumerating the worthwhile sources in each specialized field of geoscience to which each subsequent author could refer for his references.

PETROLEUM GEOLOGISTS

Gathering information for this report has emphasized the fact that petroleum geologists, at least those associated with major oil companies, are in a better position than most geoscientists to identify, locate, and obtain published material. *Petroleum abstracts* and the American Petroleum Institute's *Abstracts of refining literature* cover the world literature in the field and are far more current than most indexing and abstracting tools. Few libraries except the specialized oil company library can afford these services, however. In other words, the petroleum geologist has abstracting tools for his specific needs, and an index to the latest petroleum publications. Many oil companies have staffs of well-trained, experienced librarians who identify, locate, and obtain needed information for the oil geologist. It is true, of course, that if *Petroleum abstracts* is not available to him, the petroleum geologist does not find the coverage of the *Bibliography and index of geology* comprehensive enough.

Within the mineral industries, literature outlays and library staff are a major resource of successful, competitive

operations and are charged-off as an expense of doing business, which is not true in most research institutions. The latter depend heavily on tax supported research funding agencies, whether federal or tax-exempt trusteeships and foundations.

The needs of the petroleum geologist with regard to geoscience literature arise mostly from: (a) need for speed in obtaining material, (b) difficulty of borrowing material if it is a serial or older publication, (c) difficulty of locating materials, particularly if foreign or of a type not nationally announced, and (d) finding material that is outside the sphere of *Petroleum abstracts*.

CONCLUSION

It should be clear from the foregoing that priorities of need exist in the mind of each specialist with a consensus of opinion being concerned largely with the common need for (a) greater coverage of the geological literature, (b) abstracts or in-depth indexing, (c) regional, if not national, depositories connected into a network of information, (d) quicker awareness of published materials, (e) knowledge and availability of hard-to-find materials, and (f) foreknowledge of on-going research and prepublication results.

Petroleum geologists are the best served of geoscientists because their industry is willing to pay the cost as an aspect of competitive enterprise. In contrast, the non-industrial geologist must depend on tax-supported governmental institutions or tax-exempt foundations which historically are not of prolonged dependability.

AN ANALYSIS OF PRINTED BIBLIOGRAPHIC SERVICES IN GEOLOGY

Dederick C. Ward

Dederick C. Ward is Earth Science Librarian, University of Colorado, Boulder, Colorado 80302.

Bibliographic or secondary information services that American geologists use can be categorized into international services; national/regional services; and specialized services.

INTERNATIONAL SERVICES

The countries having international bibliographies in geology are the United States, Great Britain, USSR, Germany, France, and Japan. These international services portend to cover world wide literature, but, in fact, none capture all of it. Each covers best the literature closest to home.

Although there is some debate as to which language claims most geological publishing, English-speaking geologists read English language books and articles almost to the exclusion of all others. It would seem reasonable to assume that they also use, almost exclusively, the secondary information services in the English language.

The English language bibliographies which cover worldwide publishing in geology are *Geotitles weekly* and the *Bibliography and index of geology*.

The former is not popular in American libraries because (1) performance has not measured up to its claims in the areas of frequency and coverage; (2) the indexing lacks depth; and (3) there is no annual printed index included in the purchase price of $300/yr., rendering the service useless for retrospective searches, at least at this time. In the area of currency, however, citations appear in GW as early as 3 months after receipt of source material, whereas in the GSA *Bibliography*, the delay is 6-18 months.

Bibliography and index of geology: The GSA *Bibliography* was begun in 1934 as the *Bibliography and index of geology exclusive of North America* to complement the U.S. Geological Survey's national bibliography, the *Bibliography of North American geology*. The GSA *Bibliography* was annual until 1969, when it merged with the U.S.G.S. bibliographies (North American and *Geophysical abstracts*) to form the monthly *Bibliography and index of geology* (worldwide coverage).

Within the monthly issues, citations are arranged in 21 fields of interest. Author and subject indexes accompany each issue and cumulate annually, as do the citations. The subject indexes follow the system which was devised by F.B. Weeks and J.M. Nickles at the beginning of the century for the *Bibliography of North American geology*. This same 3-level hierarchial scheme has continued to the present day and has been adapted to automatic data processing equipment.

