GSA news & information

VOLUME 1, NOVEMBER 5 MAY 1979

MESSAGE FROM THE PRESIDENT

The *Bulletin* and scholarly documented communication in the geological sciences

The Geological Society of America recently premiered the new two-part format of its *Bulletin*: summaries and short articles in *Part I* on paper and complete scholarly articles in *Part II* on microfiche. The immediate responses have ranged from admiration (a surprising number) for innovative leadership in meeting a universal publication dilemma, to indignation (a surprisingly small number) over the loss of a habitual format for a favorite, respected journal. A great majority of the readership of the *Bulletin* appear to have taken a more patient, "Let's try it" view and indeed have subscribed to it much more rapidly than was anticipated.

In this letter I wish to discuss with you the primary reasons for the new format. The financial pressures of mounting publication costs, I believe, are credible to all of you. While these pressures have constituted the driving force for changes in our publication methods, the selection of the new format was based on considerations directly related to the extent that the recent *Bulletin* was serving adequately the fundamental objective of scientific communication for which our Society exists.

In geology, as in most other scientific areas, our literature as a means of communication with each other, other disciplines, and the lay public is a many splendored–many layered thing. There are (1) personal or informal communications—both oral and written; (2) there is a so-called gray literature that is typewritten, but only 50 to 100 copies are distributed to selected agencies, colleagues, or friends; (3) there are multitudes of articles in "open file" and in library or company depositories, held and distributed on request by governmental agencies at all levels, as well as by some nongovernmental agencies; (4) there are articles in commercial and semitechnical journals; (5) there are "quickie" articles in the form of letters or short articles published and publicly distributed, such as EOS, and, in some cases, *Geology*; and (6) there is scholarly literature, which is intended to report well-documented research of probable lasting value. Books, geologic maps, and the GSA *Bulletin* fall in this last category.

The vehicle chosen for the communication of scientific data, concepts, interpretations, or speculations is usually influenced first by the nature of the product, the author's idea of the audience he or she wishes to communicate with, and the time frame of the communication. At one extreme, the article may be intended for a group of specialists and may be transmitted directly to them. In another circumstance, the author may offer a concept of possible significance to an entire profession and may seek the widest mechanism of prompt dissemination. In reporting scholarly, documented research, we are communicating the integrated product of data gathering or conceptual developments with analyses, discussion, and interpretation. Such literary efforts are believed to be the only adequate devices for making available to anyone in the world, currently, or in another generation, the substantial basis for the contribution which is being offered to science.

Of course, many factors influence an author's decision concerning how to communicate, and these probably include the completeness of the project, the volume of basic data to be presented, the urgency for dissemination, etc., etc.

Scholarly, well-documented literature is clearly the most expensive to produce, publish, distribute, and store for ready reference. In competition with the increasing number of specialized journals and with the constantly increasing costs of publishing, publication of comprehensive scientific literature is in danger of being priced out of existence.

All of the above factors were taken into account when some 30 to 40 elected and appointed geologists on GSA's Publications and Executive Committees and the GSA Council made the recommendation and decision to change the format of the *Bulletin*. The *Bulletin* traditionally has been respected for its well-organized and well-reviewed literature. However, it became progressively slower in the publication of accepted articles; basic data, such as stratigraphic sections, extensive tables of chemical analyses, and geophysical logs, were denied or limited in publication; the relatively short abstracts did not serve adequately as a "current awareness" journal for the serious student in geology; and the cost of editing, printing, distributing, warehousing, and archiving was increasing at a frightening rate.

We believe this new system of combining summaries on paper with the fully illustrated and documented complete text on microfiche addresses and, at least partly, solves all of these problems.

continued on p. 66

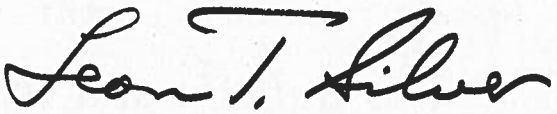
Message from the President, *continued*

The new system permits publication and distribution within four months after acceptance of a manuscript. It permits inclusion of all pertinent base and supporting data with the full text in *Part II* on microfiche (even if the total reaches 90 pages); *Part I* summaries, with key illustrations and references, serve as a "current awareness" journal; for the geologist who needs and must have the full text and supporting data for possibly one or a few articles, they are right there in *Part II*; the overall cost is greatly reduced so that two to three times the number of articles and many times the number of pages of scientific literature can be published than in the "old" *Bulletin*; and the relative cost of warehousing and archiving is reduced to insignificance. Interestingly, the "shelf life" or time until deterioration of the microfiche is much longer than the "shelf life" of the paper *Bulletin*.

An initial disadvantage is in the need for adaptation to the use of the microfiche. With the new and more widely available readers and reader-printers and with the ability to carry an entire library on fiche to the field for reading with a hand or portable reader, a slight change in habits can change this disadvantage to a major advantage.

Microfiche is converted readily to paper copy for special needs. We believe new technological developments will permit substantial increases in the capabilities and advantages of microfiche. The Society is closely following microfiche technology and will pursue those directions which will make our scientific communication more effective.

The importance of reporting and recording well-written, well-documented, serious scholarly research is taken as the first principle in designing the publication of the *Bulletin* of the Geological Society of America. We believe that in the current format we have adhered to this long-standing principle.



Leon T. Silver
President
Geological Society of America

FROM THE MEMBERSHIP

Let's Support GSA Microfiche Publication

Many of us have been disenchanted with the upward spiraling costs of scientific journals, and it is readily apparent that many of us have initial doubts about the worth of microfiche publication. The decrease in the number of manuscripts submitted to the Geological Society of America during 1978 should be disturbing to us all. In order to maintain a publications staff and a high level of efficiency, our Society needs a steady flow of manuscripts submitted for potential publication. Publication of some of our work elsewhere will only create long-term problems for the Society and ourselves. GSA opted for the printed summary and microfiche route rather than increase membership costs and further increase the lag time for getting manuscripts published. Let's support that decision.

Have you submitted a manuscript for publication in the summary and microfiche form? I have not, but I am currently writing two lengthy manuscripts for submittal to GSA. Each of us should evaluate the summary and microfiche mode of publication by having GSA publish our manuscripts. Only in this way can we fully evaluate the advantages and disadvantages of this system. I believe that most of us will be pleasantly surprised.

William B. Bull
Chairperson, Quaternary Geology
& Geomorphology Division

Editor, *GSA News & Information:*

This week I received two registration forms, copies of which are enclosed, from two geological societies to which I pay dues. Note that on the AAPG form, on the line below name and telephone number, there is a space titled "COMPANY." In the same relative position on the GSA form, there is a blank labeled "INSTITUTION (abbreviate for badge)." Ah, if Freud were alive today, what might he make of this? Are these forms unconscious reflections of deep-seated (magmatic) psychological or philosophical differences between the two geological organizations? What shrift is given us homeless souls with neither company nor institution—must we dwell in limbo, unattached, unabbreviated, and unbadged?

I confess to often having been tempted to invent a name, like "Blind Pig Drilling and Exploration Company" for AAPG meetings and "Polytechnic Institute of Geological Sciences" (abbreviate P.I.G.S) for GSA sessions. For me, though, orphaned early in my geological career, it appears that the honest, factual answer to both inquiries is "None," and I'll just have to suffer the implications and interpretations. "None" is abbreviated "0" for badge, and you may see me at the next convention wearing the symbol proudly and defiantly and crying "Fie! Fie! on you pedigreed aristocrats with your noble titles and grand affiliations! Comes the revolutions. . . ."

