GEOSCIENCE INFORMATION SOCIETY

N E W S L E T T E R no. 15 January 1971

GIS OFFICERS

The new GIS Executive Committee for 1971 is:

President:
Dr. Cornelius F. Burk, jr. (National Coordinator, Canadian Centre for Geoscience Data, Geological Survey of Canada, 601 Booth St, Ottawa 4, Ontario, Canada)

Vice-President:
George H. Goodwin, jr. (Chief Librarian, U.S. Geological Survey, Washington, D.C. 20242)

Secretary:
Mrs. Doreen M. Sutherland (Chief Librarian, Geological Survey of Canada, 601 Booth St, Rm. 350, Ottawa 4, Ontario, Canada)

Treasurer:
Howard B. Shirley (Information Scientist, Information Operations Division, Battelle Memorial Institute, 505 King Ave, Columbus, Ohio 43201)

Past President:
H. Robert Malinowsky (Assistant Director of Libraries, Univ of Kansas, Lawrence, Kans. 66044)

The new officers assumed their positions on 1 January 1971.

PRESIDENT BURK'S LETTER to GIS

In retrospect, it can now be clearly seen that establishment of GIS in Kansas City on 5 November 1965 was a far-sighted and creative achievement. During the intervening five years, the value of scientific and technical information to industry, government, and science has become generally recognized by numerous national governments, and by a variety of international and professional bodies, which has resulted in the development of high-level policy recommendations, the establishment of new agencies and programs, and the expenditure of considerable funds --all dedicated to achieving goals similar to those set by GIS in 1965 for the geoscience community. A broad national and international framework for information activities is now emerging and GIS must strive to assert its proper role.

In view of these rapid developments, I believe it is appropriate, and indeed necessary, for GIS to more clearly and specifically define its purpose, scope, and level of activity. What should we be doing and why? I propose to establish a small committee to investigate these fundamental questions and present its recommendations to the membership for debate and eventual adoption. Only then will your Executive Committee be able to make effective use of our available manpower and funds for committees, projects, and publications. A clearer statement of purpose would also have the effect, I am sure, of increasing and broadening our sagging membership roster --surely an anomalous situation in the age of information.

An important ingredient for the development of a healthy professional society is communication among its members. Our limited budget and scattered geographic distribution have made this a difficult task in the past. There are probably no easy solutions for the future, but I will continue to press for more effective inter-member communication. To this end I will propose that a survey be taken of our membership to ascertain individual interests and activities, which in turn will provide a basis for bringing together those with common interests. We must first know ourselves before we can hope to assist the geoscientists outside our ranks to whom our professional services are ultimately directed.

I am looking forward with you in the coming year to continued growth and achievement of GIS.

Sincerely,
Cornelius F. Burk, jr.
GIS President, 1971

PAST PRESIDENT MALINOWSKY'S LETTER to GIS

As the outgoing President of GIS, let me give a few brief remarks on what I consider important to the Society. In spite of all that has happened during the year, including riots, fires, budget cuts, unrest, etc., we have fared pretty well. True, we lost some members. We still have, however, a group of dedicated individuals who believe in the purpose of the Society: "to facilitate exchange of information in the geosciences by cooperation of an international membership of scientists, librarians, documentalists, editors, and other information specialists". I am confident that during the next few years our membership will grow. We have shown the rest of the geoscience community that we are truly interested in the exchange of information.

One excellent example is the GIS Symposium on New Directions in Information Exchange that was held at the GSA annual meeting in Milwaukee (see below). Another example is the work and efforts of the Guidebooks and Ephemeral Materials Committee chaired by Mrs. Elizabeth Loomis, plus the work of Dedy Ward on the theses bibliography. With these efforts, people are beginning to know who we are and they are remembering what our name is.

We are concerned individuals; we have, in some cases, encountered budget problems within our own institutions which make us more selective in our outside activities. We will experience changes as will all the member societies of GSA. Let's not get discouraged. I, for one, will continue to be optimistic about the future. There is so much that can be done and I am confident that we have the potential for doing a lot of it.

Let's give the new Executive Committee a vote of confidence by dropping them a note indicating that you are a willing member interested in furthering the Society's purpose.

Thank you, all, for your help this past year. It has been an enjoyable year, full of many happenings that can be chalked up to experience. Let's look to the future and not worry about the past.

Sincerely,
H. Robert Malinowsky
GIS President, 1970

1970 GIS CONVENTION in MILWAUKEE, Wisc.

The 5th Annual Convention of the Geoscience Information Society was held 11-12 November 1970 in Milwaukee, Wisc., in conjunction with the annual meetings of the Geological Society of America and its associated societies. The GIS convention featured a technical session on information exchange in the morning of the 11th and a luncheon business meeting on Thursday the 12th.

The technical session was a symposium of six papers on "New Directions in Information Exchange", held in the East Room of the Sheraton-Schroeder Hotel. About 75 people attended the session. Co-chairmen were Dr. C.F. Burk, jr. (Canadian Centre for Geoscience Data, Ottawa) and Donald H. Owens (Battelle Memorial Institute, Columbus, Ohio).

The first paper, by Hugh R. Wynne-Edwards (Dept of Geological Sciences, Queen's Univ, Kingston, Ontario, Canada), described a geologic field-data system for the Grenville Project in Quebec. Since 1968, input documents represented by standardized checklists have been used to specify outcrop locations and the nature of up to 20 lithologic, textural, or structural features; the data bank made for these records on magnetic tape contains 7000 station descriptions. Retrieval programs generate lists of rock types, lithologic (outcrop and specimen) maps, structural maps, and equal-area projections of structural data from any desired subarea. The user-oriented system provides: (1) consistent and complete field data available to any user, who can merge proprietary data or make further interpretations (geologists have accepted the system as being a useful part of their work); (2) versatile, flexible, and low-cost output allowing free experiment with classifications and interpretations; and (3) rapid compilations that shorten the time involved in processing data.

J.B. Peterson and W.L. Hiss (U.S. Geological Survey, P.O. Box 4369, Albuquerque, New Mexico 87106) described a computer-based data file for the earth sciences in New Mexico. Geologic, hydrologic, and other earth-science information is stored, retrieved, and processed, using a general-purpose, open-ended, user-oriented, flexible data file called OMNIANA and developed by the New Mexico District of the Survey's Water Resources Division. The file consists of a central magnetic-tape data bank and a modular computer program written in extended FORTRAN IV, thereby replacing many small individual computer programs and data sets. A non-programmer user can easily choose from a wide range of modules (executive, processing, service, conglomerate, interface) to access and process any data from the data bank. Adoption of this system has resulted in enhancement of data-processing capabilities and a concurrent reduction in overall costs.