An agreement between the GSA and the American Geological Institute in 1967 specifies that AGI collect and file information in its GEO•REF data bank, and that the GSA buy and publish most of the data in its *Bibliography and index of geology*. In 1972 the bibliography began to include theses and dissertations from the U.S. and Canadian universities. The bibliography does not include governmental technical report literature.

The GSA *Bibliography* is popular in American libraries because (1) geologists are familiar with the *Bibliography* and its predecessors and favor the indexing scheme (which is considerably deeper than the one in *Geotitles weekly*); (2) local coverage is assured; and (3) the *Bibliography* is supplemented by the tape services of GEO•REF. A disadvantage is that the *Bibliography* is not as current as it could be. The reason for this is that GEO•REF has had to give up its subscriptions to the source literature, and now must rely on the Library of Congress and the U.S. Geological Survey Library for this material. In these libraries, books and articles are subject to higher priorities before being made available to GEO•REF.

As for coverage, a projected 40,000 citations for 1974 falls far short of the estimated 100,000 papers in geology each year, but the other international services are doing no better.

ABSTRACTS

Neither the British nor American services have abstracts. This is because neither can afford to abstract and still maintain worldwide coverage under the profession's present subsidies. International services in geology would have to be heavily subsidized to include abstracts; they are more prevalent at the regional and specialized levels where coverage is limited.

If given the option, American geologists would prefer abstracts, particularly those of foreign language articles. Geophysicists were particularly hard hit when the U.S. Geological Survey dropped *Geophysical abstracts* in 1971. Apparently they have not adapted too well to the geophysics coverage (without abstracts) in the *Bibliography and index of geology*. A similar lament has come from the vertebrate paleontologists when the Society of Vertebrate Paleontologists, because of funding difficulties, decided to drop the *Bibliography of fossil vertebrates*.

NATIONAL AND REGIONAL SERVICES

National and regional bibliographies document the geology of a country, or a larger or smaller region. They tend to be more complete than the international services, but they are usually several years behind them in publication. Just about every country has, or has had, national bibliographies of some kind, published by the government, universities, or private individuals. Some are published periodically, some are published irregularly as monographs covering a given period of time. When they are interested in a specific area, American geologists will use national bibliographies in all languages because they are usually retrospective to an early date, and they tend to be complete. Of course, they will prefer the English language citations. For more up-to-date references the geologist may turn to the *Bibliography and index of geology*. A problem with national bibliographies is that sometimes they are scattered in the literature and are hard to trace.

Some countries that place emphasis on international bibliographies have dropped their national ones—currently, the United States, Great Britain, and France do not have national bibliographies in geology.

Bibliography of North American geology, 1887-1973: This regional/national bibliography was published by the U.S. Geological Survey in 1887 with subsequent cumulations by Darton (1896) and Nickles (1923) extending coverage back to 1732. From 1887 until 1973 (coverage through 1970), the Survey has published the bibliographies annually in its *Bulletin* series, cumulating them every 10 years (with the notable exception, 1960-1969).

From 1967-1971, the Survey issued *Abstracts of North American geology*, a monthly which cumulated annually as the *Bibliography of North American geology*. In 1969, by agreement among the Survey, the GSA, and AGI, North American literature became the responsibility of GEO•REF and the GSA *Bibliography*. The Survey published two more bibliographies, covering the years 1969 and 1970, and in 1972 and 1973.

U.S. STATE BIBLIOGRAPHIES

To date, most state bibliographies have been compiled by state geological surveys and are issued at regular and/or financially feasible intervals. Not all states have them. Recently, some state surveys have found it convenient for GEO•REF to prepare indexes for them from the national files, saving duplication of effort. This method is gaining acceptance among state surveys; state bibliographies for California, Colorado, and Missouri are now in preparation by GEO•REF.

SPECIALIZED SERVICES

Specialized (subject-oriented) services are used more heavily than national services because most of them are international in scope. Many provide abstracts, and there is an increasing practice to publish in English. Like the national bibliographies, some are published periodically (current awareness) and some are published as multiyear cumulations (retrospective). The larger specialized services issue annual indexes (sometimes cumulating into multiyear indexes), whereas the smaller current awareness bibliographies published periodically in journals do not cumulate.