Bruce T. Pearson
P.O. Box 1461
Midland, Texas 79701

UPDATE

Articles in *Bulletin, Part II*, May 1979

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 ($6/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. Origin of steeply inclined fractures in central and western New York State, by Joseph L. Wallach and John L. Prucha. Doc. no. M90501 (On microfiche: 39 p., 8 figs., 7 tables.)
2. Use of scintillometer and gamma-ray logs for correlation and stratigraphy in homogeneous black shales, by Frank R. Ettensohn, Linda Provo Fulton, and Roy C. Kepferle. Doc. no. M90502 (On microfiche: 22 p., 8 figs.)
3. The geochemistry and origin of the Devonian granitic rocks of southwest Nova Scotia, by T. E. Smith. Doc. no. M90503. (On microfiche: 36 p., 3 figs., 7 tables.)

ABSTRACTS DEADLINE REMINDER

ATTENTION: Deadline for receipt of abstracts at GSA headquarters for the Annual Meeting in San Diego is June 15, 1979. Mail abstracts to Abstracts Secretary, Geological Society of America, 3300 Penrose Place, Boulder, CO 80301.

GSA News & Information

Vol. 1, no. 5 May 1979

GSA NEWS & INFORMATION (ISSN 0164-5854) is the monthly newsletter of The Geological Society of America, Inc., 3300 Penrose Place, Boulder, Colorado 80301. Second-class postage rates paid at Boulder, Colorado, and at additional mailing office.

Prepared from contributions from the staff and membership by John C. Frye, Executive Director; Jo Fogelberg, Publications Manager; and June Thomas, Judy Hall, and Renée Gitchell, Production Assistants.

In May *Geology* (separates not available)

1. Mesozoic plutonic belts of southern Alaska, by T. Hudson
2. Late Quaternary faults and their relationship to tectonism in the Olympic Peninsula, Washington, by J. R. Wilson, M. J. Bartholomew, and R. J. Carson
3. Duration of large-magnitude explosive eruptions deduced from graded bedding in deep-sea ash layers, by M. T. Ledbetter and R.S.J. Sparks
4. Baffin Bay in the past 100,000 yr, by A. E. Aksu and D.J.W. Piper
5. Late Quaternary extent of the West Antarctic ice sheet: New evidence from Ross Sea cores, by T. B. Kellogg, R. S. Truesdale, and L. E. Osterman
6. Hudson River: Evidence for extensive migration on the exposed continental shelf during Pleistocene time, by H. J. Knebel, S. A. Wood, and E. C. Spiker
7. Wind regimes over the late Quaternary southwest Pacific Ocean, by Jörn Thiede
8. African hotspots and their relation to the underlying mantle, by R. Thiessen, K. Burke, and W.S.F. Kidd
9. Penrose Conference Report: Heat-transport processes in the Earth, by J. W. Mercer and C. R. Faust
10. Progressive strain in beds of monoclinal flexures, by R. Freund

Correction

Professor J. G. Johnson has written us pointing out that we should have included references with his letter published on page 22 of the February number of *GSA News & Information*. The omitted references are as follows:

Chamberlin, T. C., 1890, The method of multiple working hypotheses: Reprinted in Science, v. 148, p. 754–759, 1965.
— 1897, The method of multiple working hypotheses: Jour. Geol., v. 5, p. 837–848.
Eldredge, Niles, and Gould, S. J., 1972, Punctuated equilibria: An alternative to phyletic gradualism, *in* Schopf, T.J.M., ed., Models in paleobiology: San Francisco, Freeman, Cooper, p. 82–115.
Gilbert, G. K., 1886, The inculcation of scientific method by example: Am. Jour. Sci., ser, 3, v. 31, p. 284–299.

Necrology

Notice has been received of the following deaths: Henry Ray Aldrich, Middletown, Connecticut; Alan B. Blaxland, Münster, West Germany; Werner Dietrich Brueckner, St. Johns, Newfoundland, Canada; William P. Crowley, Baltimore, Maryland; George Harvey Dixon, Denver, Colorado; Fenton Harrison Finn, Pittsburgh, Pennsylvania; Bruce McCurdy Hall, Reno, Nevada; Marcus Albert Hanna, Houston, Texas; Arthur Lloyd Howland, Evanston, Illinois; Paul W. Long, Kimberling City, Missouri; G. Edward Manger, Chevy Chase, Maryland; Ely Mencher, New York, New York; Robert M. Moxham, Alexandria, Virginia; Louis B. Slichter, Los Angeles, California; Alton F. Wade, Lubbock, Texas.

1979 GSA Committees and Representatives . . .

PLEASE NOTE: Names of committee chairmen are printed in italics. The President shall be an ex officio member of all committees of the Council. He may designate a member from the Council to represent him.

EXECUTIVE COMMITTEE

Leon T. Silver, Laurence L. Sloss, Peter T. Flawn, William B. Heroy, Jr., M. Gordon Wolman (Budget Committee Member of the Executive Committee).

AUDIT COMMITTEE

Paul A. Bailly, Don U. Deere, Jack A. Simon.

Conferee: William B. Heroy, Jr.

COMMITTEE ON COMMITTEES

Robert E. Boyer, W. G. Ernst, Bruce B. Hanshaw, Frederick T. Mackenzie, Hugh R. Wynne-Edwards.

COMMITTEE ON GEOLOGY & PUBLIC POLICY

Allen F. Agnew (1978-80), Robey H. Clark (1977-79), M. Gordon Wolman (1977-79), Hugh R. Wynne-Edwards (1977-79), Charles G. Groat (1978-80), Robert W. Metsger (1978-80), Carol S. Breed (1979-81), Reese E. Mallette (1979-81), Jesús Nájera (1979-81).

GSA-TREATISE ADVISORY COMMITTEE

Roger L. Batten (1977-80), Richard E. Grant (1979-82), John C. Frye, Continuing.

HEADQUARTERS ADVISORY COMMITTEE

David B. MacKenzie (1977-79), S. Warren Hobbs (1977-79), Betty M. Miller (1977-79), Bruce F. Curtis (1978-80), John W. Rold (1978-80).

COMMITTEE ON HONORS AND AWARDS

Raymond A. Price, James B. Thompson, Jr., J. Kaspar Arbenz, Julian R. Goldsmith, Edward C. Dapples, Raymond T. Throckmorton, Jr., Eugene S. Simpson, Don J. Easterbrook.

SUBCOMMITTEE ON THE PENROSE MEDAL AWARD

Raymond A. Price (1978-80), Lynn R. Sykes (1977-79), Richard H. Jahns (1978-80), Helen Tappan Loeblich (1978-80), Lloyd C. Pray (1979-81), E-An Zen (1979-81).

SUBCOMMITTEE ON THE ARTHUR L. DAY MEDAL AWARD

James B. Thompson, Jr., Nikolas I. Christensen (1977-79), Allan V. Cox (1978-80), Robert A. Berner (1979-81), Iris Y. P. Borg (1979-81), George W. Fisher (1979-81), Gerald J. Wasserburg (1979-81).

SUBCOMMITTEE ON HONORARY FELLOWS

J. Kaspar Arbenz (1977-79), Claude C. Albritton, Jr. (1978-80), Robert E. Folinsbee (1978-80).

SUBCOMMITTEE ON THE NATIONAL MEDAL OF SCIENCE

Julian R. Goldsmith (1977-79), Clarence R. Allen (1978-80), Alfred G. Fischer (1979-81).

COAL GEOLOGY DIVISION PANEL ON GILBERT H. CADY AWARD

Edward C. Dapples (1977-79), Heinz H. Damberger (1979), William Spackman (Immediate Past Recipient, 1978), A. R. Cameron (Division Chairman, 1979), Harold J. Gluskoter (Division Vice-Chairman, 1979).

ENGINEERING GEOLOGY DIVISION PANEL ON E. B. BURWELL, JR., AWARD

Raymond T. Throckmorton, Jr. (1978-80), Charles A. Baskerville (1977-79), Erhard M. Winkler (1977-79), Alan L. O'Neill (1978-80), Alice S. Allen (1979-81), Roy J. Shlemon (1979-81).

