GSA news & information

SUPPLEMENT TO GEOLOGY MAGAZINE

# Troxel reviews science editor's job

NOTE: On October 1, 1975, Bennie W. Troxel, science editor for the Geological Society of America since mid-1971, resigned to return to California. He will continue to help the Society on a part-time basis until another science editor is selected. His farewell message below is a summary and analysis of his principal duties.

Working for the Geological Society of America as science editor since mid-1971 has been a very rewarding experience. The work is challenging, and the Society has an excellent staff, an excellent headquarters building, and a membership that is very cooperative.

The work has surprising variety to it, and the title "science editor" really incorporates several jobs. The most challenging aspect is, of course, being involved in the selection of manuscripts for publication. Each manuscript poses a different set of problems, and every author is vitally concerned about the fate of his or her manuscript. In spite of the large number of papers submitted to GSA (652 in 1974; 365 at the end of July 1975), the work related to manuscript review and selection consumes only about 20 percent of the science editor's time.

The rest of the time is spent approximately as follows: *Geology* magazine, 5 percent; administrative interaction with the rest of GSA headquarters units and staff, 15 percent; administrative duties and coordination of activities related to the 20 Publications Department staff members and their responsibilities (editing, proofreading, dummying; in-house composition, paste-up, and camera work), 50 percent; long-range planning, committee activities, investigating new procedures, and related work, 10 percent. Thus, one can see that the work has few dull moments and many surprises. The staff at GSA is extremely enterprising, capable, and productive, and deeply concerned about the work.

Associate Editors and reviewers evaluate all papers closely for scientific content and advise on revision of the papers. The staff editors' principal responsibility is to help the author on such matters as style, punctuation and grammar, and dummying the layout of the articles. They are proficient at all of these functions.

As you are well aware, many changes have been made in the past four years to cope with increased costs and restraints placed upon the Society's finances. The *Bulletin* was changed to a larger page size, the *Bibliography and Index of Geology* underwent changes in type size and internal format, procedures were changed on Special Papers and Memoirs, and three new publications were started to provide additional outlets for specific types of material—*Geology,* the Map and Chart series, and the Microform Publication series. Other changes include incorporation of *The Geologist* (GSA newsletter) as the News & Information section in *Geology,* the option to subscribe to separates rather than the complete *Bulletin,* provision of separate preprints of memorials, and publication of an annual volume of memorials. The catalog of GSA publications may soon be provided on microfiche, and studies are being made on the cost and feasibility of producing the *Abstracts with Programs* of GSA meetings on microfiche as well as in printed form. The Society has installed composition equipment, and the four people on the production staff compose, design, and do camera work for *Geology,* memorials, division newsletters, copy for ads, programs for annual meetings, text for Maps and Charts, and many other products, including short Special Papers. A camera and photographic laboratory were installed to provide negatives of all illustrations in the *Bulletin* and negatives of all pages for *Geology, Bibliography and Index of Geology, Abstracts with Programs,* memorials, selected Special Papers, ads, and other items.

It has been a privilege to be science editor for GSA during this four-year period of change. Many other possible changes are still under study, and the next four years promise to be just as exciting. The Committee on Publications will be fully occupied in studying and recommending changes that will be of most benefit to the Society's publications program.

I thank each of you who has helped keep the Society's publishing program viable and successful and look forward to meeting all of you who have helped. Should any of you be asked to serve the Society in any capacity, I suggest you do it—you'll find that it's well worth your time, and your participation is vital to the Society.

Should any of you need a comparison on the job of being GSA's science editor, it's like being a nude prude in a glass house.

# PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS ROCKY MOUNTAIN SECTION, 29th ANNUAL MEETING Albuquerque, New Mexico, May 19-24, 1976

Hosts for the 29th annual meeting of the Rocky Mountain Section will be the Department of Geology of the University of New Mexico and the New Mexico Geological Society. Closely coordinated symposia and field trips will focus on some of the exciting aspects of the unique geology of this region. A bonus attraction is the southwestern flavor of Albuquerque and nearby Santa Fe, with many cultural and entertainment facilities.

**TECHNICAL SESSIONS** (May 20-21): Papers containing new information on topics of broad interest or relevance to the Rocky Mountain region are solicited. Papers will be allowed 15 minutes for presentation and 5 minutes for discussion.

**SYMPOSIA** (May 20-21): ***(1) Ash-flow tuffs*** (C. E. Chapin and W. E. Elston); ***(2) Rio Grande rift*** (V. C. Kelley and L. A. Woodward); ***(3) Origin of basalts*** (Klaus Keil); ***(4) Regional tectonics and mineral resources of southwestern North America*** (D. L. Giles, T. B. Thompson, and K. F. Clark).

**FIELD TRIPS.** Premeeting: ***(1) Jemez volcanic field*** (R. L. Smith, R. A. Bailey), May 19; ***(2) Grants uranium belt*** (D. G. Brookins and others, May 19; stratigraphy and mineralization at Ambrosia Lake, San Mateo, and Jackpile-Paguate. Postmeeting: ***(3) Rio Grande rift*** (V. C. Kelley, J. F. Callender, L. A. Woodward), May 22-23, structure, stratigraphy, and associated volcanic rocks of rift from Albuquerque northward to Taos. ***(4) Mogollon-Datil volcanics*** (W. E. Elston, C. E. Chapin, and others), May 22-24, tectonic setting, relationship of volcanism to plutonism, internal structure of cauldrons, petrologic evolution, relationship of felsic to basaltic rocks, and relationship of volcanic centers to mineral deposits. Special emphasis on primary features of ash-flow tuffs, such as laminar flow and facies changes in composite sheets.

**ABSTRACTS,** which are limited to 250 words, must be submitted camera ready on official abstract forms available from

A. M. Kudo or G. P. Landis
Department of Geology
University of New Mexico
Albuquerque, New Mexico 87131
(505) 277-2020 or 2000, *or*

Abstracts Secretary
Geological Society of America
3300 Penrose Place
Boulder, Colorado 80301
(303) 447-2020

**Abstracts are due by December 29, 1975. Recent action by the GSA Council assesses a $20 publication charge for each abstract accepted for the meeting. A check payable to the Geological Society of America MUST accompany each abstract. If the abstract is not accepted, the $20 will be returned.** Acceptance or rejection of abstracts will be based on the abstracts as submitted by the author.

Abstracts will be reviewed by one outside specialist and returned to the Program Committee as acceptable, marginal, or unacceptable. Guidelines for review are as follows (in order of importance): (1) If majority of information has been presented at another professional meeting, abstract should be rejected. (2) Abstract should be informative (*see* Landes, 1966, AAPG Bull., v. 50, p. 1992). (3) Data should be reliable and conclusions should be reasonable. (4) Interest to members of the Rocky Mountain Section.

The Program Committee will review all abstracts marked "marginal" or "unacceptable" for final decision of acceptability. Only two abstracts will be accepted from any author or coauthor (sum equaling two abstracts), although the author may submit as many as he or she wishes.

*ERTS photograph of central part of Rio Grande rift and Jemez Mountains with Valles caldera (circular structure in center of photograph). Santa Fe (SF) is in lower right corner.*

*Send one original and two copies to*

A. M. Kudo or G. P. Landis,
Program Chairmen
Department of Geology
University of New Mexico
Albuquerque, New Mexico 87131
(505) 277-2020, 277-2000

**PROJECTION EQUIPMENT.** All slides must be 2" x 2" and fit in a standard 35mm carousel projector. Slides should be designed for easy viewing on 10-ft-wide screens at a distance of 70 feet. Dual projectors will not be available. Movies are acceptable, but request for projection equipment must be on abstract form.

**STUDENT AWARDS.** Student papers are encouraged and awards will be made to the most outstanding papers presented by students. Student papers should be clearly indicated as such and should be authored by one student.