Brian A. McGee (Canadian Centre for Geoscience Data, Geological Survey of Canada, 601 Booth St, Ottawa 4, Ontario, Canada) discussed a new national service for mineral exploration: the Canadian Index to Geoscience Data (see also page 7 of this newsletter). The Index is a computer-based, coordinate keyword index that identifies the sources of available data (any numerical record of an observation) on the geology of Canada. It is "new" in the sense that this is the first Canada-wide indexing project involving all interested geoscience agencies (including companies) contributing input on a voluntary basis; also, it is "unique" in the fact that it indicates quantitative geoscience data. Processing is managed by federal personnel and a commercial computer service in Ottawa using an information system (SIS-II) donated to the federal government by Imperial Oil Ltd. The first edition of the Index (70-1) released in May 1970, includes about 20,000 document titles (representing 15% of all publicly available reproducible material, thus far mainly from the Geological Survey of Canada), and is available in the form of individual indexes to the provinces and territories of Canada, together with a thesaurus of authorized indexing terms (8000 geologic terms, 24,000 area names, 4000 national topographic system units). Searches, retrievals, and other Index services for the public (estimate 8000 potential users) are performed by the Canadian Centre for Geoscience Data, a new organization established 1 April 1970 as a national coordinating and referral service of the Geological Survey of Canada.

After a coffee break, Joel J. Lloyd (American Geological Institute, 2201 M St, N.W., Washington, D.C. 20037) spoke on GEO•REF, a computer-operated bibliographic-reference tool representing an outgrowth of the cooperative GSA/AGI venture to enlarge the Bib-

liography and index of geology exclusive of North America. GEO•REF Geological Reference File is not a published bibliography, but an automated file that is now engaged in screening the archival literature, formulating current indexes for primary journals, developing subsets for topical lists, alerting media for new papers in print, repackaging information for small user groups, and producing alternates to the printed secondary journal. AGI has received 100 requests from individuals in the last two months for specific GEO•REF service. By the end of 1970, the system will have 100,000 references on file (material published from 1965 to date); another 50,000 references will be added during 1971. But there are "millions" of pre-1965 references not on tape, including those that never appeared in secondary services. GEO•REF is being partly supported by a National Science Foundation grant, and its success to date "clearly indicates that the required support will decrease, but whether it will become self-sustaining is moot. The value of a bibliographic service that preserves the ephemera and only occasionally cited literature will be seriously damaged if its contents are measured in dollars".

Graham Lea (Lea Associates Ltd., Box 1024, Westminster, London, S.W.1, England) discussed the "awareness problem in geoscience", emphasizing the services provided by Lea Associates Ltd., especially those (classification, indexing, editing) by the Geosystems Division as it copes with the "nasty exponential growth" of geoscience literature. Geoscience is defined broadly (it also includes energy, environment, materials, oceans, atmosphere). The division monitors more than 5000 sources of information (using various libraries in and about London), annually indexes more than 100,000 geoscience titles, and engages the services of many types of people (geologists, information scientists, computer scientists, geoscience-trained translators, editors in every region of the world). Information is not distinguished as good or bad, formal or informal. All material cited is available in hard copy (subject to normal copyright restraints). The division's three publications were briefly described: Geotitles weekly (indexes 1000-2000 titles weekly, using an in-house decimal classification of geoscience literature, rather than UDC, which classifies knowledge); Geocom bulletin (a monthly medium devoted to mathematical geoscience and computer technology); and Geoscience documentation (edited by GISer Anthony P. Harvey and issued every two months). Weekly magnetic tapes from Geotitles weekly are available, containing abstracts added in cooperation with existing abstracting services; other services were welcomed to join the effort to make abstracts available on tape. The Geotitles backlog project, using a TEXT-PAC format for the IBM System 360, was announced: beginning in January 1971, two to three million titles will be accessioned by 1975, in four phases (1960-1969; 1940-1959; 1900-1939; and pre-1900). There is "no danger" of duplication of the GSA/AGI and USGS efforts. A plea was made for rationality and cooperation in geoscience documentation.

William W. Hambleton (State Geological Survey, Univ of Kansas, Lawrence, Kans. 66044) concluded the symposium by discussing a concept for a national geoscience information program (a report for the AGI Committee on Geoscience Information; see pages 10-13 of this newsletter for the complete text of the report). A truly effective solution to our scientific and technical communications problems can come "only through a coordinated, multinational, multidisciplinary effort". A national geoscience information concept should: (1) be decentralized, but provide centralized and comprehensive services and information integration; (2) be compatible within the geosciences and interactive with systems within other sciences and with other countries; (3) have a central repository or network; (4) have archival aspects; (5) deal with physical files such as samples, logs, maps, specimens, and photographs; (6) be strongly user-oriented so as to provide access, hard copy, and manipulated transfer at minimum cost; and (7) be concerned with research, analysis, and the implementation and coordination of information transfer. Any system developed for the geosciences must be vitally concerned with the constraints imposed upon libraries and sources of information generally; these constraints relate to insufficient funds, man-machine interrelations, and problems of implementing new systems.

The business meeting immediately following lunch on November 12th was convened at 1:05 p.m. in the Akron Room of the Sheraton-Schroeder Hotel by President H. Robert Malinowsky. There were 24 GIS members in attendance. The minutes of the 4th annual business meeting of GIS (held in Atlantic City, N.J., 11 November 1969) were read by Secretary Marjorie W. Wheeler and approved. Treasurer Donald H. Owens presented the 1970 GIS financial report (see page 5 of this newsletter).

Brief reports of GIS committees and activities were heard:

Newsletter. Editor Robert McAfee, jr. (American Society for Information Science, Washington, D.C.), reported on the cost, procedure of editing, printing, and mailing of the Newsletter, which was published 3 times (January, June, October) during 1970. The last two issues were commercially printed by offset. Mailing was done courtesy of GISers at Battelle Memorial Institute, Columbus, Ohio. In the interest of expanding coverage and/or increasing frequency, the editor suggested that an editorial board be established with division of responsibilities (e.g. regional reporters, special-features editor, foreign correspondents, reviews editor). Those present at the meeting were asked if they liked the format; there were no objections or suggestions as to change. Neil Burk felt the Newsletter should be limited to news of GIS activities and members and to the formal actions of the Society. A question was raised regarding back files of the Newsletter, but as this is a news-type publication and the demand is small, it was not felt to be a problem as yet.