HYDROGEOLOGY DIVISION PANEL ON O. E. MEINZER AWARD

Eugene S. Simpson, John A. Cherry, Martin Mifflin, Philip Cohen, Irwin Remson.

QUATERNARY GEOLOGY & GEOMORPHOLOGY DIVISION PANEL ON KIRK BRYAN AWARD

Don J. Easterbrook, James B. Benedict (1978-79), William R. Farrand (1978-79), Sidney E. White (1978-79), John E. Armstrong (1979-80), Peter W. Birkeland (1979-80), Kenneth L. Pierce (1979-80).

COMMITTEE ON INVESTMENTS

Robert L. Fuchs (1978-80), August Goldstein, Jr. (1977-79), Donald A. Parks (1977-79), C. Harry Burgess (1978-80). Ex Officio: William B. Heroy, Jr., Treasurer (voting); M. Gordon Wolman, Budget Committee Member of the Executive Committee (non-voting). Conferee: Robert E. King (non-voting).

COMMITTEE ON MEMBERSHIP

Thornton L. Neathery (1977-79), Joan R. Clark (1977-79), Doris M. Curtis (1977-79), Richard A. Paull (1978-80), Lee A. Woodward (1978-80), Jose C. Guerrero (1979-81).

COMMITTEE ON NOMINATIONS

Robert N. Ginsburg, William L. Fisher, Howard R. Gould, Helen Tappan Loeblich.

COMMITTEE ON PENROSE CONFERENCES

Bruce B. Hanshaw (1978-80), David A. Stephenson (1977-79), Tanya M. Atwater (1978-80), Gregory A. Davis (1979-81).

PROGRAM REVIEW COMMITTEE

William R. Dickinson, John T. Whetten (1977 JTPC Chairman), J. Jeffrey Fawcett (1978 JTPC Chairman), Richard W. Berry (1979 JTPC Chairman), Robert D. Hatcher, Jr. (1980 JTPC Chairman).

COMMITTEE ON PUBLICATIONS

Robert E. Davis (1977–79), Brian J. Skinner (1977–79), Burrell C. Burchfiel (1978–80), Porter M. Kier (1978–80), Robert H. Dott, Jr. (1979–81), E. R. W. Neale (1979–81).

Conferees: Frank E. Kottlowski, Past Chairman; John C. Frye, Executive Director; Vernon E. Swanson, Science Editor; Josephine K. Fogelberg, Production Manager.

COMMITTEE ON RESEARCH GRANTS

Peter R. Vail (1977–79), Walter Alvarez (1979–82). Emile A. Pessagno, Jr. (1979–81).

Conferee: Robin Brett.

AD HOC GSA CENTENNIAL PLANNING COMMITTEE

Richard H. Jahns (Chairman), Robert E. Boyer (Vice-Chairman), Clarence R. Allen, Gabriel Dengo, M. Charles Gilbert, Sheldon Judson, David B. MacKenize, Vincent E. McKelvey, Digby J. McLaren, Guillermo P. Salas, Laurence L. Sloss, M. Gordon Wolman.

Ex Officio: Leon T. Silver, President; Laurence L. Sloss, Vice-President; William B. Heroy, Jr., Treasurer; Peter T. Flawn, Past President; John C. Frye, Executive Director.

GSA CENTENNIAL STEERING COMMITTEE

Leon T. Silver, President; Laurence L. Sloss, Vice-President; Peter T. Flawn, Past President; Richard H. Jahns, Chairman, Ad Hoc GSA Centennial Planning Committee; Robert E. Boyer, Vice-Chairman, Ad Hoc GSA Centennial Planning Committee; Not appointed at press time: Task Force Chairmen; John C. Frye, Headquarters Centennial Coordinator.

FUND-RAISING TASK FORCE

Leon T. Silver, President (Ex Officio Chairman); James Boyd; Morgan J. Davis; Robert E. Folinsbee; Robert L. Fuchs, Chairman, Committee on Investments; Laurence L. Sloss, Vice-President; Peter T. Flawn, Past President; William B. Heroy, Jr., Treasurer; John C. Frye, Executive Director.

Conferee: M. Gordon Wolman, Budget Committee Member of the Executive Committee.

GSA REPRESENTATIVES TO AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (AAAS)

Robert E. Riecker (1979–81): Section E–Geology & Geography. Phyllis M. Garman (1979–81): Section W–Atmospheric & Hydrospheric Sciences.

GSA DESIGNEES TO AMERICAN COMMISSION ON STRATIGRAPHIC NOMENCLATURE (ACSN)

Term of office to begin at the end of the GSA annual meeting.

Malcolm P. Weiss (1976–79), Robert S. Houston (1977–80), Clarence A. Hall, Jr. (1978–81), Allison R. Palmer (1979–82).

GSA DESIGNEES TO GSA-AEG-ASCE JOINT COMMITTEE ON ENGINEERING GEOLOGY (AMERICAN SOCIETY OF CIVIL ENGINEERS)

Paul L. Hilpman (July 1, 1976–June 30, 1979), John B. Ivey (July 1, 1978–June 30, 1981).

GSA DESIGNEES TO U.S. NATIONAL COMMITTEE ON GEOCHEMISTRY

Bruno J. Giletti (November 10, 1977–June 30, 1979). Not appointed at press time: (July 1, 1979–June 30, 1982).

GSA DESIGNEES TO U.S. NATIONAL COMMITTEE ON GEOLOGY

Clarence R. Allen (July 1, 1975–June 30, 1979). Not appointed at press time: (July 1, 1979–June 30, 1982).

GSA DESIGNEE TO U.S. NATIONAL COMMITTEE ON ROCK MECHANICS (USNCORM)

Fitzhugh T. Lee (July 1, 1977–June 30, 1980).

GSA DESIGNEE TO U.S. NATIONAL COMMITTEE ON TUNNELING TECHNOLOGY

Don U. Deere (July 1, 1977–June 30, 1980).

GSA DESIGNEES TO GSA-SSSA INTERDISCIPLINARY COMMITTEE (SOIL SCIENCE SOCIETY OF AMERICA)

Leon R. Follmer, John W. Hawley, Robert V. Ruhe, Peter W. Birkeland.

GSA MEMBER OF THE AGI GOVERNING BOARD

Peter T. Flawn (November 1978–November 1979).

GSA DESIGNEE TO THE AAPG AD HOC COMMITTEE ON REVISION OF THE STRATIGRAPHIC CORRELATION CHARTS FOR NORTH AMERICA

Mitchell W. Reynolds.

GSA DESIGNEE TO EARTHQUAKE ENGINEERING RESEARCH INSTITUTE

Richard H. Jahns.

GSA REPRESENTATIVE TO ASSEMBLY OF MATHEMATICAL & PHYSICAL SCIENCES (NRC)

John C. Frye (Effective May 1, 1975).

GSA DESIGNEE TO U.S. NATIONAL COMMITTEE ON SCIENTIFIC HYDROLOGY

David A. Stephenson (1978–81), Paul A. Witherspoon (Alternate).

GSA REPRESENTATIVE ON THE COMMITTEE FOR EVALUATION OF EARTHQUAKE PREDICTIONS

Clarence R. Allen.

Fellowship in the Geological Society of America

Apply for yourself or nominate a friend.

Eligibility Requirements

A candidate for Fellowship shall have had eight years of professional experience in geology or related fields. Graduate study may be substituted for a maximum of three of these eight years. Except by specific action of the Council, an individual shall have been a Member for at least one year before becoming eligible for application for Fellowship.

Qualifications for Fellowship

To meet the standards for Fellowship, a candidate is not required or expected to qualify in each of the categories listed below. If his/her accomplishments are limited to one of the last three categories, however, they should be *particularly outstanding;* if they are distributed among two or more categories, both the diversity and quality of the candidate's efforts will be considered.

