GSA news & information

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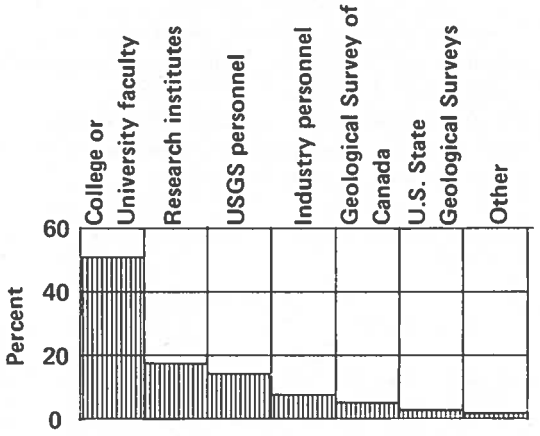
ANOTHER LOOK AT *GEOLOGY*

The preliminary results of a statistical survey of the input to and citations of *Geology* was made by David L. Weide, a member of *Geology's* Editorial Board. His survey attempted to answer two basic questions: (1) Who publishes in *Geology*?, and (2) How effective is *Geology* as a means of communication within the geologic community? The two volumes (1977 and 1978) selected for the study involved 266 published items.

The senior author in each case was used as the datum. Of these authors, 56% were Members/Fellows of GSA and 4% were GSA Student Associates. On the basis of employment, seven categories were used, and the results are shown in Chart 1. Clearly, college and university faculties have been the primary source.

CHART 1.

Employment status of senior authors of *Geology* articles



To answer his second question, Weide searched references in the 1978 volumes of 15 journals. That search yielded 15,886 references to the various journals, from which he produced the following Table 1.

TABLE 1. Absolute ranking by number of citations

JOURNAL	Rank	No. of Citations
GSA Bulletin	1	950
Journal of Sedimentary Petrology	2	497
American Journal of Science	3	363
AAPG Bulletin	4	355
USGS Professional Papers	5	334
Science	6	308
American Minerologist	7	295
Journal of Geology	8	294
Nature	9	244
Journal of Paleontology	10	179
Geology	11	139
Sedimentology	12	137
Quaternary Research	13	77
American Geophysical Union Transactions	14	74

In order to determine the import of citations to the journals in which the article was published—referred to as the "Incest Factor"—the journals were reranked with the self-citations eliminated. This ranking moved *Geology* from the 11th position up to the 4th position.

As a third and independent exercise, Weide scanned two U.S. Geological Survey Professional Papers published during 1979, to determine which of the several types of GSA publications were most frequently cited. Here, out of 790 references, *Abstracts with Programs* was the clear winner, followed by the *Bulletin,* Memoirs, Special Papers, and *Geology*.

It is apparent that among journals, the GSA *Bulletin* is paramount in number of citations in these two papers. The relatively low level of citation of *Geology* was attributed, at least in part, to the magazine's youth. Follow-up surveys in the future, preferably covering longer time spans, will make very interesting comparisons.

UPDATE

Fulbright awards in earth sciences

Among the approximately 500 Fulbright awards available in about 100 countries for 1981–1982, a number have been programmed in earth sciences.

Argentina#: edaphology, volcanic soils; *Australia*: metamorphic rocks, Australia's salt lake system, soil taxonomy; *Austria*: physical geography; *Fiji*: environmental studies; *Honduras*#; *Ivory Coast**: tectonic petrology and paleontology; *Korea*; *Liberia*; *Nepal*: meteorology; *Norway*: paleontology; *Pakistan*: geology; *Tanzania*: physical oceanography or geophysics; *U.S.S.R.*: several specialties; *United Kingdom*: oceanography.

In addition, for many countries, applications "in any field" are accepted for lecturing or research.

A copy of the 1981–1982 Fulbright announcement booklet may be obtained by any interested U.S. scholar from the Council for International Exchange of Scholars, Dept. N, Eleven Dupont Circle, Washington, DC 20036. The announcement of opportunities for university teaching and advanced research abroad should be examined before requesting application forms and other information appropriate to country and discipline interests. Applications are due for the American Republics, Australia, and New Zealand by June 1, 1980, and for Africa, Asia, and Europe by July 1, 1980.

CIES will also assist in the administration of about 500 awards in 1981–1982 for Fulbright scholars visiting the U.S. for lecturing and research. In many cases host institutions are expected to assist the scholar with full or partial maintenance; inquiries are welcome. A directory of scholars currently in the U.S. is available on request.

#Spanish required; *French required.

Necrology

Notice has been received of the following deaths: George M. Brownell, Winnipeg, Manitoba, Canada; Robert L. Browning, Leawood, Kansas; John J. Burke, Cleveland, Ohio; William H. Corey, Newbury Park, California; Morgan Jones Davis, Houston, Texas; Alden S. Donnelly, Midland, Texas; Jacob Freedman, Lancaster, Pennsylvania; Theodore Galusha, Chadron, Nebraska; Ralph S. Gray, Ogden, Utah; Winthrop P. Haynes, Boxford, Massachusetts; Matthew I. Kaufman, Laguna Niguel, California; William Christian Krumbein, Santa Monica, California; W. David Kuenzi, Kalamazoo, Michigan; John E. Lamar, Urbana, Illinois; David M. Larrabee, Chevy Chase, Maryland; W. J. Nauta, Nairobi, Kenya; Matthew F. Norton, Woodbridge, Virginia; Bruno Sander, Innsbruck, Austria; H. W. Straley III, North Olmstead, Ohio; Leif Størmer, Oslo, Norway; Jasper L. Stuckey, Raleigh, North Carolina; R. Spence Taylor, Calgary, Alberta, Canada; George A. Thiel, Frederic, Wisconsin; Garrie L. Tufford, Mahtomedi, Minnesota; Aleksander P. Vinogradov, Moscow, U.S.S.R.; Ralph A. Watson, Pocatello, Idaho; John D. Weaver, Mayaguez, Puerto Rico; Edward A. Wendlandt, Waco, Texas; Joseph D. M. Williamson, Covington, Louisiana.