Publications. There was a short discussion concerning GIS publications generally. Neil Burk felt that GIS should become more involved in dissemination of pro-

fessional information about information, such as via a technical journal. Graham Lea of Lea Associates Ltd., London, Eng., has tentatively offered the use of Geoscience documentation as the official outlet for GIS publications (such as the proceedings of the annual meeting), perhaps under an arrangement whereby GIS members could receive the journal at a reduced price or receive the proceedings issue without paying for a complete subscription. Hartley Phinney expressed reservations concerning linking up with a commercial and relatively new publisher, and raised the question of GIS itself publishing its proceedings. Marjorie Wheeler noted that GIS has received 25 standing orders for future proceedings of GIS.

Guidebooks and E hemeral Materials Committee. Chairman Elizabeth Loomis Library, Mobil Oil Canada Ltd., Box 800, Calgary 2, Alberta, Canada) was not present; her 30 October 1970 report was read by President Malinowsky. The committee is preparing a 2nd edition of its Geologic field trip guidebooks of North America (1968) . North America has been divided into six divisions with a committee member in each division responsible for (1) deciding which libraries in his area are the likeliest sources for interlibrary loans of guidebooks (considering both "superior collection and accessibility") and (2) obtaining from these libraries a list of their holdings (either a new listing or an updating of the list in the 1st edition). The divisional representatives are Doreen Sutherland (eastern Canada), Elizabeth Loomis (western Canada), Vivian Hall (NE USA), Vera Bacon (north-central USA), Harold Kansas (SE USA), and Hartley Phinney (western USA). Final copy goes to the printer in early 1971, and it is hoped to have the second edition available by April 1971. A geographic index is planned. In response to a request that contributing libraries receive a free copy, Harriet Smith moved that there be no free distribution to contributors because the demand for this type of publication is quite limited. The motion was seconded and passed. In response to a question regarding price, publisher, method of ordering, and possibility of paperback, Marjorie Wheeler replied that the price has not been set, that the publisher (Phil Wilson of Houston, the publisher of the 1st edition) does not advertise, and that the price of a paperback was so little less than hardback that it was not considered feasible. It was suggested that a news item about the forthcoming edition be sent to Geotimes now with any pertinent information about ordering. There was a general feeling that if the price could be reduced to at least $20 (1st edition price is $37.50), there would be a greater sale, especially to individual geologists. Brian McGee noted that the European market for North American guidebooks is high, but Richard Walker felt that at $37.50, there is no European market.

Theses Bibliography. Dederick Ward (Univ of Colorado), who prepares the Bibliography of theses, read his report and explained the publication history of the bibliography. In past years, the bibliography was supported by funds obtained by the American Geological Institute from the National Science Foundation. This year, the Foundation, citing priority in a time of tight money and not impressed by the sale of only 300 1965-1966 bibliographies, did not support AGI's annual request for funds to publish the bibliography. Thus, the 1967-1968 titles, which have been indexed and placed in the GEO•REF tape file, are retrievable only through a tape search. These titles will not be published in a bibliography unless (1) GIS is able to finance a method of display less expensive than the photocomposition method now used, or (2) another publisher is found. In the meantime, AGI is financing the collection, indexing, and taping of theses titles for GEO•REF. The titles for 1969 have been collected (these were to have been included in the first bibliography published on an annual basis), and annual solicitations to geoscience departments for their 1970 titles have been sent. Harriet Smith recommended that GIS send a letter to NSF's Office of Science Information Service backing up Dedy Ward's request that the theses bibliography, which has been produced for several years and is worth continuing, be published. There was general approval for this recommendation.

Nominating Committee. President Malinowsky reported that 76 ballots (38% of the membership) were received by the 1 November 1970 deadline for the election of GIS officers for 1971. The winning candidates were introduced (see page 1 of this newsletter).

The meeting was open for new business:

Bibliography of bibliographies. George Goodwin (U.S. Geological Survey Library, Washington, D.C.) reported that a preliminary study indicated about 10,000 titles would be involved in the updating of Catalogue of published bibliographies in geology, 1896-1920, compiled by Edward B. Mathews and published in 1923 in the Bulletin of the National Research Council (v.6, pt.5, no.36; 228p.). Richard Walker questioned the need for such a study and compilation, suggesting that perhaps one would go to journal articles when searching for material on a subject. The consensus seemed to be that a feasibility study of the proposed project should be made to determine its parameters and worthwhileness, with the results of such a study being presented to the membership.

Membership. Due to the decrease in membership (20% net loss in the last two years), it was suggested that (1) there be a reduced dues rate for students (perhaps $5), (2) former members be resolicited, (3) contacts be made with nongeologists working in computer and information sciences, (4) letters with advertising material be sent to academic geology departments (for posting on bulletin boards) and to science librarians responsible for geoscience collections, and (5) letters be sent to oil companies inviting them to become institutional or sustaining members. Neil Burk felt that the Society should develop a broader appeal. Historically, GIS has been associated with geoscience librarianship. The potential membership should be much larger than it has ever been: it should be international in scope, appealing to every aspect of geoscience information, and attracting members by providing services and information to those involved in such activities as editing, data processing, and information analysis centers. It was suggested that liaison be established between

GIS and such broad-based organizations as the International Union of Geological Sciences (especially its Committee on Geological Documentation and its Committee on Storage, Automatic Processing and Retrieval of Geological Data, better known as COGEODATA) and the UNISIST Project (ICSU-UNESCO Joint Committee to Study the Feasibility of a World Science Information System), as well as the recently formed information studies group of the Geological Society of London.

GSA Guidebooks. President Malinowsky reported that, upon inquiry, the Geological Society of America has no authority in the printing and publishing of the guidebooks for the annual meetings of GSA; such responsibilities are controlled locally. GSA also has no storage facilities. It was recommended that GSA publish, in Circular 1, the locations where guidebooks for the forthcoming annual-meeting field trips may be obtained. Marjorie Hooker reported that the Univ of Maryland and the Johns Hopkins Univ Press will publish the guidebooks for the 1971 GSA Annual Meetings to be held in Washington, D.C. Hartley Phinney moved that GIS establish a standing committee on availability of GSA guidebooks past, present, and future. The motion was seconded and passed. Harriet Smith raised the question of copying the field-trip guidebooks from the 1968 GSA meeting held in Mexico City (the cost of a hard-copy set of nine guidebooks will be approximately $20), and inquired if anyone was interested in having Tri-State guidebooks reprinted. Interested parties should contact Mrs. Smith, Geology Library, 223 Natural History Bldg, Univ of Illinois at Urbana-Champaign, Urbana, Ill. 61801.

A Buying List of 100 Good Geology Books for the High School Library. Mark Pangborn U.S. Geological Sur-vey Library, Washington, D.C.), who compiled the list which was published in 1967 by GIS in cooperation with 3 other organizations, reported that the present supply is exhausted and that he has contacted a new publisher to print more copies. An inquiry from AGI has been received regarding the compilation of a similar buying list of geology books for secondary school libraries.

