



# GSA news & information

VOLUME 3, NUMBER 12

G.S.A. ARCHIVES

DECEMBER 1981

## NEWS FROM GSA DIVISIONS

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

John C. Frye, Executive Director

### *from the Archaeological Geology Division*

#### **THE TWENTY-FIRST INTERNATIONAL ARCHAEOOMETRY SYMPOSIUM, MAY 17-22, 1981**

The twenty-first international Archaeometry symposium was held at Brookhaven National Laboratory, Upton, New York this year.

Note that the proceedings of the 1980 Paris symposium, published in *Revue d'Archéométric*, are available from L. Langoet, Université de Rennes, Campus de Beaulieu, Ave. du Général Leclerc, 35031 Rennes Cedex, B.P. 25A, France.

Note also that the 1982 Twenty-Second International Archaeometry Symposium will be held at Bradford, March 30-April 2, 1982. Enquiries should be sent to A. Aspinall or S. Warren at the Undergraduate School of Studies in Archaeological Sciences, University of Bradford, Bradford BD7 1DP, UK.

*The International Mountain Society (IMS)* (a non-profit organization incorporated in Colorado) submitted the following information to the membership: The Society has evolved from the work of numerous international organizations in recognition that the over-use and abuse of mountain lands have not only caused economic losses but also have become a major threat to human welfare. The goal of the IMS is to help solve mountain land-use problems by developing a foundation of scientific and technical knowledge on which to base management decisions. A major component of the Society, at least initially, will be its interdisciplinary scientific journal titled *Mountain Research and Development*. This will be co-published quarterly with United Nations University, with additional support from UNESCO. Membership in IMS is open to all individuals for an annual subscription of \$25, to students for \$18, and to institutions for \$45. All requests for further information, or subscriptions, should be addressed to: International Mountain Society, P.O. Box 3148,

Boulder, CO 80307, U.S.A. (D. Kamilli has a longer announcement concerning this organization which she could send upon request).

### *from the Coal Geologist*

#### **1981 CADY AWARD GOES TO CLAYTON G. BALL**

Congratulations are in order for Dr. Clayton G. Ball, our Division's 1981 recipient of the Gilbert H. Cady Award. This coveted award recognizes Dr. Ball's outstanding leadership in the field of coal geology. The award will be presented at the Coal Division Luncheon/Business Meeting on November 4, 1981, in Cincinnati, Ohio.

The Gilbert H. Cady Memorial Fund and Award were established in 1971 in honor of Dr. Cady, the outstanding American coal geologist. Past recipients of the Cady Award are James M. Schopf, Jack A. Simon, William Spackman, Jr., and Peter A. Hacquebard.

#### **ICCP MAY REPRINT HANDBOOK**

The International Committee for Coal Petrology is considering reprinting the 1963 Edition of the *International Handbook of Coal Petrography*. With this task in mind, they are seeking an indication of the number of copies of the reprinted handbook that might be needed over the next three years. If you would be interested in a copy or copies, you should advise Professor D. G. Murchison or R. Noel at your earliest convenience. Their address is Organic Geochemistry Unit, Department of Geology, Drummond Building, University of Newcastle, Newcastle Upon Tyne, NE1 7RU, United Kingdom.

The ICCP is considering this reprint even though they hope to publish a third edition of the handbook later in the 1980s.

#### **AUSTRALIAN REFERENCE BOOK ON COAL GEOLOGY**

The Geological Society of Australia's Coal Group is finalizing the editing of papers from the *1980 Symposium on Progress*

in *Coal Geology*. These detailed papers are expected to provide a useful text and reference book on Australian experience in coal exploration and mining geology. The papers are planned as two separate issues of their journal, *Australian Coal Geology*, and should be available by the end of the year.

#### SEDIMENTOLOGY OF COAL

The International Association of Sedimentologists' 11th International Congress on Sedimentology will hold a coal symposium at their meeting in Hamilton, Ontario, August 22-28, 1982. The attention of researchers with interest in the sedimentology of coal is drawn to this symposium titled, *Sedimentology of Coal and Coal-bearing Sequences*.

This symposium will deal with such aspects of coal as facies models of coal-bearing rocks and their depositional environments and the relationships between coal (peat) chemistry and petrography and the depositional environments of coal-bearing rocks. However, contributions emphasizing the importance of sedimentology as an aid in the exploration and development of coal are most welcome. Papers dealing with the relationships between coal rank, depth of burial and basin cyclicity and tectonics are also encouraged. For further information and/or to provide tentative topics for contribution, you are invited to communicate with the co-chairman R. A. Rahmani, Alberta Geological Survey, 3rd Floor, Terrace Plaza, 4445 Calgary Trail South, Edmonton, Alberta, Canada T6H 5R7, Tel. (403) 438-0555.

For a copy of the Congress First Circular, write to IAS Congress 1982, Department of Geology, McMaster University, Hamilton, Ontario L8S 4M1.

#### PENROSE PLANS DELAYED

Jim Palmer, Chairman of the *Resources and Reserves Committee*, reports that the Committee's planned Penrose Conference is postponed until the spring of 1982. If approved by GSA, the meeting will be held in New Harmony, Indiana. Jim is presently lining up sponsors for the conference.

### from the Engineering Geologist

#### EARTHQUAKE-GENERATED LANDSLIDES, 1971 SAN FERNANDO EARTHQUAKE

Dr. Bruce Clark and Dr. Beach Leighton of Leighton & Associates studied slope failures generated by the 1971 San Fernando earthquake under the National Earthquake Hazards Reduction Program. The failures were of two principal types: shallow soil slips involving weathered soils or colluvium, and rock falls or rock slides from steep exposed bedrock cliffs. The soil slips have been nearly obliterated by recent rains, but many bedrock failures appear little changed from their initial configuration and provide considerable insight into both their mode of failure and the hazard they represent.

The bedrock failures occurred from in situ loss of cohesion during the shaking process. Although the sites are characterized by a very steep headwall face, there is no evidence of either toppling or significant sliding along a rupture surface. Failure appears to be the result of heterogeneous motion of blocks during the earthquake itself. Existing joints widened and extended, literally shaking the slope apart. The most common rock types were conglomerates in the sedimentary sequence and blocky jointed gneisses and granite in the basement complex.

Most failures occurred on anti-dip slopes where bedding was not a factor. Joints were probably present before the earthquake but were discontinuous enough to allow large steep slopes to remain stable under static conditions. The post-earthquake slopes appear similar to the pre-earthquake slopes; previous failures have not eliminated future hazards.

New dynamic finite element models developed by Dr. Clark using a typical cross-section of the failed slope indicate that the slope geometry plays an important role in concentrating earthquake-related activity near the cliff face. The face shows a concentration of as much as a factor of two in maximum displacement during the earthquake.

#### TWO NEW PROFESSIONAL GROUPS FORMED

The *International Mine Water Association (IMWA)*, has been established with the following main objectives:

1. To improve exploitation of mineral deposits consistent with the desirable standards of safety against water hazards.
2. To increase protection of the environment against the impact of mine drainage and related activities.
3. To improve the utilization of mine waters.
4. To improve technology and economy of mine drainage control operations.
5. To create a forum for international exchange of information concerning the latest developments in the field of mine water problems.

International Mine Water Association  
Secretary

Department of Hydrogeology  
University of Granada

Apdo. de Correos 556 Granada Spain

An *International Cement Microscopy Association* was formed recently in Dallas, Texas. The objective of this association is the application of the various types of microscopic techniques to practical use in analyzing cement raw materials, clinker, cement, and concrete. The ultimate goal of this effort is better quality control, improved production, and energy conservation.

The chairman of the International Cement Microscopy Association is Walter W. Rowe, General Portland Cement, Inc., Dallas, Texas.

#### ENGINEERING GEOLOGY DIVISION AWARDS

At its annual meeting in 1979 the Management Board of the Engineering Geology Division approved the creation of a "Certificate of Appreciation" to be awarded by the Division to members for distinguished service. Through the efforts of Division Chairman for 1980, Allen W. Hatheway, and through the courtesy of his firm, Haley and Aldrich, Inc., of Cambridge, Mass., a handsome certificate, complemented with four of David Royster's outstanding landslide drawings, was prepared.

The first seven certificates bearing appropriate citations were awarded by 1981 Chairman, John S. Scott, to the following recipients at the Division's annual luncheon and business meeting held in Atlanta, November 1980:

*Donald R. Coates*—in editing the Engineering Geology Review Volume III, *Landslides*; and in bringing greater awareness to the profession of such hazards and their treatments, 1977.

*Richard W. Galster*—as Chairman in 1975, and as the architect of the revitalization of the Division.

*George A. Kiersch*—in editing Review Volume II, and four Case History volumes from 1963 to 1969, as Chairman in 1961, and in providing thoughtful guidance to the Division in the years thereafter.

*William J. Mallio*—in editorship of *The Engineering Geologist*, 1976 to 1979.

*W. Harold Stuart*—as Chairman in 1969, but especially in recognition of his representation of our conscience of tradition, and his key role in creation of the E. B. Burwell, Jr., Memorial Award.

*David J. Varnes*—in editing and guiding Division publications, as Chairman in 1977, and providing leadership in creating the U.S. National Committee for the International Association of Engineering Geology, achieved in 1980.

On the same occasion, Allen W. Hatheway, as past-Chairman of the Division, was presented with the Berkey gavel—both a handsome and functional memento crafted from a core of Boston pudding stone with a beautifully finished wooden handle and mounting board. It is fitting that the presentation, which re-establishes a tradition within the Division, was made to a person who had served the Division with enthusiasm and unstinting effort not only during his term as Chairman but also during his previous terms of office on the Division executive committee, and who was always mindful of the many contributions made by others to achieve the aims of the Division.

## *from the Geophysics Division*

### **GEOPHYSICS IN THE DECADE OF NORTH AMERICAN GEOLOGY**

The Decade of North American Geology (DNAG) sponsored by the Geological Society of America to celebrate its 1988 Centennial, has been organized to synthesize a wide range of geological, geochemical and geophysical data. These data will provide a fresh look at the North American Plate which should lead to new insight into the geology of the plate and geological processes which have fashioned it. The information will be brought together in 25 volumes of regional geology and a wide variety of correlation charts and maps. All plate-wide maps will be on the same 1:5,000,000 base map to facilitate comparisons and integration of data sets.

What role will the Geophysics Division play in this concentrated effort? Undoubtedly geophysicists will prepare chapters for the regional geology volumes and the GSA has become involved in preparing magnetic and gravity anomaly maps of North America. The Society of Exploration Geophysicists and the U.S. Geological Survey since 1975 have had a joint-program to produce gravity and magnetic maps of North America. Initially the joint effort was aimed at completing U.S. maps, but now that these maps are in final stages of preparation, the North American maps have become the focus of attention. In November 1980, preceding the annual SEG meeting, workshops were held to coordinate the efforts of several countries and organizations in the preparation of the North American maps. A. R. Palmer, Centennial Science Program Coordinator for the GSA's Decade of North American Geology, reviewed the DNAG program and plans for the map series. Both the magnetic and gravity map workshops agreed to prepare the maps in accordance with the Centennial Series specifications regarding projections, scale, etc. The GSA is now represented on the map committees and the maps will be published in conjunction with the Centennial Series.

These efforts represent a good start, but what more should be done by the Division? Hopefully, we can do quite a bit more. Several groups and individuals are working on maps of North America showing Moho depths, average crustal velocity, Pn

velocity and other geophysical parameters. It seems appropriate that we bring together those working on similar projects and produce even better maps under the aegis of the DNAG. The Executive Committee of the Division would like to have your suggestions regarding maps to be prepared and working committee memberships. We believe we should act soon, so let us hear from you in the near future. It is important for geophysical maps to play a major role in the DNAG Centennial Map Series.

W. J. Hinze  
A. R. Palmer

### **JOINT OCEANOGRAPHIC ASSEMBLY**

The next Joint Oceanographic Assembly will be held in Canada, at Dalhousie University, Halifax, Nova Scotia, August 2-13, 1982. This is the fifth in a series of international oceanographic assemblies; the last took place in Edinburgh, Scotland, in 1976.

The assembly is sponsored by the Scientific Committee on Oceanic Research and international organizations affiliated with it. A national organizing committee has been formed from representatives of Dalhousie; McGill University in Montreal, Quebec; the National Research Council of Canada; the Federal Department of Fisheries and Oceans; and the province of Nova Scotia. The scientific program will cover topics of broad interdisciplinary interest in marine science.

For more information, contact Leo O'Quinn, Executive Secretary, National Steering Committee for JOA, c/o Canadian Committee on Oceanography, 240 Sparks Street, Ottawa, Ontario, K1A 0E6 Canada.

### **SEISMOLOGICAL STATION IN CHINA**

The United States installed the first permanent seismological station in the People's Republic of China late last year. Located in the city of Kunming, in southern China, the station is part of the International Deployment of Accelerators (IDA) program, a network of 17 seismometers in 15 countries.

The monitoring equipment, installed by scientists from the University of California's Institute of Geophysics and Planetary Physics at Scripps Institution of Oceanography, measures long-period earth movements that result from major earthquakes. Information collected by cassette recording tapes is analyzed by computers in San Diego and is combined with data from other stations worldwide.

## *from the History of Geology Division*

### **TENTH INHIGEO SYMPOSIUM**

The Hungarian Geological Society (HGS; Ankerkőz 1, Budapest VI, H-1061) and supporting geological organizations in Hungary have issued the first circular for "INHIGEO '82," the 10th INHIGEO Symposium, to be held in Budapest, August 18-23, 1982. The symposium, "Development of Geological Mapping and Geocartography with Progress in Geological Thinking," will be held at the Hungarian Geological Institute. The meeting will include technical sessions, a special session on the centenary of the Department of Paleontology, Eötvös Loránd University, Budapest, and three proposed field trips—Danube bend, Transdanubian Central Range, and Pannonian basin—West Carpathians—Bohemia—Carpathian north foreland. Registration forms were due to the HGS before April 1, 1981; two copies of abstracts of papers (2-page maximum, double-spaced typescript)

were due to HGS before July 1, 1981. Dr. L. Alföldi, Deputy President, HGS, is chairing the Local Organizing Committee; Dr. E. Dudich is serving as the Committee's Secretary.

#### DIRECTORY OF RESEARCHERS IN THE HISTORY OF SCIENCE IN AMERICA

Volume 1, Number 3 (April 1981) of *History of Science in America: News and Views*, edited by Clark Elliott (Harvard Univ.), contains a 20-page directory of present researchers of the history of science in America. The directory's first part lists the names, addresses, and the research interests, current projects, and recent publications of 143 respondees to Dr. Elliott's request for information in an earlier issue. Twenty of these persons described their interest and activities in the history of the earth sciences. Part 2 of the directory includes the names and addresses of 254 other individuals on the newsletter's mailing list who did not send an entry for Part 1. The directory lists six persons who are also Division affiliates. According to Dr. Elliott, the tabulated entries indicate that "the mathematical and physical sciences, considered collectively, compare more-or-less on a par with the number interested in the biological and medical sciences. The earth sciences, considering their great importance especially in the 19th century, fare less well as an area of historical study."