Articles in *Bulletin, Part II*, June 1980

Articles in *Bulletin, Part II* are listed below. (Summaries only of these articles are in *Bulletin, Part I.*) Articles in *Part II* are not on the separates subscription.

Paper copies of *Part II* in its entirety are available at cost ($10/month) as a special service to those users (members and nonmember subscribers) who request them. Any such order should be addressed to the Publication Sales Department and be accompanied by advance payment, and no discount can be offered for multiple orders or orders for a sequence of months.

1. Chronology of the structural and petrologic development of the southwest Sierra Nevada foothills, California, by Jason Saleeby and Warren Sharp. Doc. no. M00601. (On microfiche: 120 p., 18 figs., 9 tables)

In June *Geology* (separates not available)

1. Pyritization in the shells of living bivalves, by G. R. Clark II, R. A. Lutz
2. Flowslides in muds on extremely low angle tidal flats, northeastern South America, by J. T. Wells, D. B. Prior, J. M. Coleman
3. Quaternary rivers on the New Jersey shelf: Relation of seafloor to buried valleys, by D.J.P. Swift, R. Moir, G. L. Freeland
4. Preliminary radiolarian zonation for Late Devonian through Permian time, by B. K. Holdsworth, D. L. Jones
5. New evidence for the age of the Quantico Formation of Virginia, by L. Pavlides, J. Pojeta, Jr., M. Gordon, Jr., R. L. Parsley, A. R. Bobyarchick
6. New measurements of crustal doming over the Socorro magma body, New Mexico, by R. Reilinger, J. Oliver, L. Brown, A. Sanford, E. Balazs
7. Graphite skeleton crystals—A newly recognized morphology of crystalline carbon in metasedimentary rocks, by P. L. Weis
8. Penrose Conference report: The Antler orogeny—Mid-Paleozoic tectonism in western North America, by T. H. Nilsen, J. H. Stewart

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Prepared from contributions from the staff and membership by John C. Frye, Executive Director; James R. Clark, Publications Manager; and June Thomas, Judy Hall, and Ann Fogel, Production Assistants.

Memorials Volume X now available

Memorials Volume X is now available ($10.00), containing the following memorials:

Carl Calvin Addison, 1903–1978, by I. H. Cram
Leonidas Theodore Barrow, 1895–1978, by S. P. Ellison, Jr.
Perry Byerly, 1897–1978
Neil Campbell, 1914–1978, by R. E. Folinsbee
William Skinner Cooper, 1884–1978, by D. B. Lawrence
Fenton Harrison Finn, 1904–1978, by G. C. Grow, Jr.
Julius Benjamin Garrett, Jr., 1913–1978, by A. D. Ellis, Jr.
Bruce McCurdy Hall, 1918–1977, by A. S. Allen
Everett Dale Jackson, 1925–1978, by T. P. Thayer
John Martin Kelly, 1914–1977, by V. E. McKelvey
Montis Ruhl Klepper, 1915–1978, by R. I. Tilling
Gordon Andrew Macdonald, 1911–1978, by R. Moberly
Kirtley Fletcher Mather, 1888–1978, by S. A. Wengerd
Ely Mencher, 1913–1978, by R. R. Shrock
Robert M. Moxham, 1919–1978, by W. A. Fischer and F. E. Senftle
Louis Lamy Ray, 1909–1975, by F. C. Whitmore, Jr.
Hubert Gregory Schenck, 1897–1960, by A. M. Keen
James Morton Schopf, 1911–1978, by R. M. Kosanke
Louis Byrne Slichter, 1896–1978, by L. Knopoff, R. E. Holzer, C. F. Kennel
Paul Albert Smith, 1901–1978, by M. K. Hubbert
Edmund Maute Spieker, 1895–1978, by J. W. Collinson
Clyde Graham Strachan, 1892–1978, by J. M. Wanenmacher
Peter Colley Sylvester-Bradley, 1913–1978, by D. F. Merriam
Franklin Alton Wade, 1903–1978, by R. B. Mattox
James Tinley Wilson, 1914–1978, by W. C. Kelly

Books may be purchased for $10.00 through the Publication Sales Department, GSA, 3300 Penrose Place, P.O. Box 9140, Boulder, CO 80301.

AGI specialty codes revised

In the foreward to the 18th edition of the *Directory of Geoscience Departments* the American Geological Institute announced that "A committee of geoscientists is currently revising the list of specialties to accommodate new subdisciplines in our expanding profession."

The committee met at the AGI offices in February 1980 and agreed first that the specialty code should reflect the scientific specialization of the faculty member rather than the course(s) taught. Working with this as a guideline, the committee examined and discussed each of the major categories and subdisciplines.

The end result was a new specialty code list with a three-digit numbering system to allow for changes and expansion of the codes in the future. For example, Economic Geology (100–199) and Engineering Geology (600–699) have been elevated to major categories. As examples of other changes and expansion in the codes—Archaeological Geology (002) and Paleolimnology (008) are new subdisciplines under Geology (000–099). Economic Geology (100–199) has five subdisciplines shown as: 101 General, 102 Coal, 103 Metals, 104 Non-metals, and 105 Oil and Gas.

In short, the entire specialty code listing has been carefully reexamined, in some cases redefined, and expanded. The new codes will be distributed to geology departments beginning in April.

The committee will accept suggestions for additional subdisciplines or other thoughts for improvements to the specialty code list. Send your suggestions to the Specialty Code Committee, American Geological Institute, One Skyline Place, 5205 Leesburg Pike, Falls Church, Virginia 22041.

