

GSA NEWS & INFORMATION

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The Geological Society of America

ISSN 0164-5854

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GeoVentures 1991 Registration Starts January 2, 1991

By Sue Beggs, *Meetings Manager*

Where will you be spending your free time next year? Some of GSA's members and friends will be enjoying trips to New Zealand, Great Britain, Grand Canyon, and Colorado as part of GSA's 1991 GeoVenture program. GeoVentures offer an array of trips and classroom experiences. They are especially designed for geologists who would like to experience an interesting travel destination in the company of other geologists who share similar educational interests.

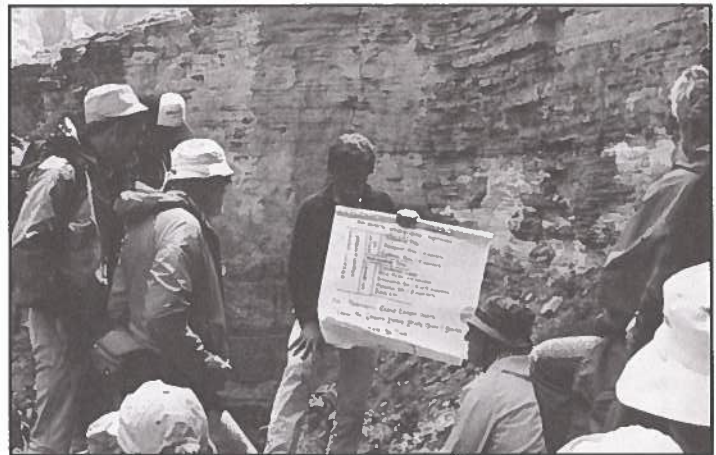
GeoVentures are a special benefit created for members, but are open to guests and friends also. GeoVentures is the overall name for adult educational and adventure experiences of two kinds: GeoTrips or GeoHostels. Both are known for expert scientific leadership. Fees for both are low to moderate (relative to the length, time of year, and destination) and include lodging and meals as designated.

1991 GeoTrips

Up to three weeks long and involving adventure and travel almost every day, the GeoTrips may go to any destination worldwide. Three offerings are being made available in 1991. The first, a trip to New Zealand, March 3–23, is fully subscribed. The next two will take place this summer and begin registering *January 2*.

GT912. **Great Britain's Classical Geology**, June 15–July 6, 1991
Cosponsored by NAGT.

GT913. **Grand Canyon Adventure**, July 14–22, 1991
George Billingsley, Ken Hamblin



Ivo Lucchitta describes Precambrian stratigraphy during a hike in Carbon Canyon, Grand Canyon.

1991 GeoHostels

A GeoHostel is also an adult learning experience for geologists and their guests. It is site-specific, with a combination of classroom and field experiences that start from the same location each day. A GeoHostel is held for five to seven days at a destination that is rich in geological interest as well as plentiful in opportunities for side excursions.

GeoHostels offer (1) an enjoyable experience with an educational focus on topics appealing to a wide range of geologists and their guests; (2) ample free time to enjoy the special environmental and cultural aspects of the location; (3) leadership by enthusiastic, well-organized geologists who can speak well, and who can cover the topics at a level appropriate for the non-expert.

GH91. **Colorado School of Mines, Golden, Colorado**
June 23–27, 1991. Kenneth Kolm, Gregory Holden

GeoVentures descriptions on pages 354–355 (registration form on p. 356)

Look for *GSA Today* next month



DNAG NEWS

by Allison R. (Pete) Palmer

DNAG Products on Their Way

As of this writing, the synthesis volume on the Caribbean Region has gone to the printer, and three transects (A-3, Alaska; E-4, Eastern Kentucky to the Carolina Trough; and H-1, La Paz to Saltillo, Mexico) as well as the two sheets of stacked transects of eastern and western North America at 1:1,000,000 have been through final proofs and will either be printed or at the printer by the time you receive this. Both the Stress Map and the Thermal Anomaly Map of North America, on the same base as the Seismicity, Magnetic Anomaly, and Gravity Anomaly maps, are to the proof stage and should be at the printer or printed by now.

More Kudos

George Kiersch has completed writing the final pieces for the Centennial Special Volume *Heritage of Engineering Geology* and is scheduled to review the galleys for the book in early November; it should be ready to send to the printer in December and will be the 21st DNAG book to be completed. The contributors are listed below; they bring the total number of contributors of finished DNAG volumes to 1569.

| | |
|------------------|---------------------|
| M. G. Bonilla | K. Mather |
| R. L. Brown | J. I. Maycotte |
| J. G. Cabrera | C. R. McClure |
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| J. R. Keaton | C. L. Sorrough |
| G. A. Kiersch | D. J. Varnes |
| S. P. Leatherman | E. B. Waggoner |
| F. T. Lee | W. F. Weeks |
| B. Mather | |

Economic Geology of Mexico

On return from my foreign travel, I learned that Bill Salas, editor for the volume *Economic Geology of Mexico*, had died on June 29. Bill was confined to bed for the last several months of his life, but worked steadily on questions about his volume, sending off a package of responses to editorial questions just four days before he died. His friend and colleague Hugo Cortes Guzmán, who was working with him, has finished up the last details regarding editorial questions, and we are now in the process of completing this book for publication.

There's Light at the End of the Tunnel

With the end of the year bearing down on us and the GSA Council and Foundation threatening to terminate all unfinished DNAG products that are not well in hand, the message seems to have gotten through to most of the authors of long-delayed manuscripts that the time has come to get their long-awaited commitments completed. Nearly everyone has been contacted in the past week. All remaining volumes that GSA expects to publish, except the volume to accompany the transects, and perhaps the Alaska and the Gulf of Mexico volumes, as well as two of the six remaining transects, should be in our hands well before you receive this. About half of the needed chapters have been promised before the GSA Annual Meeting, and these should permit completion of the U.S. volumes *Precambrian: Conterminous U.S.*; *Economic Geology: U.S.*; *Quaternary Non-glacial: U.S.*; and the *Cordilleran Orogen: U.S.* The last chapter for the Gulf of Mexico volume is promised "by the end of the year." If all goes well, 1991 should be mop-up time.

Best wishes for the holidays to all of those who have finished their commitments and are off my bugging list.

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December 1990

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Write To Support Geology Stamps

I recently received the enclosed reply from the Citizens' Stamp Advisory Committee (USPS), in relation to a suggestion I made to the Committee to honor John Burroughs, G. K. Gilbert, T. C. Chamberlin, E. S. Dana, J. D. Dana, and Louis Agassiz on stamps.

Thank you for writing to suggest that we issue stamps to honor famous geologists. The Citizens' Stamp Advisory Committee has asked me to respond.

Each year we receive thousands of letters suggesting hundreds of different topics for new stamps. Since 1957, the Citizens' Stamp Advisory Committee has reviewed many worthy subjects and has recommended a limited number based on national interest, historical perspective, and other criteria.