GIS Exhibit. Noting that GIS did not have an exhibit at the Milwaukee meetings and that it would be desirable to have one for the 1971 meetings in Washington, D.C., Mark Pangborn has drawn up plans for possible exhibit panels dealing with topics such as GIS activities, information exchange in the geosciences, preparation of geoscience bibliographies, geographic distribution of geoscience libraries, diagrammatic representations showing the growth of geoscience information activities, and status and mutual relationships of national and international organizations involved with the geosciences. The construction of such an exhibit booth will probably cost about $60.

The meeting was adjourned at 2:50 p.m. The 6th Annual Convention of GIS will be held in Washington, D.C., during the annual meetings of the Geological Society of America, 1-3 November 1971.

GIS TREASURER'S REPORT

At the GIS annual business meeting in Milwaukee, Wisc., 12 November 1970, Treasurer Donald H. Owens reported for the interim between 1 January 1970 and 26 October 1970:

Balance (1 January 1970)		$ 999.80
Received		2244.82
Dues	$ 2037.82	
Newsletter subscriptions	18.00	
Sale of Directory	62.00	
Sale of Proceedings, v.1	127.00	
Expended		909.90
Printing & duplicating	741.71	
Postage	108.94	
Supplies	31.10	
Telephone	11.45	
Bank charges	5.70	
Checks returned	10.00	
D.C. Recorder of Deeds	1.00	
Balance (26 October 1970)		$ 2334.72

Most of the Society's receipts were generated by membership dues from 198 members, personal and institutional (as compared with 231 in 1969 and 248 in 1968). This amounts to an increase of $688 in membership revenue, very nearly as estimated at last year's annual meeting. The balance of our total receipts ($207) came from the sales of Directory of geoscience libraries, volume 1 of the Proceedings of the GIS, and subscriptions to the GIS Newsletter.

Expenditures for the balance of the calendar year are estimated at $500: $200 for the Society's annual affiliation dues to AGI, $100 for printing and mailing of Newsletter no.15, $40 for printing and mailing invoices, and about $160 in miscellaneous expenses, including postage, telephone calls, expenses incidental to the annual meeting, and supplies.

Anticipating some $200 in miscellaneous receipts between now and December 31, we can expect a year-end balance of about $2000, or twice the balance at the close of 1969.

To summarize the treasuer's activities for the last year, in addition to handling the Society's funds, the required annual report to the Recorder of Deeds of the District of Columbia was submitted, tax reports were filed with the Internal Revenue Service and the District of Columbia, the Society's computer-generated mailing list was maintained, and the mailing of the Newsletter was accomplished.

The records and accounts of GIS were examined 2 November 1970 by an auditing committee (Howard B. Shirley and John F. Splettstoesser, members) and were found to be correct and in accordance with standard accounting procedures. The audit covered the period from 25 September 1969 to 29 October 1970.

GISers in the NEWS

Thomas G. Basler, formerly librarian of the American Museum of Natural History, became librarian of the New York Academy of Medicine in September 1970.

Darinka Z. Briggs and Louis I. Briggs presented a paper at the 61st Conference of the Special Libraries Association, 7-11 June 1970, entitled "Document analysis, indexing, and retrieval system in the library of a geological research laboratory".

S. Kirk Cabeen, director of Engineering Societies Library, has been elected a director of Engineering Index, Inc., for the period 1970-1971.

Henry A. Fontaine has been named Library Program Officer, Region VIII, for the U.S. Office of Education, in Denver. He will be responsible for providing technical assistance and guidance to OE library program grantees in Region VIII. He was most recently director of the Jefferson County Public Library, Golden, Colo.

Dora Gerard, Geology-Geophysics Librarian at UCLA, retired during the summer after 34 years of professional service to UCLA. The geology faculty unanimously voted to commend Miss Gerard for "the excellent service, backed by imagination and efficiency, provided by her and her staff for both faculty and students". She had previously been in charge of the UCLA Agriculture Library and later a member of the Biomedical Library staff.

Elizabeth (Libby) Loomis has been librarian at Mobil Oil Canada Ltd. (Box 800, Calgary 2, Alberta) since April 1970.

Harold Siroonian, formerly science librarian at City College of New York, is now assistant librarian at McMaster Univ, Hamilton, Ontario, Canada. He is also functioning as their science and engineering librarian.

Arleen N. Somerville, head of the chemistry, geological sciences, and life sciences libraries at the Univ of Rochester, has been elected secretary of the Upstate New York Chapter of the American Society for Information Science.

Bill M. Woods, executive director of Engineering Index, Inc., has been elected chairman of the Metropolitan New York Chapter of the American Society for Information Science.

GISers in PRINT

Briggs, Darinka Z., and Briggs, Louis I. (May 1970) Geologic-information system: methodology, design, and objectives. American Association of Petroleum Geologists. Bulletin, v.54, no.5, p.837.---Abstract of paper delivered at 55th annual meeting of the AAPG, Calgary, 22-24 June 1970. Describes SIPS, an information system for the handling and transfer of data on subsurface geology.

Carrington, David K., chairman (May 1970) Map collections in the United States and Canada: a directory. 2nd ed. New York: Special Libraries Association. 176p. $7.---A completely revised edition of the 1954 directory (20% larger), compiled by the Directory Revision Committee of SLA's Geography and Map Division. It includes the 605 major map collections in all 50 states and 8 Canadian provinces.

Graves, Roy W., jr., and Helander, Donald P. (Sept 1970) A feasibility study of automatic indexing and information retrieval. IEEE transactions on engineering writing and speech, v.EWS-13, no.2, p. 58-59.---"Comparison was made between the natural language words and phrases contained in titles and full abstract text and the indexer-assigned, thesaurus-controlled, descriptors used to define information contained in articles abstracted for inclusion in Petroleum abstracts. Exact as well as word synonym and phrase concept synonym 'matches' were recorded. The study indicates that for the system as a whole only 40 percent of the total assigned descriptors was contained in the title and text of the abstract. This amount of the optimum information needed for retrieval is considered to be an unacceptable level of recovery".

Lea, Graham (Oct 1970) The organization of international geoscience. Geoscience documentation, v.2, no.5, p.110-113.---Annotated and diagrammatic relationships among 36 international organizations concerned with the earth sciences.

Walschot, Leopold (Aug 1970) List of theses presented at the International Training Centre for Post-Graduate Soil Scientists, University of Ghent-Belgium. Geoscience documentation, v.2, no.4, p. 84-86.---Lists 111 theses, 1964-1969, arranged chronologically.