1. **Research.** Evidence for qualification under this category includes contributions to the advancement of geological knowledge through the development of new data or through the interpretation of data. Contributions to geological sciences may be made not only through research in geology, but also through research in related fields in physics, chemistry, oceanography, biology, or other sciences.

Research usually contributes most effectively to the advancement of science if it is made generally available through recognized types of scientific publications; however, publications constitute a qualification for Fellowship only if they present the results of research of good quality. In some organizations, individuals are restrained from publishing their research except in private reports of restricted distribution; nevertheless, under certain circumstances research recorded in restricted form may still constitute a contribution to the advancement of geological knowledge. In some instances, a candidate might be asked to provide copies of internal publications. The copies will be treated confidentially, not duplicated, and will be returned to the applicant.

2. **Administrative Work.** Evidence for qualification under this category consists of a list of responsible positions held in the administration or management of geological work in surveys, institutes, schools, laboratories, commercial companies, societies, and so forth. Adequate evidence of the administrative scope involved and its bearing on the advancement of geological science will be considered.

3. **Training of Geologists.** Outstanding contributions toward the production and development of adequately trained and competent geologists may qualify an individual for Fellowship. Evidence for qualification under this category is provided principally by the persons trained or developed (associates, employees, students). The candidate is further qualified by the special procedures, teaching methods, or training courses used and textbooks or training guides that have been personally prepared. The evalution of the candidate's contributions in training, educating, stimulating, or inspiring others to greater competence as geologists rests with the sponsors.

4. **Other Activities.** It is recognized that in exceptional cases candidates may qualify for Fellowship through outstanding services to the geological sciences that do not fall strictly under the preceding categories. Among such are extended service in bibliographic or editorial work in the field of the geological sciences, involving abundant subject-matter knowledge and constant awareness of newly published research results; continuing activity in scientific commissions and advisory groups, which requires broad but intensive use of geological data for planning purposes; or participation in activities concerned with utilization of personnel, requiring thorough knowledge of current advances in geologic sciences and their application.

Write for application forms:

Membership Department, Geological Society of America

3300 Penrose Place, Boulder, Colorado 80301

Report of the Committee on Research Grants

To the Council and Membership of the Geological Society of America:

The Committee on Research Grants, consisting of Peter R. Vail, William C. Kelly, William E. Benson, conferee, and Steven M. Stanley, chairman, met at Society headquarters in Boulder on March 11, 1978. Committee members had evaluated proposals prior to the meeting.

The committee had at its disposal $85,000, consisting of $67,861 provided by the Society, $1,185 kindly donated by past recipients, $1,654 from dues check-offs, $950 from the Harold T. Stearns Fund, and $13,350 generously contributed from the following companies and foundations: Alcoa Foundation, Chevron Oil Field Research Company, Gulf Oil Foundation, Marathon Oil Company, Mobil Oil Corporation, Phillips Petroleum Foundation, Inc., Shell Development Company, Texaco, Inc., and Union Oil Company of California. The total budget was $85,000, slightly below the $85,432 disbursed the previous year.

The total number of applications was 263, or approximately the same as in 1977 (269), and the overall quality of proposals remained high. Support was recommended for 124, or 47 percent of the total, an average award being $686 (compared to $718 in 1977). The total amount requested was $264,589, of which the $85,000 awarded represented 32 percent.

Susan M. Karl of Stanford University received the Harold T. Stearns Fellowship award. The committee singled out seven young scientists and their proposals for outstanding mention, and twenty awards were made from donations provided by foundations and corporations.

The Penrose Research Grant program represents a remarkably efficient use of money in the support of research and a major stimulus to many students in the geological sciences. A measure of its success is the enthusiastic response of past recipients in making personal donations to the current program. The quality of applications for 1978 was so high that a number of worthy proposals could not be funded. The committee expressed hope that the level of funding can be increased in future years.

1978 RESEARCH GRANTS SUMMARY OF COMMITTEE RECOMMENDATIONS

	Number of Applicants	Requested by Applicants	Recommended for Support
CATEGORY I (Recommended for support)			
M.S. Student applicants....	27	$ 27,511	$ 16,150
Ph.D. Student applicants...	96	111,632	68,450
Post Ph.D. applicants	1	819	500
Subtotal	124	$139,962	$ 85,100
CATEGORY II (Alternates)			
M.S. Student applicants ...	6	$ 6,804	
Ph.D. Student applicants ..	11	9,780	
Post Ph.D. applicants	1	1,266	
Subtotal	18	$ 17,850	
CATEGORY III (Not recommended for support)			
M.S. Student applicants ...	77	$ 62,368	
Ph.D. Student applicants ..	41	39,369	
Post Ph.D. applicants	3	5,040	
Subtotal	121	$106,777	
GRAND TOTAL	263	$264,589	$ 85,100
COUNCIL ACTION			
Support all Category I projects	124	$139,962	$ 85,100
Funding declined (Cancellations)	(2)	$ (2,250)	$ (1,750)
Alternates awarded	1	$ 850	$ 500
Totals awarded in 1978	123	$138,562	$ 83,850

Respectfully submitted,
Steven M. Stanley (Chairman)
Peter R. Vail
William C. Kelly
William E. Benson (Conferee)

Annual Report for 1978
The Geological Society of America

Report of Committee on Publications

To the Council and Membership of The Geological Society of America, Inc.:

The Committee on Publications held its spring meeting at GSA headquarters in Boulder on April 5, 1978, and an informal autumn meeting at the annual GSA meeting in Toronto on October 23. There was continuous contact throughout the year, particularly between the Committee Chairman, the Executive Director, and the Science Editor.

The committee's reports were presented to the GSA Council on May 9 and October 22, 1978, by the Committee Chairman and the Science Editor.

The April meeting began by welcoming the new Science Editor, Vernon E. Swanson, and thanking the previous Interim Science Editor, Paul Averitt. John C. Frye discussed financial aspects of the publications program, indicating a possible deficit budget in 1979. This led to a motion by William W. Hutchison and B. Clark Burchfiel urging a balanced budget in 1980 through realistic pricing of serial publications.

Dorothy Merrifield outlined progress on publications of books and noted the enlargement of Special Papers to 8½ x 11-inch size. The procedures for the Map and Chart series were reviewed by Jo Fogelberg. Burchfiel and Robert E. Davis moved that an article be placed in *GSA News & Information* explaining the process of coordination between *Bulletin, Part I; Bulletin, Part II;* and the Map and Chart Series.

Much discussion centered on the new *Bulletin* format with suggestions that (1) membership be informed of availability and costs of hard copy from *Part II*, (2) the GSA editorial office, if requested, pass accepted manuscripts to a commercial service for typing of camera-ready copy, and (3) there should be active solicitation of new manuscripts for the *Bulletin*.

Frye noted the AGU/GSA geodynamics publication series, a joint venture with AGU, would be executed solely by AGU, with GSA selling the books on consignment. Operation and all financial responsibilities of GeoRef, Davis reported, had been transferred to AGI.

The Geology of North America Project proposed as a large-scale Centennial undertaking by A. W. Bally was reviewed and a more detailed, formalized proposal was requested. This was referred to the GSA Centennial Planning Committee at the May 9 meeting by the GSA Council.

Davis and Burchfiel moved that Memorials be collected during a year and published in the December issue of *Bulletin, Part II* on microfiche.

During the middle and latter part of 1978, the number of manuscripts for the new format GSA *Bulletin* was relatively few. Informal suggestions from the Committee on Publications, as well as from GSA Officers and Council members, led to Executive Committee actions at their September 21 meeting, that (1) authors of *Part II* articles be provided with 50 free copies of either microfiche or paper copies, (2) GSA provide for authors, at no charge, preparation of camera-ready copy from suitable author-prepared copy, (3) paper copies of *Part II* be offered to members and nonmembers at actual cost, and (4) the Science Editor will have the discretion to include in *Part I* those papers that may exceed the length limit and other restrictions.