**DETAILED INFORMATION** concerning registration, motel accommodations, and other activities will appear in the News & Information section of a later issue of **Geology** and as a part of the **Abstracts with Programs for 1976.**

**ACTIVITIES.** In addition to the annual banquet and the luncheon and business meeting, there will be tours and luncheons for spouses. Space for additional meetings and parties is also available.

**ADDITIONAL INFORMATION, REQUESTS, or SUGGESTIONS** should be directed to

Lee A. Woodward, Local Committee Chairman
Department of Geology
University of New Mexico
Albuquerque, New Mexico 87131
(505) 277-5309, 277-4204.

# Penrose Conferences

## Late-orogenic sedimentation and related tectonics in the Cordilleran and Appalachian orogens

A GSA Penrose Conference on "Late-Orogenic Sedimentation and Related Tectonics in the Cordilleran and Appalachian Orogens" will be held April 4–8, 1976, at the Banff School of Fine Arts, Banff, Alberta, Canada. Conveners are F. B. VanHouten of Princeton University and G. H. Eisbacher of the Geological Survey of Canada.

This meeting is planned as an interdisciplinary conference to discuss the structural, sedimentological, and geomorphological controls of late-orogenic basins in the Appalachians and the Cordilleran mountain chains. The focus will be on the meaning of sedimentary sequences as expressed in tectonic terms, and on structural features as expressed in sedimentary processes. Specifically the discussion will center on rates of erosion and sedimentation; structural controls of fluvial systems; source-area geometry and elevation as derived from grain size and heavy-mineral studies; uplift of crystalline core zones, K-Ar dates, and subsidence of foreland; regional and local transgressions and regressions; tectonic setting of coal swamps; and comparison of Appalachian and Cordilleran foreland basins with those of other orogens.

Participation is limited to 60 persons. A price of $195 includes accommodations, meals, and a one-day field trip. Deadline for applications is December 15, 1975. Forward inquiries and applications to G. H. Eisbacher, Geological Survey of Canada, 100 West Pender Street, Vancouver, B.C. V6B 1R8, Canada.

## CODATA conference

The Fifth Biennial International CODATA Conference will be held June 28–July 1, 1976, at the University of Colorado in Boulder.

CODATA (Committee on Data for Science and Technology) is an interdisciplinary committee of the International Council of Scientific Unions. It deals with the compilation, critical evaluation, storage, and retrieval of data important to technology and to the various science disciplines, including the geological sciences.

Persons who want further information should write to H. van Olphen, National Academy of Sciences, 2101 Constitution Avenue N.W., Washington, D.C. 20418.

## Formation of cleavage in rocks, especially shale

A GSA Penrose Conference on "Formation of Cleavage in Rocks, Especially Shale" will be held in eastern Pennsylvania May 28–June 2, 1976. Convener is Lucian B. Platt, Department of Geology, Bryn Mawr College, Bryn Mawr, Pennsylvania 19010.

The conference will include three days of meetings and two days of field trips in the area. Cost is expected to be approximately $250-$275, including all meals, lodging, and field trips.

Attendance will be limited. Those interested in further information should write or call the convener. Students actively working on this topic may apply for financial support.

Deadline for application is February 1, 1976.

## Function of the geologist in society

A Penrose Conference on "The Function of the Geologist in Society" will be convened by A. W. Bally, C. L. Drake, and S. J. Tuthill near Houston, Texas, March 15-20, 1976.

In recent years, geologists have been increasingly confronted with issues that raise questions regarding their role in society. Since approaches to these issues are naturally colored by the geologists' backgrounds, their employers' philosophies, or the context in which they work, it is not unusual to find a lack of communication resulting from these different points of departure.

The purpose of the conference is to start a dialogue among geologists from industry, academia, and government with regard to what they believe their role to be, how effective they are in this role, and particularly what their interface problems are. Among the topics for discussion will be mineral, water, and energy resources; engineering; environment; and education.

Attendance will be limited to about 70 participants. Cost is expected to be approximately $225 including meals, lodging, and registration. Those interested in further information or in attending the conference should write to A. W. Bally, Shell Oil Company, P.O. Box 481, Houston, Texas 77001. Deadline for applications is January 10, 1976.

# Book review

**GUIDELINES AND CRITERIA FOR IDENTIFICATION AND LAND-USE CONTROLS OF GEOLOGIC HAZARD AND MINERAL RESOURCE AREAS**

**Special Publication No. 6 by W. P. Rogers, L. R. Ladwig, A. L. Hornbaker, S. D. Schwochow, S. S. Hart, D. C. Shelton, D. L. Scroggs, and J. M. Soule. Published by Colorado Geological Survey, Department of Natural Resources, State of Colorado, Denver, Colorado, 1974. 146 p., $3.00.**

As one might suspect from the title, this report stems from a legislative mandate to the Colorado Geological Survey to prepare guidelines for local governments engaged in establishing land-use controls for geologic hazards and mineral resource areas. Printed as an 8½ x 11 in. paperback, the text is augmented by 32 halftones and line drawings (black and white) and 7 tables. The format was designed to conform with the recommendations of the State Technical Advisory Board—giving one cause to expect the worst.

To their credit, the authors have seemingly met the charge imposed upon them by the state and produced a commendable reference work for the profession as well. Instead of constituting another "Primer on Acts of God and the Fortuitous Occurrence of Resources," the report is a fundamentally sound work intelligible to both the layman and professional.

More than half the text is dedicated to detailed descriptions of geologic hazards common within the state (mass movements, ground subsidence, seismic effects, radioactivity, and expansive soil and rock), and each is systematically addressed in terms of definition, criteria for recognition, consequence of improper utilization, mitigation procedures, and references. Although the list of hazards enumerated is not as complete as would be expected in a text on the subject, Colorado's varied geology offers a sufficiently wide range of examples to make the report of more than provincial interest.

In the second section, which is concerned with mineral resources, the authors have wisely realized that the topic requires a modified approach, for it is impossible to present recognition criteria for all resources in a state that annually generates more than 600 million dollars in revenue from that sector of industry alone. Accordingly, the format utilized in this section includes a substitute discussion of deposit classifications, exploration techniques, and evaluation procedures.

The following two sections of the report stand in sharp contrast to each other. The first section, concerned with identification procedures, reads much like the discussions of inventory methods so commonplace in land-use planning publications of recent vintage. The following section on qualification of investigators is unique and deals squarely with the tacky subject of the professional geologist, the engineering geologist, and the professional engineer.

The report concludes with a useful glossary and model regulations for geologic hazard areas. The model regulations are sound and, doubtless, represent a pioneer effort in this area. Geologists throughout the country involved in land-use planning should find this section of great value and well worth the price of the entire publication.

Consideration of water as either a hazard or a resource is obviously avoided in this report and the omission is likely to be considered a shortcoming by the thoughtful reader. This apparent oversight is, however, a reflection of legislative restrictions peculiar to Colorado's governmental organization rather than a failure on the part of the authors. Because water in Colorado will ultimately prove to be that state's most valuable resource and the ultimate limiting factor in land use, one can only hope that Colorado's guidelines and controls in this realm are comparable to those put forth in this report on hazards and mineral resources.

— Paul L. Hilpman
Department of Geosciences, University of Missouri–Kansas City

## A REQUEST FOR INFORMATION
### Prospectus: Bibliography and Index of American-published geology, 1669 to 1850

The scientists and settlers of North America found the Earth sciences both fascinating and useful. Consequently, geology figures prominently in the early scientific and popular literature of this country. In spite of the volume and diversity of American-published geological literature, the great majority of Earth-science publications from the 17th, 18th, and 19th centuries has never been incorporated within a bibliography. Therefore, a bibliography and index of American-published Earth-science literature from 1669 through 1850 is now being prepared. Approximately 10,000 references, encompassing books, pamphlets, mining company reports, and government documents, as well as all geological articles, reviews, and notices from more than 600 journals, will be included. The bibliography will be extensively indexed using both historical and modern-day subject headings.

Persons having information on unusual or unique geological publications are invited to forward reference data, including author, title, date, place of publication, publisher, pagination, key words for index use, and location of original, to Robert M. Hazen, Department of Geological Sciences, Harvard University, Cambridge, Massachusetts 02138. Requests for bibliographic data on specific authors, or on specific topics, are also welcome.