Where do geology graduates go?

This question, and a dozen related questions, has plagued some of the people in our profession since the American Geological Institute ceased being a central source of geoscience manpower information early in the 1970s. Several of the member societies of AGI urged initiation of a program through which information on the number of professionals actively engaged in the fields of geology and geophysics could be determined. The Institute appointed an ad hoc Manpower Committee to study the problem and recommend ways that AGI could supply manpower information to the profession.

The committee recognized the need for this information but realized that a full-blown manpower effort was impossible for AGI whose resources are limited. However, the committee did agree that the annual survey of student enrollment in geoscience departments was, in effect, a mini-manpower information source and that these data show the potential pool of future entries into our profession.

The committee reasoned that the expansion of these data would be a first step toward a constant information source and could show what happens to geology majors after they graduate. They suggested a short but direct series of questions to ask departments about those receiving bachelor's and master's degrees: How many continued on to graduate work? How many sought employment in geology and where— academia, industry, government? What were the salary ranges? Employment and salary range offers to Ph.D.s would be the prime questions.

AGI will initiate this addition to the annual survey of student enrollment as soon as all of the details can be worked out. Results of this survey will be published and made available.

• Notice •

Error in April issue: The correct Map and Chart series number for the *Tectonic Map of South America* is **MC-32.** All other information about MC-32 is correct on pages 60 and 61 of April *News and Information.*

NEWS FROM GSA DIVISIONS

GSA has seven specialty divisions, all of which prepare and publish newsletters paid for from their division dues. Much of the information contained in the newsletters is of interest to division members only, but, with the thought that some of the items are of general interest, here are a few excerpts from several recent issues.

John C. Frye, Executive Director

from the Archaeological Geology Division

The Center for Archaeological Research and Development (CARD), Peabody Museum of Archaeology and Ethnology, Harvard University, offers for the first time *two Research Associateships* to researchers interested in pursuing research or developmental projects related to the Peabody Museum collections and the use of the CARD facilities. The newly established CARD facilities include a radiocarbon dating laboratory, a thermoluminescence dating laboratory, x-ray diffraction and flourescence laboratory, a full microscopy and sample preparation laboratory, a photography laboratory, a biological laboratory and remote sensing equipment. The term of the Associateships will be for a period of three summer months. These Associateships are reserved for researchers who have had prior experience in conducting instrumental analysis on archaeological or ethnographic collections. Preference will be given to the applicants who, in the opinion of the Awards Committee, will profit most from utilizing the resources and facilities of the Peabody Museum. Application for the Associateships beginning Summer 1980 must be made by letter to: Dr. J. E. Ericson, CARD, Peabody Museum, Harvard University, 11 Divinity Avenue, Cambridge, MA 02138, by *November 15, 1979.* Further information on the Center can be sought by requesting the CARD Handbook. Every applicant for an Associateship offered by the Museum must submit a typed application which includes: a) name, home address, telephone number, b) affiliation, address, title, telephone number, c) curriculum vitae, d) three letters of recommendation sent directly to the above address, e) a detailed description (not to exceed 3,000 words) of the project proposed by the applicant, including an abstract (not to exceed 300 words), an introduction discussing significance of project, a detailed research design of project including collections or samples to be analyzed or examined as well as instrumentation and facilities to be used, a specific schedule of research, and a statement of potential funding arrangements. Announcement of the awards will be made on February 15, 1980.

from the History of Geology Division

HISTORY OF CONCEPTS IN PRECAMBRIAN GEOLOGY

The Geological Association of Canada has published its Special Paper 19, *History of Concepts in Precambrian Geology* (*James Buckland Mawdsley Memorial Volume,* xiii + 292 p., 1979), edited by Walter O. Kupsch and William A. S. Sarjeant. The volume contains 18 papers, 14 of which were presented as part of INHIGEO's Symposium 106 at the 24th International Geological Congress, Montreal, 1972. Five of the articles treat the Precambrian of North America, four deal with that of Great Britain, three with Sweden, and one each with Australia, India, and the Soviet Union; the volume also includes articles on "History of Concepts: Migmatites," "Evolution of Concepts on Physico-Geographical Environments during the Precambrian," and "Werner's Concept of the Basement Complex." Copies are available at C$18.00 each (C$15.00 to members of the Association) from GAC Publications, c/o Business and Economic Services Ltd., 111 Peter Street, Suite 509, Toronto, Ontario M5V 2H1, Canada.

THE PAPERS OF JOSEPH HENRY

The Smithsonian Institution Press has published the first three volumes of *The Papers of Joseph Henry*, edited by Nathan Reingold and his staff at the Smithsonian. *Volume 1. December 1797–October 1832. The Albany Years* (xxxix + 496 p., illus., 1972) contains material of significant interest to historians of geology in America, including Henry's attitudes on and work in the earth sciences, his correspondence with Parker Cleaveland, Amos Eaton, Ebenezer Emmons, Edward Hitchcock, and Benjamin Silliman, and selections from Henry's journal of the geological tour of the Erie Canal with Eaton and others in 1826.

Volume 3. January 1836–December 1837. The Princeton Years (xxxiv + 585 p., illus., 1979) is the second of five volumes planned to encompass that interval in Henry's life that will include his lectures on geology at Princeton. Much of *Volume 3* analyzes Henry's eight-month tour of Great Britain and Europe in 1837. "Henry, perhaps the most eminent American scientist to visit Europe since Franklin, . . . had no difficulty . . . in gaining admission to intimacy with most of the men actually engaged in science in London and Paris." Henry's "diary contains intimate and candid appraisals" of scientific colleagues (especially Michael Faraday) and acquaintances (including Conybeare, Fitton, Herschel, Lonsdale, and Nicol); of scientific institutions and universities; and his observations on geological theories and geological surveys. Alexander Dallas Bache's visit to England in 1837 overlapped that of Henry; *Volume 3* records Bache's diary account of his conversation with John Phillips evaluating the geological work of George Featherstonhaugh. Both Henry and Bache were sensitive to the reputation of American science abroad; Henry "was gratified by his success in convincing colleagues abroad of American progress in the sciences." *Volume 3* also recounts Henry's lobbying for the New York Natural History Survey and his contributions in 1836 toward selecting the scientific corps and instruments for Charles Wilkes' U.S. Exploring Expedition.