The Committee has considered John Burroughs and G. K. Gilbert in the past, but it did not recommend that a stamp be issued. However, policy requires that a topic be considered again if renewed interest is demonstrated. The proposal to honor Louis Agassiz has been brought before the Committee and currently remains under consideration for issuance. I will be pleased to see that your proposal to honor Thomas Chowder Chamberlin, Edward S. Dana, and James D. Dana is also brought before the Committee at its next meeting. Your letter will be included in the file prepared for review by the members.

To allow sufficient time for design, production, and distribution of the billions of U.S. stamps produced annually, the Committee must work two to three years in recommending stamp subjects. Decisions on these recommendations generally are announced in the fall of the year before issuance of the stamps.

Commemoration of geologists on United States postage stamps is severely lacking. The only geologists to be honored to date was John Wesley Powell, on a 1969 issue.

I urge all GSA members to write to the Committee to let them know that famous/important American geologists need to be commemorated in the near future. The address of the Citizens' Stamp Advisory Committee is:

Citizens' Stamp Advisory Committee
Stamp Division, USPS, Room 5800
475 L'Enfant Plaza SW
Washington, DC 20260-6352

Barry A. Schwartz
Subsurface Exploration Section
New York City Department of General Services

People

Fellow Donald M. Davidson, Jr., Dekalb, Illinois, has been appointed Assistant Provost for Resource Planning at Northern Illinois University.

Member Fred Dowsett, Denver, Colorado, was named Outstanding Employee of the Year in the Hazardous Materials and Waste Management Division at the Colorado Department of Health.

Cole Memorial Research Awards In Geomorphology and Micropaleontology

Through the generosity of W. Storrs Cole, two awards for support of research will be offered through GSA. The Gladys W. Cole Memorial Research Award provides research support for the investigation of the geomorphology of semi-arid and arid terrains in the United States and Mexico. It is to be given to a GSA Fellow between 30 and 65 years of age who has published one or more significant papers on geomorphology. Funds cannot be used for work already accomplished, but recipients of a previous award may reapply if additional support is needed to complete their work. The amount of this award in 1991 will be \$6000.

The second award, the W. Storrs Cole Memorial Research Award, has been established to support research in invertebrate micropaleontology. This new award will also carry a stipend of \$6000 and will be given each year to a GSA Fellow between 30 and 65 years of age who has published one or more significant papers on micropaleontology. The award is offered for the *first* time in 1991.

Additional information and application forms may be obtained from June R. Forstrom, Research Grants Administrator, GSA, P.O. Box 9140, Boulder, CO 80301.

All applications must be postmarked on or before February 15, 1991. Actions taken by the Committee on Research Grants will be reported to each applicant in early April.

These are two of GSA's most prestigious awards; all qualified applicants are urged to apply.

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FOUNDATION NEWS

by Robert L. Fuchs



Gretchen Louise Blechschmidt Fund

Family, friends, and scientific associates of Gretchen L. Blechschmidt have created the Gretchen Louise Blechschmidt Fund, the income from which will provide scholarships and fellowships for women in the geological sciences. This new GEOSTAR memorial fund will be an important addition to the Foundation's support of women in our profession. The income from the already established Women in Science Fund will be complemented by the Blechschmidt Fund in financing geologic study and research.

The benefactors of the Blechschmidt fund have set the following guidelines for the selection of recipients:

- an interest in achieving a Ph.D. in the fields of biostratigraphy and/or paleoceanography,
- an interest in sequence stratigraphy analysis, particularly in conjunction with research into deep-sea sedimentology,
- an interest in a career in academic research.

Gretchen Blechschmidt was a 1970 graduate of the University of Puget Sound in Tacoma. Subsequently she obtained M.S. (Oceanography, 1975) and Ph.D. (Geology, 1983) degrees from the University of Washington in Seattle. Both her theses dealt with deep-sea sedimentology as evidenced by calcareous nannofossils, an interest that became the basis for her career.

Gretchen joined the staff of the Lamont-Doherty Geological Observatory of Columbia University in 1978 as a Research Scientist. During her tenure at Lamont she was a member of the scientific parties of JOIDES-IPOD and DSDP cruises aboard the research vessels *Eastward*, *Glomar Challenger*, and *Cornida de Saavedra*.

In 1982 Gretchen went to work for the Exxon Production Research Company (EPR) in Houston. At EPR she taught courses in biostratigraphy and advanced stratigraphy, and also worked in the exploration of various areas, including the Gulf of Mexico, Offshore Gulf Coast, Alaska, Offshore China, South America, and Offshore Canada. In 1986 Gretchen left EPR to pursue a career in geological consulting, working with Exxon U.S.A. and Micro-Strat Inc., among others.



Gretchen Blechschmidt

Born and raised in the logging country of Washington's Olympic peninsula, Gretchen inherited a true pioneer spirit. Say the words "travel," "adventure," or "what do you think?," and there was Gretchen. This spirit enabled Gretchen to go into a field where relatively few women had gone before, and it is this spirit that will be remembered most by her friends and colleagues.

Gretchen died in August 1990 after a brief, sudden illness. She is survived by her husband, Robert D. Lyon, a computer programmer in Houston, Texas.

Contributions to the Gretchen Louise Blechschmidt Fund, enabling other women to carry on her spirit of devotion to scientific research, may be sent to the Foundation at GSA headquarters in Boulder.

Braunstein Gift

Following the recent death of Olga R. Braunstein, the Society has received a \$5000 gift from her estate. Olga Braunstein was the wife of the late Jules Braunstein, an active member of GSA and an important earth scientist.

Jules Braunstein died in 1983 at the age of 70. He was a geologist for 61 of those years; at the age of nine he began studying geology after school at the Buffalo Museum of Science. Jules had a long career with Shell Oil Company as a paleontologist, stratigrapher, and staff geologist, and his area of focus covered the Gulf Coast. After retiring from Shell in 1978 he taught geology at the University of New Orleans until his death.

Jules Braunstein was very active in GSA affairs, and he chaired the 1982 GSA Annual Meeting in New Orleans. He was an active participant in other scientific organizations, including AGI, AAPG (where he received Honorary Membership and the Distinguished Service Award), SEPM, and the New Orleans Geological Society.

This gift from the Olga Braunstein Estate will afford continuing recognition of Jules Braunstein's deep, lifelong involvement in the science of geology.

1990 Taxes Too High?

1990 will end in a few weeks, and you may have suddenly realized that your tax bill is going to be uncomfortably high. There is a way to get relief from this situation through a contribution to the GSA Foundation prior to the end of the year.

Foundation News continued on p. 335



GSA Foundation
3300 Penrose Place, P.O. Box 9140, Boulder, CO 80301
(303) 447-2020

I would like to support GSA's program for women in science. Enclosed please find my contribution in the amount of \$_____.