# News of the Coal Geology Division

## Report on the Annual Meeting of the International Committee for Coal Petrology, Poland, September 1-7, 1974

The 1974 meeting of the International Committee for Coal Petrology (ICCP) was attended by 50 scientists from 19 countries. The meeting was hosted by Dr. K. Hamberger and Dr. B. Kwiecinska under the patronage of the Rector of the Technical University in Gliwice, Dr. J. Szuba, and the Polish Association of Mining Engineers and Technicians. Attendance at the meeting was mainly from research institutes in Europe, eastern and western Europe about equally represented. North America was represented by Alex Cameron of the Geological Survey of Canada, Bishu Nandi of the Canadian Fuels Research Centre, Neely Bostick of the Illinois State Geological Survey, and I. I. Roseboom of Chevron Overseas Petroleum Co.

The International Committee for Coal Petrology is organized in four working commissions, the Nomenclature Commission, the Analysis Commission, the Commission on Industrial Applications, and the Commission for Petrology of Organic Matter in Sediments and Application to Geology. The latter two groups are at present working mainly on problems of coal coking for the metallurgical industries and on measurements of organic depositional facies and catagenesis as they are applied to oil and gas exploration.

A great strength of the ICCP is the cooperative work by people who have quite different primary research interests, and the advantages of this cooperation were very evident at this meeting.

### Six new sections on lignite

The Nomenclature Commission edited in detail six new sections on lignite to be added to the 1972 supplement to the second edition of the International Handbook of Coal Petrology. These sections had been discussed at the 1973 meeting, revised, and distributed for final comment by members. As a result of the work at the 1974 meeting, the final versions will be printed for distribution by August 1975. The new sections are Alginite, Suberinite, Bitumenite, Fusinite, Semifusinite, and Macrinite. Some work was also completed on sections for Lignite Briquetting, Pseudovitrinite, and Micrinite.

The Analysis Commission completed final revision of new handbook sections on Fluorescence Photometry and Photography and Remission Measurement. These sections, as well as the six edited by the Nomenclature Commission, are now being prepared in four languages for publication by August 1975.

The Commission on Industrial Applications worked mainly on recent interlaboratory studies of coking properties of coals with high inertinite content. This problem pertains mainly to Gondwana coals, but work on coking of blends that contain a high proportion of inert materials is also in progress. The coke strength from some of the coals studied (about 40 percent inert matter) is unexpectedly high; however, the relative size of inert and reactive macerals plays a critical role in strength.

### Polish research reviewed

B. Kwiecinska described Polish work on coal petrography and coke making—particularly important now since import of coal from Poland is increasing in many countries. An interlaboratory study of predicting coke quality (or determining optimum coking conditions) of Polish coals is in progress. M. Kaye presented his data from studies of volatile-matter content of liptinite, vitrinite, and inertinite from coals of different rank as measured by vitrinite reflectance. Kaye also gave data from a study of Ruhr dilatometer measurements related to petrographic analysis of the coals.

The Commission for Petrography of Organic Matter in Sediments and Application to Geology ("MOD Commission") discussed at length the results of the interlaboratory analysis of organic facies and organic catagenesis in Miocene shales from a bore hole in the Gulf Coast. Twenty-seven laboratories participated in the analysis. Discussion dealt with vitrinite reflectance, spore translucency, reflectance and temperature-depth gradients, sample processing, and fluorescence microscopy of whole-rock mounts. It was agreed that more work on constituent analysis is needed—particularly on distinction of solid bitumens from vitrinite particles. During the coming year the cooperative interlaboratory study will analyze three bore hole samples with a great depth range (equivalent rank about 0.7 percent to 2.1 percent vitrinite reflectance) as well as a rock very rich in organic matter (Posidonia Shale) and possibly also some Holocene or Pleistocene sediments.

Prints and diapositives from work of various members were displayed and discussed. These showed materials from the interlaboratory analysis series and various problematical materials, especially fluorescent materials.

Data and theory on the relation between temperature, burial time, and catagenesis of organic matter in sedimentary rocks and a paper on geothermal aspects of hydrocarbon exploration in the North Sea area occupied the last day of the meeting.

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# Scales on photomicrographs

A scale may be placed on photomicrographs of thin sections by a simple double exposure technique. The basic requirements are a "negative" scale (black background with clear, transparent lines) and a camera that will permit double exposures.

As I could not find suitable "negative" scales for sale, I made my own by making contact negatives of microscope eyepiece reticles. To date, two scales have been prepared, each 5 mm long. One has 0.1 mm subdivisions, the other 0.05 mm subdivisions. I used Kodalith Ortho film because it is a very high contrast film and has excellent size holding characteristics. Other types of high contrast film may be satisfactory, but I have not tried them. The contact negatives were made by placing the film on the baseboard of an enlarger with the eyepiece reticle lying on the film and with the side of the reticle having the scale lines in contact with the film. The film was then exposed with the enlarger light. A series of trial exposures was made and it was found that with the enlarging head raised about half way and the lens set at f-22, a 7-second exposure was about right. After the film was developed and dried, the scale was cut out so that it was centered in a strip of film about 2 cm long and 1 cm wide. This strip was then placed on a glass slide, and a cover glass was placed over it and tacked down with Scotch tape. The entire slide, with the exception of the scale, was then covered with electrician's black plastic tape and was ready for use.

The thin section was photographed at the desired magnification. The thin section was then replaced by the scale slide and the camera shutter recocked without advancing the film. If the thin section was photographed with crossed polarizers, the upper polarizer was removed to photograph the scale. The focus of the scale was checked as a slight change may occur, but usually no more than when changing from one thin section to another. The scale was then moved to where I wanted it to appear on the transparency or negative and photographed. If the thin section was photographed with crossed polarizers, usually the same exposure or possibly a one-stop increase was satisfactory for the scale.

The procedure described above gives a transparency or negative with the scale superimposed on the photograph of the thin section. A variation of this procedure will give a more distinct and sharper scale, but reduces the coverage of the thin section slide. Before exposing the photograph of the thin section, select the area where you wish the scale to be. Mask off this area with a strip of black paper or black plastic before taking the photograph of the thin section, and then place the scale in this area when photographing it. I have found that this method is easy to do at low magnifications, but is a bit more difficult at higher magnifications.

If you use a 35-mm single lens reflex camera that does not have a built-in double exposure feature, you may be able to make double exposures by simply holding in the rewind button when advancing the film transport lever after exposing the thin section. This usually allows you to recock the shutter but does not advance the film. However, you may have some trouble with overlapping frames and may have to sacrifice a little film by making a blank exposure before going on to the next thin section. I recommend that you experiment with black and white film before attempting color transparencies.

I intend to pass this technique on to some of the optical companies in hope that they may see fit to offer "negative" scales for sale. No doubt they can make scales that would be sharper and clearer than I have made, and could probably furnish a scale with 0.01 mm subdivisions.

— John R. Hayes
130 Dover Street, Lakewood, Colorado 80226

## News of the Coal Geology Division (continued)

The memory of recently deceased members R. Potonié and V. S. Yablokof was honored at the plenary session.

The ICCP Handbook of Coal Petrography, 2nd edition, is sold out in English; the large 2nd edition supplement is still available, however. Both are still available in the French and German editions, and the full Russian edition will be published in 1975.

Three new delegate members were elected, and M.-T. Mackowsky, D. G. Murchison, and M. Teichmuller were nominated for president, secretary, and head of the lignite group, respectively, for election in 1975. The next meeting will be held during the International Carboniferous Congress in Moscow, September 8-13, 1975, but this will not be a normal working session because of the limited time available. Therefore, the members voted to hold the 1976 meeting (United Kingdom) in March or April rather than in the fall.

My transportation to the meeting was funded by a National Science Foundation Travel Grant through the efforts of the Coal Petrology Committee of the GSA Coal Geology Division.