#### DIVISION SYMPOSIUM, GSA—NEW ORLEANS, 1982

Ellen T. Drake (School of Oceanography, Oregon State Univ., Corvallis, OR 97331) is planning a session on topics in the history of geology in North America after 1879 as the Division's symposium at GSA—New Orleans, October, 18–21, 1982. Persons interested in presenting original work related to that interval should send the title and a brief summary of their proposed paper to Dr. Drake. As always, the Division encourages contributed papers based on recently completed investigations, or those in progress, on any subject in the history of geology, to be considered by the Program Committee for an open-topic technical session.

#### GSA goes CIP

Starting with Memoir 154, Special Paper 186, and Microform Publication 12, GSA's book publications will carry the Library of Congress' Cataloging in Publication (CIP) data.

The purpose of the CIP data, which is printed on the copyright page of a publication when the book is printed, is to simplify cataloging in libraries and to make publications available to readers sooner.

Without CIP data in a publication, many libraries shelve the book in the cataloging department and await delivery of Library of Congress catalog cards, which may take many weeks or months. With CIP data, librarians can prepare their own catalog records and process the book immediately for the reader shelves.

#### Necrology

Notice has been received of the following deaths: Arthur Casagrande, Cambridge, Massachusetts; Henry Faul, Philadelphia, Pennsylvania; John W. Gruner, Pasadena, California; Walter S. Harris, Walnut Creek, California; Sterling B. Hendricks, Silver Spring, Maryland; Augustus Locke, Menlo Park, California; Thomas R. Neff, Ogden, Utah; Richard G. Osgood, Wooster, Ohio; Carleton N. Savage, Moscow, Idaho; Emmanuel G. Zies, Chevy Chase, Maryland.

#### from the Hydrogeologist

##### PATRICK A. DOMENICO, FIFTH BIRDSALL DISTINGUISHED LECTURER

The 1981 Birdsall Distinguished Lecture Committee consisting of William Back (Chairman), David Stephenson, and Irwin Remson, has named Professor Patrick A. Domenico, Department of Geology, University of Illinois, the Fifth Birdsall Distinguished Lecturer.

Educated at Syracuse University and the University of Nevada, Dr. Domenico's research has been concerned with ground-water hydrology with emphasis on simulation and optimization, and on mass and energy transport in porous media. His numerous publications include a book, *Concepts and Models in Groundwater Hydrology*, and a paper on "Energy Transport in Thick Sequences of Compacting Sediment" for which he received the Division's 1979 O. E. Meinzer Award.

#### from the Quaternary Geologist and Geomorphologist

##### COLE GRANT

The Gladys W. Cole Research Grant has been established by GSA for investigation of geomorphology in arid regions in the U.S. and Mexico. Applicants must be GSA Fellows between 35 and 60 years old and must have published at least one significant paper on geomorphology.

The grant is made possible by funds established by W. Storrs Cole. The first grant is tentatively slated for 1982. The amount of the grant will be determined from interest on the fund. Evaluation of applications will be made by the Management Board of the Division and forwarded to the Committee on Research Grants for final action. Further announcements concerning the grant will be made in the next newsletter.

#### Annual Report for 1980 available on request

Librarians who wish to receive a copy of the GSA Annual Report for 1980 for archival purposes may obtain a photocopy by writing to

The Geological Society of America  
P.O. Box 9140  
Boulder, Colorado 80301  
(Attention: Administrative Assistant)

#### Prospectors and Developers Association Convention

The Prospectors and Developers Association will mark its 50th year at their convention, March 7–10, 1982. It will be held at the Royal York Hotel, Toronto, Ontario, Canada.

#### GSA News & Information

Vol. 3, no. 12 December 1981

GSA NEWS & INFORMATION (ISSN 0164-5854) is the monthly newsletter of The Geological Society of America, Inc., P.O. Box 9140, 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; James R. Clark, Production Manager; June Thomas and Ann H. Fogel, Production Assistants; Advertising Sales, James R. Clark.

# UPDATE

## In December *Geology*

1. Model for the tectonic evolution of the Mississippi embayment and its contemporary seismicity, by M. F. Kane, T. G. Hildenbrand, J. D. Hendricks
2. Proterozoic basin in the southern Midcontinent of the United States revealed by COCORP deep seismic reflection profiling, by J. A. Brewer, L. D. Brown, D. Steiner, J. E. Oliver, S. Kaufman, R. E. Denison
3. Uranium-series and soil-geomorphic dating of the Calico archaeological site, California, by J. L. Bischoff, R. J. Shlemon, T. L. Ku, R. D. Simpson, R. J. Rosenbauer, F. E. Budinger, Jr.
4. Paleomagnetic evidence for a large (~2,000 km) sinistral offset along the Great Glen fault during Carboniferous time, by R. Van der Voo, C. Scotese
5. Of price and prejudice: The importance of being earnest about environmental impact statements, by I. Lucchitta, D. Schleicher, P. Cheney
6. Coconuts in Miocene turbidites in New Zealand: Possible evidence for tsunami origin of some turbidity currents, by P. F. Ballance, M. R. Gregory, G. W. Gibson
7. Possible correlation of Precambrian rocks of Newport, Rhode Island, with those of Anglesey, Wales, by N. Rast, J. W. Skehan, S.J.
8. Multistage melange formation in the Franciscan Complex, northernmost California, by K. R. Aalto
9. Allochthonous terranes in Alaska: Implications for the structure and evolution of the Bering Sea shelf, by S. E. McGeary, Z. Ben-Avraham
10. Magma immiscibility in the Shonkin Sag and Square Butte laccoliths, by G. C. Kendrick, C. L. Edmond

### American Institute of Physics offers reduced subscription rates to GSA members

It is the policy of the Institute to offer reduced-rate subscriptions for its own journals to members of affiliated societies. This offer is limited to one subscription per person to each journal. If any GSA member wishes to take advantage of this offer, he should send his subscription orders, with remittances, directly to the American Institute of Physics, 335 East 45th Street, New York, NY 10017, and include a statement indicating that he is a member of GSA, an affiliated society.

Following is a list of Institute-owned journals showing the member rates that are available to members of our society, and the nonmember rates, for 1982.

	Domestic rates	
	Member Rate	Nonmember Rate
Journal of Applied Physics	\$50.00	\$240.00
Applied Physics Letters	30.00	140.00
The Journal of Chemical Physics	80.00	420.00
Journal of Mathematical Physics	40.00	240.00
The Physics of Fluids	35.00	220.00
Physics Today	25.00	45.00
The Review of Scientific Instruments	30.00	130.00
Current Physics Index	50.00	170.00
Journal of Physical and Chemical Reference Data	38.00	150.00



## CENTENNIAL NEWS

### D-NAG summary, 1981 accomplishments

The Decade of North American Geology is the theme for the major program of synthesis of the Geology of North America that is being sponsored by GSA in celebration of its Centennial. This international and intersocietal program is involving geologists from industry, academia, and government agencies throughout the continent in the production of volumes of regional geological synthesis, major new continent-wide maps, regional correlation charts, and geological/geophysical transects across the continental margins. As 1981 draws to a close, the following accomplishments can be reported for GSA's component of this program:

1. Project leaders for almost all of the 25 regional synthesis volumes met in April to organize the approach to regional geological synthesis;

2. Texts, prepared by these project leaders, for most chapters of a 1982 Special Paper, "Perspectives in regional geological synthesis: Planning for *The Geology of North America*," are now submitted;

3. Planning workshops for five of the synthesis volumes, which will bring together most of the chapter authors, are now set and organized for the first five months of 1982;

4. The top 21 U.S. oil companies have been approached by Howard R. Gould, GSA President; Dwight V. Roberts, GSA Foundation President; and A. R. Palmer, Centennial Science Program Coordinator, as part of an effort to seek major industry support for GSA's component of the Decade of North American Geology;

5. Compilation of the new edition of the Geologic Map of North America, which will be produced and published by GSA, has begun;

6. The first planning steps have been taken toward a series of Centennial Field Guides, which will be Centennial projects for each of the six regional sections of GSA, and workshops on this topic will be held at each sectional meeting in the spring of 1982.

# NORTHEASTERN AND SOUTHEASTERN SECTIONS, GSA Combined Meeting March 25–27, 1982

The Northeastern and Southeastern Sections of the Geological Society of America will meet jointly March 25–27, 1982, at the Shoreham Hotel in Washington, D.C., together with the Northeastern and Southeastern Sections of the Paleontological Society and the Eastern Section of SEPM. This 17th Annual Meeting of the Northeastern Section and 31st Annual Meeting of the Southeastern Section is sponsored by the Geological Society of Washington.

## REGISTRATION

Registration is required for all those attending the meetings, field trips, short course, exhibits, and spouses' programs. Registration will be held from 1700 to 2100 hours on March 24, 0800 to 2030 hours on March 25, and 0800 to 1700 hours on March 26 in the west lobby of the Shoreham Hotel.

Preregistration forms must be received by **FEBRUARY 24**. Those planning to attend field trips need to preregister by *February 7*. Refunds on cancelled preregistrations will be made in full until February 24, 1982. After that date, no refunds will be made except if a field trip or the short course is cancelled.

Admission to meeting functions is by badge only. A locator board, showing names and lodging location of registrants, will be maintained throughout the meeting in the registration area.

## WELCOMING PARTY

A welcoming party for all those attending the meeting will be held from 2000 to 2200 hours on Wednesday, March 24, in the Regency Ballroom at the Shoreham Hotel. Registration badges are required.

## TECHNICAL PROGRAM

**General Program.** Technical sessions will be scheduled as oral presentations and poster sessions on Thursday, Friday, and Saturday.

**Symposia.** The following symposia have been organized.

1. *Barrier Island Processes* (Stephen Leatherman and George Oertel)
2. *Geology of the Great Appalachian Cambro-Ordovician Carbonate Bank* (Lawrence Hardie)
3. *Weathering and Soil Genesis in the Eastern U.S.* (Milan Pavich and Helaine Markewich)
4. *Grenville Terranes of the Appalachians* (Mervin Bartholomew, Krishna Sinha, Eric Force, and Norman Herz)
5. *Timing of Orogenic Events in the Appalachians* (William Thomas and James Tull)
6. *Barrier Island Information Transfer: How Well Is It Working?* (Emery Cleaves and David Moody)
7. *Environmental Geology: Case Studies in the Eastern U.S.* (James O'Connor for E and SE Sections NAGT)
8. *Process Sedimentology: A Symposium to Honor Robert Fahnestock* (Jon Boothroyd and Dag Nummndal for Eastern Section SEPM)
9. *Geological Aspects of the Newark Supergroup Rift Basins* (Roy Lindholm for Eastern Section SEPM)
10. *Paleontology of Branching Organisms* (Roger Cuffey for NE Section Paleontological Society)
11. *Adaptive Strategies of Shallow Water Faunas and Floras* (Ernest Mancini and Scott Brande for SE Section Paleontology Society)

12. *Tectonics and Geophysics in the Eastern U.S.* (Isidore Zietz and Jeffrey Phillips for Geophysics Section GSA)

13. *Hazardous Waste Problems in the Eastern U.S.* (Harry Smedes, Allen Hatheway, Elinor Handman, David Harper, and Dan Threlfall)

## SHORT COURSE

A two-day short course on recent advances in Organic Geochemistry [Marilyn Estep, organizer, (202) 966-0334] will be offered at the Geophysical Laboratory, March 23–24, 0800 to 1700 each day. Course topics include: molecular fossils, structure and formation of humic acids and kerogen, amino acids, isotope biogeochemistry, and microbiological effects on metals/minerals, and methane formation/sulfate reduction. Short course lecturers include: Kenneth Nealson, Bernie Simoneit, John Zumberge, Stephen Macko, Marilyn Estep, Michael Engel, P. Edgar Hare, and Thomas Hoering. Attendees are encouraged to register and obtain housing early. The Shoreham Hotel is convenient to the Geophysical Laboratory; however, additional information on housing and other details will be sent to all short course registrants. Includes lunches and course materials. **Limit: 40; Cost: US \$85.**

## STUDENT PAPERS

Three cash awards (\$100, \$50, and \$25) will be made for the best student papers presented in the technical sessions. To be judged and eligible, the abstract must be by a single author and must be designated on the abstract form as a student paper.

## SPOUSE ACTIVITIES

A hospitality and information room will be maintained in the Shoreham Hotel. Washington, D.C. offers a wide variety of activities including tours of government buildings, the Smithsonian Institution, restaurants, and shopping. The National Zoo, numerous embassies, and the National Cathedral are within walking distance of the Shoreham Hotel. Tours to the Mall and Monuments will be arranged at the meeting.

## PROJECTION EQUIPMENT

All slides must be 2" x 2" and fit a standard 35mm carousel tray and projector. Only one projector and screen will be used in the technical sessions. Please plan your presentation accordingly and bring your own loaded carousel tray if possible.

## EXHIBIT SPACE

Exhibits will be in the Empire Room of the Shoreham Hotel, near the technical session area. A single 8' x 10' booth is

(continued on page 217)



# PREREGISTRATION DEADLINE: February 24, 1982

## FIELD TRIPS

Field trip registrants **MUST ALSO** preregister for the meeting. Field trip registration is on a first-come, first-served basis. If a trip is over-subscribed, the full field trip fee will be refunded. Field trip preregistration must be received by **February 1, 1982**, accompanied by full payment. Trips may be cancelled if registration is insufficient. Full refunds will be made under such circumstances. No other trip refunds will be made after February 1, 1982.

The following field trips have been organized. Unless otherwise noted all trips depart from and return to the Shoreham Hotel.