- Gretchen Louise Blechschmidt Fund
- Women in Science

Name _____

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Phone _____

Here is my 1990 contribution of \$_____. Please send me the Foundation poster with my contribution of \$50 or more.

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December 1990



The Geological Society of America

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Contributions of cash, appreciated securities, life insurance, real estate, and other property, if made during 1990, can be used as deductions in calculating the amount of tax payable for the year. There will be two results—a lower tax bill for you in mid-April 1991, and an increase in the Foundation's ability to support GSA's geologic programs such as research grants, education, meetings, and publications.

Send your year-end cash contributions to the Foundation today. Please call the Foundation office at (303) 447-2020 with respect to arranging gifts of securities and other property.

One final word to close out the 1990 contribution year. Between the date you receive this copy of *News & Information* and midnight on **December 31, 1990**, all who send contributions to the Foundation of \$50 or more will receive by return mail a complimentary copy of the Foundation's striking western U.S. landscape poster. To receive this poster, please clip and return the attached coupon (p. 332), along with your contribution, and ensure that the envelope bears a 1990 postmark.

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Call for Nominations for 1991

Nominations for GSA's most prestigious awards, the Penrose and Day Medals, for Honorary Fellowship in the Society, and for the Donath Medal (Young Scientist Award) are due at headquarters by **FEBRUARY 1, 1991**.

Nominations for service as officers and councilors of the Society are due at headquarters by **FEBRUARY 15, 1991**.

Nominations for the Distinguished Service Award are due at headquarters by **MARCH 1, 1991**.

For procedures and additional information, please refer to the October 1990 issue of GSA News & Information, or call headquarters at (303) 447-2020.

Send your nominations and required backup and supporting materials today to the Administrative Department, Geological Society of America, P.O. Box 9140, Boulder, CO 80301.

Help Direct GSA's Future

The GSA Committee on Nominations requests your help in compiling a list of GSA members qualified for service as officers and councilors of the Society. The committee requests that each nomination be accompanied by basic data and a description of the qualifications of the individual for the position recommended (vice-president, treasurer, councilor).

Nominations for 1992 officers and councilors must be received at GSA headquarters no later than **FEBRUARY 15, 1991**. Please send nominations and backup material to the Administrative Department, Geological Society of America, P.O. Box 9140, Boulder, CO 80301.

Call for Nominations for Distinguished Service Award

The GSA Distinguished Service Award was established by Council in 1988 to recognize individuals for their exceptional service to the Society. GSA Members, Fellows, Student Associates, or, in exceptional circumstances, GSA employees may be nominated for consideration. Any GSA member or employee may make a nomination for the award. Awardees will be selected by the Executive Committee, and all selections must be ratified by the Council. Awards may be made annually, or less frequently, at the discretion of Council. This award will be presented during the Annual Meeting of the Society. Nominations and any supporting information may be addressed to

Executive Director
Geological Society of America
P.O. Box 9140
Boulder, CO 80301

Deadline for nominations for 1991 is MARCH 1.

Recipients to date: 1988 *Campbell Craddock*
Robert D. Hatcher, Jr.
Eldridge M. Moores
William A. Thomas
1990 *William B. Heroy, Jr.*

Call for Nominations for 1991 Young Scientist Award (Donath Medal)

The Young Scientist Award was established in 1988 to be awarded to a young scientist (35 or younger during the year in which the award is to be presented) for outstanding achievement in contributing to geologic knowledge through original research that marks a major advance in the Earth sciences. The award, consisting of a gold medal called the Donath Medal and a cash prize of \$10,000, was endowed by Dr. and Mrs. Fred A. Donath.

For the year 1991, only those candidates born on or after January 1, 1956, are eligible for consideration. In choosing candidates for the Young Scientist Award, scientific achievement and age will be the sole criteria. Nominations for the 1991 award must include

- biographical information,
- a summary of the candidate's scientific contributions to geology (200 words or less),
- a selected bibliography (no more than 10 titles),
- supporting letters from five scientists.

Nominations for the 1991 Young Scientist Award must be received at GSA headquarters by **FEBRUARY 1, 1991**.

Recipients to date: 1989 *Mark Cloos*
1990 *Leigh H. Royden*

In Memoriam

C. Richard Murray
Reston, Virginia
December 6, 1989

Albert W. Weeks
Bryn Mawr, Pennsylvania
June 23, 1990

Gilbert C. Lueninghoener
Fremont, Nebraska
February 1990

Byron W. Beebe
Boulder, Colorado
July 17, 1990

George O. Gates
San Francisco, California
February 21, 1990

Lyle H. Henderson
Del Rio, Texas
July 28, 1990

Grace C. Keroher
Bellevue, Washington
March 22, 1990

G. Frederick Shepherd
Dallas, Texas
July 28, 1990

Heber D. Lessig
Salt Lake City, Utah
March 31, 1990

Madeleine A. Fritz
Ontario, Canada
August 20, 1990

Eugene Borax
Carpinteria, California
May 20, 1990

Spence T. Taylor
New York, New York

Melville W. Sherwin
Jackson, Missouri
May 21, 1990

Alfred O. Woodford
Claremont, California

GSA in Education

by Allison R. (Pete) Palmer

SAGE, a Popular Acronym

After the GSA Education Committee developed the concept of the SAGE Program (Science Awareness through Geoscience Education) in 1989, we learned that the Association for Women Geoscientists (AWG) had independently developed a SAGE Award (Student Awards for Geoscience Excellence). This is a worthy activity that is consistent with the goals of GSA's SAGE Program and deserves support within the profession.

Because of the great potential for confusion in fund-raising among overlapping constituencies, the AWG has agreed to phrase future requests for support in terms of their SAGE Award Fund; GSA will be soliciting support for the SAGE Program.

We have learned of several other activities using the SAGE acronym, but with different meanings; also, they are either involved in activities that do not significantly overlap those of the geological community or are not engaged in public fund-raising. If you see *Science Awareness through Geoscience Education*, that's us.

Textbook Evaluations

If you have contact with high school earth science teachers, you might want to make them aware of a publication called *The Textbook Letter*, published by the California Textbook League, P.O. Box 51, Sausalito, CA 94965. The May-June issue (Vol. 1, no. 2) contains two excellent, pointed reviews by Art Boucot of high school texts produced by two major publishers in 1989. These reviews may save some school districts a bit of money.

1990 Recipients of GSA's Award for Excellence in Earth Science Teaching

Twenty-nine teachers from 27 states have received GSA's 1990 Award for Excellence in Earth Science Teaching. Twenty-three were among the three finalists in their state in the competition for the Presidential Awards for Excellence in Science and Mathematics Teaching, and we have learned that 10 of these (marked by an asterisk in the lists below) became national winners of this award. The remaining six GSA awardees were named Outstanding Earth Science Teachers by regional sections of the National Association of Geology Teachers (NAGT). Two states, Missouri and Nebraska, have two awardees. The awardees and their schools are listed below.