GSA members interested in more detail on particular activities or in reports of the ICCP are invited to telephone or correspond with me.

— Neely H. Bostick
Coal Section, Illinois State Geological Survey
Urbana, Illinois 61801 (phone: 217-344-1481)

# AGI scholarships awarded to minority students

The number of minority scholarship recipients supported by the American Geological Institute, its member societies, companies, and individuals increased from 23 to 37, or 61 percent, from 1974-1975 to 1975-1976. The dollar amount of the scholarships awarded increased from $13,050 to $31,800, or 141 percent.

In addition to the six minority scholars selected for support for 1975-1976 at the November 1974 meeting of the Advisory Committee to the AGI Minority Participation Program, 31 were picked when the Advisory Committee met at the Geological Society of America headquarters in Boulder, Colorado, on May 22-23, 1975. They are listed below.

Of the 31 minority scholars, three are specifically supported by the National Association of Geology Teachers and are designated NAGT Minority Scholars. They are Rhonda Davis, Lucia Kuizon, and Carlos Mendoza.

Recipients are *Ricardo Aguilar,* Mexican-American Earth-science sophomore at Grand Valley State College, Allendale, Michigan; *Manuel Berumen,* Mexican-American geology senior at Rice University; *Everett Carter,* Black physics-geophysics junior at M.I.T.; *Rhonda Davis,* Black Earth-science sophomore at Adelphi University, Garden City, New York; *Fernando Fernandez,* Mexican-American geology junior at Texas Southern University (TSU); *Manuel Fernandez,* Mexican-American geology graduate student at USC; *Blas Gonzales,* Mexican-American geology junior at Boise State University, Idaho; *Frederick Guidry,* Black geophysics graduate student at Cornell; *Johnny Gutierrez,* Mexican-American geology sophomore at TSU; *Sylvia Gutierrez,* Mexican-American geology freshman at TSU; *Constance Hill,* Black geology graduate student at Rennselaer Polytechnic Institute; *Toya Horn,* Black geology graduate student at the University of Washington; *Wayne Hunt,* American Indian geology junior at Campbell College, Buie's Creek, North Carolina; *Karen Jackson,* Black Washington, D.C., high school graduating senior and entering oceanography freshman in Florida or Maryland; *Dean Jones,* Black geology graduate student at Kent State; *Lucia Kuizon,* Puerto Rican geology graduate student at Indiana University; *Emmitt Lockard,* Black geology senior at Tennessee Tech; *Gonzalo Lopez,* Mexican-American math-geology sophomore at TSU; *Raymond Lopez,* Mexican-American geology graduate student at the University of Toledo; *Celestino Lucero,* Mexican-American Earth-science sophomore at New Mexico Highlands University (NMH), Las Vegas; *Carlos Mendoza,* Mexican-American geology junior at the University of Wisconsin-Milwaukee; *Cynthia Norris,* Black geology senior at Kent State; *Kim Perez,* Mexican-Japanese-American geology junior at Western Illinois; *Raymond Perez,* Mexican-American geology senior at Western Michigan; *Philip Reed,* Black geology senior at the University of Colorado; *Richard Scott,* Mexican-American Denver graduating high school senior and entering oceanography freshman at the University of Miami; *Richard Sheppy,* Black geology graduate student at the University of Houston; *Joseph Torrez,* Mexican-American Earth-science senior at NMH; *Richard Vega,* Mexican-American geology graduate student at Texas A&M; *Nickie Williams,* Black geology freshman at the University of New Orleans transferring to Virginia State College; *Ella Woods,* Black geology graduate student at the University of North Carolina.

Member societies that have contributed or pledged contributions to the 1975-1976 scholarship fund are the American Geophysical Union, Geological Society of America, National Association of Geology Teachers, Seismological Society of America, Society of Economic Geologists, Society of Economic Paleontologists and Mineralogists, and the Colorado Section of the American Institute of Mining, Metallurgical, and Petroleum Engineers.

Companies that have contributed or pledged are American Metal Climax Foundation, Inc.; Exchange Oil and Gas Company; EXXON USA; General Crude Oil Company; Kennecott Copper Corporation; Kinemetrics, Inc.; Marathon Oil Company; Natural Gas Pipeline Company; Sun Oil Company; Union Oil Company; and Utah International, Inc.

— L. C. Pakiser
Chairman, Advisory Committee to the
AGI Minority Participation Program

## Bicentennial Conference on History of Geology

At the request of the U.S. National Committee on History of Geology, a Bicentennial Conference on History of Geology in America will be held at the University of New Hampshire, Durham, in middle October 1976. It is being organized by Cecil J. Schneer, secretary of the U.S. National Committee and professor of geology and professor of history of science at the university.

Theme of the conference will be the first 200 years of geology in America. It is expected the analyses will be chronologic, disciplinary, geographic, and biographic. It is hoped that a major lecture can be included on recent history by one or more of the key figures in development of the most active current ideas of geology, as a case history in living history of science. A volume of the essays presented at the conference is in the planning stage. The conference format will somewhat resemble that of the very successful conference on history of geology in 1967 at Rye Beach, New Hampshire, also organized by Professor Schneer.

If you would like further information, please write to George W. White, Department of Geology, University of Illinois, Urbana, Illinois 61801.

# Microform Publication series well under way

Since the adoption of the Microform Publication series in May, the Society has published *Environmental Geology: A Selected Bibliography* by Vivian S. Hall, has in press *Mineral Resources of China* by A. B. Ikonnikov, and has agreed to publish *Pennsylvanian Conodont Biostratigraphy and Paleoecology of Northwestern Illinois* by Glen K. Merrill. Under consideration for publication in the series are a group of symposium papers on peat and another paleontology paper. Each year, the Society intends to publish in the Microform Publication series all of the data placed in its depository that year in order that these data will be more widely available.

Obviously, the new series is already well on its way to serve serious needs for publishing large amounts of information rapidly and at less cost than book form.

Several innovations are planned in order to accommodate special needs or to make it as easy as possible to read the material. For example, all of the maps in the paper on mineral resources of China will be placed in a group on one of the microfiche. In the paper by Merrill, page-size figures and tables will be repeated each time that they are called out. The microfiche will also be accompanied by 3" x 5" photographs of conodonts. Such prints will provide excellent detail of fossils or other critical information.

It is possible also to provide 35-mm positive or negative film strips of critical photographs so that they can be projected or used to obtain enlarged photographs. Color or black and white maps can also be provided in 35-mm film strips, as photographic prints, or as 3" x 5" color film transparencies. Each innovation will add to the cost, but total cost will be less than it would be if the information were issued in book form.

GSA uses a standard 4" x 6" film card (microfiche) with space for 98 frames (pages) on it. Standard microfiche readers with a 24x magnification lens are available from several manufacturers for prices ranging from about $100 to about $250. Most large libraries have equipment for reading microfiche, and many have equipment for enlarging and copying the material. Pocket readers can be purchased for as little as $25.

The procedure for publishing on microfiche is moderately simple. Two copies of each manuscript should be provided as if it were to be reviewed for the *Bulletin* or a GSA book. The manuscript must be typed double spaced, with one-inch margins on the four margins of the typescript. Illustrations should be legible for review.

Two reviews are obtained, and the author is advised of the results. Manuscripts acceptable for publication are returned to the author for revision and preparation of the typescript and illustrations for publication on microfiche. The typescript returned by the author will be the copy that is photographed and reduced for reproduction on microfiche. The Society will provide specific instructions on preparation of final copy.

Collections of papers, such as for a symposium, will be collected by a volume editor, reviewed by peers of the volume editor's choice, and when reviews and revisions are completed, submitted to GSA. Ordinarily, these papers will not need further review.

Once accepted by the Society, papers can be published in six weeks. The purchase price will vary but will average about $1.50 per microfiche if more than three fiche are used. Thus, a standard 8½" x 11" page of typescript can be provided to readers at a cost to them of about 1.5 cents (98 frames on a microfiche).