NEW MEMBERS of GIS

Individual

Cook, Sharon R.: Student Assistant, Geography-Geology Library, 250 Science Hall, Univ of Wisconsin, Madison, Wisc, 53706

Coppin, Mrs. Ann S.: Research Assistant, Minerals Exploration Company, 216 North 4th Ave, Tucson, Ariz. 85705

Finnerty, Mrs. Margaret Gary: Co-Editor, Glossary, American Geological Institute, 2201 M St, N.W., Washington, D.C. 20037

Hill, John Davis: Geology-Geophysics Librarian, Univ of California at Los Angeles, 405 Hilgard Ave, Los Angeles, Calif. 90024

Kuehner, Irvin V.: Librarian, Michigan Geological Survey, Lansing. Mich. 48926

Marcott, Tharrel Dennis: Student, Portland State Univ, Portland, Ore. 97207

Qadir, Syed M.A.: 403 Terry Terrace, #205, Seattle, Wash. 98016

Sweeney, Mrs. Leslie T.: Geological Librarian and Research Assistant, Molybdenum Corporation of America, P.O. Box 607, Louviers, Colo. 80131

Wolf, Mrs. Carol Larmon: Co-Editor, Glossary, American Geological Institute, 2201 M St, N.W., Washington, D.C. 20037

Institutional

Canadian Dept of Energy, Mines, & Resources, Earth Physics Branch Library, Ottawa, Ontario, Canada
Mobil Research and Development Corporation, Field Research Laboratory Library, P.O. Box 900, Dallas, Tex. 75221

CANADIAN INDEX to GEOSCIENCE DATA

The Canadian Index to Geoscience Data is a computer-based, coordinate keyword index that identifies sources of data on the geology of Canada (see McGee's talk, page 2 of this newsletter).

The first edition (70-1) was published in May 1970 by the Canadian Centre for Geoscience Data. It consists of 10 individual volumes with an accompanying thesaurus of authorized indexing terms, and it includes about 20,000 document titles, mainly from the Geological Survey of Canada, but also titles from the Mineral Resources Branch, the Quebec Dept of Natural Resources, and the Ontario Dept of Energy & Resources Management. At least eight other agencies have indicated an interest in contributing input to the Index.

Bound copies of indexes for each of the provinces and territories listed below and copies of the thesaurus are available, prepaid from: Information Science Industries Ltd., 1755 Woodward Dr, Ottawa 5, Ontario, Canada.

Subject	Canadian $
1. Newfoundland, 230p.	11.00
2. Nova Scotia, 396p.	19.00
3. New Brunswick/P.E.I., 294p.	14.50
4. Quebec (3 parts), 1155p.	48.00
5. Ontario (2 parts), 927p.	41.00
6. Manitoba, 294p.	16.00
7. Saskatchewan, 363p.	19.00
8. Alberta, 419p.	20.00
9. British Columbia (2 parts), 988p.	41.00
10. Yukon/N.W.T. (2 parts), 744p.	36.00
11. Thesaurus, 274p.	13.50
12. Complete set of all volumes	260.00

REPORT of the AESE COPYRIGHT INVESTIGATION COMMITTEE

(The following report was prepared by GISer Howard A. Meyerhoff, chairman of the Copyright Investigation Committee of the Association of Earth Science Editors, and presented at the October 1970 meeting of AESE in Washington, D.C.)

The copyright situation has many of the ear(th) marks of an earthquake hazard. We know it exists, we know the faults along which the breaks will occur, but the timing and intensity are in the lap--or is it the foot?--of the gods. The growing concern about the importance of copyright, however, is becoming increasingly evident, as the following items clearly show.

1. At present the AAPG, for example, is content with the simple copyright statement, "All rights reserved". But witness the expanded statement that appears in a 1970 book published by William Morrow & Co., Inc.: "All rights reserved. No part of this book may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage and retrieval system, without permission in writing from the Publisher".

Even though William Morrow & Co. can merely hope that it has thought of everything, it still enjoys no more practical or legal protection than the AAPG.

2. The Congress remains in a stew about protection from the mechanical and electronic devices that worry William Morrow & Co.; and although there is a slow fire under the stew, the Senate has not taken it off the burner and acted. The House of Representatives drafted and passed an amended copyright law in 1966, but the bill died in the Senate. The House bill has been reintroduced in each succeeding Congress, but without action except for the Senate subcommittee action, described in item 3. This got as far as the full Senate Judiciary Committee, but no farther. Senator McClellan announced on August 17 that no further action would be taken in this Congress, and none until the Federal Communications Commission announces new rules covering cable television. Odds are offered that, even then, some new excuse will be found for further inaction.

3. This year, however, the Senate had a bill before it that differs from the equally dormant House bill in details that have given the librarians fits. The law provides for "fair use" of copyrighted material without specifying what "fair use" is. Libraries assume it means one copy of anything to anybody who requests it, so long as the user states it is for private noncommercial use. However, you and I can go to any large library, get any book off the shelves, copy any or all of it on a do-it-yourself Xerox machine provided by the library, with no questions asked.

S.543 contains a provision that restricts libraries to the making of copies only of materials "not in print or available from a licensed reproduction agent". Strongly as I disagree with the librarians' free-wheeling use of the concept of "fair use", I agree with them that such a provision is so restrictive in the absence of "licensed reproduction agents" as to be either potentially detrimental to research in scientific and engineering fields, or potentially provocative of law-breaking.

4. Publishers are in a tailspin of their own because of an effort on the part of developing countries to modify the international or Universal Copyright Convention so that these countries would have the right to publish and to export to other developing countries, without permission of the authors, works intended for

educational, scientific, and cultural use. This protocol was actually passed by the Berne Union, but the major publishing countries have refused to ratify it.

5. Abstracting-service organizations, both commercial and nonprofit, have their troubles, both with publishers and users. For example, the American Society for Testing and Materials is so concerned about unauthorized copying of its standards that they engaged the Committee to Investigate Copyright Problems to make a survey with the voluntary cooperation of ASTM's clients. The problem faced by ASTM is by no means peculiar to this one organization--it is the general problem of all scientific societies and it threatens to become acute as printing costs and society dues rise. Someone has to pay the costs of publication; as members defect or subscriptions decline, the primary sources of scientific and engineering information will dry up. Much as authors want their writings to be read and used, their writings must first be published; hence all this concern about protection for publishers.