**1. Tectonic control of cyclic sedimentation in the Chesapeake Group of Virginia and Maryland (March 23 and 24).** Leaders: W. L. Newell and E. K. Rader. Excellent exposures of Miocene and Pliocene marine, nearshore marine, and fluvial sediments will be examined in the context of transgressive-regressive depositional sequences. The utility of cyclic sequences as lithostratigraphic map units will be illustrated. Faults and folds, structure-contoured horizons, and the areal distribution of facies within and between sequences document tectonic control of basin geometry, basin migration, and subsurface faulting. Several stops afford the opportunity to collect a wide variety of Miocene fossils. Includes meals, lodging, guidebook, and bus transportation. Leave March 23, 0800 hours and return March 24, 1730 hours. **Limit 36; Cost: US \$115.**

**2. Late Mesozoic and Cenozoic compressional faulting along the Atlantic Coastal Plain margin, Virginia (March 24).** Leaders: R. B. Mixon and W. L. Newell. This field trip along the Piedmont-Coastal Plain margin will show the Stafford fault system, a series of an echelon, northwest-dipping reverse faults, along which Piedmont crystalline rocks of early Paleozoic age are thrust at high angles over much younger Coastal Plain strata. Field stops will include outcrops of the main faults and the thin lithostratigraphic units typical of the Inner Coastal Plain strata. Discussions will show how the faulting affects the distribution and thickness of rock units and controls the location of the Fall Line and the northeast-trending reach of the Potomac River estuary. Includes lunch, van transportation, and guidebook. Leave March 24, 0730 hours and return 1800 hours. **Limit: 28; Cost: US \$35.**

**3. A geologic traverse of the northern Culpeper Basin (Triassic-Jurassic) in northern Virginia (March 24).** Leaders: A. J. Froelich, B. D. Leavy, and R. C. Lindholm. This trip to northern Virginia will present an overview of the geologic history of the nonmarine basin which formed during Late Triassic and Early Jurassic time. The depositional environments of a variety of sedimentary rocks in the northern Culpeper Basin, volcanism that attended deposition and intrusion, as well as metamorphism and deformation that followed, will be discussed. Environmental, economic, geophysical, engineering, and hydrologic aspects of rocks in this basin will also be briefly considered. Includes lunch, guidebook, and bus transportation. Leave March 24, 0730 hours and return 1800 hours. **Limit: 36; Cost: US \$45.**

**4. Geology of the Catoclin-Blue Ridge anticlinorium in northern Virginia (March 24).** Leaders: G. Mitra and M. T. Lukert. We will look at Precambrian Y and Z rocks in the core and flanks of the Blue Ridge anticlinorium and will examine structures, including the Blue Ridge-South Mountain cleavage and its relation to ductile deformation zones. Basement/sediment cover relations will be studied. Visits will be made to key outcrops to solve chronostratigraphic problems. Environmental aspects of Catoclin extrusion will be discussed. Includes lunch, guidebook, and bus transportation. Leave March 24, 0730 hours and return 1900 hours. **Limit: 36; Cost: US \$50.**

**5. Anorthosite, ferrodiorite, and titanium deposits in the Grenville Terrane of the Roseland District, central Virginia (March 27-29).** Leaders: E. Force and N. Herz. Petrologic and age relations in a recently mapped area within the Grenville basement of the Virginia Blue Ridge will be examined. To be viewed are pre-Grenville(?) granulites that are cut firstly by anorthosite (and rutile deposits), secondly by ferrodiorite (and nelsonitic ilmenite deposits), and subsequently deformed and intruded by younger plutons. Optional extra stops in the Irish Creek tin district will be led by T. Hudson. This trip is co-sponsored by SEG. Includes lodging (March 27 and 28), 2 breakfasts, 2 lunches, guidebook, and bus transportation. Does not include the cost of two dinners. Leave

March 27, 1700 hours and return March 29, at approximately 1800 hours to National Airport, Washington, D.C. and Shoreham Hotel. **Limit: 32; Cost: US \$115.**

**6. Geology of the Blue Ridge, and Valley and Ridge at the junction of the central and southern Appalachians (March 23 and 24).** Leaders: M. J. Bartholomew, A. P. Schultz, W. Henika, and T. Gathright. This trip will include a variety of stops in the Valley and Ridge and Blue Ridge Provinces, and will look at structures along the Green Ridge fault, stratigraphy of the Fincastle fault block, structures of the footwall of the Pulaski thrust, stratigraphy and structure of the Chilhowie Group, structures in a window through the Pulaski thrust sheet, and structures and lithologies of crystalline rocks of the Eastern and Western Blue Ridge thrust sheets. Includes bus transportation, lodging, 1 breakfast, 2 lunches, 1 dinner, and guidebook. Leave March 23, 0800 hours from Holiday Inn at the Intersection of Peters Creek Road and Interstate 581 in Roanoke, Va. Return to Roanoke airport area (for those with cars) on March 24, 1600 hours. The bus will then continue on to the Shoreham Hotel arriving 2000 hours. For those arriving in Roanoke the evening of March 22, a field trip discussion will be arranged. **Limit: 34; Cost: US \$105.**

**7. Facies of the Great American Carbonate Bank in the central Appalachians (March 23 and 24).** Leaders: R. V. Demicco and R. W. Mitchell. This trip will take a detailed look at the Middle Ordovician St. Paul Group Limestone and the Upper Cambrian Conococheague Limestone. The stratigraphic and structural setting of these two lower Paleozoic platform carbonates will be discussed. This will include description and interpretation of facies, modeling of environments of deposition, and a discussion of modern analogs. Includes bus transportation, guidebook, lodging, 2 lunches, and 1 breakfast. Does not include cost of one dinner. Leave March 23, 0730 hours and return March 24, 1900 hours. **Limit: 36; Cost: US \$95.**

**8. An old-fashioned geologic excursion through the Rock Creek Valley, Washington, D.C. (March 28).** Leader: J. V. O'Connor. This walking trip in the Piedmont of northwest Washington will include petrology and structure in both metamorphosed igneous and sedimentary rocks. Urban environmental problems will be discussed. No sample collection will be allowed, but cameras are encouraged. Boots, warm clothing, and rain gear are recommended. Includes guidebook. Leave March 28, 0800 hours and return 1600 hours. Participants may return to Shoreham Hotel earlier if necessary. **Limit: 20; Cost: US \$3.**

**9. The Red Line: Land-use observations along the Metro between Silver Springs, Maryland and Union Station, Washington, D.C. (Date and time to be announced at registration).** Leader: J. V. O'Connor. A round-trip, two-hour Metro ride, which will on the outbound trip provide an overview to quantify aesthetic qualities, and on the inbound trip will analyze land-use between stations. Two hundred years of land-use history for the District of Columbia can be seen. Materials will be provided for those who wish to take the trip on their own. **Limit: 15; Cost: one transit fare.**

---

**Northeastern-Southeastern  
Preregistration and Housing forms  
on following pages . . .**

---

**PREREGISTRATION FORM**  
**Northeastern-Southeastern Sections, Geological Society of America, Combined Meeting**  
**Washington, D.C., March 25-27, 1982**

(for office use only)

ck/M.O. # \_\_\_\_\_ Amount \$ \_\_\_\_\_  
 Personal check \_\_\_\_\_ Other check \_\_\_\_\_  
 Issued by \_\_\_\_\_

**Name:** \_\_\_\_\_  
   last  first  middle

**Registered as**                      Professional                       Student                       Spouse/Guest

**Spouse/Guest name for badge** \_\_\_\_\_

**Affiliation (abbreviate for badge)** \_\_\_\_\_

**Professional Address** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip** \_\_\_\_\_

**Phone: Business** \_\_\_\_\_ **Home** \_\_\_\_\_

**GSA Member**    yes     no                       **Speaker**    yes     no   
**GSA Student Associate**    yes     no

Enclosed is a check or money order (U.S. funds only) made payable to **NE-SE GSA MEETING** in the amount of \$ \_\_\_\_\_  
for

Preregistration (prior to February 24) per person	\$25.00	\$	_____
Registration (after February 24) per person	\$30.00	\$	_____
Student/Guest Preregistration (prior to February 24) per person	\$10.00	\$	_____
Student/Guest Registration (after February 24) per person	\$15.00	\$	_____
GSA Luncheon, Shoreham Hotel, March 26, per person	\$8.00	\$	_____

**FIELD TRIPS AND SHORT COURSE**  
**PREREGISTRATION DEADLINE FOR FIELD TRIPS IS FEBRUARY 1, 1982**  
All field trip and short course participants must also preregister for the meeting

**FIELD TRIPS**

<b>Field Trip 1.</b> Tectonic control of cyclic sedimentation in Chesapeake Group, VA-MD March 23-24, per person	\$115.00	\$	_____
<b>Field Trip 2.</b> Late Mesozoic and Cenozoic compressional faulting along the Atlantic Coastal Plain margin, VA; March 24, per person	\$35.00	\$	_____
<b>Field Trip 3.</b> A geologic traverse of the Northern Culpeper Basin (Triassic-Jurassic), VA; March 24, per person	\$45.00	\$	_____
<b>Field Trip 4.</b> Geology of the Catoctin-Blue Ridge anticlinorium, northern VA; March 24, per person	\$50.00	\$	_____
<b>Field Trip 5.</b> Anorthosite, ferrodiorite, and titanium deposits in the Grenville Terrane, Roseland District, central VA; March 27-29, per person	\$115.00	\$	_____
<b>Field Trip 6.</b> Geology of the Blue Ridge, and Valley and Ridge at the junction of the central and southern Appalachians; March 23-24, per person	\$105.00	\$	_____
<b>Field Trip 7.</b> Facies of the Great American Carbonate Bank in the central Appalachians; March 23-24, per person	\$95.00	\$	_____
<b>Field Trip 8.</b> An old-fashioned geologic excursion through Rock Creek Valley, Washington, D.C.; March 28, per person	\$3.00	\$	_____
<b>Field Trip 9.</b> The Red Line: Land-use observations along the Metro between Silver Spring, MD, and Union Station, Washington, D.C.; date, time, and cost to be announced at registration			

**SHORT COURSE**

Recent advances in organic geochemistry; March 23-24, per person (check here if you have a background in organic chemistry or biochemistry <input type="checkbox"/> )	\$85.00	\$	_____
--	---------	----	-------

**TOTAL FEES** \_\_\_\_\_ \$ \_\_\_\_\_

**PREREGISTRATION FORMS MUST BE RECEIVED NO LATER THAN FEBRUARY 24, 1982**  
refunds on cancelled preregistrations will be made in full until February 24, 1982. After that date, no refunds will be made except for cancelled field trips.

**Mail completed preregistration forms and fee remissions to:**

John O. Maberry  
USGS  
908 National Center  
Reston, Virginia 22092

*Make checks or money orders payable to NE-SE GSA meeting*



# Northeastern-Southeastern Sections Combined Meeting

(continued from page 214)

US \$150 for educational and non-profit institutions and US \$450 for commercial enterprises. For additional information contact Bruce Lipin, USGS, 954 National Center, Reston, VA 22092, (703) 860-7356.

## SPECIAL EVENTS

Northeastern-Southeastern sections joint luncheon will be held Friday, March 26, at 1200 hours followed by section business meetings. GSA councilors will be available to talk with members about Society concerns sometime during the meeting.

There will be a Southeastern Campus Liaison Group buffet breakfast at 0730 hours, Friday, March 26. Place will be announced at registration.

Northeastern and Southeastern Management Board Meetings will be held Wednesday, March 24, 1800 hours. Meeting room numbers will be available at registration. The Northeastern Section meeting will be a dinner meeting.

There will be a meeting of Women in Geosciences on Thursday, March 25, from 1700 to 1900 hours. Place of meeting will be announced at the registration desk.

The Eastern Section SEPM business meeting will be addressed by Robert H. Dott, Jr., President of SEPM. Time and place to be announced at registration desk.

## TRAVEL INFORMATION AND ACCOMMODATIONS

The Shoreham Hotel is the headquarters hotel and will contain the entire meeting. It is located on Calvert Street at Connecticut Avenue, Northwest, Washington, D.C. There is taxi and limousine service from National Airport and Union Station, and the Washington Metro System of subway and buses is available. A map of the hotel and Washington, D.C. area will be included in the *Abstracts with Programs* volume.

When you register for your room, please identify yourself as a member of the NE-SE GSA meeting so that credit will be given towards meeting room rental charges. A limited amount of student housing at reduced prices has been arranged at the Westpark Motel in the Roslyn area of Arlington, Virginia, about 20 minutes by Metro from the meeting headquarters.

### HOUSING FORM

**Geological Society of America  
Northeastern-Southeastern Sections  
March 24-28, 1982**

**Shoreham Hotel, Washington, D.C. 20008  
(202) 234-0700**

### RATES

Single, \$60-65; Double, \$72-77  
Suites, Parlor +1, \$125-150, Parlor +2, \$200-250

A block of 500 rooms is being held until February 24, 1982, at the above advertised rates. After February 24 rates may be higher and rooms at the Shoreham Hotel may not be available.

Enclose check or money order for 1st night's deposit, or give all necessary information for one of the following credit cards: American Express, Diner's Club, VISA, BankAmericard, MasterCard.

Complete Card Number \_\_\_\_\_ Expiration Date \_\_\_\_\_

Signature \_\_\_\_\_

Reservations *will not* be accepted without 1st night's deposit. Deposit will be refunded if cancellation is received 48 hours prior to anticipated time of arrival.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Arrival \_\_\_\_\_ day/date \_\_\_\_\_ time (am/pm)

Departure \_\_\_\_\_ day/date \_\_\_\_\_ time (am/pm)

Additional persons sharing the same room:

\_\_\_\_\_ name

\_\_\_\_\_ name

\_\_\_\_\_ name

**RETURN THIS FORM TO SHOREHAM HOTEL  
2500 Calvert Street, N.W., Washington, D.C. 20008**  
check out time 1:00 p.m.  
Rooms may not be available until 3:00 p.m.

### STUDENT HOUSING FORM

A limited number of rooms are available in the Westpark Motel, Roslyn, VA. The Westpark is 20 minutes from the Shoreham Hotel by Metrorail. Roundtrip Metro fare—\$1.40.

### RATES

(plus 9% room tax)  
Single, \$50; Double, \$55; Triple \$60; Quad, \$65

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Will arrive on \_\_\_\_\_ at \_\_\_\_\_ am/pm \_\_\_\_\_

Other persons sharing the room:

\_\_\_\_\_ name

\_\_\_\_\_ name

\_\_\_\_\_ name

**RETURN THIS FORM BY FEBRUARY 24, 1982 TO**  
George C. Stephens  
Department of Geology, George Washington University  
Washington, D.C. 20052

## SOUTH-CENTRAL SECTION, GSA, March 29–30, 1982

**THE SOUTH-CENTRAL SECTION** of the Geological Society of America will hold its 16th annual meeting at the Oklahoma Center for Continuing Education (OCCE), the University of Oklahoma, Norman, Oklahoma, March 29–30, 1982. The meeting will consist of two days of symposia and voluntary papers, four field trips, a welcoming party, luncheon, and the annual banquet. The Texas and Kansas-Oklahoma chapters of the National Association of Geology Teachers will also meet with the South-Central Section of GSA.

The OCCE is an excellent and complete conference facility operated on the campus of the University of Oklahoma. It has large and small conference rooms, a variety of housing, a restaurant, and parking, all at a single location. The address of the facility is 1700 Asp Avenue, Norman, Oklahoma 73037. To register, conferees should go to the lobby of the Forum Building at OCCE. The hours are 1400 to 1800 on Sunday, March 28, and 0800 to 1700, Monday and Tuesday, March 29 and 30.

### ADVANCE REGISTRATION

You are urged to register in advance so that the Local Committee can make plans efficiently. Mail the accompanying preregistration form and a check (made payable to the University of Oklahoma) to Lee Hayden, Oklahoma Center for Continuing Education, 1700 Asp Avenue, Norman, Oklahoma 73037; telephone (405) 325-3602.