Papers published on microfiche have the same authenticity as any other peer-reviewed paper, and are copyrighted and catalogued by the Library of Congress.

## Nominations Committee asks members' suggestions

The Committee on Nominations seeks members' advice in one of the most important contributions that can be made to the health of the Society. Early in 1976, the committee will draw up a list of Members or Fellows whom they consider to be suitable replenishments for the gradually changing group that guides and manages Society affairs. Their final lists will be presented to the Council in May. In its turn, the Council will decide on a slate of officers to be placed on the ballot for the fall election. Chances are that a single slate will be presented for vote of the membership, though write-in votes are encouraged and are always welcome. The single slate concept, however, is all the more reason why your advice is needed for the Committee on Nominations. Its members cannot possibly know all of the potential leaders of the Society—they need your help. Nominations are to be made for president (usually the incumbent vice-president), vice-president, treasurer, and four councilors.

All suggestions received by February 1, 1976, will receive careful consideration. Write directly to headquarters. Suggestions will be forwarded to the committee.

To ensure thorough consideration by the committee, please back up each suggested nomination with a brief biographical sketch and a summary of his or her chief contributions to geology.

# October BULLETIN briefs

*Brief summaries of articles in the October 1975 GSA* Bulletin *are provided on the following pages to aid members who chose the lower dues option to select* Bulletin *separates of their choice. The Document Number of each article is repeated on the coupon and mailing label in this section.*

☐ 51001—Early Mesozoic tectonic evolution of the western Sierra Nevada, California. *Richard A. Schweickert, Department of Geological Sciences and Lamont-Doherty Geological Observatory of Columbia University, New York, New York 10027; Darrel S. Cowan, Department of Geological Sciences, University of Washington, Seattle, Washington 98195.* (8 p., 3 figs.)

Prebatholithic rocks of Mesozoic age in the Sierra Nevada can be interpreted as remnants of ancient volcanic arcs, subduction complexes, and sequences of oceanic lithosphere. Two partly coeval subparallel volcanic arcs, one in the western foothills and the other in the northern and eastearn Sierra Nevada, are juxtaposed. The western arc was an east-facing island-arc complex that evolved through a series of steps including formation of a remnant arc and interarc basin. The eastern arc was a west-facing marginal arc that was constructed on the edge of North America. Both arc-subduction complexes consumed intervening oceanic lithosphere and collided during the Late Jurassic Nevadan orogeny. Generation of magmas in both arcs apparently ceased at about this time, and renewed subduction was initiated west of the island arc in latest Jurassic time, giving birth to the Franciscan-Sierran arc-trench complex. Fault zones and mélanges in the western Sierra Nevada reflect the complex suturing at the collision boundary. Pre-Tithonian ophiolite at the base of the Great Valley sequence in the Coast Ranges originated in a back-arc or marginal basin setting with respect to the coeval Sierran foothills arc.

☐ 51002—Metamorphic and deformational processes in the Franciscan Complex, California: Some insights from the Catalina Schist terrane. *J. P. Platt, Department of Geology and Mineralogy, University of Adelaide, Adelaide, South Australia 5001.* (11 p., 9 figs.)

On Santa Catalina Island, blueschist is overlain by glaucophanic greenschist, which is overlain in turn by amphibolite and ultramafic rock. These three units are juxtaposed along sub-horizontal postmetamorphic thrusts; tectonic blocks of amphibolite are distributed along the thrust between the greenschist and the blueschist. Metamorphism occurred in a newly started subduction zone, where an inverted thermal gradient developed below the hot hanging-wall peridotite. Postmetamorphic eastward underthrusting along surfaces of varying dip can explain the present structural relationships.

Tectonic blocks of glaucophana-epidote schist, amphibolite, and eclogite elsewhere in the Franciscan Complex may be disrupted remnants of similar metamorphic zones.

The gross decrease in age and metamorphic grade westward across the Franciscan results from successive underthrusting and accretion of progressively younger slices of supercrustal material, concurrent with uplift and erosion. Pressure-temperature conditions of metamorphism in each east-dipping tectonic slice will increase downdip. At any given time, older, more easterly slices will have been uplifted farther, hence metamorphic grade in the exposed edges will increase eastward and structurally upward.

If erosion is faster than accretion for a time, younger slices will be metamorphosed at lower pressures than were the older higher ones. Simple reverse faulting can then produce the observed interleaving of rocks of different metamorphic grade.

☐ 51003—Aeromagnetic study of the Mid-Atlantic Ridge near the Oceanographer Fracture Zone. *J. D. Phillips, Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543 (present address: Department of Geodesy and Geophysics, Cambridge University, Cambridge, England); H. S. Fleming and R. H. Reden, Naval Research Laboratory, Washington, D.C. 20375; W. E. King, Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543; R. K. Perry, Naval Research Laboratory, Washington, D.C. 20375.* (10 p., 9 figs., 2 tbls.)

An aeromagnetic study was conducted over the Oceanographer Fracture Zone on the Mid-Atlantic Ridge between 33° to 37°N and 31° to 39°W. A seafloor-spreading interpretation of the magnetic anomalies reveals that the ridge crest is formed of short, en echelong segments 40 to 60 km long, offset by transform fractures. An average spreading rate of about 1.1 cm/yr active over the last 10 m.y. can be fitted to some ridge crest anomalies. However, positive identification of the outer flank anomalies is not possible. The ridge crest anomalies younger than 7 m.y. old (anomaly 4) show a general trend of N30°E, but anomalies between 9.3 and 17.5. m.y. old have trends of

about N8°E. The oldest flank anomalies trend about N35°E. Application of the anomaly trend superposition technique to account for the offset anomaly and fracture-zone pattern has allowed a new calculation of rotation pole parameters for the North American–African plate systems. The major change in the pole location between anomalies 2, and 5 about 7 m.y. ago appears to have been accompanied by the creation of a new transform fracture pattern with old fractures terminating and new ones being formed. Comparison of the two general pole locations deduced here with poles determined by others for the earlier opening history of the North American–African plate system shows that all finite poles lie in either of these locations. This suggests that a bi-stable dynamic equilibrium condition has prevailed throughout the opening history, with the rotation poles being located south of Iceland during the earliest period (200 to 80 m.y. ago) and the latest period (∿7 m.y. ago to the present) of opening. During the intervening period, the poles were located near Svalbard.

☐ 51004—Trace-element and organic carbon content of surface sediment from Grand Traverse Bay, Lake Michigan. *Anita Baker-Blocker, Edward Callender, and Paul D. Josephson, Department of Atmospheric & Oceanic Science, University of Michigan, College of Engineering, Space Research Building, 2455 Hayward, Ann Arbor, Michigan 48105 (present addresses: Callender, U.S. Geological Survey, Reston, Virginia 22092; Josephson, Fort Lauderdale Public School System, Fort Lauderdale, Florida 33313).* (5 p., 3 figs., 2 tbls.)

Grand Traverse Bay occupies a drowned preglacial river valley and is separated from Lake Michigan by a shallow sill. The surface sediment of the bay is largely calcareous mud with a high content of organic carbon. The trace-element concentration of acid-peroxide extracts from the sediment is a function of the mean grain size; the higher trace-element concentrations are found in extracts prepared from the finer grained surface sediment.

Fine grain sizes, high organic carbon content, and high trace-element content are found to be similar in surface sediment from the central trough of the East Bay and from three stations in the lower West Bay, an area in which the sedimentation is influenced by the Boardman River. Regression equations that treat mean grain size, expressed in phi units, as the independent variable have been developed; these equations can be used to estimate trace-element content of acid-peroxide extracts prepared from surface sediment. The regression equations show that sediment being deposited in the Boardman plume area of the lower West Bay, compared to surface sediment in other parts of the bay, is enriched in Cu, Fe, Mn, Zn, and organic carbon.

☐ 51005—Strain, fractures, and pressure solution in natural single-layer folds. *R. H. Groshong, Jr., Cities Service Oil Company, Exploration & Production Research, Box 50408, Tulsa, Oklahoma 74150.* (14 p., 24 figs., 2 tbls.)