Coverage varies, as some services only report literature selected as central to the field, while others attempt to exhaust the literature (like the national bibliographies). Typically, specialized bibliographies have a few hundred to a few thousand citations per year. Recently a journal publisher (*Marine geology*) employed GEO•REF to prepare, from its files, bibliographies of current interest to the journal's readership. GEO•REF also prepares the *Bibliography and index of micropaleontology* for the American Museum of Natural History.

Two specialized services which have ceased bear mention, because they have been especially lamented by their respective users—*Geophysical abstracts* and the *Bibliography of fossil vertebrates*.

CONCLUSIONS

1. The literature of geology contains so much local and esoteric material that coverage of two-thirds of the estimated worldwide total (100,000) would appear to be an outstanding achievement for an international printed bibliographic service. This level is approximately 20,000 more citations per year over the current GEO•REF/GSA projection of 40,000. At this time, it would be unrealistic to hope for an international geological *abstracting* service in English, since current subsidies from the profession are not enough, and present coverage is below what it should be. For specialized bibliographies, however, geologists want abstracts, and these services should be continued.
2. GEO•REF must find a quicker way to obtain source material for indexing purposes and for the preparation of the *Bibliography and Index of geology*.
3. There should be a 10-year cumulation of the *Bibliography of North American geology* (1960-1969) to facilitate retrospective searching in the printed bibliographies. Also, the existing 10-year cumulations should be reprinted, as they are now out-of-print.
4. Regional/local and specialized services should use the resources of national data banks to produce bibliographies and prevent duplication of effort.

AN EVALUATION OF GEO•REF

Julie Bichteler

Julie Bichteler is Assistant Professor, Graduate School of Library Science, The University of Texas at Austin, Austin, Texas 78712.

INTRODUCTION

In its draft proposal, "A New National Program of Library and Information Service," the National Commission on Libraries and Information Science suggested that the program be based on a national network joining libraries and information centers throughout the U.S. In the present discussions by Wheeler and by Aull, some views of a national network for the geosciences are proposed. Regardless of the form and organization of such networks, necessary and integral components will undoubtedly be the large-scale computerized bibliographic data bases, produced in recent years for many disciplines.

GEO•REF, the international data base of the geological sciences, is of critical concern to the geoscience community. This paper will discuss and summarize aspects and problems of GEO•REF from the point-of-view of its users; the content is based on a recent investigation by Bichteler and on an informal user survey, just completed.

BACKGROUND

In 1966 the American Geological Institute (AGI) agreed to produce monthly by computer the *Bibliography and index of geology exclusive of North America*, published by the Geological Society of America (GSA). Its title was changed to the *Bibliography and index of geology* in 1969, with a concomitant increase in scope; in July of that year, the AGI Board of Directors accepted the request of the Committee on Geoscience Information to establish a "bibliographic reference center for the geosciences." This reference center, to be known as GEO•REF, would use as its base the data on magnetic tape accumulated in producing the *Bibliography*.

It is significant that in the early days apparently little, if any, thought was given to the future use of the data base for automated retrospective and current literature searching. As Schneider has pointed out, the AGI is certainly not unique in this lack of foresight:

> . . . many producers of indexed data originally focused the design of their systems on the production of a published product . . . Production of magnetic tapes as a by-product of the publication process, and their use for retrospective searching or for SDI services, was a much later development, almost an afterthought. Yet use of these tapes is growing so rapidly, that it may be time to redesign the tape-producing systems, with ease of tape use for SDI services and retrospective searching as the primary consideration, and with publication of abstract and index bulletins or title listing relegated to secondary importance.

In 1971 AGI assumed responsibility for expanding GEO•REF to include information previously covered by various U.S. Geological Survey publications. Since that time GEO•REF has continued to serve as a multi-purpose system and the "center for bibliographic control of the geologic literature." By Spring, 1974, the data base contained more than 200,000 references stored on magnetic tape with over 3000 per month being added. These references include journal articles, symposium and conference proceedings, theses, monographs, and reports.