State Finalists for Presidential Awards For Excellence in Science and Mathematics Teaching

Vincent J. Ames

Central High School, Grand Forks, North Dakota

Thomas C. Arnold

State College Area High School, State College, Pennsylvania

*Herman Boatman, Jr.**

Edsel Ford High School, Dearborn, Michigan

*Mary Alice Legendre Cain**

East Jefferson High School, Metairie, Louisiana

*Jerry Lynn DeLuca**

Tucker County High School, Hambleton, West Virginia

Talosia Esau

Samoana High School, Pago Pago, American Samoa

James Lavern Fitzgibbon

Red Cloud Community Schools, Red Cloud, Nebraska

Wilson R. Flight

Concord-Carlisle Regional High School, Concord, Massachusetts

*Kathleen Kaye Gulley**

Pike High School, Indianapolis, Indiana

Carl A. Jarvinen

Chaparral High School, Las Vegas, Nevada

Dean H. Jones

Fairmont Junior High School, Boise, Idaho

*Linda B. Knight**

Paul Revere Middle School, Houston, Texas

Larry L. Larson

Cedar Ridge Middle School, Hyde Park, Utah

Jo Ann P. Mulvany

Mills E. Godwin High School, Richmond, Virginia

*Sheryl L. Schaaf**

Forks Middle School, Forks, Washington

*Pamela T. Sloan**

Central High East, Tuscaloosa, Alabama

*Brian Slopey**

Union 32 Jr./Sr. High School, Montpelier, Vermont

Martha Hutchins Staker

Georgetown Middle School, Georgetown, Kentucky

Rion D. Turley

O'Fallon Township High School, O'Fallon, Illinois

*Judith I. Vandel**

McCormick Junior High School, Cheyenne, Wyoming

*Jan S. Weilert**

West High School, Iowa City, Iowa

Ida D. Wideman

St. Andrews Middle School, Columbia, South Carolina

David Wood

Sidwell Friends School, Washington, D.C.

NAGT Outstanding Earth Science Teachers

Janice Arden

Enka High School, Enka, North Carolina

William Burge

Newport Harbor High School, Newport Beach, California

Joyce Cullen

Somers High School, Lincolndale, New York

Art Kasey

Fox Senior High School, Arnold, Missouri

Charles Matlock

Erie Mason High School, Erie, Michigan

Edwin T. Schafer, Sr.

Rawlston Middle School, Rawlston, Nebraska

If you live in the vicinity of these fine teachers, talk to them about partnering, or encourage them to attend a GSA Section or Annual Meeting. Part of their award from GSA is the availability of \$300 each year for the next three years to defray the costs of attendance at one GSA meeting of their choice.

The Geological Society of America

Congressional Science Fellowship 1991–1992



The Geological Society of America invites applications for the 1991–1992 Congressional Science Fellowship. The Fellow selected will spend a year (September 1991–August 1992) in the office of an individual member of Congress or a congressional committee advising on a wide range of scientific issues as they pertain to public questions. Guided by the American Association for the Advancement of Science, the Fellow selects a congressional staff position in which he or she can work on major legislative issues.

Criteria

The program is aimed at highly qualified earth scientists in early or mid-career. Candidates should have exceptional competence in some area of the earth sciences, cognizance of a broad range of matters outside the Fellow's particular area, and a strong interest in working on a range of public policy problems.

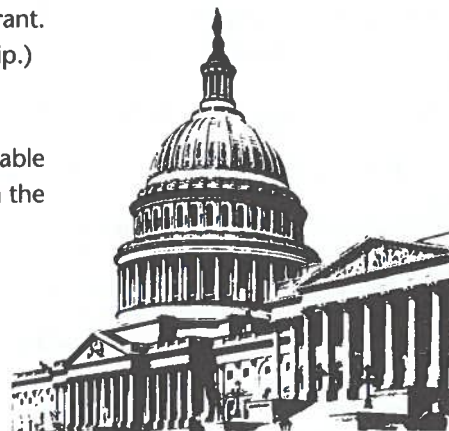
Award

The GSA Congressional Science Fellowship carries with it a \$35,000 stipend, and limited health insurance, relocation, and travel allowances. The fellowship is funded by GSA and the U.S. Geological Survey which supports 47% of the program with a \$21,000 grant. (Employees of the USGS are ineligible to apply for this fellowship.)

To Apply

Procedures for application and detailed requirements are available in the geology departments of most colleges and universities in the United States or upon request from:

Executive Director
Geological Society of America
P.O. Box 9140
Boulder, Colorado 80301



Deadline for receipt of all application materials is February 15, 1991

Final Announcement
NORTHEASTERN AND SOUTHEASTERN SECTIONS, GSA
Baltimore, Maryland
March 14–16, 1991

The combined Northeastern and Southeastern Sections of the Geological Society of America, with the Association for Women Geoscientists (AWG), the Eastern Section of the SEPM, the Northeastern and Southeastern Sections of the Paleontological Society (PS), and the New England, Eastern, and Southeastern Sections of the National Association of Geology Teachers (NAGT), will meet at the Omni Inner Harbor Hotel in downtown Baltimore. The meeting is cosponsored by the Maryland Geological Survey and the U.S. Geological Survey in cooperation with Johns Hopkins University, University of Maryland, Towson State University, and George Washington University.

REGISTRATION

Registration is required of everyone participating in any event connected with the meeting. Please note the cost differential for students and professionals and GSA members and nonmembers on the registration form. One-day registrations are available for individuals not able to participate in the entire meeting and to encourage participation by pre-college earth science teachers.

Preregistration: All participants are strongly urged to preregister; please note the significant reduction in the registration fee for all participants registering before *February 12, 1991*. All participants in the field trips and short courses **MUST** preregister. There will be no refunds on preregistrations after March 1, 1991, unless specific prepaid events are canceled. The attached registration form must be completed and sent with a check or money order in U.S. funds for the full amount due (payable to: *NE-SE GSA*).

On-site registration: Meeting registration and pick-up of registration materials will take place in the foyer (Lobby Level) of the Omni Hotel from 3:00 p.m. until 8:00 p.m. on Wednesday, March 13, 1991, from 7:30 a.m. until 5:00 p.m. on Thursday and Friday, March 14–15, and 7:30 a.m. until noon on Saturday, March 16. No on-site refunds will be made unless specific ticketed events are canceled.

TECHNICAL PROGRAM

General technical sessions (oral and poster) and symposia will begin at 8:00 a.m. Thursday, March 14 and continue until 5:00 p.m. on Saturday, March 16. All sessions will be held in the Omni Hotel. In addition to the symposia listed below, the program committee is interested in grouping papers for theme sessions involving:

- Extensional tectonics of the Atlantic and proto-Atlantic oceans
- Assessing physical and chemical dynamics of estuarine systems
- Channel change and sediment yield of developed drainage systems
- Application of geologic mapping and geographic information systems to land-use studies
- Applied geology and geologic engineering concerns in the eastern United States
- The role of geologists in understanding global and climatic change
- Interpreting chaos in geologic systems
- The geoscience department of the future—what will it be?
- Timing of Appalachian orogenic events.