Dr. Reingold plans to devote nine volumes to Henry's years as the Smithsonian's first Secretary (1846–1878).

from the Quaternary Geologist and Geomorphologist

MACKIN GRANT

At the annual business meeting in San Diego, the Division voted to increase the Mackin Grant to $500, effective with the 1979 award. Applications are available upon request from the Division secretary, Department of Geology, Western Washington University, Bellingham, WA 98225. Deadline for receipt of applications is February 15th.

Donna Marron, University of California at Berkeley, was awarded the 1979 Mackin Grant at the annual banquet and business meeting in San Diego, November 6, for her proposed research on slope processes in Redwood National Park. The following citation was made by Bill Bull, Chairman of the Division:

> Donna Marron:
>
> It is a distinct pleasure for the Quaternary Geology and Geomorphology Division of the Geological Society of America to award you the J. Hoover Mackin Research Grant for 1979 for your proposed studies on slope processes in the watersheds that have recently been added to Redwood National Park in northwestern California. Your work should provide some exceptional data and new concepts regarding rates of geomorphic processes and impacts of human activities.
>
> The J. Hoover Mackin Research Grant is in honor of a truly outstanding geomorphologist. For more than three decades, Hoover Mackin stimulated and guided many students at two major universities. He was renowned as a teacher as well as being an outstanding field scientist, and his scientific contributions have greatly increased our understanding of a variety of important subjects. J. Hoover Mackin's memory can be honored in no better way than to provide a token of financial support to a student like yourself. His dedication to Quaternary geology and geomorphology and his careful work set a remarkable standard of quality for all of us.
>
> Congratulations on your award-winning ideas on your Ph.D. research. The Society wishes you the best of luck.
>
> W. B. Bull

ARCTIC SYMPOSIUM REPORT

A 1-day symposium "Important Frontiers of Research in the Paleoceanography of the Arctic Seas," was held on April 17, 1979, at the Quaternary Research Center, University of Washington in Seattle. The participants represented a broad spectrum of disciplines, including physical and chemical oceanography, sea-ice dynamics, marine geochemistry, micropaleontology, glaciology, geomorphology, and magnetic stratigraphy. The purpose of the conference was to examine the present status of knowledge and to point out the most pertinent areas of future research.

Knut Aagaard and Nobert Untersteiner (University of Washington), reviewed data on present oceanographic conditions in the Arctic, emphasizing that the strong density stratification of the upper 100 to 200 m of the Arctic Ocean is critical in the maintenance of permanent ice cover. Above about 500 m, the stability is solely salinity controlled. Not only is the temperature contribution to density small, but it is also destabilizing. The salinity structure represents a dynamic equilibrium between the subsurface addition of salt from the Atlantic water and the addition of fresh water from runoff. In addition to salt, the Atlantic water also supplies large quantities of sensible heat. The role of various mechanisms is not completely clear, but gravitational convection during winter is probably of major importance. Several separate lines of inquiry have recently suggested that vertical mixing and cycling of salt and fresh water in the Arctic Ocean are more effective than had been thought.

A key question is therefore the temporal stability of the salinity stratification. At present very little is known about it, not even whether the most important feedback mechanisms are positive or negative. Annual variations in discharge from the major rivers can be nearly 50% of the long-term mean, and inflow of Atlantic water can vary by this much. The consequences for the ice cover of these variations is not known.

What happened in the past is also speculative, but during glacial periods, when the atmospheric circulation must have been more strongly zonal, little if any Atlantic water may have entered the Arctic Ocean, perhaps resulting in more stratification than at present. The same might also have been the case for the Norwegian Sea.

George Kukla, Lamont-Doherty Geological Observatory, discussed paleomagnetic stratigraphy of Arctic deep-sea cores collected by LDGO over the past two decades, and pointed out several problems inherent to oceanic sediments in low sedimentation areas, such as the flank and crest provinces of the Alpha Cordillera. Reasons perhaps include homogenization of sediments by bioturbation which makes the definition of magnetic boundaries imprecise and attenuates the signals of climatic fluctuations.

The oceanic paleoclimates interpreted from the fossil record of planktonic foraminifers and oxygen isotope measurements were summarized by Yvonne Herman, Washington State University: Three major climatic regimes are recognized in Arctic sediments deposited in the past $\cong$4.5 to 5 m.y. During the earliest ($\cong$4.5 to 2.5 m.y. B.P.), red clays containing manganese micronodules, ice-rafted debris, and solution-resistant, cold-water planktonic foraminifera were deposited. The sediments representing the second climatic regime, deposited in the Matuyama epoch, contain abundant coarse, ice-rafted debris and sub-Arctic solution-susceptible planktonic foraminifera. During the Matuyama epoch ($\sim$2.5 to 0.7 m.y. B.P.), global temperatures were lower than in the preceding 2 million years, and the paradoxial dominance of "warmer" planktonics in this epoch may be due to the dissolution of these warmer solution-susceptible elements in the red clays. The sediments of the youngest climatic regime, deposited during the Brunhes epoch, contain about seven foram-rich/foram-poor cycles. The latter are believed by some investigators to represent low productivity periods, while others attribute the near absence of fossils to post-depositional solution due to prolonged exposure to corrosive cold bottom water in areas of very low sedimentation or to a very thick ice cover which would have inhibited productivity.