DATA BASE IMPLEMENTATION AND INDEXING

In order to obtain feedback on implementation of GEO•REF tapes and on aspects of search formulation after the data base is implemented, four subscribers were contacted and asked to respond to some open-ended questions. Their remarks centered around two problem areas, discussed below.

MNEMONICS

The mnemonics or tags used for information fields such as accession number, author, journal title, date, etc., are inconsistent. The meanings of some of the tags have *varied over the years;* thus, the programmer is forced to be "year conscious" when processing GEO•REF tapes—an annoying but manageable problem. More serious is AGI's practice of allowing the currently-used meaning of tags to *vary according to the type of publication.* Thus, the attribute of one tag may depend on the value of another tag; the tape processing program can no longer be value independent if one wishes to be able to search on these particular fields.

INDEXING

The indexing system employed reflects the rather unusual and complex approach of the *Bibliography and index of geology* and is inappropriate for machine processing. Recall that in 1967 the sole aim of AGI was to produce the *Bibliography;* Ochs (Gerald L. Ochs, formerly Professional Staff Associate, GEO•REF; interviews with Mr. Ochs were held at AGI, Washington, D.C., September 19-20, 1973) has pointed out that the problem was considered to be simply one of matching the content and format of this published product. A document may be indexed by several three-level "index sets," familiar to all users of the *Bibliography,* with increasing specificity in each set from first to second to third levels. A particular term may be used in more than one index set for a single document and may appear at different levels. Although standard lists of terms are used by AGI indexers, considerable latitude is allowed in adding terms on the third level; these new, uncontrolled terms do not appear in the GEO•REF *Guide to indexing,* but may be discovered by a keyword listing by computer of all terms used.

GEO•REF users agree that this lack of a thesaurus and controlled vocabulary is a major problem in search formulation. As pointed out by the Marathon Oil subscribers who offer both an SDI service and retrospective searching on post 1970 data:

> The main difficulty in formulating the search arises from the fact that there is no controlled vocabulary or thesaurus for GEO•REF. We partially solve this problem by generating—from the master record tapes themselves—a "term guide" or alphabetical listing of terms that have been used in indexing the records. This term guide must be consulted in order to know if a term can be used in a search strategy . . . even with the term guide the generating of useful descriptors depends primarily on the imagination of the searcher. This means that the immediate user of GEO•REF must either be very familiar with the nomenclature of the geosciences or have some other specialized thesaurus (with good "see also" references) available to him.

Another implementation problem relates to the repetition among index terms. There is general agreement among GEO•REF tape users that, for computer implementation, no special designation or consideration of levels should be made. In other words, all terms at all levels are simply treated as keywords attached to the document. Care must be taken, therefore, to avoid loading duplicate keywords for a document.

Finally, the indexing terminology itself should be improved and standarized. For example, material is indexed under both singular and plural form (APPLICATION, APPLICATIONS); long phrases appear as index terms (CHANGE OF BIOTITE TO CHLORITE AND MUSCOVITE); use is made of very similar terms (CASPIAN AREA, CASPIAN SEA AREA, CASPIAN REGION); and misspelled and meaningless terms occur (AUSTRALSIA, ALFRED). Some improvements in indexing have been made in files dating from 1971, however much is left to be accomplished.

REACTIONS OF GEOSCIENTISTS

In order to investigate the capability of GEO•REF for retrospective searching, eleven queries were run on the complete data base as implemented by AGI on INQUIRE. Nine geoscientists at The University of Texas at Austin voluntarily participated in this project. Each was asked to state a research topic or topics of current interest, as broad or as narrow as he wished.

After the searches were completed, each user evaluated his output based on a document surrogate of: author(s), source, original and translated title, and keywords on which the item was retrieved. Eight of the eleven searches were successful from the point of view of the users, who felt that such a retrospective search capability would be a valuable aid to research efforts. Precision averaged 51% on a four-point scale.

Due primarily to the lack of abstracts, 12 % of the total of 1502 items retrieved could not be evaluated. GEO•REF users are unanimous in their desire to have abstracts or annotations included; they have good reason indeed to be dissatisfied, as geoscience is unique among major scientific disciplines in its lack of a comprehensive abstracting service, printed *or* automated.