Intragranular strain has been measured by the twinned calcite strain-gage technique from the hinges and limbs of three single-layer minor folds with limb dips of 15°, 48°, and 67°. The folds are in unmetamorphosed, Silurian-age limestone beds enclosed in shale, in the Appalachian Valley and Ridge province of central Pennsylvania. In all three folds, the maximum compressive strain axes are subparallel to bedding and tend to plunge toward the inner arcs of the hinges. The principal deviatoric compressive strains in the fold cross sections range from -0.48 ± 0.77 to -4.75 ± 0.78 percent; the largest compressive strains are in the gentlest fold and the smallest ones are in the tightest fold. Syntectonic stylolites are abundant in the folds and approximate a fanning cleavage. Filled extension fractures occur normal to bedding on the outer arc of the hinges of the two tightest folds. Filled fractures on the limbs of the same folds began as extension fractures subparallel to bedding and evolved into throughgoing thrust faults. A significant amount of the folding deformation is evidently accomplished by pressure solution and by displacement on fractures.

The folds are interpreted as buckle folds and distinguished from transverse bends and passive folds on the basis of the mechanical contrast between the limestone and enclosing shale beds and the orientation and distribution of the principal strain axes, stylolites, and fractures. The orientations of the principal strain axes are best fit by buckle-fold models. Strain models of pure bending, layer-parallel shear, and shear parallel to the hinge plane are shown to be inadequate by themselves even as first-order approximations.

A simple rheological model including intragranular strain and pressure solution fits the inferred relationships between these features. The model predicts that when conditions are suitable for pressure solution, more of the strain will occur by this mechanism than by twin gliding and related mechanisms. This can explain the overall low values of measured intragranular strain.

☐ 51006—Tomstown Dolomite (Lower Cambrian), central Appalachian Mountains, and the habitat of *Salterella Conulata*. *Juergen Reinhardt, Maryland Geological Survey, Baltimore, Maryland 21218 (present address: U.S. Geological Survey, National Center Stop 928, Reston, Virginia 22092); Edward Wall, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, Maryland 21218 (present address: U.S. Geological Survey, Conservation Division, Metairie, Louisiana 70011).* (4 p., 7 figs., 1 tbl.)

Measured sections in the Tomstown Dolomite, Washington County, Maryland, indicate a considerably thinner section of carbonate rocks than in Virginia. *Salterella conulata* Clark, found at three previously undescribed localities, is confined to a narrow stratigraphic interval and may have biostratigraphic value. *S. conulata* is a faunal component in the lagoon-bay portion of an Early Cambrian tidal flat complex.

☐ 51007—Origin of andesite and dacite: Evidence of mixing at Glass Mountain in California and at other circum-Pacific volcanoes. *John C. Eichelberger, Department of Geology, Stanford University, Stanford, California 94305 (present address: Geosciences Group, Los Alamos Scientific Laboratory, University of California, Los Alamos New Mexico 87544).* (11 p., 7 figs., 4 tbls.)

The intimate association of basalt, andesite, dacite, and rhyolite within a volcanic center suggests that these rocks are genetically related. Individual lava flows that show a gradation in composition may preserve maximum evidence of the magmatic processes producing this association. One such flow of rhyolite to dacite composition, Glass Mountain in northern California, was formed by contamination of rhyolite magma as it intruded the basaltic flows of the Medicine Lake Highland shield volcano. Although dacite flows and domes commonly show less variation in composition than the Glass Mountain flow, many show similar evidence of contamination by basalt by the presence of abundant basaltic inclusions and phenocrysts and phenocryst clots from those inclusions. Similarly, many andesite flows contain rhyolitic inclusions, rhyolitic bands, and phenocrysts appropriate to rhyolite. These observations indicate that andesite and dacite are hybrid rocks that are formed when rising primary basalt and rhyolite magmas either become contaminated with the glassy debris of the volcanic pile or mix with each other directly. It appears that partial melting usually produces magma of rhyolitic and basaltic compositions and that any subsequent fractional crystallization is of limited importance.

☐ 51008—Preferred position model and subsurface symmetry of valleys. *Robert C. Palmquist, Department of Earth Science, Iowa State University, Ames, Iowa 50010.* (7 p., 7 figs., 4 tbls.)

The preferred position model postulates that the shape of the transverse profile of a valley is a product of the relative duration of occupation by the stream of each position across the valley. Data on distribution of streams in their valleys indicate that streams preferentially occupy the outer half of their valleys at a bend but have no preferred position within straight reaches. The symmetry variations in the transverse profiles of bedrock valleys reflect these position variations by being asymmetrical at bends and symmetrical in straight reaches. Borehole data suggest that, on the average, maximum flood scour occurs to a depth twice the bank height. These data indicate that many streams that are flowing on alluvium may scour the bedrock floor of their valleys. These conclusions indicate that some streams that flow on alluvium and appear underfit may, in fact, be fit and that some aspects of the underfit stream model are in need of re-evaluation.

☐ 51009—Seismotectonics of the Cape Mendocino, California, area. *G. W. Simila, W. A. Peppin, and T. V. McEvilly, Seismographic Station, Department of Geology and Geophysics, University of California, Berkeley, Berkeley, California 94720.* (8 p., 6 figs., 2 tbls.)

A radio-telemetered network of high-grain seismographs allowed determination of hypocenters for 150 earthquakes with depths of 5 to 30 km in the Cape Mendocino area. Analysis of *P*- and *S*-wave arrival times indicates that the region exhibits a Poisson's ratio in excess of 0.3. The pattern of seismicity reveals a diffuse distribution. Composite fault-plane solutions indicate general north-south compression, consistent with generally inferred movements of the Pacific, North American, and Gorda plates. Near the cape, however, the principal compression is oriented roughly northwest-southeast, consistent with Gorda plate motion normal to the ridge. Right-lateral strike-slip movement appears to be the dominant faulting pattern. Thrust-fault mechanisms seen at the continental margin near the cape may reflect late Cenozoic underthrusting at the Gorda plate boundary. East-west cross sections of hypocenters show no indications of an active Benioff zone. These results are consistent with the hypothesis that the San Andreas fault joins the Mendocino fracture zone, which absorbs most of the right-lateral strike-slip motion. The Gorda plate is now deforming near the continental margin, apparently the consequence of transition from thrusting near the cape to right-lateral faulting northward as the mode accommodation of the relative plate motions.

☐ 51010—Late Cenozoic volcanism in the Aleutian Arc: Information from ash layers in the northeastern Gulf of Alaska. *K. F. Scheidegger and L. D. Kulm, School of Oceanography, Oregon State University, Corvallis, Oregon 97331 (present address, Scheidegger: Marine Sciences Institute and Department of Geology and Geography, University of Connecticut, Groton, Connecticut 06340).* (6 p., 4 figs., 2 tbls.)

A sequence of ash layers recovered from site 178 of the Deep Sea Drilling Project in the Gulf of Alaska was studied to determine the nature of highly explosive volcanic eruptions associated with the Aleutian Arc and Alaskan Peninsula during the last 8 m.y. The major-element chemistry of 25 distinct ash layers was determined. When the analyses are plotted on conventional major-element variation diagrams, the unusual, highly evolved, calc-alkalic characteristics of the ashes are apparent. There is a good correlation of certain indices of the degree of chemical evolution of each ash ($SiO_2$ content and Larsen index) with sample age. Both parameters vary cyclically, with maximum values of both indices occurring at present, 2.5, and about 5.0 m.y. ago. The cause of the cyclic activity, as well as discontinuous volcanic activity reported for other areas by other investigators, is not precisely known. However, we suggest that variable rates of subduction provide a viable hypothesis for discontinuous volcanic activity associated with convergent plate boundaries.

☐ 51011—Gravity and magnetic investigation of the Twin Sisters dunite, northern Washington. *George A. Thompson, Department of Geophysics, Stanford University, Stanford, California 94305; Russell Robinson, U.S. Geological Survey, Menlo Park, California 94025.* (10 p., 9 figs., 2 tbls.)