Minze Stuiver, University of Washington, reviewed interpretations of oxygen isotope analysis of planktonic and

benthonic foraminifera in deep-sea cores, emphasizing the value of this technique for elucidating paleoclimates. He pointed out that interpretation of the isotopic record of foraminiferal shells is complicated by the simultaneous changes in the isotopic composition and temperatures of the oceans, the former primarily controlled by the waxing and waning of continental ice sheets.

Principal Conclusions and Recommendations

The consensus among participants was that an interdisciplinary long-term program would be highly desirable and very timely; such programs should include:

1. Comprehensive observational records in the fields of physical, chemical, and biological oceanography. Furthermore, the sediment-coring program should be extended to the little-known Eurasian Basin, in particular to regions of relatively high sedimentation about the CCD and to sectors near the present sea-ice limits. The latter areas may be the most sensitive to climatic changes. Dating of sediments radiochemically and by magnetic stratigraphy needs to be undertaken concurrently with paleontological and oxygen isotope determinations.

2. Investigation of the effect of Arctic ice cover on global climate.

Yvonne Herman, Washington State University

from the Coal Geologist

NEW SECRETARY NEEDS HELP

As editor of the division's newsletter, I need items of interest for future volumes of *The Coal Geologist.* If you have any newsworthy items or are just looking for a pen pal, feel free to write or call. With your help, we should be able to make the newsletter timely and informative. Send me information on such things related to coal as upcoming meetings and new books. I'm also open to suggestions on what kind of items you want in the newsletter. Send your cards and letters to: Gary B. Glass, Geological Survey of Wyoming, Box 3008, University Station, Laramie, WY 82071, or phone (307) 742-2054 or (307) 766-2286. P.S. Allow an extra week for mail delivery in winter months (September–June).

from the Hydrogeologist

1980 MEETING OF INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS

Leonard A. Wood, Chairman, and John E. Moore, Secretary-Treasurer, U.S. National Committee, International Association of Hydrogeologists (IAH), report that the General Assembly of IAH will be held in Paris, France, July 7–17, 1980, in conjunction with the 26th International Geological Congress (IGC) which will celebrate the centennial of IGC. Section 15, Hydrogeology, will be concerned with three themes: (1) Contribution of lithostratigraphy and structural analysis to the understanding of aquifer systems and to the evaluation of their sources of supply; (2) Hydrogeological studies of aquifer basins or systems: quantitative methods of evaluating reserves and resources; (3) Regional syntheses or methodological studies showing attempts at quantifying hydrological data.

William Back, second Birdsall Distinguished Lecturer, will chair an inter-sectional symposium with Section 10, Geochemistry, on "Geochemistry of Underground Waters and Reservoir Rocks."

Several pre- and post-convention field excursions on hyrogeology will be held in Europe in addition to one-day excursions during the Congress. *For information write to:*
The Secretary General
26th International Geological Congress, Maison de la Géologie
77-79 rue Claude-Bernard, 75005 Paris, France

from the Engineering Geologist

Environmental Geology

Our first concern of the 1979–1980 year is that of environmental geology. Environmental geology certainly means different things to different people. However, there is one striking fact about this discipline (shall we call it that?). That is the fact that geologists of a variety of backgrounds are talking about it and working with it, sometimes offering their efforts as a part of their employment, sometimes providing advice on a voluntary basis. Whatever the source of involvement, the product generally remains the same: geology applied to protect Man from the Environment or to protect the Environment from Man. These "efforts" are so widespread as to affect those who have traditionally thought of themselves as engineering geologists, as well as hydrogeologists, engineering geophysicists, the low-temperature variety of geochemists, economic geologists, some petroleum geologists, and, certainly, many geomorphologists. Forgiveness, please, for those whom I may have forgotten. The practice of whatever is environmental geology at a particular time and place is just too widespread for us not to recognize it as a particularly timely and effective application of geology.

The upshot of this is that the Management Board feels that the issue is worthy of some consideration by the division as to the appropriateness of the Engineering Geology Division providing a home for environmental geology within the Geological Society of America. We invite you to take this under consideration and to write the chairman with your comments and perhaps be prepared to respond to a more formal statement of alternatives for division action in the near future.

The division has taken under advisement some other issues of importance to its membership:

Centennial Activities

Father James Skehan has accepted charge of a standing committee to provide the recommended scope of Engineering Geology Division activities for the 1988 Centennial of the Geological Society. Jim will report in writing before the 1980 Annual Meeting in Atlanta and his committee findings will be made available to you in the *Newsletter* before your Management Board meets in that city. Jim solicits comments and participation from division members and notes that publications and field trips are only a starting point. Past Chairman Dick Jahns has reported that regional and cross-country field trips have been discussed at Society level in the ad hoc Centennial Committee which he chaired. Members in Mexico and Canada are reminded that the Centennial effort treats North America as a whole.

The starting effort of the EGD Centennial Committee will also include organizing and conducting the 1981 Engi-

neering Geology symposium for the Cincinnati annual meeting, tentatively titled "Growth and Development of Engineering Geology in the Government Agencies." This will be a historical chronicle and recognizes the fact that the impetus for growth of engineering geology in North America came from construction of the pioneer water supply, reclamation. flood control, and electric power generation projects.

Engineering Geology Data Sheets

Many of us remember the American Geological Institute (AGI) Data Sheet series, found in those old, small-format issues of that magazine. My sheets are still hand-bound in the small, six-ring notebook and within arm's reach at the office. Barney Pipkin, Department of Geological Sciences, University of Southern California, has suggested a revival of this theme and now serves as Editor of this new feature for our *Newsletter*. The ground rules for your participation in this effort are simple:

1. Identify a small body of graphical or tabular reference knowledge that would be useful to you or your colleagues;
2. Write Barney (address in the division listing elsewhere in this issue) and get his approval for the concept;
3. Compile the data in a clean-drafted or photographic copy form from the original; get permission to release if the source is nongovernmental and prepare a mockup of the text in typewriter font in the length and width ratio as prescribed by Barney; include the most important references and your own name and organizational byline; you should provide the drafted product;
4. Send it to Barney Pipkin. He will do the rest.