Other reactions from the users included strong appreciation of the translated titles and mild irritation over errors such as duplicate entries in the data base or incomplete information input for some references. Several were able to suggest references which they thought should have appeared in their output; upon examination of the *Bibliography* it was found that most of these had simply not been indexed in such a way as to be retrievable by the search strategy. A few, however, of appropriate type and date could not be located in the *Bibliography.* The question of completeness of coverage of the literature by AGI was thus raised.

Mr. Clarence Sturdivant has pointed out that GEO•REF users at Marathon Oil Company have also been concerned with this problem. Marathon produced a printout of all GEO•REF entries for 1972 by source. Several apparent gaps appeared in the list, particularly in publications from state geological surveys. Likewise, Ms. Mary Scott became aware of this situation when she examined the results of a GEO•REF search run for the North Dakota Geological Survey; many North Dakota publications which should have appeared were absent. She investigated and discovered that AGI had inadvertently been removed from the Survey's mailing list and had not been receiving their publications! These examples illustrate that a practice of relying on state surveys to forward their own publications is inadequate.

A recent informal survey of GIS members has continued to emphasize this problem. Over and over, critical comments concerning coverage of GEO•REF (and the *Bibliography*) are heard. "GEO•REF is not comprehensive enough in its coverage and does not go back far enough in time." "How good is the coverage (of GEO•REF)? We need some control over the coverage or some assurance that it is very complete." "GEO•REF should include selected titles from other disciplines—soil science (for geomorphologists), physics (for geophysicists), etc." Users are also concerned about the cost of GEO•REF: "The cost is too high for the average geologist without outside funding and is also out of reach of a student."

CONCLUSION

Although this study has presented some criticisms of GEO•REF, it must be pointed out that the majority of geoscientists and librarians who have used the data base are pleased with the results of their SDI programs and retrospective searches. The dramatic rise in the annual number of searches conducted by AGI since 1970 is evidence of the geoscience community's increasing reliance upon GEO•REF. Furthermore, the 1973 on-line implementation of GEO•REF by System Development Corporation may have implications for increased use.

Ochs has encouraged wider use of the data base for a variety of purposes, such as supplying listings of articles of interest to attendees at conferences. An example of this type of publication is GEO•REF's *A reference listing to stratigraphic palynology,* produced for the 1972 annual meeting of the American Association of Stratigraphic Palynologists. In addition to producing the *Bibliography and index of geology,* GEO•REF is, of course, already used for compiling special subject bibliographies such as *Bibliography of coal in Kentucky* and *Bibliography of Kansas geology,* as well as for providing indexes to several geological journals.

Specific suggestions have been outlined for improving the indexing used in GEO•REF. In addition, the development of a standarized thesaurus for controlled indexing terminology seems essential, particularly in light of the possibility, suggested by Mr. Joel Lloyd of AGI, of using cooperative foreign indexing. GEO•REF subscribers should, of course, be supplied a thesaurus tape. Further, basic questions concerning the indexing philosophy itself should be considered. Ochs, for example, has suggested the use of longer annotations and less in depth indexing. Thus, the structure of the index evidently preferred by GSA for the *Bibliography* would be retained, with improvement of the data base for the GEO•REF user. Longer annotations or the eventual use of abstracts would serve a dual purpose (1) user evaluation of retrieved surrogates would be easier and more accurate; and (2) the search capability would be enhanced, i.e., one could search on words or specific combinations of words appearing in the abstract.

Insuring complete coverage of the geological literature should be a major concern of AGI. A more active acquisitions program would be desirable, although, of course, considerably more expensive.

When considering changes and improvements in GEO•REF, the geological community should keep in mind the significance and potential of the data base as a means of automatic retrieval. Requirements, real or imagined, necessary to produce various printed publications should not be allowed to dominate the system.