At the October 23, 1978, information meeting of the Committee on Publications in Toronto, Science Editor Vernon Swanson reported 108 articles were published in *Geology* in 1978 and 155 articles in the 1978 *Bulletin*. Other publications were Memoirs 151 and 152, Special Paper 179, Engineering Geology Case History 11, and Map and Chart nos. 18 through 27, in addition to the *Abstracts with Programs,* 12 issues of *Bibliography and Index to Geology, GSA News & Information*, Memorials, Division Newsletters, *Membership Directory*, Environmental Paper No. 6, and Mini-Catalog.

The Committee suggested sales data should be received in the Science Editor's office to assist in making decisions to accept or reject manuscripts for the book series and for maps and charts. Brian J. Skinner and Porter M. Kier moved that an extensive effort be made to provide information to GSA members concerning the availability, price, and size range of microfiche readers, particularly hand-held readers in the $10 to $40 range.

Skinner and Hutchison moved that Associate Editors of the *Bulletin* be charged to expand their duties to include direct personal contact with speakers, session chairpersons, and symposia organizers at GSA Section meetings, and non-GSA meetings in their specialties, to urge publication of papers in the *Bulletin*.

Two topics were suggested for consideration at the formal 1979 spring meeting: (1) a recommendation to GSA Council concerning formal commendation to Douglas M. Kinney for his efforts on behalf of GSA's Map and Chart Series and (2) long-range planning for GSA's publication program.

The Committee is appreciative of the excellent services by the GSA headquarters editorial staff, headed by Science Editor Vernon E. Swanson, of Executive Director John C. Frye's direction and support, of committee work by Marianne L. Faber and Irene Woodall, and of the pertinent advice from 1978 President Peter T. Flawn and Vice-President Leon T. Silver.

Respectfully submitted,
Frank E. Kottlowski, *Chairman*

Annual Report for 1978
The Geological Society of America

PENROSE CONFERENCE GUIDELINES

PURPOSE

The Penrose Conferences were established by the Geological Society of America in 1969 as an important effort in its promotion of the Earth sciences. The conferences provide the opportunity for exchange of current information and exciting ideas pertaining to the science of geology and related fields. They are intended to stimulate and enhance individual and collaborative research and to accelerate the advance of the science by the interactions and development of new ideas. The conferences consist of a critical mass of active scientists from the Society, the national and international science communities, and students, sequestered in an attractive meeting place for several days of focused discussion. The participants do not seek simply to resolve technical controversies; their objectives are to provide stimulus and excitement for their field, to air new ideas and develop new associations, and to provoke new research on important questions.

SUBJECT/TOPIC

Ideal subjects for conferences are those Earth science topics for which recent work suggests a potential for further significant advances in the near future. Each conference subject should be under current investigation and active discussion by a number of able researchers in the field and/or in the laboratory. Topics should be broad enough so that a range of specialists can discuss them from several points of view, but not so broad that a lack of communication can develop.

CONVENERS

Conveners must have technical competence and be knowledgeable about current activities in the specialized fields that are to be represented at a conference. Responsibility for organizing a conference normally is shared by two or more conveners, each of whom can draw upon his or her own experience and expertise in developing a well-integrated, effective conference program that will foster communication and stimulate research progress among experts in diverse but related fields. At least one of the conveners must be a member of GSA.

SIZE/TIME

It is essential that the conferences be informal. Groups should be small enough that personal discussion among all participants is encouraged, and large enough to provide diversity and depth. As an empirical rule, the maximum number for success is about 70. Normally, the minimum number required to convene a conference is 50.

Commonly, the length of a conference is five days, although exceptions may be made at the discretion of the Penrose Conference Committee. Participants are expected to attend the entire conference.

A period of approximately nine to twelve months between the date of approval by the Penrose Conference Committee and the date of the conference is normally required. In no case should there be less than six months from the time of conference announcement in *GSA News & Information* and *Geotimes* and the conference dates.

Care should be taken to avoid scheduling conferences at the same time as other scientific meetings, especially other GSA meetings. Conveners should check the calendar of events in *Geotimes* or call the Penrose Conference Coordinator to establish suitable dates.

LOCATION

Essential qualities of a good site are that it be removed from the distraction of other meetings and other demands on the time and attention of the participants. The site should offer adequate meeting facilities and comfortable surroundings where participants can live, eat, work, and relax together. Climate, accessilibity, meals, sleeping accommodations, recreational facilities, and economy should all be considered in selecting a site.

Although there are no restrictions about holding conferences anywhere in the world, logistics, costs, and other problems dictate caution in organizing conferences outside of North America. The Penrose Conference Committee is of the opinion that conferences held outside of North America may add an important dimension to the Penrose Conference program. However, such conferences are approved only if there are special circumstances that make a North American site much less appropriate. For a conference convened outside of North America, the cost of special liability insurance must be included in the conference budget.

Conveners may suggest specific sites or may indicate to the Coordinator which geographical area would be most suitable for a conference. Selection of the site is made by the Coordinator, in cooperation with the conveners, and with the approval of the Penrose Conference Committee.

PARTICIPATION

Anyone interested in attending a specific conference is encouraged to contact the conveners of that conference. Conveners initially invite a few key speakers necessary to the organization and success of the conference. Aside from these invitations issued in the early planning stages of a conference, the conveners utilize indications

Penrose Conference Guidelines

of interest from those actively working in the field to complete the list of conference participants. Participation is not restricted to members of the Geological Society of America. GSA members, however, will receive preference when there is a choice between equally qualified persons. The final decision on participation will be made by the conveners, whose decision shall not be subject to appeal. Acceptances for participation are not transferable.

Participation by graduate students is encouraged by providing incentives such as reduced registration fees. The cost of supporting graduate student participation is to be included in each conference budget.

In addition to *GSA News & Information* and *Geotimes*, all conferences are announced in other Earth science journals, newsletters, and so forth.

All participants are expected to live at the conference site. Spouses, families, and others who are not registered participants are requested not to visit the conference site, and are not allowed to participate in conference activities.

All must pay the full conference registration fee. Some exceptions may be made in the case of international guests when outside funding for them can be obtained. As noted above, participants are expected to attend the full conference.

SPONSORSHIP

The Geological Society of America is the principal sponsor of the Penrose Conferences; however, the Society welcomes other societies, organizations, and institutions as co-sponsors. Conveners must identify sponsors in their proposals, and the Penrose Conference Committee reserves the right to approve co-sponsors at the time the proposals are being considered. Recognition is given to co-sponsors in the conference announcements, as well as during the conference.

FINANCING

Each conference must be self-supporting with financial management provided solely by the Coordinator. Conveners are required to confer with the Coordinator, who develops a conference budget based on estimated costs. From this budget, a registration fee is established that covers all costs, such as food and lodging, local transportation, field trips, and miscellaneous conference expenses.

Administrative and other expenses incurred in support of the conferences are offset by a surcharge to be included in the registration fee.

At the conclusion of the conference, a financial report is prepared by the Coordinator for the conveners, the Penrose Conference Committee, and the GSA Council.

INITIATION OF A PENROSE CONFERENCE PROPOSAL

Anyone interested in convening a Penrose Conference may submit a proposal; but at least one of the conveners must be a member of the Geological Society of America. Each proposal must contain the following:

1. A short expression of the subject, by title.
2. A short outline of the subject.
3. A short statement explaining how a conference on this subject will meet the objectives that have been established for the Penrose Conferences.
4. An initial list of suggested key speakers and their fields of interest.
5. A tentative outline of sessions.
6. A suggested geographic location.
7. A choice of dates and alternate dates (or at least a preference on the time of year).
8. Anticipated number of participants.
9. A description of any field trip that is a suggested part of the conference.
10. A statement on any international guests who might be considered and the source and amount of anticipated financial support for their participation.
11. A statement indicating the willingness of the conveners to abide by the Penrose Conference Guidelines and to cooperate with the Coordinator.
12. Biographic data on the conveners, including a list of publications and projects that qualify them for leading the proposed conference.
13. Identification of co-sponsors, if any, and their role in the conference.