The Twin Sisters dunite body of northern Washington, an alpine-type ultramafic body, is upper-mantle material tectonically emplaced in the crust. Gravity and magnetic anomalies indicate that the body has a base at shallow depth. It is a flat, serpentine-sheathed pod of peridotite, 16 km by 6 km and 2 km thick, thickened and more highly serpentinized near its western margin. The pod is elongate, parallel to a thrust fault, and a branch of the magnetic anomaly continues northwest along the thrust; this suggests emplacement by thrusting. Serpentine is more abundant at depth than in outcrop; this might explain late movement along near-vertical contacts if a pistonlike uplift accompanied expansion during serpentinization.

☐ 51012—Chemistry of ferromanganoan sediment of the Bauer Deep. *Frederick L. Sayles, Department of Chemistry, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543; T.-L. Ku, Department of Geological Sciences, University of Southern California, Los Angeles, California 90007; Paul C. Bowker, Department of Chemistry, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543.* (9 p., 3 figs., 7 tbls.)

Sediment from the Bauer Deep in the east Pacific is commonly carbonate free, containing only small amounts of detrital minerals, and is enriched in Fe, Mn, Cu, Co, Ni, Zn, and Ba. An Fe-montmorillonite and ferromanganese compounds, occurring both as colloids and micronodules, are the principal phases present. A large proportion of the Fe occurs in the Fe montmorillonite, which appears to originate from the interaction of hydrothermal solutions with sea water. Adsorption and incorporation of metals from sea water on the micronodules or the Fe and Mn oxide colloids best explain the elemental relationships observed for Fe, Mn, Cu, Zn, and Ni in the oxide fraction of the sediment. These processes are responsible for the enrichment of the sediment in Ni, Co, and possibly Mn. Enrichment in Cu and Zn occurs in both the oxides and the Fe montmorillonite.

Sedimentation rates measured in one core provide a minimum value of 2.5 mm/$10^3$ yr. The rate of accumulation of authigenic material is more than 2 mm/$10^3$ yr. Elemental accumulation rates of Fe, Mn, Cu, Ni, and Zn are comparable to those found near the crest of the East Pacific Rise.

☐ 51013—U-Pb age of zircon from Vernal Mesa-type quartz monzonite, Unaweep Canyon, west-central Colorado. *M. E. Bickford and T. F. Cudzilo, Department of Geology, University of Kansas, Lawrence, Kansas 66045 (present address, Cudzilo: Chevron Oil Company, Minerals Staff, Box 599, Denver, Colorado 80201).* (3 p., 2 figs., 1 tbl.)

The Vernal Mesa-type quartz monzonite is an igneous body of batholithic proportions of Precambrian age in western Colorado and eastern Utah. A Rb-Sr age of 1,480 ± 40 m.y. has been previously reported; other Rb-Sr data reported suggest that the rock might be as much as 200 m.y. older than this. The U-Pb age of the suite of zircons is 1,443 ± 22 m.y., confirming that the Vernal Mesa was formed during the igneous activity which was widespread in the southwestern and central United States 1,450 to 1,500 m.y. ago.

☐ 51014—Incremental $^{40}Ar/^{39}Ar$ ages of biotite and hornblende from the northeastern Reading Prong: Their bearing on late Proterozoic thermal and tectonic history. *R. D. Dallmeyer, Department of Geology, University of Georgia, Athens, Georgia 30602; J. F. Sutter and D. J. Baker, Department of Geology and Mineralogy, Ohio State University, Columbus, Ohio 43210.* (9 p., 5 figs., 4 tbls.)

K-Ar and $^{40}AR$-$^{39}Ar$ incremental-release ages have been determined for biotite and hornblende from Grenville basement gneiss units of the northeastern Reading Prong west of the Hudson River. Biotite ages range from 768 ± 15 to 819 ± 18 m.y. (average of 790 m.y.), and those for unaltered hornblende range from 869 ± 20 to 949 ± 24 m.y. (average of 900 m.y.). Individual biotite and hornblende release spectra show negligible variations in $^{40}AR/^{39}Ar$ ratios, and total-gas and incremental-release ages are similar.

These ages are discordantly younger than zircon ages of about 1,060 m.y. from this area; however, the consistent correlation of K-Ar, total-gas, and incremental-release ages argues against the discordancy resulting from partial argon loss during a distinct post-Grenville thermal event. The correlation suggests that the ages date times during post-Grenville metamorphic cooling when temperatures dropped below those required for argon retention in the minerals.

The ages place constraints on postmetamorphic cooling history and allow development of a model for the late Proterozoic uplift of this segment of the Appalachian Grenville terrane.

☐ 51015—Geochronology of Precambrian metamorphic rocks, north-central New Mexico. *Randall L. Gresens, Department of Geological Sciences, University of Washington, Seattle, Washington 98195.* (5 p., 2 figs., 4 tbls.)

New K-Ar and Rb-Sr data have been obtained for Precambrian rocks of north-central New Mexico. K-Ar dates fall into one group with a mean of 1,325 ± 13 m.y. and another with a mean of 1,257 ± 21 m.y. The former conforms to the 1,350-m.y. B.P. event reported in previous literature. The latter defines a 1,250-m.y. B.P. event that is both tectonic and hydrothermal. Limited new Rb-Sr data support a 1,425-m.y. isochron. Thus, there are four events for the Precambrian rocks of Northern New Mexico: (1) 1,673-m.y. B.P. intrusion of "Embudo Granite"; (2) 1,425-m.y. B.P. tectonic and metamorphic event accompanied by pegmatite emplacement; (3) 1,350-m.y. B.P. thermal event; and (4) 1,250-m.y. B.P. tectonic and hydrothermal event.

☐ 51016—Petrology of the Older Series lavas from Mauritius, Indian Ocean. *Alistair N. Baxter, Department of Geology, University of Edinburgh, Edinburgh EH9 3JW, Scotland (present address: Department of Geology, City of London Polytechnic, 146-150 Minories, London, England).* (10 p., 10 figs., 8 tbls.)

The Older Series volcanics of Mauritius form a widely differentiated transitional basalt suite, in which two distinct stages of activity can be recognized. The first stage, shield-

building, is composed principally of alternating picrite-basalt flows and agglomerate; this is followed by a second, evolved stage composed of feldsparphyric basalt, hawaiite, mugearite, and high-level trachytic intrusive rocks.

Three suites of nodules, each with specific associations, occur in the volcanic rocks; these are probably derived from layered subvolcanic cumulates. The nodular suites are (a) dunite and wehrlite (restricted to the picrite basalt); (b) bytownitic anorthosite (found only in the feldsparphyric basalt); and (c) mafic syenite (exclusive to the trachytic intrusive rocks). There is some evidence, from the extremely calcic nature of the plagioclase in the anorthosite nodules and feldsparphyric basalt and from the presence of kaersutite in evolved lava, that a hydrous period of crystallization developed—probably in the later stages of activity.

Variation diagrams indicate the close control of phenocryst mineralogy on bulk-lava chemistry, compositions with more than 5 or 6 percent MgO lying along a pronounced olivine + clinopyroxene control line and more evolved lava along a trend developed from fractionation of olivine + clinopyroxene + plagioclase + titanomagnetite. Trachytic compositions show pronounced trace-element trends, probably controlled by anorthoclase fractionation, but it can be demonstrated that they are unlikely to represent successive differentiates from a common trachytic magma.

A distinct "silica gap" within the series, reflected in the absence of benmoreite, is tentatively ascribed to secondary boiling phenomena.

☐ 51017—Topologically random channel networks in the presence of environmental controls. *Athol D. Abrahams, School of Geography, University of New South Wales, Kensington, 2033, New South Wales, Australia.* (4 p., 1 fig., 5 tbls.)