The engineering geologist and Clinton's Ditch

Written communication in 1839 between James Hall (State Geologist of New York, 1837–1898) and Alfred Barrett (Chief Engineer of the Erie Canal) recently unearthed in the archives of the New York State Geological Survey indicates that Dr. Hall may have been one of America's earliest engineering geologists. As the two letters reproduced below show, the modern day problems between engineer and contractor, in which the engineering geologist must often ride to the rescue, are really not so modern after all.

Lockport June 8th, 1839

Jas. Hall Esquir
State Geologist 4th

Dear Sir

I am very desirous of obtaining your opinion of the rock which occurs in the Excavation opposite the present Locks in this village upon the North Side of the Canal. That is its Geological Clasification and the constituent parts of the different Classes as nearly as you can judge from their appearance as it presents its self to view Commencing with the Gray lime stone on the surface the rock appears to Change by incensible degrees from the under surface of the grey lime to the bottom of our Excavation Containing a greater proportion of Alumina as we descend the Strata. In Our Original Estimate this Material was called Slate rock & Shale we supposed it would all Come under the head of Shale below the gray lime stone. In observing the face from which the rock has been recently blasted I See that there are very heavy layers of this material with apparently little or no Seams, but on Exposure to the Atmosphere it soon yields and crumbles to pieces in Small Cubes, and by Continued Exposure it becomes decomposed or disintegrates and forms a very tenatious clay. . . . by giving your opinion upon this Subject you will confer a very great favour. . . .

It is fair to state to you that this information is desired to Enable the Canal Commissioner and my self to decide a question raised by the Canal Contractors [unreadable name] in relation to their Contract for the Excavation of this Material. In the Contract they have a price for "Solid rock" and a price for "Slate rock & Shale."

They Claim that the whole is Solid rock. Therefore your professional opinion will be of great Service

I am
Very respectfully
Yours
A. Barrett
Chief Engineer

Alfred Barrett Esquir
Chief Engineer &c

Lockport June 9th 1839

Dear Sir,

I have received your favor of yesterday and hasten to give an answer to your inquiries in relation to the rock occurring in the excavation opposite the Locks,, I understand you to require the names by which the several rocks are known geologically –

The face of the cliff presents the following rocks in the descending order – 1st about 10 feet of gray, encrinal limestone of a crystalline and compact texture occurring in strata from a few inches to 2 feet thick. Below the limestone are about 6 feet composed of layers of a few inches thickness and alternating with seams of shale. This rock may be termed an argillo-siliceous limestone and probably contains magnesia or a trace of iron and perhaps manganese. It belongs to the variety which are termed hydraulic limestones, though this term is rather vague in its application. Below the hydraulic limestone are nearly 80 feet in thickness of "calcareous shale" – (The same rock was termed calciferous slate" by Prof. Eaton) with occasional layers of siliceous limestone from one to four inches thickness. In a general description these would scarcely be mentioned as the amount is so small as not to affect the character of the mass as a whole which comes strictly within the denomination of shale, and no other name can properly be applied to it. Where it has never been exposed to the weather it separates into solid blocks which readily cleave into irregular laminae, this is a character common to all our shale rocks. The upper part of this rock is more compact and apparently contains a larger proportion of carbonate of lime than that below which has a more slaty structure. On exposure this shale decomposes into a tenaceous clay which is the condition of much of that portion along the banks or sides of the cliffs below the locks. The change from the shale to a perfect state of decomposition is very gradual and there are so many intermediate stages that it may not be easy to decide the point when one begins or the other ends, yet for all practical purposes the distinction is sufficiently obvious.

I have here stated distinctly my opinions of the characters of these rocks, and the names are those by which they are known to all geologists. I make these statements impartially without reference to individuals or circumstances, regarding only truth. Should there be any points which are not satisfactorily explained I shall give any farther explanation with pleasure. You are aware that there can be nothing assumed or arbitrary on my part as rock terms are suited and in common usage among geologists of Europe and America.

I cannot give an opinion of what constitutes "solid rock" in your contracts it is evident that you have certain specifications attached to it in contradistinction to shale – if the term solid rock is applied to this then there is no farther use of the term "slate rock & shale" except as applicable to the weathered edges of such strata which are partially decomposed. The circumstances of the mass crumbling into cubical or angular fragments denotes the presence of some scalene matter, which in this case is probably sulphate of iron and sulphate or magnesia arising from the decomposition of iron pyrites, the sulphuric acid uniting both with the iron of the pyrites and with the magnesia of the rock.

With regard to hardness this rock is far inferior to the limestone and is one of the softest rocks which occur in any series.

I am very respectfully
yours
James Hall
Geologist 4th Dist.