Requests for information about Penrose Conferences in general should be sent to

Penrose Conference Coordinator
The Geological Society of America
3300 Penrose Place
Boulder, CO 80301

Proposals for Penrose Conferences should be sent to

Executive Director
The Geological Society of America
3300 Penrose Place
Boulder, CO 80301

The Penrose Conference Committee reviews the proposals as they are received. In acceptance of a proposal, the Penrose Conference Committee may offer advice, which in some cases may be a condition of acceptance. The committee chairman will address an advisory letter to the conveners calling attention to any matters that seem likely to pose a problem that must be resolved if the conference is to be successful. Proposals are then recommended for approval or rejection by the Society's

Penrose Conference Guidelines

Executive Committee who reserves full authority for the final approval.

PENROSE CONFERENCE COORDINATOR

The Society provides to conveners, and requires the use of, the services of a Penrose Conference Coordinator to assist in every area of non-program conference planning. The Coordinator assumes responsibility for negotiating arrangements with the conference facility concerning prices, space for meetings and sessions, food, recreation, lodging, transportation, scheduling projection facilities, and handling other administrative chores as they arise.

The Penrose Conference Coordinator is solely responsible for all financial matters relating to the conference and fieldtrip fees. The Coordinator or a qualified assistant provides on-site assistance during each conference and frees conveners so that they may concentrate on the technical and scientific aspects of the program.

Conveners who have had a proposal approved by the Penrose Conference Committee will receive from the Coordinator (for use as guides) sample letters and forms, as well as a check list that has been found useful by past conveners.

The Penrose Conference Committee requires periodic progress reports from the Coordinator regarding conference planning.

PROGRAM

Care must be taken not to overstructure the program and to allow sufficient time for free discussion by all participants. It is important to note that all participants need not expect to make formal presentations. Contributions also can be presented in informal discussions or in poster sessions.

CONFERENCE REPORTS AND PUBLICITY

The conveners assist the Coordinator in the preparation of the conference announcement that is published in appropriate scientific journals. As soon as the conference is over, the conveners are required to send a brief formal report to the Executive Director of the Society. The report should include an evaluation of the technical and logistical success of the conference based on the participants' comments and the conveners' experience, as well as suggestions for improvement of the Penrose Conference format as a whole.

Within three months, the conveners will prepare and submit a news report for publication in *Geology*. This report will cover the most interesting scientific and technical aspects of the conference, and, wherever appropriate, include recommendations on research opportunities and priorities that were developed during the conference and may be of value to organizations responsible for supporting and coordinating research in the field covered by the conference.

The purpose of the report is to inform those not in attendance of the main trends of thought and discussion that prevailed at the conference. The report should not publish specific data or concepts for which individual participants expect to receive priority through publications authored by them in regular journals of their individual choice. In balancing the opposing needs to inform and to preserve priority, the conveners must perform this task with responsibility and delicacy.

Other similar reports on the conference may be prepared and submitted to other journals for publication, but only after the letter of acceptance to publish the initial report has been received from *Geology*.

As an incentive to free exchange of information and to encourage open and frank discussion, no formal scientific report may be derived from the conference. It is anticipated that symposia, at GSA meetings or elsewhere, may develop from some conferences. These should consist of a related series of formal papers, each reflecting the author's own ideas, rather than a synthesis of what was presented at a particular conference.

The Society hopes and expects that all participants will freely discuss with their colleagues the significant results of their participation. The intent is that the conferences shall promote generation of new concepts and nurture new research efforts in all phases of the Earth sciences.

GUIDELINES

These guidelines, formulated by the Penrose Conference Committee and approved by the GSA Council, provide rules based on experience gained from past conferences; changes and improvements will be incorporated as experience dictates. Once approval has been given by the Society, the conveners are fully responsible for the conference in accordance with the guidelines, and their acceptance implies agreement to abide by them. In cases of flagrant violation of the guidelines, the Executive Director of the Society is empowered to take appropriate action, including postponement or cancellation of the conference.

MEMOIR 97

HANDBOOK OF PHYSICAL CONSTANTS

Forward by Francis Birch. Edited by Sydney P. Clark, Jr. viii + 588 p., 103 figs. 1966. ..... was $15.00

PERMANENTLY REDUCED **$7.00**

CONTENTS

Composition of rocks, S. P. Clark, Jr.
Abundances of the elements, A. G. W. Cameron
Isotopic abundances and 1961 atomic weights, S. P. Clark, Jr.
Density of rocks, R. A. Daly, G. E. Manger, and S. P. Clark, Jr.
X-ray crystallographic data, densities, and molar volumes of minerals, R. A. Robie, P. M. Bethke, M. S. Toulmin, and J. L. Edwards
Thermal expansion, B. J. Skinner
Compressibility; elastic constants, Francis Birch
Internal friction in rocks, J. J. Bradley and A. N. Fort, Jr.
Seismic velocities, Frank Press
Geodetic data, G. J. F. MacDonald
Strength and ductility, John Handin
Viscosity, S. P. Clark, Jr.
Melting and transformation points in oxide and silicate systems at low pressure, F. C. Kracek and S. P. Clark, Jr.
Phase relations in sulfide-type systems, G. Kullerud
High-pressure phase equilibria, S. P. Clark, Jr.
Pressure-volume-temperature and phase relations of water and carbon dioxide, G. C. Kennedy and W. T. Holser
Binary mixtures of volatile components, H. J. Greenwood and H. L. Barnes
Ionization constants in aqueous solutions, H. L. Barnes and H. C. Helgeson
Solubility, S. P. Clark, Jr.
Thermodynamic properties of minerals, R. A. Robie
Thermal conductivity, S. P. Clark, Jr.
Heat flow and volcanic temperatures, W. H. K. Lee and S. P. Clark, Jr.
Radioactive decay constants and energies, G. W. Wetherill
Abundances of uranium, thorium, and potassium, S. P. Clark, Jr., Z. E. Peterman, and K. S. Heier
Magnetic properties of rocks and minerals, D. H. Lindsley, G. E. Andreasen, and J. R. Balsley
Electrical properties of rocks and minerals, G. V. Keller
Conversion factors, numerical constants, atomic constants, S. P. Clark, Jr.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ORDER FORM

Date _____

Please send to: GSA member number _____

Name _____

Address _____

City _____

State/Province _____ Zip Code _____

Address all orders to:

Geological Society of America
Publication Sales Department
3300 Penrose Place
Boulder, Colorado 80301

Qty.	Series and number (or other brief description)	Price each	TOTAL
	Colorado Residents add applicable sales tax	TAX	
		TOTAL	

- **Payment in U.S. funds must accompany all orders** for up to $25 regardless of their point of origin. Postage and handling charges are waived on these orders.
- GSA member discount (see reverse side of membership card) allowed when claimed.
- Orders in excess of $25 will be accepted on open account only when originating within North America or a U.S. possession. The Society reserves the right to limit credit to organizations and individuals with established lines of credit.
- Denver metro residents—add 3½% sales tax; Boulder residents—add 5½% sales tax; Colorado residents—add 3% sales tax.

GSA PUBLICATIONS

Reconnaissance Geologic Map of the West-Central Part of the State of Nayarit, Mexico

MC-24 — By Gordon Gastil and Daniel Krummenacher, 1978. In color, 17½'' × 23''. Eight-page text, scale 1:200,000. Available folded only: $6.00.