Registration fee: Advance, \$20.00, after March 15, 1982, \$25.00; Student's advance, \$5.00, after March 15, 1982, \$10.00.

The registration fee will cover admission to the symposia, technical sessions, exhibits, welcoming party Sunday evening, and the GSA luncheon on Monday (OR the NAGT luncheon on Tuesday).

### TECHNICAL SESSIONS

Six symposia have been organized as part of the technical sessions. Titles and conveners are as follows:

- (a) Wichita Mountains/Anadarko Basin Relationships; *M. Charles Gilbert*, Virginia Polytechnic Institute and Oklahoma Geological Survey, and *Suzanne Takken*, Consultant Geologist.
- (b) Petroleum Potential of the Ouachita Mountains; *George Viele*, University of Missouri, and *Kaspar Arbenz*, Shell Oil Company.
- (c) The Atokan Series and its Boundaries; *Patrick K. Sutherland*, University of Oklahoma, and *Walter L. Manger*, University of Arkansas.
- (d) Seismotectonics of the Nemaha Ridge; *Kenneth V. Luza*, Oklahoma Geological Survey, and *Neil B. Steuer*, U.S. Nuclear Regulatory Commission.
- (e) Cenozoic Volcanism in Trans-Pecos Texas; *Don Parker*, Baylor University, and *Christopher Henry*, University of Texas at Austin.
- (f) Development of the Ouachita-Marathon System; Convened and sponsored by the Texas and Kansas-Oklahoma chapters of National Association of Geology Teachers.

Sessions of voluntary papers will run concurrently with the symposia. Titles of sessions will be selected after all abstracts have been received.

### ANNUAL BANQUET

The annual banquet will be held at the Commons Restaurant of OCCE at 1930 hours, Monday, March 29, following a no-charge cocktail hour starting at 1830. A guest speaker and

entertainment for the banquet are being selected. The banquet cost is \$10.

### WELCOMING PARTY

A no-charge cocktail party (with minor snacks) will be held for all registrants at the Commons Restaurant of OCCE from 1800 to 2000 hours, Sunday, March 28.

### BUSINESS MEETINGS

The Management Board of the South-Central Section, GSA, will meet at 1630 hours, Sunday, March 28, in one of the conference rooms on Corridor C of the Forum Building at OCCE.

The annual business meeting of the section will convene at 1630 hours, Monday, March 29, in one of the conference rooms on Corridor C of the Forum Building at OCCE.

Representatives from the GSA Council (at press time: Past-President Howard R. Gould and Treasurer William B. Heroy) will speak to all participants at the luncheon on Monday, March 29.

### NAGT MEETING

The Texas and Kansas-Oklahoma chapters of the National Association of Geology Teachers will hold its annual meeting for the second time with the South-Central Section of GSA. A half-day symposium, "Development of the Ouachita-Marathon System," is planned for the morning of Tuesday, March 30. This will be followed by the NAGT luncheon. Registrants for the entire meeting may use the free luncheon ticket *either* for the GSA luncheon on Monday *or* the NAGT luncheon on Tuesday. NAGT also is planning a full-day field trip to the Arbuckle Mountains on Monday, March 29, starting from OCCE at 0800 hours. Registration and fees for this field trip will be handled at the registration desk.

### PROJECTION EQUIPMENT

Carousel projection equipment will be provided for standard 2" x 2" (35 mm) slides only (dual projectors by prior request only). Please bring your own loaded carousel trays.

### BEST STUDENT PAPER AWARD

The South-Central Section, GSA, will again offer three awards for the best papers authored and presented exclusively by students. The awards are in the amounts of \$100, \$50, and \$25. We encourage participation in this professional competition.

### GUEST ACTIVITIES

Spouses and guests will be able to join excursions to the Cowboy Hall of Fame and Western Heritage Center in Oklahoma City, as well as to several of the mansions that are being maintained by the Historical Preservation Society. Sites of interest in Norman include several museums located within easy walking distance of OCCE. Information on how to sign up for trips will be available at the registration area.

### FIELD TRIPS

Preregistration is required for field trips. Field trips 1 and 2 will leave from Sooner House at OCCE, 0700 hours, on Friday and Saturday mornings, respectively. Breakfast will be available at OCCE Commons Restaurant at 0630 hours both mornings for those going on field trips. Lodging is available in suites at the OCCE Hall of Advanced Study for those wishing to arrive the night before the field trip. Please indicate on the housing form if

# PREREGISTRATION DEADLINE, March 15, 1982

you wish to have such housing the one night before your field trip. These accommodations at the Hall of Advanced Study consist of four private single bedrooms, sharing a large living room and tub and shower bath, at a cost of \$11.00 each person for the night.

Field trip 3 will leave Sooner House at 1800 hours on Tuesday evening.

**1. Basement rocks and overlying Cambrian-Ordovician sedimentary rocks of the eastern Wichita Mountains.** Leave 0700 hours, March 26; return 1700 hours, March 28. Leaders: M. Charles Gilbert and Nowell Donovan.

Field trip will examine new sites and present new information that will elucidate the development of the Southern Oklahoma Aulacogen.

The first two days will concentrate on contact and structural relationships between major igneous rock units (including both acidic and basic igneous rocks). The third day will focus on the changing structural style that developed during Pennsylvanian deformation in the region of the Blue Creek Canyon Fault, which cuts basement rocks, and the Timbered Hills and Arbuckle Group sedimentary rocks. This trip will have several stops requiring nonstrenuous hikes of about one mile. Limit, 45; cost, \$100. Includes bus transportation, two nights' lodging in Lawton (double occupancy), three lunches, one dinner, guidebook, and refreshments.

**2. Lower Pennsylvanian (Morrowan and Atokan) stratigraphy in south-central Oklahoma.** Leave 0700 hours, March 27; return 1700 hours, March 28. Leader: Patrick K. Sutherland.

The first day will be taken with stops in the type area of the Atokan Series, located on the northeastern flank of the Arbuckle Mountains. The

## SOUTH-CENTRAL SECTION PREREGISTRATION FORM

16th Annual Meeting of the South-Central Section, GSA, March 29-30, 1982, Norman, Oklahoma

**DEADLINE FOR ADVANCE REGISTRATION: MARCH 15, 1982**

Name \_\_\_\_\_  
(last) (first) (middle) (nickname, for card)

Social Security No. \_\_\_\_\_

Institution or Firm \_\_\_\_\_

Address \_\_\_\_\_  
(street) (city) (state) (zip)

Phone (\_\_\_\_\_) (\_\_\_\_\_) \_\_\_\_\_  
business home

Spouse or Guest \_\_\_\_\_  
(last) (first) (middle)

Address \_\_\_\_\_  
(street) (city) (state) (zip)

<u>Registration</u>	<u>Until March 15</u>	<u>After March 15</u>	
Regular fee	\$20.00	\$25.00	\$ _____
Student fee	\$ 5.00	\$10.00	\$ _____
Annual banquet, Monday evening, March 29 (\$10.00 each), including cocktail hour. Number of persons _____			\$ _____

**All field-trip registrants MUST ALSO preregister for the meeting.**

### FIELD-TRIP RESERVATION

**Field Trip No. 1:** Basement rocks and overlying Cambrian-Ordovician sedimentary rocks of the eastern Wichita Mountains: **\$100** \$ \_\_\_\_\_

**Field Trip No. 2:** Lower Pennsylvanian (Morrowan and Atokan) stratigraphy in south-central Oklahoma: **\$60** \$ \_\_\_\_\_

**Field Trip No. 3:** Structural styles of the Ouachita Mountains: **\$80** \$ \_\_\_\_\_

**Field Trip No. 4:** NAGT-sponsored trip on geologic setting of the Arbuckle Mountains of southern Oklahoma; check here  if you plan to go, but registration and fees will be handled by NAGT at the registration booth.

**TOTAL REGISTRATION AND FIELD TRIPS** \$ \_\_\_\_\_

**NOTES REGARDING FIELD TRIPS:** Reservations will be accepted **only if accompanied by full payment**. Field trips may be cancelled if registration is insufficient or for reasons beyond GSA's control. Full refund will be made in those circumstances. Personal cancellations must be received in **writing before March 15, 1982**. Refunds are subject to a processing fee.

Mail this preregistration form and check (payable to the University of Oklahoma) to **Lee Hayden, Oklahoma Center for Continuing Education**  
**1700 Asp Avenue, Norman, OK 73037**

(continued from page 219)

night will be spend in Ada, Oklahoma. On the second day, stops will be (1) at a newly described and very important Morrowan-Atokan-Lower Desmoinesian sequence in the Mill Creek Syncline, in the middle of the Arbuckle Mountains, and (2) at Morrowan-Atokan sections in the northern part of the Ardmore Basin, directly south of the Arbuckles. Emphasis will be on biostratigraphic correlation based on a variety of fossil groups and on an analysis of the striking regional facies changes. Limit, 45; cost, \$60. Includes bus transportation, one night's lodging in Ada (double occupancy), two lunches, guidebook, and refreshments.

**3. Structural styles of the Ouachita Mountains.** Leave 1800 hours, March 30; return to Norman 1700 hours and to Oklahoma City Airport 1800 hours, April 1. Leader: Kent Nielsen.

The trip will generate two traverses from the frontal zone into the core zone of the Oklahoma portion of the Ouachita Mountains. Areas visited will include Black Knob Ridge at Atoka, the Broken Bow Uplift, Kiamichi Mountain, Potato Hills, and the boundary between the Ouachitas and the Arkoma Basin near Wilburton. Recent structural and geophysical data will be emphasized in comparing deformational styles across the mountain belt. Limit, 45; cost \$80. Includes bus transportation, two nights' lodging in Ouachitas (double occupancy), two lunches, guidebook, and refreshments.

chitas and the Arkoma Basin near Wilburton. Recent structural and geophysical data will be emphasized in comparing deformational styles across the mountain belt. Limit, 45; cost \$80. Includes bus transportation, two nights' lodging in Ouachitas (double occupancy), two lunches, guidebook, and refreshments.

**4. Geologic setting of the Arbuckle Mountains of southern Oklahoma.** Leave 0800 hours, March 29; return 1700 hours, March 29. Leader: to be provided by NAGT.

This will be a one-day trip sponsored by the Texas and Kansas-Oklahoma chapters of National Association of Geology Teachers. It will be held at the same time as the Monday technical sessions of the GSA. The trip will provide an overview of the geology of the Arbuckle Mountains, with emphasis on the stratigraphy and structure of the region. Information on cost, transportation, and registration for this trip will be provided at the NAGT information booth area in the Forum Building of OCCE, Sunday afternoon from 1400 to 1800 hours, March 28, and Monday morning, March 29, from 0745 to 0800 hours.

## ROOM RESERVATION FORM, SOUTH-CENTRAL SECTION, GSA

For use **ONLY** in lodging offered at the conference site by Oklahoma Center for Continuing Education. Accommodations offered by OCCE are very good (not great), reasonable, and the only lodging within two miles of the conference site. To obtain

room assignment and room keys for any OCCE lodging, go first to Sooner House at the south end of the OCCE facility upon arrival in Norman.

PLEASE MARK THE HOUSING ACCOMMODATIONS YOU WISH:

**Sooner House:** Twin bedroom; tub and shower bath

\_\_\_\_\_ One person            \$19.00  
\_\_\_\_\_ Two persons        \$13.00 each

**Cottage Suite:** Two twin bedrooms, living room, kitchen, dining area, and tub and shower bath

\_\_\_\_\_ One person        \$28.00  
\_\_\_\_\_ Two persons        \$16.00 each  
\_\_\_\_\_ Three persons      \$13.00 each  
\_\_\_\_\_ Four persons        \$12.00 each

**Hall of Advanced Study Suites:** Four private single bedrooms, sharing a large living room and tub and shower bath

\_\_\_\_\_ One person        \$22.00  
\_\_\_\_\_ Two persons        \$14.00 each  
\_\_\_\_\_ Three persons      \$12.00 each  
\_\_\_\_\_ Four persons        \$11.00 each

**Walker Tower Student Housing:** Twin bedroom, sharing tub and shower bath with adjacent twin bedroom

\_\_\_\_\_ One person        \$14.00  
\_\_\_\_\_ Two persons        \$11.00 each

Arrival Date \_\_\_\_\_ Time \_\_\_\_\_

Name: \_\_\_\_\_ Mr. \_\_\_\_\_ Ms. \_\_\_\_\_

Address: \_\_\_\_\_

Town: \_\_\_\_\_ State \_\_\_\_\_

Departure Date: \_\_\_\_\_ Check-out time is 2 p.m.

Other persons sharing room or suite: \_\_\_\_\_

If you going on a pre-conference field trip, please indicate here  if you want lodging for \$11.00 at the Hall of Advanced Study on the night before your field trip. Please repeat the name(s) of person(s) that will need this special lodging and which night (Thursday or Friday) it will be needed.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ name \_\_\_\_\_ night

Lodging is also available at motels two to three miles from OCCE, and if you wish to make your own arrangements, please contact:

Holiday Inn            (405) 329-1624  
Ramada Inn            (405) 321-0110  
Howard Johnson's Motel    (405) 329-8000

Mail this room reservation form to  
Lee Hayden  
Oklahoma Center for Continuing Education  
1700 Asp Avenue  
Norman, OK 73037

## UPDATE

### **Council for International Exchange of Scholars announces Fulbright scholars available for short-term visits**

More than 150 Fulbright scholars from all regions of the world, in the United States for college and university teaching and advanced research, are available for occasional lectures, seminars, and special programs. The Council for International Exchange of Scholars (CIES), which administers the Senior Scholar Fulbright Program, announced that limited funds would be available to facilitate travel to interested institutions, particularly those which have had little opportunity to participate in the Fulbright Scholar Exchange Program.

The Council has prepared a brochure describing the

Occasional Lecturer Program and listing by discipline Fulbright scholars who welcome short-term invitations. The entries include proposed topics, home, and U.S. affiliations. A copy of the brochure is available from Mrs. Mary W. Ernst, Council for International Exchange of Scholars, 11 Dupont Circle, N.W., Dept. N, Washington, DC 20036, telephone (202) 833-4979. Also available upon request is the 1981-1982 Directory of Visiting Fulbright Scholars, a by-discipline list of more than 700 scholars, indexed by home country and by state of host institution.

### **Fifteenth edition of *American Men and Women of Science* will undergo major revision**

*American Men and Women of Science* is about to undergo a major revision. The 15th edition of this respected biographical reference will be published in August 1982. The seven-volume directory contains approximately 130,000 brief biographical entries of men and women who have education and training equivalent to the doctorate and who have attained a position of responsibility in the physical, biological, mathematical, or engineering sciences. Coverage includes researchers, educators, and administrators who are citizens of the Americas and noncitizens working in the Americas on

a permanent basis. Prospective entrants may request a questionnaire (see below) on which to submit information and return it by April 1982.

Current entrants will be sent copies of their existing data for review and updating during the fall and winter of 1981-1982. All address changes occurring since 1978 should be reported to the editors promptly.