GSA DIVISION OFFICERS, 1980

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GSA DIVISION OFFICERS, 1980

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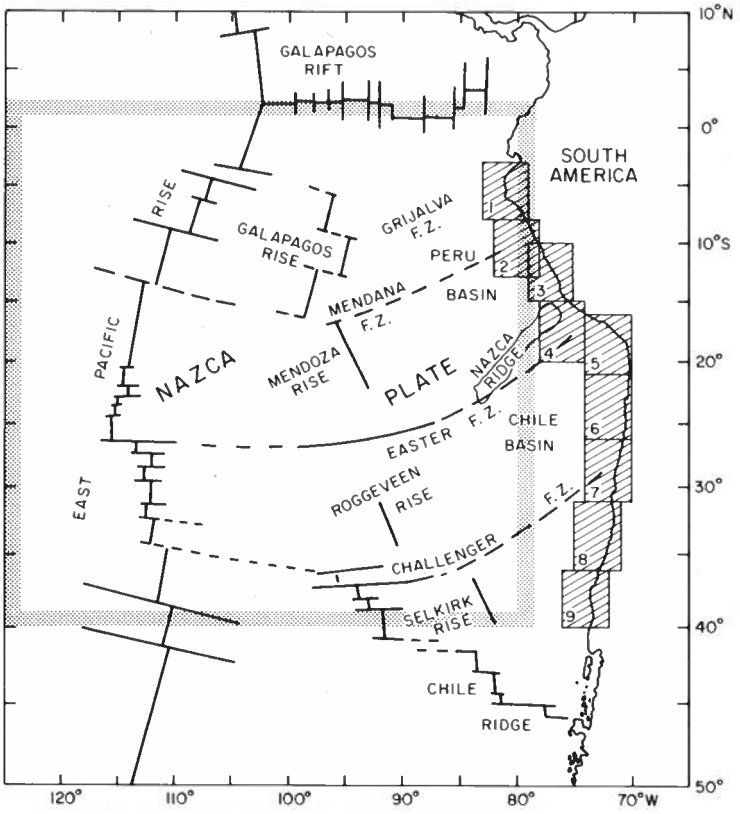

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JUNE BULLETIN SEPARATES

Summaries

At the request of members, the Summaries section may be ordered as one separate by those who have purchased the separates option. To order, write "June Summaries" on coupon.

• S00601—Chronology of the structural and petrologic development of the southwest Sierra Nevada foothills, California: Summary

Jason Saleeby, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California 91125; Warren Sharp, Department of Geology and Geophysics, University of California, Berkeley, California 94720. (4 p., 1 fig., 1 tbl.)

Bulletin Briefs

Titles and abstracts of conventional articles in the June 1980 GSA Bulletin, Part I *are provided on the following pages to aid members who have purchased the separates option to select* Bulletin, Part I *separates of their choice. See instructions for ordering on page 95.*

• 00602—Surface sediments of the Peru-Chile continental margin and the Nazca plate.

Lawrence A. Krissek, Kenneth F. Scheidegger, LaVerne D. Kulm, School of Oceanography, Oregon State University, Corvallis, Oregon 97331. (11 p., 9 figs., 3 tbls.)

Surface sediment samples from 86 locations on the Peru-Chile continental margin and the Nazca plate have been analyzed for bulk chemistry and texture to evaluate the factors influencing sediment formation on continental slope and adjacent abyssal plain depositional environments. Sand-sized calcareous microfossils are abundant above the carbonate compensation depth (CCD), but their removal by dissolution leaves fine-grained deposits in the deeper basins. Terrigenous silts are found seaward of the Peru-Chile Trench, especially south of 7°S, and may be transported there by wind, mid-water turbid layers, or bottom waters flowing north through the deep ocean basins. Sediments become finer grained away from shore as coarse terrigenous particles settle out. The more humid climate of northern Peru produces finer fluvial sediments there than to the south. This textural change also appears in adjacent marine sediments. In the Peru Basin, bottom nepheloid layers are found where clay-sized terrigenous material dominates the sediments. On the adjacent Galapagos Rise, however, nepheloid layers are absent, and eolian-derived sedimentary components in the $<5\ \mu$ size range may exceed those transported to the area by currents.

R-mode factor analysis has outlined sediment constituents from the geochemical data. Terrigenous components dominate the slowly accumulating clay-sized sediments of the Peru and Chile Basins, and the coarser, more rapidly forming margin deposits south of 14°S. Biogenic deposits form at intermediate rates on topographic highs on the Nazca plate. Very slow hydrogenous sedimentation occurs in the seaward portions of the deep basins. Sediments rich in organic components are concentrated in rapidly forming deposits along the margin north of 14°S, beneath centers of strong coastal upwelling.

Several distinct sediment accumulations have been mapped on the continental shelf and upper slope. An upper-slope deposit is anomalously fine grained and organic rich; it lies between 10.5°S and 13.6°S, in the region of most intense upwelling. Preservation of this body is enhanced by the inclusion of fine inorganic material in biogenic fecal pellets, and by the impingement of the shallow-water oxygen minimum layer on the slope at the same level.

• 00603—The Portwashingtonian warm interval in the northern Atlantic coastal plain.

Les Sirkin, Department of Earth Sciences, Adelphi University, Garden City, New York 11530; Robert Stuckenrath, Radiation Biology Laboratory, Smithsonian Institution, Rockville, Maryland 20852. (5 p., 3 figs., 1 tbl.)

Stratified and deformed masses of marine sediment that range in age from 43,800 to 21,750 yr were deposited in the Woodfordian moraine on western Long Island, New York. Reconstruction of the geologic history of these sediments provides further evidence of a mid-Wisconsinan warm interval, the Portwashingtonian warm interval (new name), that is represented by warm climate, temperate forests, and relative sea level comparable to modern sea level.

• 00604—Cenozoic biogenic silica sedimentation in the Antarctic Ocean.

Nancy Ann Brewster, School of Oceanography, Oregon State University, Corvallis, Oregon 97331 (present address: Union Oil Company of California, P.O. Box 6176, Ventura, California 93003). (11 p., 6 figs., 1 tbl.)

The Antarctic Ocean during Cenozoic time experienced four periods of enhanced siliceous productivity. The beginning of

the Miocene and the Pliocene-Quaternary are the two major periods. The Pliocene-Quaternary increase in productivity began 5 m.y. ago and has progressively increased to the present level of intense surface productivity. Two short-lived periods of slightly increased surface productivity were the middle Eocene and the middle Miocene.