As shown on this multicolored map, the western part of the Trans-Mexican volcanic belt of Pliocene to Holocene age is underlain by strongly folded pre-Cenozoic rocks, the oldest of which is of Late Jurassic age. These older rocks are overlain sequentially by a rhyolitic sequence 20 to 80 m.y. old, a basalt sequence about 10 m.y. old, and then by the andesite-basalt sequence of the volcanic belt which is no more than 4.5 m.y. old. These rocks are intruded locally by small plutons of varied composition. The main underlying structure is that of an extensively faulted, northwest-trending graben.

The mapping in west-central Nayarit was undertaken in an effort to trace from the Gulf of California the southeastern extension of the transform fault and connecting segments of the East Pacific Rise and trench. Although no evidence for the extension of this major structure through the Nayarit area was found, the authors discuss the possibility and probable location of a major but largely concealed, northwest-trending fault with right-lateral offset.

Wallace A. Jensky II contributed to the writing of the explanatory text.

Gravity Field of the Northwest Pacific Ocean Basin and Its Margin: Kuril Island Arc–Trench System

MC-27 — By Anthony B. Watts, Mikhail G. Kogan, and John H. Bodine, 1978. A free-air gravity anomaly map, contoured at 25-mgal intervals, 33'' × 43'', in color, with a four-page summary statement. Folded: $7.50; rolled: $8.50.

The new free-air gravity anomaly map of the Kuril island arc–trench system shows a narrow belt, about 120 km wide, of large-amplitude *positive* gravity anomalies associated with the Kuril Ridge and a parallel narrow belt, about 150 km wide, of large-amplitude *negative* gravity anomalies associated with the Kuril Trench. The gravity "relief" between the low of the trench and the high of the ridge is about 570 mgal. The map also shows many smaller gravity features in the northwest Pacific Ocean, the northern part of the Japan Sea, and the Sea of Okhotsk.

The map is based on more than 13,700 gravity measurements obtained between 1955 and 1976. It is contoured and color shaded at 25-mgal intervals. An analysis of gravity values at the intersection of ships' tracks suggests that individual measurements used in making the map are accurate to about ±7 mgal. The scale at lat 55°N is about 1:2,530,000.

This map is fourth of a series. The previous maps dealt with Hawaii and vicinity (MC-9), the Aleutian island arc–trench system (MC-10), and the Philippine Sea (MC-12).

MAY 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 "May Summaries" on coupon.

• S90501—Origin of steeply inclined fractures in central and western New York State: Summary.

Joseph L. Wallach, Atomic Energy Control Board, P.O. Box 1046, Ottawa, Ontario K1P 5S9 Canada; John L. Prucha, Syracuse University, Syracuse, New York 13210.

• S90502—Use of scintillometer and gamma-ray logs for correlation and stratigraphy in homogeneous black shales: Summary.

Frank R. Ettensohn, Department of Geology, University of Kentucky, Lexington, Kentucky 40506; Linda Provo Fulton, Department of Geology, University of Cincinnati, Cincinnati, Ohio 45221; Roy C. Kepferle, U.S. Geological Survey, University of Cincinnati, Cincinnati, Ohio 45221.

• S90503—The geochemistry and origin of the Devonian granitic rocks of southwest Nova Scotia: Summary.

T. E. Smith, Department of Geology, University of Windsor, Windsor, Ontario N9B 3P4 Canada.

• S90504—Cross section, Alaska Peninsula–Kodiak Island–Aleutian Trench: Map Summary.

Roland Von Huene, George W. Moore, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025; J. Casey Moore, Earth Sciences Board, University of California, Santa Cruz, California 95064; Christopher D. Stephens, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025.

Bulletin Briefs

Titles and abstracts of conventional articles in the May 1979 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 79.*

• 90505—A long-leaved specimen of *Lepidodendron.*

Robert M. Kosanke, U.S. Geological Survey, Box 25046, Denver Federal Center, Denver, Colorado 80225. (4 p., 1 fig.)

Lepidodendron obovatum Sternberg var. *grandifolium* var. nov. is described from a single, unusual specimen collected from the roof shale of the Beckley coal (Lower Pennsylvanian) of West Virginia. *L. obovatum* Sternberg var. *grandifolium* var. nov. is an unbranched stem with attached leaves and with pyramidal leaf cushions. The leaves are long, attaining a length of more than 78 cm; they are sessile, entire, and thought to be sharply pointed. Leaves of such length are not generally associated with *Lepidodendron*, but with *Sigillaria*. The description of this new variety of *Lepidodendron* helps to confirm the idea that there is little difference between the foliage of *Lepidodendron* and *Sigillaria*. The unbranched condition of the new variety herein described is thought to represent a young axis prior to the first dichotomy.

• 90506—Submarine extension of the southwest rift zone of Mauna Loa Volcano, Hawaii: Visual Observations from U.S. Navy Deep Submergence Vehicle *DSV Sea Cliff.*

Daniel J. Fornari, DSDP—East Coast Repository, Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York 10964; Donald W. Peterson, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025; John P. Lockwood, U.S. Geological Survey, Hawaiian Volcano Observatory, Hawaii National Park P.O., Hawaii 96718; Alexander Malahoff, National Ocean Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20852; Bruce C. Heezen, Lamont-Doherty Geological Observatory and Department of Geological Sciences of Columbia University, Palisades, New York 10964. (9 p., 6 figs., 1 tbl.)

North-south–trending dikes exhibiting well-developed columnar jointing have been visually observed on a series of submersible dives to the submarine extension of the southwest rift zone of Mauna Loa Volcano, Hawaii. These dikes are exposed along a west-facing 1,900-m-high scarp that is the sea-floor expression of the southwest rift zone. They form prominent walls, 10 to 60 m high and 1 to 3 m thick at their crests, separated by sediment- and rubble-mantled benches. The talus at the base of each dike consists of faceted blocks of basalt broken from the face of the wall.

Major-element analyses of samples collected *in situ* show the rocks to be of "normal" Mauna Loa tholeiite composition.

• 90507—Ophiolite and island-arc volcanism in Costa Rica.

Carlos Galli-Olivier, Central American School of Geology, University of Costa Rica, Apartado postal 35, Ciudad Universitaria "Rodrigo Facio," Costa Rica (present address: Ciencias Marinas, Apartado postal 453, Universidad Autónoma de Baja California, Ensenada, Baja California, Mexico). (9 p., 4 figs.)

The Pacific margin of Costa Rica is a very deformed basement terrane of ophiolite composed of pillowed and massive basalt, mafic and ultramafic plutonic rocks, volcanic breccia, hyaloclastite, radiolarian chert, and limestone. The ophiolite underwent changes through burial metamorphism after subduction of the Cocos plate under the southwestern margin of the Caribbean plate. In some areas the ophiolite is a mélange. While the age of the emplacement of the ophiolite in northwestern Costa Rica is late Santonian to early Campanian, the period of accumulation of the ophiolite seems to be very long, possibly extending from middle Tithonian to late Santonian. New age determinations based on foraminifera and radiolaria support the previous dating. A relative scarcity of turbidite in the ophiolite of Costa Rica, compared to other similar terranes of the Pacific margin, has been associated with the intra-oceanic origin of the southern Central American arc.

The island-arc suite clastic rocks first unconformably covered the ophiolite in Costa Rica in early Campanian time. Their origin is closely related to the intrusive and volcanic activity of a plutonic-volcanic arc located between South and North America since early Campanian time. The clastic rocks of the island-arc suite are low-porosity volcanogenic types. Limestone has accumulated from Cretaceous time to the present, in some areas forming porous biohermal bodies. Vertical tectonics originated marginal- and intra-arc sedimentary basins intermittently throughout the evolution of the arc. A fourfold geotectonic division of Costa Rica is proposed.

• 90508—Threshold of critical power in streams.

William B. Bull, Department of Geosciences, University of Arizona, Tucson, Arizona 85721. (12 p., 11 figs.)