Information or requests should be addressed to the Editors, *American Men and Women of Science*, P.O. Box 25001, Tempe, AZ 85282.

### **Smithsonian offers programs of higher education and research training**

The Smithsonian Institution announces its programs of higher education and research training for 1982-1983 in the fields of anthropology, biological sciences, earth sciences (sedimentology, mineralogy, petrology, meteoritics, volcanology, and planetary geology), and the history of technology and science.

Smithsonian Fellowships are awarded to support independent research in residence at the Smithsonian Institution using the collections, facilities, and laboratories and pertaining to research interests of the Smithsonian research staff. Proposals for research may be offered in the fields in which the Institution has research strength. In addition to pre- and postdoctoral fellowship awards, a limited number of 10-week appointments are made to graduate students. Applications

have the same deadline as pre- and postdoctoral awards.

Applications are due by January 15, 1982. Stipends supporting these awards are \$17,000 plus allowances for postdoctoral fellows and \$9,500 plus expenses for pre-doctoral fellows. Ten-week graduate students receive \$1,500.

Awards are based on merit. Smithsonian Fellowships are open to all qualified individuals, without reference to race, color, religion, sex, national origin, age, or condition of handicap of any applicant. For more information and application forms, please write Office of Fellowships and Grants, 3300 L'Enfant Plaza, Smithsonian Institution, Washington, DC 20560. Please indicate the particular area in which you propose to conduct research and give the dates of degrees received or expected.

### **PLEASE SEND YOUR RECOMMENDATIONS FOR OFFICERS AND COUNCILORS TO THE GSA COMMITTEE ON NOMINATIONS**

The future of your Society—the Geological Society of America—is largely in the hands of your elected officers and councilors. Furthermore, in these present times of rapid change, rapid inflation, and rapidly evolving science, sound decisions for the Society's future must be made on a continuing basis.

It is the charge of the Committee on Nominations to consider the total membership of the Society and to submit a list of persons to Council for consideration for nomination to elective posts. The committee does not do the formal nominating or the electing. These are done by Council. The committee, however, is charged with the task of recommending several persons, each of whom they consider fully qualified, for each of the elective posts.

The committee requests your help! When sending nominations to headquarters, attention Administrative Department, please specify WHY a particular candidate would qualify to serve on Council. All nominations will be forwarded to the committee as soon as it has been appointed.

Please take this request seriously and act. The deadline for receipt of nominations at headquarters is **FEBRUARY 1, 1982.**

# CORDILLERAN SECTION, GSA, April 19–21, 1982

The 78th annual meeting of the Cordilleran Section will be held April 19–21, 1982, at the Anaheim Convention Center, Anaheim, California, in conjunction with the annual meeting of the Seismological Society of America and the annual meeting of the Pacific Coast Section of the Paleontological Society. The Department of Earth Science, California State University, Fullerton, as host, is organizing the arrangements and program for the meeting.

\* \* \* \* \*

## REGISTRATION

Preregistration will be by mail. On-site registration will take place Sunday, April 18, from 1700 to 2000 hours at the Anaheim Quality Inn Hotel and during the meeting at the Anaheim Convention Center. *Preregistration fees* are \$30.00 for professionals, \$3.00 for GSA Student Associates, and \$6.00 for other students. *On-site registration* for professionals is \$40.00 for three days, \$25.00 for one day, and \$6.00 for all students. The lower preregistration rates are in effect only until **March 12, 1982**. To qualify for GSA Student Associate preregistration rate, you must show your 1982 GSA Membership Card when picking up your preregistration packet. To qualify for the student rate, you must show your student ID when registering or when picking up your preregistration packet.

## WELCOMING PARTY

A welcoming party with no-host bar will be held for all registrants from 1930 to 2300 hours on Sunday, April 18, at the Quality Inn Hotel.

## SYMPOSIA (organizers in parentheses)

### Cordilleran Section, GSA

- A. *The regional geology of the state of Washington, in honor of J. D. Barksdale, H. A. Coombs, P. Misch, A. L. Washburn, and H. E. Wheeler* (E. S. Cheney, B. McKee)
- B. *Paleomagnetism and tectonics of the Cordilleran margin* (B. Luyendyk)
- C. *Fluvial sedimentation, western North America* (T. H. Nielsen, R. Brady)
- D. *Tertiary volcanism west of the San Andreas fault and tectonic implications* (P. W. Weigand)
- E. *Neotectonics of the western Transverse Ranges* (A. C. Darrow, R. H. Patterson)
- F. *Geology, tectonics, and origin of the crystalline terranes and adjacent sedimentary basins of the Transverse Ranges, California* (B. Carter, R. E. Powell)
- G. *Cretaceous-Cenozoic metallogenic evolution of the Mojave Desert and southwestern boundary of the Colorado Plateau* (S. Keith)
- H. *The hydrogeology of inland arid basins* (J. F. Mann, P. K. Saint, D. Moyle)
- I. *Surficial deposits of southwestern United States: Stratigraphy, chronology, and depositional environments. A memorial symposium to Denis E. Marchand* (D. Hoover, D. Weide)
- J. *The Upper Precambrian and Lower Paleozoic environmental stratigraphy of the southwestern Great Basin* (J. Mount, R. Miller)
- K. *Cretaceous and Cenozoic paleontology and chronostratigraphy of northwestern Mexico and southwestern United States* (I. Ferrusquia)

- L. *A comparison of Mesozoic compressional tectonics and mid-Tertiary detachment faulting in the Colorado River area* (E. G. Frost, T. E. Cameron, D. L. Martin)

### Seismological Society of America

- I. *Earthquake prediction* (C. R. Allen)
- II. *The decision-making process in siting critical facilities* (L. S. Cluff)
- III. *Test-ban treaty verification research* (T. C. Bache)
- IV. *Computational Seismology I: Use of computers in network seismology* (S. D. Malone)
- V. *Computational Seismology II: Theoretical research* (L. R. Johnson)
- VI. *Strong ground-motion prediction* (R. E. Scholl)

## TECHNICAL SESSIONS

Technical sessions will include poster displays for individual discussion as well as the usual 15-minute oral presentation.

## PROJECTION EQUIPMENT

Carousel projection equipment will be provided for 2" x 2" (35 mm) slides only (dual projectors by prior request only). Please bring your own loaded carousel trays. Avoid glass-mounted slides.

## SOCIETY LUNCHEONS

GSA Cordilleran Section business luncheon (\$8.75) will be held at the Quality Inn Hotel on Tuesday, April 20, 1200 hours.

Seismological Society annual luncheon (\$8.75) will be held at the Quality Inn Hotel on Monday, April 19, 1200 hours.

Paleontological Society luncheon (\$8.75) will be held at the Quality Inn Hotel on Monday, April 19, 1200 hours.

## GENERAL TRAVEL INFORMATION

The Anaheim Convention Center is located on Katella Avenue, just west of Harbor Boulevard. Bus service is available from the Los Angeles, Long Beach, John Wayne, and Ontario Airports to the Grand Hotel and Disneyland Hotel. Most of the hotels provide shuttle services to these airport bus terminals. Amtrak train service stops at the Santa Ana terminal located about five miles away. Greyhound and Trailways have bus stations in the Disneyland-Convention Center area. Most hotels provide shuttle services.

## FIELD TRIPS

All field trip registrants **MUST ALSO** preregister for the meeting.

Field-trip registration is on a first-come, first-served basis. Field-trip preregistration **MUST BE RECEIVED IN FULLERTON BY MARCH 12, 1982**, accompanied by payment in full. On the attached form, registrants may indicate alternate choice(s) in the event that first choice is oversubscribed. If registrant's choices are oversubscribed, the full registration fee will be refunded. If trips are cancelled because of low number of registrants or for reasons beyond our control, full refunds will be made. The trips will start from and return to THE QUALITY INN HOTEL, Anaheim, unless otherwise indicated.

### Premeeting

**1. Sedimentation history of Ridge Basin, southern California.** (April 17–18), Pacific Section SEPM field trip. Leaders: *J. C. Crowell and M. H. Link*.

Ridge Basin, located in the central Transverse Ranges, contains

# PREREGISTRATION DEADLINE March 12, 1982

## PREREGISTRATION FORM

78th Annual Meeting, Cordilleran Section, Geological Society of America  
April 19-21, 1982, Anaheim, California

**IMPORTANT**

1. Full payment **must** accompany registration, unless prepaid with accepted abstract.
2. Register **one** professional or student per form.
3. Your check will be your receipt. Copy this form for your records.
4. Preregistration deadline: **MUST BE POSTMARKED NO LATER THAN MARCH 12, 1982.**
5. Refund policy: Written request must be received at California State University, Fullerton, no later than MARCH 22. No refunds after March 22. Refunds subject to a \$5.00 processing fee.

(Please print or type)			
Name (last, first, initial) _____			
Registered as	_____ Professional	_____ GSA Student Associate	_____ Other Student
If accompanied by guest, list name for badge _____			
Address (street) _____			
City, State, Zip _____			
Phone (business)	(    )	(home)	(    )
Affiliation (abbreviate for badge) _____			
Please circle affiliations:			
	GSA	SSA	Paleontological Society
_____ Speaker	_____ Professional preregistration fee submitted with abstract.		
	_____ Student preregistration fee submitted with student, single-author abstract.		

**REGISTRATION FEES**

Preregistration (by March 12) .....	\$ 30.00	\$ _____
Registration (after March 12)* .....	\$ 40.00	_____
GSA Student Associate (by March 12) .....	\$ 3.00	_____
GSA Student Associate (after March 12) .....	\$ 6.00	_____
Student with I.D. (before or after March 12) .....	\$ 6.00	_____

**PROFESSIONAL EVENTS**

GSA Business Luncheon	_____	@	\$ 8.75	\$ _____
	No. in party			
SSA Luncheon	_____	@	\$ 8.75	_____
Paleontological Society Luncheon	_____	@	\$ 8.75	_____

**FIELD TRIP TOTAL** (Trip Nos. \_\_\_\_\_) ..... \$ \_\_\_\_\_

**GRAND TOTAL** \$ \_\_\_\_\_

Make all checks payable to **1982 Cordilleran Section GSA** and mail checks and preregistration form to  
 J. A. Ryan, Treasurer  
 Earth Science Department, S-263  
 California State University, Fullerton  
 Fullerton, CA 92634

\*Also, one-day registration (on-site only) will be \$25.00.  
(Please, no credit cards)



(continued from page 222)

nearly 40,000 feet (12,000 m) of Miocene and Pliocene sediments deposited in an active transform margin setting. The trip will emphasize the examination of the marine and overlying lacustrine, fluvial, and alluvial fan facies that were deposited in the narrow basin. Special attention will be focused on the interplay between sedimentation and tectonics in the wrench fault setting. Includes lodging in Gorman, dinner, box lunches, refreshments, transportation (bus), and guidebook. Leave April 17, 0800 hours, and return April 18, 1800 hours. Limit 95. Cost \$95.00 payable to Pacific Section SEPM. (See field-trip registration form.)

**2. Late Cenozoic tectonic and magmatic evolution of the central Mojave Desert, California.** (April 17-18). Leaders: *R. K. Dokka and A. F. Glazner.*

Elements of the Miocene to Recent structural and magmatic evolution of the central Mojave Desert will be examined. Special emphasis will be placed on reviewing evidence for a short, but remarkably intense, interval of crustal extension and volcanism that occurred during the early Miocene. Features to be observed include elements of the central Mojave detachment fault complex (low-angle detachment faults, high-angle normal faults, regional arches and sags, tectonic mega-breccias) and the Mojave volcanic belt (Miocene bimodal and intermediate volcanism). The excursion will also include stops at recently active volcanic centers, a pull-apart basin, a middle Miocene mammalian fossil locality, giant sand dunes, and uplifted beach ridges. Includes lodging in Barstow, box lunches, refreshments, transportation (vans), and guidebook. Leave April 17, 0600 hours, and return April 18, 2000 hours. Limit 40. Cost \$95.00.

**3. Neotectonics of the Ventura Basin.** (April 17-18). Leaders: *R. S. Yeats, E. A. Keller, K. R. Lajoie, T. K. Rockwell, A. M. Sarna-Wojcicki, and R. F. Yerkes.*

The Ventura region of the Transverse Ranges exhibits a spectacular array of structures related to present day compressional tectonics, including late Quaternary folding and faulting. The trip will visit localities critical to the interpretation of the late Quaternary history and the seismogenic potential of the Oak Ridge, Simi, Ventura, Red Mountain, and San Cayetano faults. South-dipping faults related to compressional folding will be visited at Oak View and Carpinteria. Dating of late Quaternary deposits by amino-acid stereochemistry, degree of soil development, and C-14 techniques will be discussed and critical localities visited. A section on the Ventura Avenue anticline illustrates Quaternary geochronology for the last two million years, including the techniques of tephrochronology, fission-track dating, and paleomagnetic stratigraphy. Includes lodging in Ojai, box lunches, refreshments, transportation (bus), and guidebook. Leave April 17, 0730 hours, and return April 18, 1700 hours. Limit 45. Cost \$95.00.

**4. Geologic hazards along the San Andreas fault system, San Bernardino-Hemet-Elsinore, California.** (April 17). Leader: *G. S. Rasmussen.*

Trip will emphasize San Andreas fault features in an urban environment. Features in San Bernardino include sag pond, springs, and a thrust fault turning into a landslide that crosses the San Andreas fault. View of the San Jacinto fault zone includes a stop on the 17-foot alluvial fault scarp of the Casa Loma fault, site of the M 7.1 earthquake of 1899. View of the Elsinore fault zone includes a stop at the locality of the 1910 earthquake. Some walking expected. Includes box lunch, refreshments, transportation (bus), and guidebook. Leave April 17, 0700 hours, and return April 17, 1700 hours. Limit 45. Cost \$35.00.

**5. Geology and structural setting of the San Gabriel anorthosite-syenite body and adjacent rocks of the western San Gabriel Mountains, Los Angeles County, California.** (April 17-18). Leader: *B. A. Carter.*

Excellent exposures of the complete anorthosite-gabbro-syenite suite are present in the western San Gabriel Mountains. Well-preserved primary lithologies, textures, and structures suggest a cumulate origin of most of these rocks. The petrogenesis and origin of this suite will be discussed. The structural history of the western San Gabriel Mountains also will be emphasized, including the evidence that this entire area is part of a large allochthonous sheet that is floored by a series of cataclastic gneisses. Rocks of the western San Gabriel Mountains are correlative with some of the rocks to be seen on postmeeting trip no. 11. Includes lodging in Palmdale, box lunches, refreshments, transportation (vans), and guidebook. Several 2-4 mile hikes. Leave April 17, 0700 hours, and return April 18, 2000 hours. Limit 35. Cost \$75.00.