SYMPOSIA

The following symposia have been organized and may contain both invited and volunteered papers. Individuals with ques-

tions about a specific symposium should contact one of the convenors listed below. Unresolved questions about symposia should be directed to: George W. Fisher, Department of Earth and Planetary Sciences, Johns Hopkins University, Baltimore, MD 21218, (301) 338-7237.

1. **Nickelsen Symposium on Thrust-belt Structure and Tectonics.** Richard Groshong, University of Alabama, (205) 348-1882; Terry Engelder, Pennsylvania State University, (814) 865-3620.
2. **Pennsylvanian Marine Zones in the Appalachian Region: Stratigraphy, Biostratigraphy, and Environments.** Jon Inners and Albert Glover, Pennsylvania Geological Survey, (717) 787-6029.
3. **Phosphate Sedimentation Associated with Neogene Depositional Systems: U.S. Atlantic Continental Margin (Eastern Section SEPM).** Stanley Riggs, East Carolina University, (919) 757-6360.
4. **Sequence Stratigraphy of the Eastern Gulf of Mexico (Eastern Section SEPM).** Anthony Randazzo and Jonathan Jee, University of Florida, (904) 392-2231.
5. **Sedimentary-cycle Control—Tectonics versus Eustacy (Eastern Section SEPM).** John Dennison, University of North Carolina, (919) 966-4516; Frank Ettensohn, University of Kentucky, (606) 257-3758.
6. **Terrestrial and Shallow Marine Geology, Bahamas and Bermuda (Eastern Section SEPM).** Allen Curran and Brian White, Smith College, (413) 585-3943 or 3944.
7. **Geologic Considerations and Amelioration Techniques in Low-level Waste.** Edward O'Donnell, U.S. Nuclear Regulatory Commission, (301) 492-3859; Robert Ridky, University of Maryland, (301) 405-6962.
8. **Metamorphic Petrology: Implications for Appalachian Tectonics.** Jo Laird, University of New Hampshire, (603) 862-1718; Helen Lang, West Virginia University, (304) 293-5603.
9. **Magmatism in the Appalachians.** A. Krishna Sinha, Virginia Polytechnic Institute and State University, (703) 231-5580; L. Peter Gromet, Brown University, (401) 863-3338.
10. **Structural Interaction Between Blue Ridge and Appalachian Cover Rocks.** Thomas Anderson, University of Pittsburgh, (412) 624-8781; Carol Simpson, National Science Foundation, (202) 357-7911.
11. **Computer Applications in Geology.** Lawrence Malinconico, Lafayette College, (215) 250-5193.
12. **Geologic Processes and the Environment: Studies of Natural and Manmade Radionuclides.** Linda Gunderson, U.S. Geological Survey, (303) 236-1648; Alexander Gates, New York
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- Geological Survey, (518) 474-5818; L.T. Gregg, Atlanta Testing and Engineering, (404) 476-3555.
13. **Nature of Avalon/Carolina Terrane Boundaries in the Appalachians.** Allen Dennis, University of South Carolina at Aiken, (803) 648-6851, x3396; Robert Hooper, University of South Florida, (813) 974-2237.
 14. **Terrane Accretion and Related Processes in the Appalachians and Adjacent Crustal Blocks.** Robert Hatcher, Jr., University of Tennessee, (615) 974-6565; Wright Horton, Jr., U.S. Geological Survey, (703) 648-6933.
 15. **Coastal Plain Estuaries: A Comparison of Chesapeake and Delaware Bays.** Jeffrey Halka, Maryland Geological Survey, (301) 554-5543; Charles Fletcher, West Chester University, (215) 436-2570 (address after Jan. 1: University of Hawaii, (808) 956-7640).
 16. **The Role of Hydrogeology in Ground-water Science and Engineering.** Harry Hansen, Maryland Geological Survey, (301) 554-5554; Francis Chapelle, U.S. Geological Survey, (813) 765-5966.
 17. **The Coastal Environment (NAGT).** Mildred Graham, Georgia State University, (404) 651-2518; James O'Connor, University of the District of Columbia, (301) 593-7851.
 18. **Earthquakes in the Eastern United States: Causes, Expression, and Implications.** Gilbert Bollinger, VPI & SU, (703) 231-9190; John Ebel, Weston Observatory of Boston College, (617) 899-0950.
 19. **Innovative Approaches to Taphonomy and Trace Fossils (Southeastern Section Paleontological Society).** Michael Gibson, University of Tennessee at Martin, (901) 587-7435; Frank McKinney, Appalachian State University, (704) 262-3049.
 20. **Taphonomy and Paleoecology of Sphaerobitic and Exaerobic Marine Environments (Northeastern Section Paleontological Society).** Gordon Baird, SUNY, Fredonia, (716) 673-3293; Carlton Brett, University of Rochester, (716) 275-2408.

PROJECTION EQUIPMENT

All slides must be 2" x 2" and fit standard 35-mm carousel trays. Two projectors and two screens will be available in each meeting room. Please bring your own loaded carousel trays, if possible. Label your trays with your name, session, left or right screen, and time of paper; give your trays to the projectionist at least 20 minutes before your paper. Slide preview facilities will be available at the hotel.

FIELD TRIPS

Both premeeting and postmeeting field trips are planned. Unless otherwise noted, trips leave from and return to the Omni Hotel in Baltimore. Costs generally include transportation, lodging (based on double occupancy), guidebook materials, and meals (as indicated: B—breakfast, L—lunch, D—dinner) during the course of the field trip. An information sheet with detailed logistics will be sent to you as soon as you register for a trip. For additional details, contact the appropriate field trip leader. General questions may be addressed to: Arthur P. Schultz, U.S. Geological Survey, 926 National Center, Reston, VA 22092; (703) 648-6501. *Preregistration is required for all field trip participants.*

Premeeting Trips

1. **Terranes and Tectonics of the Northern Maryland Piedmont.** The northern Maryland Piedmont is composed of the Baltimore, Potomac, and Westminster terranes, which contain gneiss domes, melanges, olistostromes, serpentinites, and a

variety of polydeformed metasedimentary rocks. This two-day trip will present field evidence that redefines the boundaries and tectonic interpretations of these terranes. Field trip stops will examine characteristic lithologies in each of the terranes. Outcrop and map data will be examined within the context of the Maryland Piedmont's structural evolution. Leaders: Alec Gates, New York State Geological Survey, (518) 474-5818; Peter Muller, SUNY College at Oneonta, (607) 431-3707. Tuesday and Wednesday, March 12–13, 1991. Limit: 37. Cost: \$110 (2L, 1 lodging).