A real dilemma arises when one considers these user suggestions and proposed improvements in the light of funding available for GEO•REF. Expanding coverage is an expensive undertaking; development of a thesaurus would require a considerable outlay of funds. The summary of a recent report from the AGI/GSA GEO•REF Steering Committee, outlined recommendations for reducing expenses:

This committee . . . noted that beginning with 1975 the National Science Foundation will no longer support GEO•REF operations. It recommended quarterly budget revision; that a list of priorities and a contingency plan be drawn up for 1975; that AGI attempt to reduce the unit cost of identifying, indexing and processing bibliographic information; that indexing input be sought from professional societies, government agencies, and other outside services; that more editorial work on GSA's *Bibliography & index of geology* (for which GEO•REF provides the basic input) be shifted to GSA; that plans for marketing of GEO•REF services be strengthened.

The conflict between a recommendation such as "attempt to reduce the unit cost of identifying, indexing and processing bibliographic information" and the user's desire for abstracts, increased coverage, and a standarized thesaurus is obvious.

Dr. Cornelius Burk, Jr., former Chairman of this Steering Committee, has summarized problems of GEO•REF and its importance to the geoscience committee:

In the present age of energy and mineral shortage, it is increasingly important that basic information about earth resources be readily available. The GEO•REF file of the American Geological Institute is a major contributor to providing such information. National, institutional, and corporate information services are now coming to depend on GEO•REF to an increasing extent. As former Chairman of the AGI/GSA Steering Committee on GEO•REF, I have had occasion to study the operation and development of computer-based bibliographical systems in some detail. I find it ironic that as the need for this type of information increases, the services and quality of work are deteriorating, not improving. These difficulties appear closely related to poor financial support from government, ineffective management of operations, and counter-productive hassles with competing services. I have no good solutions to these difficult problems, but can only emphasize that future development of earth resources will depend significantly on satisfactory solutions.

A NATIONAL NETWORK OF GEOSCIENCE LIBRARIES

Sara Aull

Sara Aull was formerly Head of the Science & Engineering Division, University of Houston Library, Houston, Texas. Her present address is 201 West Rice Street, Landis, North Carolina 28088.

The National Commission on Libraries and Information Science, in its draft of a proposal on "A New National Program of Library and Information Service," identified the safeguarding of national knowledge resources as one of the principal responsibilities at the federal level. The National Library of Medicine was mentioned, in addition to the National Library of Congress, as an institution "whose collection and services constitute unique national assets," and whose collection could play an important role in a national program.

The U.S. Geological Survey Library is a unique national knowledge resource. Founded in 1882 for the benefit of personnel in the newly established Geological Survey, it has become the world's largest specialized collection in geology and related subjects, including mineralogy and paleontology. Academic, industrial, and public libraries look to the Survey Library for many publications not available in their localities, such as older works, foreign publications (particularly those issued by professional societies or institutes in limited numbers and distributed primarily on an exchange basis), field trip guidebooks, and maps. Geoscientists have numerous occasions to refer to early studies and papers. Often these are obscure and difficult to locate except in a government library. Whereas practicing physicians are concerned primarily with the literature of the past three to five years, geologists' literature needs may span decades or centuries, depending upon the geographic and subject areas being explored.

The Survey Library is a prime resource in an unstructured network of geoscience libraries that functions on an informal basis. This network includes the U.S. Geological Survey Library with its Denver Field Center Library, Menlo Park Field Center Library, and Astrogeology Branch at Flagstaff, Arizona; state geological survey libraries (many of which are associated with state-supported universities); libraries in scientific museums and research institutes; academic libraries; industrial libraries; and some public libraries. These are the resource libraries; their librarians are the major information handlers.

Special librarians are active participants in and contributors to this informal network composed of both publicly and privately supported organizations. Through membership in professional organizations, like the Geoscience Information Society and Special Libraries Association, they cooperate in sharing resources of their libraries and in sponsoring bibliographic aids for locating publications and other material needed by their users. As members of Geoscience Information Society, they participate in the work of the American Geological Institute (GIS is a member society), and, since 1971, have had representation on the Institute's Committee on Geoscience Information.

Initiative for an information system for the geosciences came from the private sector, through the American Geological Institute. *A concept of an information system for the geosciences*, prepared by the Institute's Committee on Geoscience Information, was endorsed in 1970 by official delegates from its 17 member societies. The following year, GIS invited Wallace Olsen (Mr. Olsen is a recognized authority on networking and is currently planning the agricultural sciences information network at the National Agricultural Library), to present a paper on *A library network for the geosciences* at its meeting devoted to a discussion of the concept plan. He made the point that the plan did not display adequate awareness or concern for the role of the geoscience libraries and cited examples of agriculture and medicine in which their national libraries were placed as the nuclei for systems. Libraries provide both visibility and single-agent approach, essential to successful operation of a system.