**6. Late Cenozoic stratigraphy and structure of the San Bernardino Mountains.** (April 18). Leaders: *P. M. Sadler, J. Foster, R. Weldon, and K. Meisling.*

Plio-Pleistocene sediments along the northern front of the San Bernardino Mountains and Miocene sediments and basalt in the Santa Ana Valley to the south will be examined to demonstrate the distinction between fault systems responsible for uplift of the range and those that have been subsequently active. Includes box lunch, refreshments, transportation (vans), and guidebook. Leave April 18, 0700 hours, and return April 18, 2000 hours. Limit 30. Cost \$40.00.

**7. Comparison of Mesozoic tectonics with mid-Tertiary detachment faulting in the Colorado River area, California, Arizona, and Nevada.** (April 16, 17, 18). Leaders: *E. G. Frost, T. E. Cameron, and D. L. Martin.*

This trip will focus on regional examination of detachment faulting in Mesozoic compressional tectonics from Las Vegas to Yuma along the Colorado River. Emphasis will be on geometric characteristics of faulting, upper plate structure and stratigraphy, and geochronology. Detachment faulting localities to be visited will include an overview of the Whipple Mountains terrane as well as the Newberry, Chemehuevi, Riverside, Big Maria, and Trigo Mountains. A special feature is a trip along the detachment fault by commercial sight-seeing boat through the spectacular Topock Gorge area of the Chemehuevi Mountains. The field trip is dedicated to R. Ernst Anderson and Warren Hamilton of the USGS. Includes 3 nights lodging (Las Vegas, Lake Havasu City, and Blythe), 3 dinners, box lunches, refreshments, transportation (vans), boat trip, and guidebook. Leave from Las Vegas, April 16, 0800 hours, and return to Anaheim, April 18, 1700 hours. A pre-trip dinner, meeting, and preview will be held in Las Vegas the evening of April 15. Limit 60. Cost \$195.00.

**8. Late Cretaceous depositional environments and paleogeography, Santa Ana Mountains, southern California.** (April 17). Pacific Section SEPM field trip. Leaders: *D. J. Bottjer, I. P. Colburn, J. D. Cooper, R. Blake, F. A. Sundberg, L. Saul, A. A. Almgren.*

We will examine classic exposures of Upper Cretaceous conglomerates, sandstones, and shales in the Santa Ana Mountains with emphasis on stratigraphic, sedimentologic, and paleoecologic characteristics of this terrestrial and marine sequence. Controversial shallow/deep-water interpretations for marine environments of deposition will be highlighted. For those interested, an unofficial, informal field trip to the Upper Cretaceous section in the Santa Monica Mountains will be held on the following Sunday (April 18). Includes box lunch, refreshments, transportation (vans), and guidebook. Leave April 17, 0830 hours, and return April 17, 1730 hours. Limit 75. Cost \$25.00 payable to Pacific Section SEPM. (See field-trip registration form.)

**Postmeeting**

**9. Stratigraphy, structure, and geomorphology of selected areas in the San Bernardino Mountains, Mojave Desert, and southwestern Great Basin.** (April 22, 23, 24). Leaders: *C. S. Cameron, E. L. Miller, B. W. Troxel, L. A. Wright, P. Butler, R. Brady, J. K. Otton, J. D. Cooper, R. H. Miller.*

Trip will emphasize upper Precambrian and lower Paleozoic stratigraphy and depositional environments. Metasedimentary terranes in the San Bernardino Mountains and Victorville areas will be examined and compared with the classic exposures of this stratigraphic succession in the southern Death Valley region. Field trip stops will cover a variety of stratigraphic units, sedimentologic features, paleontologic characteristics, and regional correlation and paleogeography. Aspects of the Amargosa River system, turtleback features, and Cenozoic stratigraphy and structure along the junction of Death Valley and Garlock fault zones will also be examined. Includes lodging for first night (CSUC Study Center at Soda Springs), option of camping or motel accommodations for second night in Shoshone, two dinners, two breakfasts, box lunches, refreshments, transportation (vans), and guidebook. Participants will need sleeping bags for first night's accommodations. Several moderately long hikes. Leave April 22, 0600 hours, and return April 24, 2000 hours. Limit 60. Cost \$125.00.

**10. Landslides and landslide abatement, Palos Verdes Peninsula, southern California.** (April 22). Leaders: *P. L. Ehlig and M. E. Ray.*

We will examine large landslides on the seaward-facing south

**GSA FIELD TRIP REGISTRATION FORM**  
**1982 CORDILLERAN SECTION, ANAHEIM, CALIFORNIA, APRIL 19-21**

**IMPORTANT:**

1. Field trip registrants must also register for meeting.
2. Each registrant must use a separate form.
3. Full payment must accompany registration.
4. Field trip preregistration deadline: Must be received no later than March 12.
5. Refund Policy: Written request must be postmarked no later than March 22. No refunds after March 22. Refunds subject to \$5.00 processing fee.

(Please type or print)

Registrant Name _____	Employer _____
Mailing Address _____	Phone (____) _____ (business)
_____	(____) _____ (home)
_____	_____

Above will be used as address label.

**FIELD TRIPS** (circle first choice)

**FOR OFFICE USE ONLY**

	Date	Limit	Cost	Amount																																	
<b>Premeeting</b>					<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Accepted</th> <th>Standby</th> <th>Filled</th> <th>Cancelled</th> </tr> </table>	Accepted	Standby	Filled	Cancelled																												
Accepted	Standby	Filled	Cancelled																																		
*1. Sedimentation history, Ridge Basin	Apr. 17-18	95	\$ 95	\$ _____	<p><b>*Mail to Pacific Section, SEPM</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>																																
2. Tectonics, magmatic history, Mojave Desert	Apr. 17-18	40	\$ 95	\$ _____																																	
3. Neotectonics, Ventura Basin	Apr. 17-18	45	\$ 95	\$ _____																																	
4. Geologic hazards, San Andreas fault zone	Apr. 17	45	\$ 35	\$ _____																																	
5. San Gabriel anorthosite	Apr. 17-18	35	\$ 75	\$ _____																																	
6. Cenozoic history, San Bernardino Mountains	Apr. 18	30	\$ 40	\$ _____																																	
7. Detachment faulting along Colorado River	Apr. 16-18	60	\$195	\$ _____																																	
*8. Upper Cretaceous, Santa Ana Mountains	Apr. 17	75	\$ 25	\$ _____	<p><b>*Mail to Pacific Section, SEPM</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Accepted</th> <th>Standby</th> <th>Filled</th> <th>Cancelled</th> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	Accepted	Standby	Filled	Cancelled																												
Accepted	Standby	Filled	Cancelled																																		
<b>Postmeeting</b>																																					
9. Upper Precambrian-Lower Paleozoic stratigraphy	Apr. 22-24	60	\$120	\$ _____																																	
10. Landslides, Palos Verdes Peninsula	Apr. 22	80	\$ 40	\$ _____																																	
11. Crystalline basement, eastern Transverse Ranges	Apr. 22-24	20	\$125	\$ _____																																	
12. Quaternary soil stratigraphy	Apr. 22-23	45	\$ 85	\$ _____																																	
13. Mineral deposits of Mojave Desert	Apr. 22-23	80	\$120	\$ _____																																	
14. "Big Bend" San Andreas fault	Apr. 22-23	20	\$ 90	\$ _____																																	

**TOTAL \$ \_\_\_\_\_**

**INSTRUCTIONS**

Make checks for **GSA field trips** payable to **1982 Cordilleran Section GSA** and mail check and field trip registration form to **J. A. Ryan, Treasurer**, Earth Science Department, S-263 California State University, Fullerton Fullerton, CA 92634

\*Trips No. 1 and 8 are official parts of the annual meeting of the Pacific Section SEPM/AAPG to be held April 14, 15, and 16 in Anaheim. Any registrant of the Cordilleran Section GSA meeting may take these trips.

Register by sending the SEPM field trip fee to **David J. Bottjer**, Pacific Section SEPM/AAPG Field Trip Chairman, Department of Geological Sciences, University of Southern California, Los Angeles, CA 90007

Make checks for the **SEPM field trips** payable to **Pacific Section SEPM**

**Optional:**

If trip is filled, my other choices are

Premeeting: \_\_\_\_\_

Postmeeting: \_\_\_\_\_

Trip no. \_\_\_\_\_

Title \_\_\_\_\_

(continued from page 224)

flank of the Palos Verdes Peninsula with emphasis on methods of investigation, landslide mechanics, and existing potential methods of landslide stabilization. Highlights will include the highly destructive Portuguese Bend landslide, which has been continuously active since 1956, and the Abalone Cove landslide, currently being stabilized by dewatering. Includes box lunch, refreshments, transportation (bus), and guidebook. Leave April 22, 0730 hours, and return April 22, 1700 hours. Limit 80. Cost \$40.00.

**11. Crystalline basement terranes in the southern Eastern Transverse Ranges, California.** (April 22, 23, 24). Leader: *R. E. Powell.*

Participants will examine crystalline rocks in the Eastern Transverse Ranges south of the Pinto Mountain fault, including pre-Mesozoic lithologies and Mesozoic batholithic suites in the Chuckwalla, Eagle, Hexie, Little San Bernardino, and Pinto Mountains. The lithologies and stratigraphic relationships within two pre-batholithic terranes (San Gabriel and Joshua Tree) will be studied in detail, with emphasis to be placed on the tectonic superposition of these terranes along a regional pre-batholithic thrust fault system. Belts of Mesozoic batholithic rocks that intrude these terranes will be viewed as will Cenozoic structures that have disrupted the crystalline bedrock patterns. The lithologies of the San Gabriel terrane are related to those to be seen in the San Gabriel Mountains on premeeting field trip no. 5. Includes lodging for one night in Twenty-Nine Palms, one dinner, and one breakfast (in camp), box lunches, transportation (4wd), and guidebook. Sleeping bag will be needed for one night of camping. Several moderately long hikes. Leave April 22, 0600 hours, and return April 24, 1800 hours. Limit 20. Cost \$125.00.

**12. Late Quaternary pedogenesis and alluvial chronologies of the Los Angeles Basin and San Gabriel Mountains areas, southern California.** (April 22-23). Leaders: *L. D. McFadden, J. C. Tinsley, and J. C. Matte.*

Emphasis will be on the development of Pleistocene and Holocene alluvial soils in the San Gabriel Mountains and Los Angeles Basin, and the application of soil stratigraphy to interpreting the evolution of fault scarps in the Day Canyon area. Pleistocene-age soil profiles will be examined to show the probable impact of climatic change and parent materials on soil genesis. We will also examine soil profiles, geomorphic relations, and fault scarps near Cucamonga and Day Canyons, and we will propose a reconstruction of Holocene faulting in the Cucamonga fault zone. Also included are stops to examine a suite of terraces and associated soils along the north fork of the San Gabriel River and a well-developed soil profile (Number 10R hue, at least 38 percent clay, B-horizon greater than 2 m thick) and 4.2 percent extractable oxyhydroxides) near Duncan Canyon. Includes lodging in the Monrovia-Azusa area, box lunches, refreshments, transportation (bus), and guidebook. Leave April 22, 0730 hours, and return April 23, 1800 hours. Limit 45. Cost \$85.00.

**13. Geology and mineral deposits of the Mojave Desert.** (April 22-23). Leaders: *A. E. Flint and D. Phoenix.*

Trip will visit important mines and mining districts in and adjacent to the western Mojave Desert, including the U.S. Borax Mine at Boron, the ASARCO mineral properties at Calico Mountain, and the Mojave-Rosamond Mining District where one mine, not presently in operation, will be examined underground. Also, the Kaiser Cushenbury limestone quarry and plant, the Oro Grande quarry and plant, the Blackhawk slide mineralized area, and others will be visited. The publication, *Geology and Mineral Wealth of the California Desert* (Dibblee Volume), South Coast Geological Society, D. L. Fife and A. R. Brown, eds., 1980, will serve to review the economic geology of the Mojave Desert. Includes lodging in Barstow, box lunches, refreshments, transportation (bus), the Dibblee volume, and guidebook. Leave April 22, 0800 hours, and return April 23, 1700 hours. Limit 80. Cost \$120.00.

**14. Surficial structure and geomorphology of the San Andreas fault, western portion of the "Big Bend."** (April 22-23). Leaders: *T. Davis and E. Duebendorfer.*

Surface expression and shallow structure of the San Andreas fault in the San Emigdio Mountains will be examined. Emphasis will be on structural and geomorphic processes, Quaternary tectonics, late Holocene seismicity, and pre-San Andreas structures caught within the fault zone. Includes dinner and breakfast, box lunches, refreshments, lodging at private camp site and lodge, transportation (vans), and guidebook. Individuals can sleep in or outdoors, but must provide own sleeping bag and should be prepared for hiking over rugged terrain. Leave April 22, 0800 hours, and return April 23, 1800 hours. Limit 20. Cost \$90.00.

## GUIDEBOOKS

For each field trip, a guidebook will be provided to the participant. GSA field guides will be lumped into several volumes with a geologic province theme. These volumes will be on sale during the meeting. After the meeting, guidebooks may be purchased by writing J. A. Ryan, Earth Science Department, S-263, California State University, Fullerton, Fullerton, CA 92634 before August 15, 1982.

## EXHIBITS

Educational and commercial exhibits will be on display at the Anaheim Convention Center. The exhibit area will be open from 1100 to 1700 hours, Monday, April 19; from 0800 to 1700 hours, Tuesday, April 20; and from 0800 to 1300 hours, Wednesday, April 21.

The deadline for contracting booth space is February 15, 1982.

For exhibit space, contact J. Patterson, Exhibit Coordinator, Earth Science Department, S-263, California State University, Fullerton, Fullerton, CA 92634; Phone (714) 773-3882.

## INFORMATION CENTER

An information center will be maintained at the Convention Center for transmitting messages, providing guides to restaurants and motels, and posting employment notices.

INQUIRIES for additional information should be directed to Neil J. Maloney, Local Committee Chairman, Earth Science Department, S-263, California State University, Fullerton, Fullerton, CA 92634; Phone (714) 773-3882.

## FAMILY AND SOCIAL ACTIVITIES

Southern California offers a diversity of entertainment, recreational, and educational experiences for the entire family. We have selected a range of activities that we hope will appeal to our visitors. *All tours leave from and return to the Convention Center.*

**GSA Special Event—Barbeque at Gold Rush Camp.** A barbeque and entertainment in an authentic, western style atmosphere in the Gold Rush Camp, a secluded part of the Knott's Berry Farm. The cost includes dinner, beer and wine, entertainment, and transportation to and from the park. **Date:** Monday, April 19, 1982. **Time:** 7:00 to 10:00 p.m. **Price:** \$27.50 per person.

**Disneyland.** A passport ticket provides entrance to the park, adjacent to the Convention Center, and to all its rides and attractions during one day.

**Tour 1. Stars Homes, Farmers Market.** A tour of the beautiful Beverly Hills area, passing television and movie stars homes in the surrounding area, the likes of which may include Jimmy Stewart, Rosemary Clooney, and Lucille Ball. From here we will journey to Farmers Market (described in Tour 2). **Date:** Saturday, April 17, 1982. **Time:** 10:00 a.m. to 3:00 p.m. **Price:** \$13.00 per person.