6. The most blatant violator of copyright is the U.S. Government, as Mr. William Passano [President, Williams & Wilkins Company, Baltimore, Md.] made clear to this group [AESE] in his talk at Norman two years ago. As you may recall, he brought suit against the Government for indiscriminate abuse of Williams & Wilkins copyright by the National Institutes of Health. For more than two years HEW lawyers have stalled on defense in the case, but I have been told that the case is definitely to be heard this month (September) or next. The outcome is vitally important. According to NSF statistics, more than half the U.S. scientists work full- or part-time for, or are subsidized by, the Government. If any or all of them may call upon Government agencies to supply free reproduced copies of any publication for their use, the potential support for private publications is weak, indeed. In my judgment the legal and financial protection of private publication by our societies is of concern to all of us, for it is our best assurance of independent and diverse editorial policies, and these are the sine qua non of science in general and of our science of geology in particular.

Addendum to Report

I have just received a telephoned report from Washington that the Williams & Wilkins case went through six days of court hearings before three Federal judges. The Williams & Wilkins case rested on the interpretation of the existing Copyright Law--the National Institutes of Health was and is guilty of violation. HEW defense labored two main points: Much of the material published by Williams & Wilkins stemmed from NIH-supported research, hence it should be the Government agency's prerogative to use it free and freely; Williams & Wilkins is a $6 million corporation and surely suffers no appreciable financial disability from NIH policy.

What more convincing verification of the statements I made in item 6 could have been provided by the Government itself?

MISCELLANEOUS

The July/August 1970 issue of Geotimes (v.15, no.6, p.14-17) carries a compilation of statistics and rank-order listing of 94 serials accounting for 49% of the citations in the 1969 Bibliography and index of geology. The listing includes addresses of publishers and percents of total citations. The paper, entitled "Serials important to geologists", by Peter Fenner & Joel Lloyd of the American Geological Institute, was prepared as an aid to new earth-science libraries wishing to form a core collection.

The October 1970 issue of Geotimes (v.15, no.8, p.19) describes the current and past geoscience-information activities of the American Geological Institute.

The September 1970 issue of Endeavour (v.29, no.108, p.125-128) contains an article by T. Victor Loudon entitled "Computing techniques in geology". Computer techniques are increasingly used to analyze, interpret, and store vast amounts of geologic data distributed in space and time. "The computer has proved of great value in the preparation of geological maps and it shows promise as a means of simulating geologic processes".

The September 1970 issue of IEEE transactions on engineering writing and speech (v.EWS-13, no.2, p.60-64 has an article by Samuel J. Martinez entitled "An information system for petroleum engineering technology" that describes the Petroleum abstracts service produced by the Information Services Dept of the Univ of Tulsa.

Report no.14 of the Center for Research in Scientific Communication of the Johns Hopkins Univ is entitled: The information-dissemination process associated with the production of journal articles on geophysics May 1970; NTIS PB 192 126 . Based on articles published in geophysics during 1968 and a portion of 1969, the 59-page report concluded that geophysicists spend much time and effort interacting and that scientific information exchange in the informal domain (prepub-lication dissemination) is very effective for them. The study showed that "the scientific information in journal articles which have been published less than six months is likely to be useful only to those geo-physicists who have not had earlier contact with the information through the prepublication dissemination process" (p.45-46). It was noted that from the time the average author of an article on geophysics ini-tiates his work, until its citation in Reviews of geophysics, lags in the information-flow process ac-cumulate to a total of 4.75 years.

The July/October 1970 issue of INSPEL (v.5, no.3-4, p.85-89), the official organ of the Special Libraries Section of the International Federation of Library Associations, carries an article by Karl Heinz Meine entitled "Reflections about the organization of a special library on 'space cartography'" and presented at the meeting of the Geography and Map Libraries Subsection, in Moscow, 3 Sept 1970. Terminology for special maps in extraterrestrial cartography is discussed.

The Information Systems Office of the U.S. Library of Congress has issued (1970) Maps; a MARC format, available from the U.S. Government Printing Office for 50¢. The 45-page document gives "specifications for magnetic tapes containing catalog records for maps" and describes the content designations (tags, indicators, and subfield codes) for variable fields of the MARC II record format for maps. The basic design was developed, in part, by GISer David K. Carrington.

Articles of interest to GISers in recent issues of the Journal of the International Association for Mathematical Geology, published by Plenum Publishing Corporation, include:

Hubaux, A. (1969) "Archival files of geological data", v.1, no.1, p.41-52.
Loudon, T. Victor (1969) "A small geological data library", v.1, no.2, p.155-170.
Hubaux, A. (1970) "Description of geological objects", v.2, no.1, p.89-95.
Dixon, Colin J. (1970) "Semantic symbols", v.2, no.1, p.81-87.

NOAA

As the result of a reorganization proposed by President Nixon, the National Oceanic and Atmospheric Administration (NOAA) was created in the U.S. Dept of Commerce on 3 October 1970.

NOAA brings together the functions of: the Environmental Science Services Administration (ESSA) and its major elements (Weather Bureau, Coast and Geodetic Survey, Environmental Data Service, National Environmental Satellite Center, and Research Laboratories); the Bureau of Commercial Fisheries, the Marine Game Fish Research Program, and the Marine Minerals Technology Center (formerly of the U.S. Dept of the Interior); the National Oceanographic Data Center and the National Oceanographic Instrumentation Center (formerly administered by the U.S. Navy); the National Data Buoy Development Project (formerly of the Coast Guard, U.S. Dept of Transportation); the National Sea Grant Program (formerly of the National Science Foundation); and elements of the U.S. Lake Survey (formerly of the Army Corps of Engineers).

Dept of Commerce's Secretary Stans has stated that the new organization is designed to help accomplish the following goals: (i) a unified approach to the problems of the oceans and atmosphere; (ii) better understanding, development, and conservation of marine resources; (iii) consolidation of efforts toward greater knowledge of oceanic and atmospheric phenomena, as well as those of the solid earth; and (iv) a balanced Federal program toward more effective environmental monitoring control.

With these goals in view, 6 major line components will be established:

The National Marine Fisheries Service (from the Bureau of Commercial Fisheries and the Marine Game Fish Research Program)
The National Weather Service (from the Weather Bureau)
The National Ocean Survey (from the Coast and Geodetic Survey and the U.S. Lake Survey)--attached to the new Survey will be seismology and geomagnetic centers and stations
The National Environmental Satellite Service (from the National Environmental Satellite Center)
The Environmental Research Laboratories (from the ESSA Research Laboratories)
The Environmental Data Service (from the National Oceanographic Data Center and ESSA's Environmental Data Service)

NSF's Sea Grant program will become a separate office. The Navy's National Oceanographic Instrumentation Center, the Interior Dept's Marine Minerals Technology Center, and the Coast Guard's Data Buoy Project Office, which will form the nucleus of the new agency's technology development activities, will be operated during the interim under the direction of an Assistant Administrator for Environmental Systems. The ESSA Commissioned Corps, which has operated several nautical and engineering programs, will become the NOAA Corps.