Stream power is the power *available* to transport sediment load, and it may be defined as γQS, where γ is specific weight of water, Q is stream discharge, and S is slope. Critical power is the power *needed* to transport sediment load. The threshold of critical power is where stream power/critical power = 1.0. Where stream power exceeds critical power during long time spans, additional sediment load is obtained by vertical erosion that cuts V-shaped cross-valley profiles in bedrock. The threshold is approached asymptotically during downcutting, and high-order streams approach the threshold more rapidly than do low-order streams. High discharges cause net lateral erosion in reaches near the threshold. Straths and flood plains form under such conditions. Where stream power is less than critical power, selective bedload sedimentation decreases sediment load and size and therefore the critical power. Such deposition is self-enhancing because of concurrent decreases in slope. Thus,

it is unlikely that aggrading reaches attain the threshold, but the tendency to attain the threshold may keep stream and critical power roughly the same. Reaches of streams at the critical-power threshold are sensitive to changes in climate, base level, and the impact of humans; these may change stream and/or critical power and result in aggradation or degradation.

• 90509—Crystallization, fractionation, and solidification of the Tuolumne Intrusive Series, Yosemite National Park, California.

Paul C. Bateman, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025; Bruce W. Chappell, Australian National University, Department of Geology, P. O. Box 4, Canberra, A.C.T. 2600, Australia.
(18 p., 7 figs., 2 tbls.)

Study of the Tuolumne Intrusive Series, a concentric texturally and compositionally zoned plutonic sequence in the eastern part of Yosemite National Park, was undertaken to develop and test a model for the origin of comagmatic plutonic sequences in the Sierra Nevada batholith. The granitoid units that make up the sequence are progressively younger and more felsic inward. The bulk of the rocks are granodiorite, but the outermost formation is quartz diorite, and the innermost one is granite porphyry. The compositional gradient changes both gradually within formations and abruptly between them. The change is greatest in the outer 1 km and lower toward the center of the sequence. Hornblende and biotite, abundant in the marginal rocks, decrease rapidly inward for 1 km as K-feldspar and quartz increase, but farther inward, they decrease slowly. The most conspicuous chemical changes are shown by the elements that are enriched in the mafic minerals.

The compositional zoning indicates that with decreasing temperature, the sequence solidified from the margins inward. Solidification was interrupted repeatedly by surges of fluid core magma. The magma eroded the adjacent solidifying rock, and it expanded the area of the magma chamber at the exposed level by crowding the wall and roof rocks outward and upward and by breaking through the solidifying carapace into the wall rocks. The compositional zonation resulted from crystal fractionation that could have involved (1) preferential accretion of crystalline material present in the magma to the margins of the magma chamber, thus displacing the melt phase progressively inward, and/or (2) downward settling of crystals, probably accompanied by upward movement of melt and volatiles, the residual magma solidifying to form the granitoids. Although either mechanism can explain the observed relations, they lead to very different interpretations of the composition of the magma when the first exposed granitoids solidified at the margins of the magma chamber and as the sequence solidified inward.

• 90510—Shear heating at the Olympos (Greece) thrust and the deformation properties of carbonates at geological strain rates.

C. M. Barton, Department of Geology, Sedgwick Museum, Downing Street, Cambridge CB2 3EQ, England (present address: Institute of Geological Sciences, Overseas Division, 154 Clerkenwell Road, London EC1R 5DU, England); P. C. England, Department of Geology, University of Oxford, Parks Road, Oxford OX1 3PR, England (present address: Department of Geodesy and Geophysics, Madingley Rise, Madingley Road, Cambridge CB3 0EZ, England).
(10 p., 8 figs., 2 tbls.)

An example of thermal gradient inversion below a major thrust is described from the carbonates of the Olympos autochthon in northeast Greece. On the basis of several hundred probe analyses, temperatures have been determined across 3 km of structural height using calcite-dolomite geothermometry. The inversion is interpreted in terms of shear heating accompanying the Tertiary emplacement of the overlying metamorphic sheet.

Significant heating is restricted to the uppermost 1 km of the Olympos platform, where the carbonates have been deformed partly by steady-state flow. A simple heat-conduction calculation gives an estimate of about 0.6 m.y. for the duration of the shear heating, and geological constraints suggest that the minimum Tertiary movement on the thrust is 15 km, equivalent to a strain rate of 10^{-12} s^{-1} during overthrusting.

More detailed numerical modeling shows that the high rates of movement implied by this strain rate are essential to the generation of the inferred thermal profile. An additional requirement of a shear stress of several hundred bars at the thrust suggests that a horizontal compressive stress was necessary to maintain the movement. The shear strength

ORDERING SEPARATES FOR 1979

The system for ordering separates has changed. Those members who have purchased separates of conventional articles (not summaries) for 1979 have received, or will receive in the near future, 10 or 20 coupons and instructions for ordering separates in 1979.

It is not too late to purchase separates for 1979. The price to members having paid their basic membership dues is $5 for 10 separates and $10 for 20 separates. All orders and inquiries should be addressed to **Bulletin Separates Division, Geological Society of America, 3300 Penrose Place, Boulder, Colorado 80301.**

behavior deduced for the Olympos carbonates is in good agreement with the extrapolation to geological strain rates of Heard's and Heard and Raleigh's experimental data for the Yule marble.

• 90511—Plagiogranite and keratophyre in ophiolite on Fidalgo Island, Washington.

E. H. Brown, J. Y. Bradshaw, G. E. Mustoe, Department of Geology, Western Washington University, Bellingham, Washington 98225. (15 p., 15 figs., 2 tbls.)

A sequence of Jurassic rocks on Fidalgo Island, Washington, is interpreted to be ophiolite. The order of rock types, from the base upward, is serpentinite, layered gabbro, a dike complex made up mostly of plagiogranite, volcanic rocks that are dominantly keratophyre, coarse breccia with clasts of keratophyre and plagiogranite, pelagic argillite, and siltstone-sandstone turbidites. The plagiogranites and keratophyres have identical chemical compositions and are mutually gradational in field setting and textures, all of which suggests that they are cogenetic. These rocks are distinguished from calc-alkalic rock types by their very low content of K_2O (where SiO_2 = 70%, K_2O = 0.2% to 0.7%). Metasomatic alteration of the rocks appears to be insignificant, judging from (1) well-preserved primary igneous textures, (2) well-preserved primary intrusive and extrusive contacts, and (3) uniformity of chemical composition across igneous units.

An oceanic origin of the ophiolite is suggested by the capping of pelagic sediments. Their fine grain size, abundance of radiolaria, and enrichment in Mn and other metals are virtually identical to those of modern Pacific pelagic sediments and unlike that of arc or epicontinental sediments. This interpretation conflicts with the apparent paucity of plagiogranite and keratophyre on the present-day sea floor.

Field relations and chemical trends indicate that the plagiogranite-keratophyre magma is not the product of fractionation of the same melt that crystallized layered gabbro. High water content of the plagiogranite-keratophyre magma is indicated by hydrothermal alteration of the gabbro near plagiogranite intrusions and the occurrence of hornblende instead of pyroxene in mafic varieties. We suggest that this water is from the sea and that the anomalously low K_2O content of these magmas is due to exchange with sea water.

• 90512—Australasian microtektites and the stratigraphic age of the australites: Discussion and reply. (5 p., 1 fig., 1 tbl.)

Discussion: *R. O. Chalmers, Australian Museum, Sydney 2000, Australia; E. P. Henderson, Brian Mason, Smithsonian Institution, Washington, D.C. 20560.*

Reply: *B. P. Glass, Geology Department, University of Delaware, Newark, Delaware 19713.*

THE GEOLOGICAL SOCIETY OF AMERICA
3300 Penrose Place · Boulder, Colorado 80301

SECOND CLASS
Postage Paid
at Boulder, Colorado
and at additional mailing office

GSA news & information