**Tour 2. George C. Page Museum, La Brea Tar Pits, and Farmers Market.** View the permanent exhibitions which include reconstructions of Pleistocene animals from fossils recovered from the tar pits (among them, imperial mammoths, dire wolves, California sabertoothed cats, American mastodons, and many more). From here we journey to the world-famous Farmers Market, where one may enjoy shopping for curios from the world over and taste foods from a variety of countries. **Date:** Sunday, April 18, 1982. **Time:** 9:00 a.m. to 3:00 p.m. **Price:** \$14.00 per person.

**Tour 3. Harbor cruise, Lido Village shopping, Rogers Gardens.** We depart Anaheim for Newport Beach to sample the ambience of this resort area. First, we'll board a cruise boat for a tour of Newport Bay with views of several celebrities' homes. After our cruise, we will have the opportunity to shop at Lido Village with its brick-paved lanes and quaint, unusual shops. You may lunch on your own at one of the charming restaurants in the village. On our way home, we stop at Rogers Gardens, a magnificent nursery with an array of hanging baskets and unusual floral displays. **Date:** Monday, April 19, 1982. **Time:** 10:00 a.m. to 4:00 p.m. **Price:** \$15.00 per person.

**Tour 4. Universal Studios.** Our tour of the world's largest movie studio begins on the Glamour Tram as we peek into stars' dressing rooms, tour a sound stage, view the special effects, and much more. We will entertain you with stunt show, "Airport 77," Screen Test Theater, and other cinema sights and sounds. **Date:** Tuesday, April 20, 1982. **Time:** 9:00 a.m. to 4:00 p.m. **Price:** \$22.00 per person.

**Tour 5. San Juan Capistrano/Laguna Beach.** Begin this tour with a

historical narrative of Orange County's points of interest and tour San Juan Capistrano Mission, where Father Serra taught the native Indians 200 years ago. Following this historical tour, we travel up the coast to another renowned landmark, Laguna Beach, where unusual boutique shops, ocean beauty, and varied arts and crafts await the visitor. **Date:** Wednesday, April 21, 1982. **Time:** 9:00 a.m. to 3:00 p.m. **Price:** \$15.00 per person.

### TOURS AND ACTIVITIES PREREGISTRATION

Please mail the application, with your check, by **March 12, 1982**, to

GSA Family Program  
PS Tours  
P.O. Box 4483  
Anaheim, California 92803

Make checks payable to  
**PS Tours**

<u>Tour</u>	<u>Activity</u>	<u>Date</u>	<u>Cost per person</u>	<u>No.</u>	<u>Amount</u>
1.	Star Homes, Farmers Market	Apr. 17	\$13.00	_____	\$ _____
2.	La Brea Tar Pits, Page Museum	Apr. 18	\$14.00	_____	\$ _____
3.	Newport Harbor Cruise, Rogers Gardens	Apr. 19	\$15.00	_____	\$ _____
4.	Universal Studios	Apr. 20	\$22.00	_____	\$ _____
5.	Mission San Juan Capistrano, Laguna Beach	Apr. 21	\$15.00	_____	\$ _____
	Barbeque at Gold Rush Camp	Apr. 19	\$27.50	_____	\$ _____
	Disneyland Passport Ticket, any day, at special GSA discount rate				
	adult .....		\$9.25	_____	\$ _____
	junior (age 12 to 17) .....		\$8.10	_____	\$ _____
	child (age 3 to 11) .....		\$7.65	_____	\$ _____

You may pick up tickets at the hospitality desk in the Registration Area at the Convention Center. On-site registration depends upon availability because tours may be cancelled for insufficient registration.

### HOTEL INFORMATION

The convention headquarters is the Anaheim Quality Inn Hotel. It is conveniently located across from the Convention Center and two blocks from Disneyland on Convention Way at Harbor Boulevard.

There are nearly a hundred other hotels and motels in the Disneyland-Convention Center area, as well as four recreational-vehicle parks. The closest campground is at Featherly Park located about 15 miles to the northeast on the Riverside Freeway, 91.

### ROOM RESERVATION FORM

For use with Quality Inn, Anaheim  
CORDILLERAN SECTION, GSA

ALL REQUESTS MUST BE RECEIVED PRIOR TO **MARCH 19, 1982**

Name \_\_\_\_\_  
Institution or Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Check one of the following:

_____ Single	\$42.00	_____ Triple	\$ 58.00
_____ Double	\$50.00	_____ Quad	\$ 58.00
_____ Twin	\$50.00	_____ Suite	\$200.00

ARRIVAL DATE \_\_\_\_\_ TIME \_\_\_\_\_  
DEPARTURE DATE \_\_\_\_\_ TIME \_\_\_\_\_

**MAIL TO:**  
QUALITY INN/ ANAHEIM  
616 Convention Way  
Anaheim, California 92802  
(714) 750-3131

**PLEASE INCLUDE ONE NIGHT'S DEPOSIT**

NOW AVAILABLE

Geological Society of America Special Paper 184  
**PACIFIC NORTHWEST CENOZOIC BIOSTRATIGRAPHY**

Edited by John M. Armentrout

Two schools of thought existed regarding the classification of Cenozoic formations on the Pacific Coast. One was that of paleontologists working with megafossils, and the second that of paleontologists working on foraminifera. These two schools existed because the rock record of the Pacific Coast was either rich in microfossils and lacking in megafossils or vice versa. The C. E. Weaver committee in 1944 integrated the fossil schemes, and subsequent work revealed that several of the "stage" and "formational" units were coeval biofacies. To overcome the biofacies problems, workers are now using refined time-stratigraphic biostratigraphy, radiometric dating, planktonic biostratigraphy, and magnetostratigraphy. These tools have resulted in major changes in the interpreted age of Pacific Northwest Cenozoic strata.

Eight of the papers included in *Pacific Northwest Cenozoic Biostratigraphy* were originally presented in a symposium convened by John M. Armentrout of Mobil Oil Corporation and Kristin McDougall of the U.S. Geological Survey. The purpose of the symposium was to focus on new data concerning the age relation-

ships of the Cenozoic strata of Oregon and Washington and the correlation of the local strata within a worldwide time framework. Not since the Weaver committee has such an effort been undertaken. To round out this volume, two additional papers have been added plus abstracts of six others.

Topics range from biostratigraphy to paleoecology based on studies of fossil mollusks, foraminifers, echinoderms, palynomorphs, and megaflores. The authors include W. O. Addicott, J. A. Wolfe, K. R. Newman, W. W. Rau, G. A. Miles, A. D. Warren, J. H. Newell, J. A. Barron, G. Keller, J. C. Ingle, Jr., and others.

178 pages with index, 8½ x 11", perfect bound . . . . . \$26  
postage paid

To order, send \$26\* in U.S. funds (plus 3½% sales tax for Metro Denver delivery, 5½% Boulder, 3% other Colorado) with name and mailing address to GSA Publication Sales Department, P.O. Box 9140, Boulder, CO 80301.

\*Member discount allowed when claimed.

**Committee on Institutional Cooperation (CIC) offers opportunities to minorities**

The CIC Minorities Fellowships Program in the Sciences, Mathematics, and Engineering offers four-year fellowships for graduate study to minority students seeking Ph.D. degrees in scientific fields.

The fellowships provide full tuition and an annual stipend of at least \$5,000 for each of four years. Sponsored by the Committee on Institutional Cooperation (CIC), the consortium of the Big Ten universities and the University of Chicago, the fellowships may be used at any one of the 11 CIC universities to which recipients have been admitted (University of Chicago, University of Illinois, Indiana University, University of Iowa, University of Michigan, Michigan State University, University of Minnesota, Northwestern University, Ohio State University, Purdue University, and University of Wisconsin).

American Indians, Black Americans, and Hispanic Americans who intend to pursue studies leading to a Ph.D. in any of the various disciplines in the sciences and engineering are eligible to apply.

The deadline for applications for fall 1982 is January 15, but students are urged to apply as early as possible in the fall of 1981. A unique one-step application procedure combines on a single form application both for the fellowship and for admission to any of the CIC universities.

The competition for the CIC fellowships to be awarded in fall 1982 is the second held under the program, which is funded by a grant from the John D. and Catherine T. MacArthur Foundation and by the CIC universities.

The fellowships program in the sciences is the newest component of the CIC Minorities Fellowships Program, which

has been in operation since 1978. Similar fellowships are offered to minority students seeking doctorates in a number of social science and humanities fields. To date, about 150 students from all sections of the country and from Puerto Rico have received fellowships to begin their graduate studies at the various CIC universities.