2. **Stratigraphy and Structure of the Great Valley and Valley and Ridge, West Virginia.** Detailed geologic mapping has led to reinterpretation of the structure and stratigraphy of Cambrian, Ordovician, Silurian, and Devonian rocks in the Great Valley and Valley and Ridge provinces of West Virginia. This two-day transect will view classic outcrops and structures in each of the Appalachian lithotectonic units exposed in the area. Stops will examine faults, folds, and cleavage in the Harpers, Tomstown, Waynesboro, Elbrook, Helderberg, Oriskany, Marcellus, Mahantango, and Brallier Formations. Regional tectonic models and subsurface interpretations will be presented for this part of the Appalachian fold belt. Leaders: Peter Lessing, West Virginia Geological Survey, (304) 594-2331; Stuart Dean; Byron Kulander. Tuesday and Wednesday, March 12–13, 1991. Limit: 23. Cost: \$150 (1B, 2L, 1D, 1 lodging).
3. **Tectonic History of the Blue Ridge Basement and its Cover—Central Virginia.** The Blue Ridge province between Charlottesville and Lexington, Virginia, is the type area for separating the crystalline Pedlar and Lovingston massifs across the Rockfish Valley ductile deformation zone. Stops on this three-day trip will be integrated with text and discussions of Grenville and pre-Grenville petrogenesis, late Proterozoic/Cambrian extensional tectonics, Paleozoic metamorphism and structure, and Mesozoic extension. Detailed geologic mapping, regional structural data (including kinematic indicators), published and unpublished ages, whole-rock, trace-element, and REE data for most of the field trip stops make this area an outstanding place to interpret the petrogenetic evolution of Proterozoic rocks and the Catoclin cover. Leaders: Jerry Bartholomew, Montana Bureau of Mines and Geology, (406) 496-4177; A.K. Sinha, Virginia Polytechnic Institute and State University. Associate leaders: S. Lewis, R. Badger, and S. Hughes. Monday through Wednesday, March 11–13, 1991. *This trip leaves from Baltimore, but will include an additional pick-up point in Charlottesville around noon on March 11.* Limit: 33. Cost: \$200 (3L, 2 lodging).
4. **Taconic Collision in the Delaware-Pennsylvania Piedmont and Implications for Subsequent Geologic History.** This three-day trip will trace a regional cross section through a structurally complex suture zone. Regional terranes to be visited include: North American basement, an allochthonous magmatic arc (Wilmington Complex), a metamorphosed accretionary prism and/or forearc basin sequence (Wissahickon Formation), and an imbricate stack of basement-cored nappes with a thin mantle of shelf siliciclastic and carbonate rocks. Lithologies examined include a variety of granulite-facies gneisses, low to high-grade metasediments, serpentinites, and undeformed plutonic igneous rocks. A review of previous tectonic models and a presentation of new interpretations will be included. Leaders: Mary Emma Wagner, University of Pennsylvania, (215) 898-7446; L.A. Srogi; J. Alcock; G. Wiswall. Monday through Wednesday, March 11–13, 1991. Limit: 35. Cost: \$175 (3L, 2 lodging).

5. **Stratigraphy of Late Precambrian and Early Cambrian Clastics, Southwestern Virginia and Northeastern Tennessee.** In central and southern Virginia and northern Tennessee, exposures of upper Proterozoic and Lower Cambrian rocks record the transition from rifting to the establishment of the Cambro-Ordovician carbonate platform. This two-day field trip will examine and discuss the tectonic implications of the Chilhowee Group, correlations of the Chilhowee Group using sequence stratigraphy, development of parasequences, depositional environments adjacent to a sequence boundary, and the implications of recently discovered trace and body fossils with regard to the Precambrian-Cambrian boundary. Detailed process sedimentological studies and identification of diverse trace fossil assemblages have allowed the leaders to document a wide range of depositional environments from alluvial fan to outer shelf. Leaders: Ed Simpson and Dan Walker, Kutztown University, (215) 683-4447. Tuesday and Wednesday, March 12-13, 1991. *Trip meets in Knoxville, Tennessee on Monday evening, March 11.* Limit: 45. Cost: \$150 (2L, 2 lodging).
6. **Tertiary Lithology, Paleontology, and Sequence Stratigraphy, Chesapeake Bay Region.** This scenic two-and-a-half-day boat trip down the tidal Potomac River and along the western shore of the Chesapeake Bay estuary will visit highly fossiliferous outcrops of Cretaceous, Paleocene, Eocene, Miocene, Pliocene, and Pleistocene age. Participants will have opportunities to view and collect fossil plants, pollen, dinoflagellates, diatoms, forams, mollusks, barnacles, fish, and mammals, from many classic localities, including Calvert Cliffs (Miocene). Discussions will emphasize the integration of lithostratigraphy and biostratigraphy in resolving time-stratigraphic boundary problems and in refining the onlap-offlap history of the Salisbury Embayment in terms of sequence stratigraphy. Leaders: L. W. Ward, Virginia Museum; David Powars, U.S. Geological Survey, (703) 648-6936. Monday afternoon through Wednesday, March 11-13, 1991. Limit: 18. Cost: \$150 (2L, 1D, 2 lodging).
7. **Bottom Sediments of the Chesapeake Bay: Physical and Geochemical Characteristics.** Research efforts of the Maryland Geological Survey (MGS) have focused on understanding the recent biogeochemical history of sediments accumulating in the Chesapeake Bay and the bay's history of infilling during the Quaternary. Deciphering this history requires integration of sediment chemistry, the early stages of diagenesis, sediment textural characteristics, and the activities of the benthic infauna. On this one-day trip aboard the MGS's 47-foot research vessel, bottom-sediment characteristics of fine-grained accumulations in the northern part of the bay will be examined using acoustic reflection profiling and sediment coring. Onboard analysis of the cores will be integrated with other detailed studies conducted by MGS to characterize the sedimentary geochemical environments and history of infilling for the past 10,000 years. Leaders: Jeff Halka and Jim Hill, Maryland Geological Survey, (301) 554-5543. Wednesday, March 13, 1991. Limit: 14. Cost: \$50 (1L). *This trip will be canceled and your fees will be refunded in case of bad weather.*

Postmeeting Trips

8. **Sedimentology and Sequence Stratigraphic Framework of the Middle Devonian Mahantango Formation in Central Pennsylvania.** Ongoing investigations of the Mahantango Formation (Middle Devonian), a thick sequence of fossiliferous mudstone, sandstone, and conglomerate, have refined previous paleoenvironmental interpretations. Sequence correlations

and paleo-flow data indicate that cycles in the Mahantango resulted from episodic progradation of a mostly straight, north-east-southwest-oriented, tide-dominated shoreline into a shallow, storm-dominated marine basin. New sequence-based stratigraphy reflects depositionally meaningful units which elucidate the sedimentology and genesis of cycles in the Mahantango. At each stop, facies descriptions and interpretations will be presented to build a stratigraphic framework that can be placed within the overall Devonian setting for this part of the Appalachian foreland basin. Leaders: Tony Prave, City College of New York, (212) 690-8441; W. L. Duke, Pennsylvania State University. *This trip departs at the end of technical sessions on Saturday, March 16, and will return on Sunday, March 17, 1991.* Limit: 24. Cost: \$100 (1L, 1 lodging).