The major control of Antarctic surface productivity through the Cenozoic has been climate. Climate in the Southern Ocean is ultimately controlled by tectonic changes in the Antarctic Ocean basin, which altered the patterns of surface and thermohaline circulation. Antarctic surface waters became more conducive to siliceous biological productivity with the progressive latitudinal and thermal isolation of Antarctica. Opal production during the Neogene increased particularly during globally cooler times, due to the intensification of upwelling south of the Polar Front. This intensification was caused by accelerated atmospheric circulation and an increased volume production of Antarctic Bottom Water.

Since the Oligocene, times of increasing productivity in the Antarctic correspond to periods of decreasing productivity in the central equatorial Pacific Ocean. It appears that high concentrations of limiting nutrients upwelling in the Southern Ocean have enabled the region to successfully "compete" for silica. The efficiency of the biological cycling of silica has progressed to the extent in the Antarctic that much of the silica assimilation and accumulation has transferred to the Antarctic at the expense of other productive oceanic regions such as the central equatorial Pacific.

• 00605—Regional basement geology of Lake Huron.

Norbert W. O'Hara, Department of Oceanography and Ocean Engineering, Florida Institute of Technology, Melbourne, Florida 32901; William J. Hinze, Department of Geosciences, Purdue University, West Lafayette, Indiana 47907. (11 p., 9 figs.)

Gravity and magnetic anomalies observed over Lake Huron primarily reflect variations in the lithology of the basement rocks underlying the Phanerozoic sedimentary rocks of the Michigan Basin. Central Lake Huron is dominated by a 25-mgal gravity maximum which correlates with a complex, discontinuous belt of positive magnetic anomalies that extend southwest from Georgian Bay into Michigan. These anomalies are believed to originate from mafic gneiss intercalated with granitic gneiss such as encountered elsewhere in the Grenville Province. The western boundary of these northeasterly trending anomalies is interpreted to mark the location of the Grenville Front beneath the Lake between Killarney, Ontario, and Michigan's Saginaw Bay. To the west of the Grenville Front, the gravity and magnetic anomalies consist of alternating maxima and minima striking east-southeast which can be traced across Michigan into Wisconsin. The North Channel and the islands to the south are dominated by negative anomalies associated with lower Proterozoic sedimentary rocks. Much of the basement rock beneath Manitoulin Island and the lake to the south and west, nearly to the Michigan shoreline, is intruded by a complex of plutons having a strong magnetic signature.

• 00606—Allochthonous Jurassic ophiolite in northwest Washington.

John T. Whetten, U.S. Geological Survey, Seattle, Washington 98105, and Department of Geological Sciences, University of Washington, Seattle, Washington 98195; Robert E. Zartman, U.S. Geological Survey, Denver, Colorado 80225; Richard J. Blakely, David L. Jones, U.S. Geological Survey, Menlo Park, California 94025. (10 p., 4 figs., 2 tbls.)

Fragments of Jurassic ophiolite having U-Pb zircon ages narrowly grouped at 160 to 170 m.y. are widespread over parts of northwest Washington. The Haystack thrust fault is inferred to mark the base of the ophiolite in the San Juan Islands and adjacent Cascade foothills; other bodies of mafic and ultramafic rock in the western Cascades may be klippen of the Haystack thrust plate. The Haystack thrust fault is probably the structurally highest and possibly most extensive thrust yet recognized within a family of Late Cretaceous thrust faults in northwest Washington.

The ophiolite and its time of emplacement (bracketed between about 100 and 88 m.y.) suggest a similarity with the Coast Range thrust of California which thrust Upper Jurassic ophiolite and the Great Valley sedimentary sequence over the Franciscan assemblage. However, relations in the Cascades are complicated by the extraordinarily diverse character of lower plate rocks, of which very few resemble the Franciscan. We conclude that an original subduction system was modified by later tectonic activity so that a variety of terranes was juxtaposed as a family of rootless thrusts, with the ophiolite forming, at least in some areas, the uppermost structural unit. Perhaps the emplacement of Wrangellia, an allochthonous microcontinent west of the San Juan Islands, caused the thrusting.

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• 00607—Petrology, structure, and regional tectonics of South Fork Mountain Schist, Pine Ridge Summit, northern California.

Susan A. Monsen, U.S. Geological Survey, 1107 N.E. 45th St., Suite 110, Seattle, Washington 98105; K. R. Aalto, Department of Geology, Humboldt State University, Arcata, California 95521. (5 p., 3 figs., 1 tbl.)

South Fork Mountain Schist of Pine Ridge Summit, northern California, is predominantly metasedimentary, of the glaucophanitic-greenschist facies, and has undergone at least two periods of folding. It was overridden by the Klamath Mountain block (Coast Range thrust fault) and later thrust over unmetamorphosed broken formation of the Franciscan Complex. The schist differs markedly from the subjacent Franciscan in being derived from a more distal submarine fan deposit. Chert breccia and volcanic boudins within the fault zone beneath the schist may have been derived from a melange terrane now situated beneath the Klamath block. The schist does not correlate lithologically or structurally with the nearby Redwood Mountain schist outlier, which may have been transported to its present position by strike-slip faulting.

• 00608—North American Commission on Stratigraphic Nomenclature. Report 8 — Amendment of Code Concerning Terminology for Igneous and High-Grade Metamorphic Rocks.

John B. Henderson, Geological Survey of Canada, Ottawa, Ontario, K1A 0E4, Canada; W.G.E. Caldwell, Department of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0, Canada; Jack E. Harrison, U.S. Geological Survey, Federal Center, Denver, Colorado 80225. (3 p.)

• 00609—North American Commission on Stratigraphic Nomenclature. Note 52 — A Preliminary Proposal for a Chronometric Time Scale for the Precambrian of the United States and Mexico.

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