Detailed information about the program can be obtained by writing to the CIC Minorities Fellowships Program, 111 Kirkwood Hall, Indiana University, Bloomington, IN 47405. After September 15, prospective applicants from outside Indiana may call toll-free at 800-457-4420 to obtain information and application forms.

~~~~~  
**Articles in *Bulletin*, Part II,  
November 1981**

Summary only of this article is in *Bulletin*, Part I.

A deep low-velocity body under the Yellowstone caldera, Wyoming: Delineation using teleseismic P-wave residuals and tectonic interpretation, by H. M. Iyer, J. R. Evans, G. Zandt, R. M. Stewart, J. M. Coakley, and J. N. Roloff. (On microfiche: 175 p., 26 figs., 6 tables)

# PENROSE CONFERENCES

## Origin of fluids and metals in porphyry and epithermal mineral deposits

A GSA Penrose Conference, "Origin of Fluids and Metals in Porphyry and Epithermal Mineral Deposits," will be held August 8-13, 1982, at Holiday Inn, Dillon, Colorado. The conveners are James LeAnderson, Steve Ludington, and Arthur Bookstrom. Applications should be sent to James LeAnderson at the Department of Geological Engineering, Colorado School of Mines, Golden, CO 80401, by April 20, 1982. Persons interested in giving an oral presentation or a poster session are invited to submit a title and description of the topic no later than February 28, 1982. Final figures on costs (not available at press time) will be published soon in *GSA News & Information*.

Knowledge and interest in the origin of metal-bearing fluids related to porphyry and epithermal mineral deposits have increased significantly in the last few years, due to the continually increasing value of metals contained in these deposit types. Recently, researchers in the public and private sectors have largely abandoned simplistic models for the origin of these deposits, having recognized that the processes are complicated and often compound. The application of increasingly sophisticated research tools, such as the electron microprobe and mass spectrometer, have revealed layers of complexity unknown to earlier geologists. The question of whether the metals and fluids ultimately come from the magmas or are leached from the surrounding terrain has profound implications for the way in which

we explore for these deposits and for our success rate in finding them. Recent studies seem to yield, in part, conflicting evidence, and answers for some types of deposit are far from resolved.

How important are the environment and processes of emplacement of plutons in the upper crust, relative to the ultimate origin of those plutons? How do we *prove* that an epithermal deposit is or is not related to plutonism? How, if at all, are metal content and mineral assemblages of deposits related to plutons, if they are present? How do we deduce the chemical nature of intruding magmas from their resultant altered and metal-depleted plutons? What are the limits to the amount of metal, sulfur, fluorine, chlorine, and water that melts of various compositions can carry into the upper crust? Why do some metal-rich intrusions result in ore deposits and hydrothermal systems, while others do not? Under what conditions will a pluton produce a porphyry-type deposit, a vein deposit, or both? Do specific deposit types require specific metal sources? Together we will address these and other related problems, including those brought to the conference by the participants.

Two one-day field trips will include (1) surface tours of the Idaho Springs-Central City and Jamestown mining districts, and (2) an underground tour of the Henderson molybdenite deposit. There will also be optional half-day surface field trips to additional mining districts in central Colorado.

## Models of diagenesis in clastic reservoirs

A GSA Penrose Conference, "Models of Diagenesis in Clastic Reservoirs," will be held in mid-August 1982 in Kailua, Kona, Hawaii. The conference will follow the Clay Mineral Society Annual Meeting which will be held August 8-14 in Hilo, Hawaii. The conveners for this conference are J. R. Wood, COFRC, P.O. Box 446, La Habra, CA 90631; Ian Hutcheon, Department of Geology, University of Calgary, Calgary, AB, Canada T2N 1N4; J. R. Boles, Department of Geology, UCSB, Santa Barbara, CA 93017.

The purpose of this conference is to critically examine diagenetic models pertaining to reservoir rocks. These include geologic and mineralogic models, heat and mass flow simulations, and hydrologic models as well as purely geochemical models. Emphasis will be placed on the temporal and spatial distribution of alteration products in actual reservoirs and on theoretical models of heat, mass, and fluid flow. The integration of organic and inorganic diagenesis is also one of the primary aims of this conference. Thus, studies on the timing of diagenetic reactions relative to hydrocarbon maturation and transport are also relevant, particularly since the common ground shared by organic

and inorganic geochemists has not been adequately explored to date in spite of numerous advances in both of these disciplines.

The problems faced in the analysis of reservoir diagenesis are clearly complex and will require a multidisciplinary attack if even approximate solutions are to be obtained. The conveners hope that this conference will attract participants with a wide range of interests, from purely chemical and/or physical to purely geological. A lesser objective of the conference will hopefully be to expose people with general interests in rock-fluid interaction to some of the specific problems currently facing us in the analysis of reservoir diagenesis and provide an up-to-date survey of available data and techniques.

The conference is scheduled for five days, tentatively from August 15 to 20, 1982. The registration fee is expected to be approximately \$400 per person, including food and lodging. Those desiring to attend the conference should contact J. R. Wood at the above address and should include a brief description of topics they wish to contribute or reason for attending the conference. Applications should be received by April 30, 1982.

### GSA OFFICERS AND COUNCILORS

*Digby J. McLaren*, President  
Ottawa, Ontario

*William B. Heroy, Jr.*, Treasurer  
Dallas, Texas

*Paul A. Bailly*, Vice-President  
Lakewood, Colorado

*Howard R. Gould*, Past President  
Houston, Texas

#### 1980-1982 Councilors

*Robert E. Boyer*  
*Frank E. Kottowski*  
*Dallas L. Peck*  
*Peter R. Vail*

#### 1981-1983 Councilors

*Hubert Gabrielse*  
*Bruce B. Hanshaw*  
*John C. Harms*  
*Robert D. Hatcher, Jr.*

#### 1982-1984 Councilors

*Haydn H. Murray*  
*Thornton L. Neathery*  
*Arthur A. Socolow*  
*Rosemary J. Vidale*

# NOVEMBER BULLETIN BRIEFS

## Article Summary

• A deep low-velocity body under the Yellowstone caldera, Wyoming: Delineation using teleseismic P-wave residuals and tectonic interpretation: Summary.

*H. M. Iyer, J. R. Evans, G. Zandt\*, R. M. Stewart, J. M.*

*Coakley, J. N. Roloff, U.S. Geological Survey, Menlo Park, California 94025 (\*present address, Zandt: Department of Geology and Geophysics, University of Utah, Salt Lake City, Utah 84112). (7 p., 5 figs.)*

## Articles Complete in the November Issue of Part I

• Megablocks of calcified algae in the Cow Head Breccia, western Newfoundland: Vestiges of a Cambro-Ordovician platform margin.

*Noel P. James, Department of Geology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3X5 (13 p., 15 figs.)*

Slope and basin deposits in the Cow Head Group of early Paleozoic age contain a wide variety of carbonate clasts. Among the most common, largest, and most persistent (middle Middle Cambrian to lower Middle Ordovician) are blocks of fine-grained white limestone. The origin of these clasts is unknown, as no limestones of similar lithology have been found in contemporaneous shallow-water carbonate deposits anywhere in the northern Appalachians.

Petrographic study of these enigmatic limestones reveals that, no matter what their age, they are of similar composition: calcified algae, cement, and fine-grained sediment. The predominant algae are *Epiphyton* spp., occurring as numerous masses of tiny shrublike and clumplike growths, and *Girvanella* spp., developed as numerous thin strands and arcuate sheets. *Renalcis* spp. and stromatolitic algae, although locally common, are not persistent. The algae are surrounded by fibrous calcite cement interpreted to be syngedimentary, while the numerous small cavities between algae are partly filled with geopetal marine sediment.

These blocks are interpreted to be redeposited fragments of reef mounds and buildups which grew along the shallow, submerged margin of the North American craton during early Paleozoic time. These buildups are now probably buried beneath the allochthonous Cow Head strata. The mounds were composed of calcareous algae, because there were no large reef-building metazoans during this time in geologic history. Recognition of similar clasts in analogous settings in the Quebec and southern Appalachians, as well as in the Cordillera, suggests that this facies was both widespread and persistent for more than 70 m.y.

• Rates and possible causes of neotectonic vertical crustal movements of the emerged southeastern United States Atlantic Coastal Plain.

*Thomas M. Cronin, U.S. Geological Survey, M.S. 970, Reston, Virginia 22092. (22 p., 11 figs., 2 tables)*

Emerged Pliocene and Pleistocene shorelines and associated marine deposits were used to determine the magnitude and rate of vertical crustal movement during the past 3 m.y. in the United States Atlantic Coastal Plain of South and North Carolina. On the basis of a new regional ostracode assemblage zonation, planktic biostratigraphic data, and radiometric data, emerged marine deposits were determined to be primarily interglacial and can tentatively be correlated with hemispheric warm intervals in evidence from deep-sea data.

The paleontologic evidence indicates a primary glacio-eustatic component to the local sea-level record and a secondary tectonic

component. Net vertical uplift rates averaging 1 to 3 cm/1,000 yr, but perhaps as high as 5 to 10 cm/1,000 yr, are in evidence for the emerged Coastal Plain. Although details of the timing of regional rheological events remain obscure, the trend of net uplift contrasts with general subsidence rates of about 2 to 4 cm/1,000 yr since the Cretaceous in submerged parts of the continental margin near subsiding sedimentary troughs. Hydro-isostatic crustal response to multiple deglaciation events may have periodically uplifted the coast, but long-term lithospheric flexural upwarping in response to sediment loading offshore is a more plausible mechanism to explain the present positions of shorelines above present mean sea level. An eustatic sea-level model is proposed for interglacial high stands of the past 3.0 m.y.

• Radial outflow and unsteady retreat of late Wisconsin to early Holocene icecap in the northern Long Range Upland, Newfoundland.

*Richard B. Waite, Jr., U.S. Geological Survey, 301 E. McLaughlin Blvd., Vancouver, Washington 98663. (5 p., 4 figs.)*

A swampy very low-relief drift terrain along the medial zone of the northern Long Range Mountains passes outward into fresh glacially eroded bed rock of low to moderate relief. Striations, crescentic gouges, lunate fractures, streamlined stoss-and-ice surfaces, erratics, and other evidence in the upland abundantly reveal radial outflow from a late-glacial icecap that was centered over the Long Range and discharged through peripheral fjord-like valleys to coastal lowlands. A discontinuous belt of moraines and concentrated boulders delineates a stillstand or readvance after the icecap had retreated entirely to the upland and was about 50 km broad. Relatively thick till and an abundance of boulders in the medial low-relief zone suggest that after further contraction to 10 to 15 km wide, the icecap contracted rather slowly. These upland moraines may correlate with cool intervals 11,000 to 9,000 yr ago in the oxygen-isotope record of the ice core from Camp Century, Greenland, or with glacier advances 9,500 to 8,000 yr ago in Greenland and the Canadian Arctic.

• Chrysophyte cysts as potential environmental indicators.

*David P. Adam, U.S. Geological Survey, Menlo Park, California 94025; Albert D. Mahood, California Academy of Sciences, San Francisco, California 94121. (6 p., 7 figs.)*

Many chrysophyte algae produce morphologically distinctive, siliceous, microscopic cysts during a resting stage of their life cycles; these cysts are often preserved in sediments. Scanning electron microscopy and Nomarski optics permit much more detailed observation of these cysts than was heretofore possible. We have used an ecologic and biogeographic approach to study the distribution of cyst forms in sediments and have established that many cyst types are found only in specific habitats, such as montane lakes, wet meadows, ephemeral ponds, and *Sphagnum* bogs. In the samples we have studied, cysts seem to be most common in fluctuating fresh-water habitats of low to moderate



pH and some winter freezing. Numerous taxonomic problems have yet to be resolved. We believe that chrysophyte cysts have the potential to become a useful tool for both modern environmental assessments and paleoecological studies of Cenozoic fresh-water lacustrine deposits.

---

• Tsunami-induced sediment transport in the abyssal Mediterranean Sea.

*Kim A. Kastens, University of California, San Diego Marine Physical Laboratory of the Scripps Institution of Oceanography, La Jolla, California 92093 (present address: Lamont-Doherty Geological Observatory, Palisades, New York 10964); Maria B. Cita, Istituto di Geologia, University of Milan, Milan, Italy. (13 p., 10 figs., 1 table)*

An unusual stratigraphic unit (nicknamed "homogenite") fills topographic lows in the complex ridge and trough bathymetry at two survey sites on the Western Mediterranean Ridge and the Calabrian Ridge. On near-bottom 4-kHz seismic-reflection profiles, this unit is an acoustically transparent, near-surface, flat-lying layer, whereas in cores, it is a homogeneous gray marl as much as 7 m thick. Grain size decreases upcore within the unit, implying that it was deposited in a single event controlled by gravitational settling. The stratigraphic position of the homogenite relative to a firmly dated sapropel bed suggests emplacement between 4,440 and 3,100 yr B.P. The source of the homogenite is inferred to be the nearby basin walls. Farther east, two other sites with similar rugged topography lack homogenite entirely.

A triggering mechanism is required which is capable of initiating massive sediment transport simultaneously in many separate basins at the western two survey sites, but which is not effective at the eastern sites. A large archeologically recorded earthquake of the correct age is considered and rejected because its epicenter is closer to the nonhomogenite-bearing sites than to the sites where this sediment type was observed, and because several other earthquakes of comparable magnitude have since been recorded in the area, whereas the homogenite is unique. The 3,500 yr B.P. collapse of the caldera of the volcano of Santorini caused a huge tsunami which is recorded archeologically and geologically around the eastern Mediterranean. Because of refraction of the tsunami by the bathymetry, and because the caldera collapsed in its southwest corner, a disproportionate amount of tsunami energy was directed toward the western area where homogenite is observed. In contrast, the homogenite-free sites were relatively sheltered. An order-of-magnitude calculation shows that the near-bottom oscillating currents accompanying the Santorini tsunami were at or above the threshold erosion velocity at the homogenite-bearing sites. In addition, the near-bottom pressure pulse under the tsunami at the homogenite-bearing sites was sufficient to cause liquefaction of sediments. Neither mechanism was adequate to cause sediment transport or slope failure at the homogenite-free sites.

---

• Rare-earth element geochemistry of the island-arc volcanic rocks of Rabaul and Talasea, New Britain.

*Joseph G. Arth, 981 National Center, U.S. Geological Survey, Reston, Virginia 22092. (6 p., 5 figs., 2 tables)*

The island-arc volcanic rocks of Rabaul and Talasea, New Britain, range in composition from basalt through rhyolite. Rare-earth elements have been determined by mass-spectrometric

isotope dilution in 16 samples. Chondrite-normalized rare-earth element patterns are distinct for each volcanic center, but all are relatively flat ( $Ce/Yb_{E.F.} = 1.1$  to 3.0). Within each center, rare-earth element concentrations increase from basalt to dacite, and Eu anomalies become progressively more negative from basalt to dacite ( $Eu/Eu^* = 1.0$  to 0.8). Lavas inferred to contain cumulate phenocrysts show positive Eu anomalies ( $Eu/Eu^*$  of up to 1.2). The observed variations are consistent with fractional crystallization of basalt or basaltic andesite by removal or accumulation of the observed phenocrysts, including olivine, plagioclase, pyroxene, and opaque minerals. Quantitative trace-element models for Talasea lavas indicate precipitation of 50 wt percent of phenocrysts from basalt to produce andesite and an additional 22 wt percent to produce dacite. A total-equilibrium model provides the best approximation to observed concentrations, implying that the process took place at a depth sufficient to allow slow cooling of the magma as precipitation proceeded. The "least fractionated" basalts and basaltic andesites are similar in rare-earth element pattern to those of corresponding type suites in other oceanic-island arcs, implying a widespread uniformity of source and process in the production of each magma type.

---

• Rb-Sr ages of granitic gneisses of the Inner Piedmont belt of northwestern North Carolina and southwestern South Carolina.

*Stephen B. Harper,\* Paul D. Fullagar, Department of Geology, University of North Carolina, Chapel Hill, North Carolina 27514 (present address Harper: Department of Geology, East Carolina University, Greenville, North Carolina 27834) (9 p., 8 figs., 3 tables)*

Granitic gneisses from the Inner Piedmont belt of northwest North Carolina have Rb-Sr whole-rock ages of  $427 \pm 9$  m.y.,  $460 \pm 9$  m.y., and possibly 534 m.y. Initial  $^{87}Sr/^{86}Sr$  ratios for these rocks are approximately 0.704. Rb-Sr data for granitic gneisses from the Inner Piedmont belt of southwestern South Carolina and adjacent Georgia suggest a whole-rock age of approximately 423 m.y. and an initial  $^{87}Sr/^{86}Sr$  ratio of 0.7069. These ages are tentatively interpreted as times of igneous crystallization. Together with previously published results, these data suggest that 460 to 420 m.y. ago was a time of significant igneous activity in the Inner Piedmont of North and South Carolina; igneous activity also occurred 545 to 525 and 350 to 335 m.y. ago.

---

• The Middle Devonian rugose coral *Prismatophyllum conjunctum* (Davis), and the age of the "Columbus" Limestone at Ingersoll, Ontario.

*William A. Oliver, Jr., U.S. Geological Survey, Washington, D.C. (5 p., 5 figs., 1 table)*

*Prismatophyllum conjunctum* (Davis) is a craspedophyllid coral that has the growth form of *Prismatophyllum* and an *Eridophyllum*-like internal wall (aulos). This mixture of the characters of two distinct genera is interpreted as convergence because the aulos is independently developed in several stocks of corals. Specimens of *P. conjunctum* are not common but are known from four widely scattered sequences in Kentucky, Ohio, Ontario, and New York. These occurrences of approximately the same age, and other stratigraphic data, help resolve differing interpretations of the relationship of the central southwestern Ontario section to other Devonian sequences in eastern North America.

## SEPARATES PROGRAM DISCONTINUED FOR 1981

GSA Map and Chart Series

**North Atlantic Ocean:  
Bathymetry and Plate Tectonic Evolution**

Naval Research Laboratory • Acoustic Media Characterization Branch

This beautiful chart printed in hypsometric tints from surrounding land masses to sea level and down to 8,000 metres depth is a full 56 by 41 inches. Magnetic lineations, earthquake epicenters, and deep sea drilling program sites appear on the reverse side of the chart for obverse viewing. When a light source is placed behind the chart, these data become visible and can be viewed relative to the bathymetry on the front. Scale at equator 1:8,753,909.

Inserts on this chart include (A) paleobathymetric charts at various stages of evolution of the North Atlantic, (B) a time scale (chronology) of geomagnetic reversals, (C) crustal age versus distance from Mid-Atlantic ridge western North Atlantic, and (D) a map of the North Atlantic where known or presumed oceanic crust is color-coded in intervals of the stratigraphic time scale.

**MC-35 Rolled \$10.25      Folded \$8.75**

**ALSO AVAILABLE**

Geologic Cross Section of the Sierra Nevada and the Great Basin along 40°N. lat., Northeastern California and Northern Nevada by R. C. Speed and E. M. Moores. Two sheets in color 49" x 40" each, with 12-page text.

**MC-28L Rolled \$14.00      Folded \$12.50**

Geologic Cross Section from the Sierra Nevada to the Las Vegas Valley, Eastern California to Southern Nevada by L. A. Wright and others. One sheet in color 51" x 32" with 16-page text.

**MC-28M Rolled \$15.75      Folded \$14.25**

Geologic Cross Sections, Northern California Coast Ranges to Northern Sierra Nevada, and Lake Pillsbury Area to Southern Klamath Mountains by J. C. Maxwell and others. One sheet in color 55" x 36½" with 8-page text.

**MC-28N Rolled \$12.00      Folded \$10.50**

**Order from  
GSA Publications Sales  
P.O. Box 9140  
Boulder, CO 80301**

| Item   | Price each     | Qty | Total |
|--------|----------------|-----|-------|
| MC-28L | Rolled \$14.00 |     |       |
| MC-28L | Folded \$12.50 |     |       |
| MC-28M | Rolled \$15.75 |     |       |
| MC-28M | Folded \$14.25 |     |       |
| MC-28N | Rolled \$12.00 |     |       |
| MC-28N | Folded \$10.50 |     |       |
| MC-35  | Rolled \$10.25 |     |       |
| MC-35  | Folded \$8.75  |     |       |

Sales tax\* \_\_\_\_\_

Total \_\_\_\_\_

check  money order in U.S.  
funds enclosed for total amount.

Name \_\_\_\_\_

GSA Member No.\*\* \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

\*Metro Denver 3½%, Boulder 5½%,  
other Colorado 3%.

\*\*GSA Member discount allowed.

# INSIDE---

Final announcements and preregistration forms:

|                                                            |     |
|------------------------------------------------------------|-----|
| Northeastern-Southeastern Sections, Combined Meeting ..... | 214 |
| South-Central Section .....                                | 218 |
| Cordilleran Section .....                                  | 222 |
| News from GSA Divisions .....                              | 209 |



**THE  
GEOLOGICAL SOCIETY  
OF AMERICA**  
P.O. Box 9140 • 3300 Penrose Place  
Boulder, Colorado 80301

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