9. **Geology of the Robertson River Igneous Suite, Blue Ridge Anticlinorium, Virginia.** The Robertson River Igneous Suite includes a series of metaluminous to peralkaline granitoids and felsites which preserve important evidence of the felsic magmatism associated with the initial stages of the late Proterozoic rifting of Laurentia. This one-day trip will examine the field and petrographic evidence for multiple episodes of magma generation manifested as a series of diverse plutons which exhibit a wide range of petrochemical characteristics and which were emplaced at varying depths within attenuated Precambrian crust. Field evidence bearing on the relative timing of magma emplacement and mechanisms of intrusion into Grenville-age gneissic country rock will be examined. Discussions at stops will draw on integrated field, mineralogical, and petrochemical studies combined with new isotopic information to define the implications for the tectonic evolution of the Blue Ridge province. Leader: Richard Tollo, George Washington University, (202) 994-6960. *Trip leaves Saturday, March 16 after the technical sessions and returns Sunday, March 17, 1991.* Limit: 25. Cost: \$75 (1L, 1 lodging).
10. **Late Proterozoic Sedimentation and Tectonics in Northern Virginia.** The Fauquier Group consists primarily of a fining-upward fluvial sequence of arkosic conglomerate, sandstone, siltstone, and shale. The sequence is largely derived from and rests unconformably on Laurentian basement orthogneisses of presumed Grenville age. These rocks appear to be conformably overlain by areally extensive volcanics of the Catoclin Formation of latest Proterozoic age. This one-day trip will examine basement-cover relations, syndepositional structures within the Fauquier, provenance and depositional environments of the Late Proterozoic rocks, chemistry and age of Catoclin volcanics, and the imprint of Paleozoic structure and metamorphism on all of the rocks. Emphasis will be placed on discussions relating interpretations of the Fauquier to the tectonics of the Blue Ridge province. Leaders: Peter Lyttle, (703) 648-6943; S. Schindler, U.S. Geological Survey; S. Kline, George Mason University. *Trip leaves Saturday, March 16, after the technical sessions and returns Sunday, March 17, 1991.* Limit: 36. Cost: \$90 (1L [at winery], 1 lodging).
11. **Sideling Hill Road Cut and Visitor's Center—An Educational Opportunity Combining Outcrop and Classroom.** A spectacular new road cut in the heart of the Maryland Valley and Ridge Physiographic Province is being developed as a visitor center with emphasis on geological education. A regional-scale syncline is exposed in the cut which consists of siliciclastic rocks of Mississippian age. A range of geologic topics, from the most general to the most esoteric, lends itself to discussion at the center. Topics include: interpretation of Carboniferous
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sedimentary history based on the lithologies exposed in the cut, structural evolution of the Appalachian fold and thrust belt, coal geology, Appalachian geomorphology, and construction statistics. The emphasis of this trip is the educational potential of this unique locality. Included is a possible tour of the facility (depending on state of construction) and a look at what the future center will offer. Geologists and earth science educators are encouraged to attend this trip and familiarize themselves with this exceptional field locality and educational resource. Leader: Kenneth Schwarz, Maryland Geological Survey, (301) 554-5525. Sunday, March 17, 1991. Limit: 45. Cost: \$40.

SHORT COURSES

Fees for the short courses include only the course participation and the notes prepared by the lecturers. All short courses will be held at the Omni Inner Harbor Hotel. For additional details about the short courses, contact the lecturers listed below. General questions about the short courses may be directed to: Declan De Paor, Department of Earth and Planetary Sciences, Johns Hopkins University, (301) 338-7049. Registrants will receive confirmation and detailed information about the course times and room location. *Preregistration is required for short course participation.*

1. **Geostatistics in the Search for Energy** (*Sponsored by Eastern Section AAPG*). This two-day short course addresses the need for an understanding of geostatistics among geoscientists. *Kriging* and *variogram* are mysterious words that express simple geologic concepts numerically. Kriging is used extensively in the mining industry, and most computer mapping packages use it for contouring or smoothing data. Despite its usefulness in estimating reserves and contouring variables, few geologists are familiar with kriging or other useful geostatistical tools. This course will develop understanding of geostatistical tools through real examples taken from research in petroleum and coal geology. Lecturer: Michael Ed. Hohn, West Virginia Geological Survey, (304) 594-2331. Tuesday and Wednesday, March 12-13, 1991. Limit: 40. Cost: \$60.
2. **Radon in the Air and Water**. This one-day course will provide an overview of new research developments related to radon occurrence and its health effects. Course topics include: radon entry and behavior, radon measurement in air and water, building investigation diagnostics, mitigation techniques, and radon hazard maps. Presentations will include hands-on examination of measurement equipment for radon in air and water, and examination of remediation and radon-reducing equipment. Lecturers: Douglas Mose and George Mushrush, George Mason University, (703) 323-4318 or 4327. Wednesday, March 13, 1991. Limit: 40. Cost: \$40.
3. **Environmental Management: A Short Course on the Environment, the Geologist, and Consulting**. This one-day course will provide an overview of the application of geologic principles to environmental management. The identification and characterization of environmental contamination and the design and implementation of remedial action are complex undertakings requiring geologic, ecologic, toxicologic, chemical, and engineering expertise. Topical discussions will be complemented by detailed case studies from recent projects. It is hoped that this course will spur interaction between environmental professionals and professionals responsible for teaching students of geosciences, engineering geology, and public policy. Students contemplating a career in environmental science are encouraged to attend. Lecturers: C. W. Houlik, Jr. and staff of E A

Engineering, Science, and Technology. Wednesday, March 13, 1991. Limit: 40. Cost: \$50.

PUBLIC FORUM

A public forum entitled "**Science in Chesapeake Bay — An Estuary in Transition**," will be held on Friday, March 15 following the technical sessions. The session is sponsored by the Geology and Public Policy Committee of the Southeastern Section of GSA. A cash bar and light snacks will precede this one-hour panel discussion. Questions from the audience will be requested following opening statements and discussion among the panelists.

PRESS ROOM

To promote the dissemination of news and information from the meeting, a press room will be set up during the meeting in the Peale Room of the Omni Hotel. The room will be staffed from 9 a.m. until 5 p.m. on Thursday, March 14, and Friday, March 15, and from 9 a.m. until noon on Saturday, March 16. Please come in during the meeting and let us know of papers and information that would be of interest to the scientific and the general press. Before the meeting, presenters will be contacted concerning news releases on selected papers. Members of the news media may receive complimentary registration with appropriate press credentials. If you have questions concerning news releases, press conferences, or interviews before the meeting, contact Gail Wendt, U.S. Geological Survey Public Affairs Office, (703) 648-4462, or Sandra Rush, c/o Geological Society of America Communications Department, (303) 443-8489.