GIS Newsletter Editor:

Robert McAfee, jr.
American Society for Information Science
1140 Connecticut Avenue, N.W., Suite 804
Washington, D.C. 20036

TOWARD A CONCEPT FOR A NATIONAL GEOSCIENCE INFORMATION PROGRAM

A Report for the Committee on Geoscience Information
of the American Geological Institute

by

William W. Hambleton *

Several days ago, I had occasion to visit with Joseph Shipman, the Director of Linda Hall Library in Kansas City, Mo. For those of you who do not know it, the Linda Hall Library was established about 1946 as a benefaction of the late Herbert Hall to provide a science and technical library for the Kansas City area.

During the visit I had occasion to hold in my hands a late-15th-century first printing of works by Aristotle and Theophrastus from the wonderfully rich, rare-science book collection that Mr. Shipman has developed. Note that this book is approximately 500 years old. It had been restored partly by washing its pages, which were manufactured of pure linen rag, in a bathtub. In the 15th century, affluent citizens presumably donated used garments to book manufacture rather than the local thrift shop as we do. The text was printed with an ink composed from pure carbon black mixed with water and egg albumen. Compare this with the microfilm collection begun at Linda Hall after World War II, and which now shows extensive spotting and film deterioration.

Mr. Shipman showed me another beautiful work, part of a collection of narrative and plates from Cook's Endeavour voyages which began in 1768. Although this voyage attracted much public attention, and Banks and his colleagues produced beautiful illustrations, the plates lay in the British Museum for approximately 200 years and were not printed until the early 1900's.

Mr. Shipman showed me something else: the magnificent microfiche collection which attains compression of literature that was unthinkable a short time ago. For example, the entire Old and New Testament can be displayed on a single aperture card, and any page can be read on a viewer and copied. Mr. Shipman now receives 70,000 requests per year for copies of information of this kind in Linda Hall Library.

As you can see, many of the major aspects of science information are displayed in this single library, such as archival preservation, current awareness, and access.

Other aspects can be encountered by reading documents that express the horror of our situation. The AGI estimates that there are between 35,000 and 50,000 serial publications. Robert Malinowsky, Assistant Director of the University of Kansas Libraries, is conducting a study for AGI and has unearthed approximately 10,000 earth-science serials. Craig (1969) estimates that the number of geologic papers published each year ranges from 35,000 to 100,000 per year, averaging 7500 to 10,000 words each, all largely unread. However, the spread of these figures suggests a low confidence level.

Bates (1970) in a whimsical way in his column in Geotimes has provided some guidance by recommending a shelving index, or SI, which is the price of a publication per linear inch of thickness, and has given us another measure of pages-per-dollar index, or PDI, along with a horrible example of one publication having 216 pages and costing $270, with a 0.8 PDI, or 0.8 of a page representing one dollar.

The February 1970 issue of Datamation (v.16, no.2, p.60-104) attempts to look at the problem with respect to the computer and library systems. The authors of papers in this issue do not give one much cause for comfort regarding rapid progress, although suggestion is made that Committee Z39 of the American National Standards Institute, Inc. offers some hope in standardization in libraries, documentation, and information science.

Reports on our problems and how to manage them have been issued at a great rate. Included is the National Academy of Sciences (1969) report on scientific and technical communication (otherwise known as the "SATCOM Report"), which incidentally has no subject index.

The Council on Biological Sciences Information recently issued a report on information handling in the life sciences (Steere, 1970), and one is struck by the similarity between earth-science and life-science information problems.

Despite all the furor, Dale B. Baker, Director of Chemical Abstracts Service, in an article entitled "Communication or chaos" (1970), suggests that the so-called information explosion is a myth and that scientific information has been growing at pretty much the same, predictable, exponential rate for several centuries, but, nevertheless, yields some two million new reports of research and development each year. However, the major point of his paper is that despite the progress that we are making in modernizing

* State Geological Survey, University of Kansas, Lawrence, Kansas 66044. Paper presented at the symposium on New Directions in Information Exchange of the Geoscience Information Society, Milwaukee, 11 November 1970.

individual, discipline-oriented, and mission-oriented information systems in science and technology, we have not yet recognized that a truly effective solution to our scientific and technical communications problems can come only through a coordinated, multinational, multidisciplinary effort. As you will see, my conclusions are similar.

At the urging of the Office of Science Information Service of the National Science Foundation, various disciplines such as the biological sciences, chemistry, and physics created groups that were representative of each discipline to develop a concept for a national information system for that discipline. The geosciences could not resist the challenge and in 1968 AGI established a Committee on Science Information, subsequently renamed the Committee on Geoscience Information (thus changing from the euphonious acronym COSI, to the somewhat harsher COGI). This action was taken by mandate of the Council of Society Presidents in October 1967, directing the President of AGI to appoint a committee from a list of candidates supplied by member societies. The action was followed by subsequent infusion of $44,400 for background investigations and a later grant of approximately $200,000.

The Committee under the chairmanship of William C. Krumbein held six meetings and a variety of subcommittee meetings, and reported to the House of Society Representatives in Atlantic City last year (1969).

The Committee was charged with "the development of a concept for a national information system in the geosciences, and the definition of long-range goals".

During the course of its meetings, the Committee identified 9 major areas for study and attention. These included:

1) Bibliographic services and publications
2) Translation publications and services
3) Vocabularies, definitions, and nomenclature
4) Meetings and personal communication
5) Library resources and services
6) Specialized information and data services
7) Primary and informal publications
8) Information on current research & development
9) Instruments, supplies, and directory services

At the end of two years, the Committee had developed and evolved a concept of representative policy formulation, centralized program administration, and decentralized and diversified implementation. The Committee viewed its role as containing three elements: information research or fact-finding; an analytic function leading to problem resolution; and the implementation and coordination of projects to be undertaken to improve information transfer in problem areas.

In the area of bibliographic services and secondary publications, GEO·REF, the bibliographic data center operated by AGI, has been developed, and future tasks include establishment of guidelines, policies, and plans for achieving bibliographic coverage of the backlog literature, developing bibliographic guidelines for use of authors and editors of primary journals, and undertaking profile studies of worldwide bibliographic coverage and content.

A special study group has been appointed to examine the primary journal, which in its classic format often is not an effective medium for information exchange. The Committee will study alternative possibilities to the conventional journal and has a contract study of the subject. It has been working with the Journal of paleontology looking toward page-length summaries of accepted papers whose full text, in an inexpensively duplicated form, would be available to subscribers on request.