The U.S. Geological Survey Library should be the nucleus of an emerging geoscience information system. It makes sense to build on strength and ask the federal government to recognize the need by providing authority and funds necessary to make the Survey Library an official center of a national network of geoscience libraries and a component part of the geoscience information system. This system would include data bases such as GEO•REF and the automated API services, information centers like those for oceanography and oil information, and other geology related data bases and information centers supported by the government, like NOAA EDS Center or the EROS Data Center. The library network would give the user a convenient way to tap the resources of specialized services whether they be supported privately by petroleum companies or publicly by the taxpayers' dollars.

The formal national network of geoscience libraries might be started as a USGS-state geological survey library network, financed through federal and state funds. The state survey libraries are already focal points for acquisitions within the states and for both local and national services. The Director of the U.S. Geological Survey and the Association of American State Geologists would have the enthusiastic and willing assistance of the Geoscience Information Society and other interested groups in helping design a national network of geoscience libraries on this base.

Before the environmental and energy crises, interlibrary loan service from the Survey Library was reasonably adequate. It supplied actual documents—a service especially appreciated because of the need of users to see charts, plates, and maps as printed rather than as reproduced in black and white. The quickened tempo of demands for geoscience information, both from its own personnel and from libraries, has brought about a curtailment of a modest interlibrary loan service at a critical time. Resources of the Survey Library are as vital to the quality of life as the resources of the National Library of Medicine are to the health of its people. In the words of the Director of the Survey, "The impact of growth on a finite world is producing many areas of strain that require basic earth-science knowledge as a framework for wise planning and decision making."

SUMMARY

1. The U.S. Geological Survey Library is a unique national knowledge resource which should be developed, and its use should be extended nationally.
2. This can be accomplished most economically and expeditiously through federal recognition of the Survey Library as an official center of a national network of geoscience libraries and through adequate funding for extension of services via the network.
3. An unstructured network of geoscience libraries composed of both publicly and privately supported libraries is operating on an informal basis. It has the geographic framework desirable for a national network: a large federal library with three regional branches, state-supported libraries throughout the United States, and specialized collections in museums, institutes, universities, and industrial organizations. There is a history of good cooperation between the public and private sectors through professional societies.
4. A USGS-state geological survey library network is suggested as the basis for a national network of geoscience libraries.

1974 GIS Officers

PRESIDENT: Dr. Evelyn Sinha, Principal Investigator, Ocean Engineering Information Service, P.O. Box 989, La Jolla, Calif. 92037 (714/454-1922)

VICE-PRESIDENT and PRESIDENT-ELECT: Jack L. Morrison, Project Director, Oil Information Center, Univ. of Oklahoma Research Institute, Norman, Okla. 73069 (405/321-6812)

SECRETARY: Ruth L. Keefer, Reference Librarian, Technical Information Section, Field Research Laboratory, Mobil Research and Development Corp., 3600 Duncanville Road, Dallas, Tex. 75211 (214/331-6531, ext. 524)

TREASURER: Aphrodite Mamoulides, Head Librarian, Shell Development Co., P.O. Box 481, Houston, Tex. 77001 (713/667-5661, ext. 633)

The *GIS newsletter* is published bi-monthly in February, April, June, August, October and December by the Geoscience Information Society. Subscription to the *Newsletter* is $10.00 per year and is included in the Society's annual membership dues. All correspondence relating to dues, membership status and address changes should be directed to the GIS Secretary:

Ruth L. Keefer
Reference Librarian, Technical Information Section
Field Research Laboratory
Mobil Research and Development Corporation
3600 Duncanville Road
Dallas, Texas 75211

GIS members are invited to contribute articles or news of general interest to the membership. Please submit all material to the Editor.

Editor: Regina Brown
Librarian, Orton Memorial Library of Geology
The Ohio State University
155 South Oval Drive
Columbus, Ohio 43210
(614/422-2428)