The occurrence of topologically random channel networks in the presence of strong environmental controls does not necessarily indicate that network topology is insensitive to such controls. In areas where environmental controls have a preferred orientation, certain topologically distinct channel networks may be promoted where networks of a given magnitude flow in one direction and inhibited where they flow in another; but these biases in network topology may compensate for one another so effectively that they do not give rise to identifiable systematic deviations from topological randomness. This theme is illustrated by analyses of magnitude-4 channel networks from three aras of southeastern Australia. Goodness-of-fit tests indicate that the exhaustive samples of networks from these areas could have been drawn from topologically random populations. However, similar tests applied to subsamples selected according to network flow direction reveal biases in network topology in two of the areas. These biases, which are apparently due to microclimatic controls, signify that, although the networks in each area may belong to a topologically random population, they are not composed of randomly merging stream channels.

☐ 51018—K-Ar ages of some volcanic rocks from the Cook and Austral Islands. *G. Brent Dalrymple, U.S. Geological Survey, Menlo Park, California 94025; R. D. Jarrard, Marine Physical Laboratory, Scripps Institution of Oceanography, La Jolla, California 92037; D. A. Clague, Geological Research Division, Scripps Institution of Oceanography, La Jolla, California 92037 (present addresses: Jarrard, Department of Geology, University of California, Santa Barbara, California 93106; Clague, U.S. Geological Survey, Menlo Park, California 94025).* (5 p., 1 fig., 1 tbl.)

K-Ar age measurements on 19 volcanic rocks from Rurutu, Mangaia, Rarotonga, and Aitutaki in the Cook-Austral chain do not show a systematic increase in the age of the volcanoes to the west-northwest away from Macdonald Seamount as predicted by the melting-spot hypothesis and suggested by geomorphic evidence. Ages determined for alkalic basalt samples from Rurutu range from 1.02 to 1.09 m.y., for Mangaia from 16.6 to 18.9 m.y., and for Aitutaki from 0.66 to 0.77 m.y. Two distinct periods of volcanism on Rarotonga were dated at 1.8 and 1.2 m.y. B.P. The relation between the dated units and the main shield-building stage of these volcanoes is uncertain.

☐ 51019—Tectonic implications of new geochronological data from the Limpopo belt at Pikwe, Botswana, southern Africa. *Martha H. Hickman and John Wakefield, Department of Earth Sciences, University of Leeds, Leeds LS2 9JT, England (present address, Wakefield: Mindeco Noranda, Box 4370, Lusaka, Zambia).* (5 p., 4 figs., 5 tbls.)

A Rb-Sr isotope study of gneiss units in the Pimpopo orogenic belt at Pikwe, Botswana, in southern Africa confirms two previously established isotopic events in the belt at 2,700 and 2,000 m.y. B.P. The new data make it possible to relate these ages to specific events in the tectono-metamorphic history of the Pikwe area and to show that some deformation took place substantially later than the emplacement of the satellite extensions of the Great Dyke (2,600 ± 120 m.y. ago), which cut Limpopo belt gneiss units to the north in Rhodesia.

In the first recognizable tectono-metamorphic event, the formation of regional gneissic foliation was accompanied by granulite facies conditions and extensive partial melting. This metamorphism has a Rb-Sr whole-rock isochron age of 2,660 ± 40 m.y. ($2\sigma$) and resulted in the complete isotopic homogenization of Sr across distances of at least 350 m in the gneissic succession.

Upright folds were superimposed on recumbent folds in a late polyphase event 2,100 to 2,000 m.y. ago. Minor structures in a late D3 shear zone show a transition from ductile to brittle deformation, and from early D2 to late D3, metamorphic conditions fell from upper amphibolite to greenschist facies. Upper amphibolite facies conditions caused near-complete isotopic rehomogenization of Sr on a scale of 7 cm; isotopic mixing was restricted to less than 25 cm.

☐ 51020—Episodic exposure of inselbergs. *C. R. Twidale and Jennifer A. Bourne, Department of Geography, University of Adelaide, Adelaide, South Australia 5001.* (9 p., 12 figs.)

Flared slopes, breaks of slope, tafoni, and gently inclined platforms occur together in the piedmont zone of many inselbergs. Similar assemblages of forms at various levels above the present hill-plain junction are interpreted as former piedmont zones that have been abandoned as the inselbergs have been episodically exposed. Correlation of these old piedmont assemblages with paleosurface rem-

nants of adjacent plains and uplands suggests that parts of the inselbergs are tentatively dated as Mesozoic, and many of the lower whalebacks are considered to be of Tertiary age.

Most of the discussion is concerned with Eyre Peninsula in South Australia, a region that diastrophically is and has been relatively stable and that has suffered progressive erosion.

☐ 51021dr—Geology of coral terraces, Huon Peninsula, New Guinea: Discussion and reply.

Discussion: *W. T. Ward, Commonwealth Scientific and Industrial Research Organization, Division of Soils, The Cunningham Laboratory, Mill Road, St. Lucia 4067, Queensland, Australia.*

Reply: *John Chappell, Department of Geography, S.G.S., Australian National University, Box 4, P.O., Canberra, A.C.T. 2600, Australia.*

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Discussion: *A.H.G. Mitchell, c/o UNDP, Post Office Box 650, Rangoon, Burma.*

Reply: *A.E.J. Engel, Scripps Institution of Oceanography, La Jolla, California 92037; Sonja P. Itson, Department of Geology, California State University, San Diego, California 92115; Celeste G. Engel, Scripps Institution of Oceanography, La Jolla, California 92037; Dale M. Stickney, Department of Geology, California State University, San Diego, California 92115; Edward J. Cray, Jr., Department of Geology, University of California, Davis, California 95616.*

## Bulletin separates available for one year

In January 1975, a membership dues option was initiated that permits ordering separate articles from the *Bulletin* in lieu of a *Bulletin* subscription. A similar dues option is being continued during 1976. As was announced originally, separates will be maintained in stock at headquarters for one year after the appearance of the article in the *Bulletin*. That is, separates from the January 1975 *Bulletin* will be available from headquarters for 12 months, but will not be available after February 1976.

The discontinuance of stock will be handled on a monthly basis so that separates from any issue will be available for ordering for one full year.

## Page charge policy explained

As most authors know who have submitted manuscripts to the Geological Society of America, the Society seeks to obtain contributions in the form of page charges from the institutions that sponsor the research reported in the articles. Although the decision to publish an article is not based upon the availability of funds for publication, authors of scientific articles published in the *Bulletin, Geology,* Special Papers, Memoirs, Engineering Geology Case Histories, and Maps and Charts are automatically queried about the availability of funds to support the processing and publication of their information.

The Society seeks a contribution of $50 for each printed page and $500 for each illustration larger than page size. These figures are about one-fourth of the cost for each page or large illustration, and contributions are received for considerably fewer than half of the pages or large illustrations that are printed. As a result, page charges provide only a small proportion of the publication funds.

The Society provides two opportunities for volunteer support of its publications program. Authors who do not have financial support for their research may, if they wish, make a volunteer (tax deductible) contribution in lieu of page charge contributions. Also, the annual dues statement provides the opportunity to make a tax deductible contribution at the time dues are paid.

Page contributions, although only a small fraction of the publication budget, nevertheless help to extend the publications program of the Society.

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## Honors and Awards Committee seeks suggestions

The Committee on Honors and Awards needs your help in nominating potential recipients of GSA's highest honors—the Penrose Medal, the Day Medal, and Honorary Fellowship. The criteria for these honors are described in the booklet *Council Rules, Policies, and Procedures,* or you can get a good idea of the kinds of scientists who have been honored in the past by glancing at the lists on pages xii-xiv of your *1975 Yearbook*.

Suggestions for consideration for 1976 awards must be received by headquarters by *January 15, 1976.* They will be forwarded to the appropriate subcommittee chairmen.

To ensure thorough consideration by the particular subcommittee, please back up each suggested nomination with a *brief biographical sketch* and a *summary of his or her chief contributions to geology.* In the case of the Penrose and Day Medals, a *selected bibliography* must accompany the nomination.