The Committee authorized study of collections of special data and samples held in university museums, research institutes, and the like. This information has been accessed and indexed by AGI, and now covers almost 500 collections. The Committee has appointed a task force charged to explore requirements for thesauri in the geosciences. Working with the Geoscience Information Society, it hopes to develop a national plan for providing users access to the formal literature, to undertake a complete inventory of guidebooks and specialized documents, to extend the worldwide inventory of geoscience serials (now nearing completion), and to identify major holdings of libraries.

As to a concept of an information system for the geosciences, the Committee has defined an information system as a "functioning program for the efficient transfer of information, involving all conventional channels and services, updated to provide for the explosive growth of geoscience information during the past several decades, and employing new techniques introduced with the development of electronic data processing".

In a rather simple-minded way, an information system can be thought of as an input function, followed by an input filter (such as an editor), followed by a great big black box, followed by an output filter (such as money), followed by output to the user. A great deal is known about input and input filtering, and about output filtering and the user. Much can be done to change this part of the system if the political and economic environment is appropriate. The big black box in the middle cannot be examined directly and one of the most important problems is to find out what its components are, and what takes place within it.

I have developed some perceptions about geoscience information and the possibilities of a national concept which I would like to share with you. First of all, I have read many statements that read something like the following: "Any information system (and one may precede this by the word 'geo-' or 'bio-' or 'chemical') should be user-oriented and should provide the user with information he needs as rapidly as possible, in a form most useful to him, and at minimum cost; additionally, the system should assure full information on the topic of his interest, on a worldwide

basis, with access to archival information, in appropriate degree of depth, but without overwhelming him with unneeded information". The fact that such an information system is the objective of virtually every one of the disciplines with which I have been in contact suggests that the usual National Science Foundation policy of multiple approach to problems may prove, in this case, to be unwise, costly, and inefficient. The diverse efforts of the sciences should be concentrated on common goals, and to restate Baker's (1970) admonition, we have not yet recognized that a truly effective solution to our scientific and technical communication problems can come only through a coordinated, multinational, multidisciplinary effort.

However, inasmuch as we have ignored this advice, we should look at some of the special problems that arise in the development of the geoscience information system by virtue of peculiar characteristics--characteristics which have close similarity to those of the biological sciences.

Geoscience subject matter ranges from the taxonomic and ecologic aspects of studies in paleontology, to the observational and experimental studies of the geochemist and geophysicist, to the particular techniques of the stratigrapher and structural geologist which may include studies in rock mechanics, and to the efforts of mathematically and statistically oriented geologists who are strongly committed to computing and computing science.

Superimposed upon this diversity of subject matter is a peculiar employment pattern. Although other sciences exhibit a wide range in employment pattern in academic institutions, in governmental and private research institutions, and in industry, few sciences had the unique orientation toward the subject of exploration. The largest concentration of employment is in the area of petroleum exploration on a national and international scale, with lesser effort in other kinds of mineral exploration.

The pattern is one of diversity in both subject matter and organizational structure. This diversity takes form in many professional organizations such as the AAPG, the GSA, the SEPM, the SExG, and the like, each of which is strongly and independently organized. Unlike some of the other sciences, which rely heavily upon a single strong coordinating organization such as the American Institute of Physics or the American Chemical Society, we are loosely affiliated with the American Geological Institute. In other words, the geosciences are strongly decentralized, and this pattern is not likely to change significantly unless economic pressures produce stronger motivation than apparently exists.

We have developed a large body of descriptive literature which must remain accessible. This literature has locational and geographic aspects and has orientation toward the past, the third dimension, and time. Increasingly this literature has given way to large amounts of data from both field and laboratory investigations. Another important aspect is reliance upon samples, cores, logs, field guides, and maps, all of which have peculiar requirements for storage and access. Finally, much information resides in the files of an exploration-oriented industry, and proprietary and security aspects are highly significant.

I suggest, then, that a national geoscience information concept should include the following characteristics:

(1) Decentralized with Centralized Services

A national geoscience information system should recognize explicitly the diversified information sources and character of geoscience information and serve to provide centralized and comprehensive discipline-wide services and information integration. The organizational structure of the geosciences is not likely to change significantly within the foreseeable future until cost-benefits and economies of scale become evident. Meanwhile, a central office can provide aa decentralized network with referral services, research and development with respect to the functional ele-ments of information, abstracting services, transla-tions, continuing development toward automation, criteria for standardization, development of union lists, and many other services. Such a centralized service can be thought of as driving the information system in the direction of order, or high, negative-entropy.

(2) An Interactive System

A national geoscience information system should be compatible and interactive. That is to say, such a system should be compatible in its decentralized parts within the geosciences and interactive with systems developed by or within other sciences as represented by the American Chemical Society and the American Institute of Physics, and with other countries, such as Canada. Because the geosciences depend heavily upon these other sciences, abstracting services should be interactive with, for example, the Chemical Abstracts Service.

(3) Central Repository or Network

The geosciences have no central repository such as the National Agricultural Library or the National Library of Medicine. The development of a national information system should include careful examination of alternatives as to whether a national central repository library should be developed or whether a network of separate, specialized, communicating, and interactive libraries might best serve the needs of both the public and private geoscientists.

(4) Archival Aspects

Much geoscience information has current relevance irrespective of its age. Unlike some disciplines where information of the past five years forms the core of an information and data base, very old geoscience information forms the foundation of current and new studies. Accordingly, much attention must be devoted to the archival- versus active-file aspects of geoscience information and critical criteria must be developed for information disposition. Some have suggested that the citation index should be em-

ployed; other criteria might be developed.

(5) Physical Files

A geoscience information system must deal with the great diversity and location of physical files, such as samples, logs, specimens, maps, and photographs. The development of union lists of these such materials would be a significant step forward, inasmuch as centralization of such files seems unlikely and impractical. However, research and development should continue in the direction of digitization and optical processing of much of this information, and transfer for graphic display.

(6) User Orientation

A national information system should be strongly user-oriented and should be developed so as to provide access, hard copy, and manipulated transfer at minimum cost in such a way as to not overwhelm the user when the system is queried. In short, the system should strive to be an intelligence amplifier.

Any system developed for the geosciences must be vitally concerned with the constraints which are imposed upon libraries and sources of information generally. These constraints relate to the broad area of man-machine interactions and the problems of implementing new systems.

The members of the Committee on Geoscience Information, who should not be held accountable for this report, are: George E. Becraft, Cornelius F. Burk, jr., James M. Forgotson, jr., John C. Griffiths, William C. Krumbein, Clayton E. Ray, John S. Steinhart, Robert Van Nostrand, and William W. Hambleton, chairman.

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