POLICY ON SMOKING, CAMERAS, AND SOUND EQUIPMENT

The policy of both the Northeastern and Southeastern Sections of GSA prohibits the use of cameras and sound-recording equipment during oral or poster sessions. A no-smoking policy has been adopted by the Local Committee for all meeting rooms in the Omni Hotel including all organized social functions. In addition, this no-smoking policy extends to field trip meetings and travel in buses and vans.

EXHIBITS

A limited number of exhibit booths are still available in the Liberty Ballroom of the Omni Hotel. The exhibit hall will be open during the welcoming party on Wednesday evening, all day Thursday, Friday, and until early afternoon on Saturday. The cost of a standard booth (8' x 8') is \$500 for commercial exhibitors and \$250 for educational and nonprofit organizations. For further information and space reservations, contact Jeff Williams, U.S. Geological Survey, 914 National Center, Reston, VA 22092, (703) 648-6511, fax 703-648-5464.

STUDENT ASSISTANCE

Support for travel expenses of GSA student members from the Southeastern Section presenting papers at the meeting is available. Interested GSA student members should contact: Michael J. Neilson, Department of Geology, University of Alabama at Birmingham, Birmingham, AL 35294, (205) 934-5102.

SPECIAL EVENTS

The specific location for all of the special functions will be listed in the program for the meeting. Signs throughout the hotel area will direct participants to these functions. Many of the ticketed events may be sold out unless you preregister.

Wednesday, March 13

A **welcoming reception** will be held in the International and Liberty Ballrooms of the Omni Hotel from 6:00 to 9:00 p.m. The Exhibit Hall will be open during the welcoming reception. Admission to the International and Liberty Ballrooms will be by badge only.

Thursday, March 14

The **Association for Women Geoscientists breakfast** will be held from 7:00 to 8:30 a.m. in the Omni Hotel. The topic for open discussion will be *Keeping Young People Interested in Science*. This event is open to all who are interested in this topic. Cost: \$12.

A **reception and banquet commemorating the Third Combined NE-SE GSA meeting** will be held in the International Ballroom area from 6:00 to 10:00 p.m. M. Gordon Wolman, Department of Geography and Environmental Engineering at Johns Hopkins University, will be the after-dinner speaker. His address is entitled *The Earth and Human Affairs: A Return*. Cost: \$25.

Friday, March 15

A **breakfast for the NAGT Sections meeting together** will be held from 7:00 to 8:30 a.m. in the Omni Hotel. Cost: \$11.

Eastern Section SEPM business meeting with refreshments from 5:00 to 6:00 p.m. follows the SEPM afternoon symposium in the same meeting room.

A **luncheon for the Southeastern Section of the Paleontological Society** will be held in the Omni Hotel from 12:00 to 1:30 p.m. Cost: \$16.

The **Public Forum on Chesapeake Bay**, open to meeting attendees and the public, will be held in the International Ballroom area from 6:30 to 8:00 p.m. Cash bar and light snacks at 6:00 p.m.

A **reception and dinner honoring Richard P. Nickelsen** on his retirement from Bucknell University will be held on Friday evening in the Omni Hotel. Cash bar from 6:00 to 7:00 p.m.; dinner 7:00 to 10:30 p.m. Cost: \$28.

Saturday, March 16

An **8-km fun run** will be held prior to the start of the technical program. The course is a scenic one, from the Omni Hotel area to Fort McHenry and back.

The **NAGT luncheon** will be held in the Omni Hotel from 12:00 to 1:30 p.m. Cost: \$16.

GEOLOGICAL PHOTO CONTEST

A photographic competition and exhibit will be held at this combined meeting. Entries will be judged on the basis of impact, content, composition, and overall presentation. Photos will be exhibited during the entire meeting, near the poster sessions (International D). First, second, third, and honorable mention prizes will be awarded for color and black-and-white prints. Guidelines are:

- Prints must be 8" x 10" or larger, firmly matted (with border), not to exceed 16" x 20"
- Your name, address, and telephone number on the back of each matte board
- No more than three entries per photographer
- Entries must be picked up in the exhibit area between noon and 5:30 p.m. on Saturday, March 16.

To enter, fill out the entry form (opposite), and send it with your photos to: Jane Eggleston, U.S. Geological Survey, 956 National Center, Reston, VA 22092. Call (703) 648-6464, for additional information.

Deadline for receipt of entries is March 1, 1991.

GUEST AND SPOUSE ACTIVITIES

A hospitality room at the Omni Hotel will be the gathering point for information on local attractions, including Harbor Place, the National Aquarium, the Edgar Allan Poe House, the Maryland Science Center, Antique Row, the Baltimore Museum of Art, and the Walters Art Gallery. A complimentary hotel shuttle can transport you and your friends to these and other local attractions. Walking tours of the Baltimore redeveloped district will also be organized for geologists and their spouses or guests.

TRAVEL TO BALTIMORE

By car, Baltimore is conveniently located at the junction of Interstate Highways 95, 83, and 70. Baltimore-Washington International Airport is served by most major airlines and is located approximately 8 miles south of the hotel; transportation between the airport and the Omni Hotel is readily available. AMTRAK service to Baltimore arrives at the Charles Street Station, just north of the downtown area. Maps of the area are included in this announcement.

HOUSING

A large block of rooms has been reserved for meeting participants and their guests at the Omni Inner Harbor Hotel. Participants staying at the Omni Hotel will lower the cost of the meeting for the Local Committee and minimize problems with parking and traffic during the meeting. For conference planning purposes and to insure guaranteed room rates, it is imperative that you reserve your room(s) before *February 12, 1991*. **Mail the Housing Form directly to the hotel.**

PARKING

No free parking is available in downtown Baltimore. There are several all-day parking lots/garages in the vicinity of the Omni Hotel. Guests staying at the Omni can park for \$7 for each 24-hour period in the garage beneath the hotel without additional in and out charges for leaving the hotel. To receive this rate, guests are required to have the parking fee charged to their room account.

ADDITIONAL INFORMATION

Inquiries or suggestions about any aspect of the meeting may be directed to:

| | | |
|--|----|---|
| Emery T. Cleaves NE-GSA Chairman Maryland Geological Survey 2300 St. Paul Street Baltimore, MD 21218 (301) 554-5504 | or | Juergen Reinhardt SE-GSA Chairman U.S. Geological Survey 926 National Center Reston, VA 22092 (703) 648-6789 |
|--|----|---|

CLIP AND SEND ONE COPY WITH EACH ENTRY

Name _____

Institution _____

Address _____

City _____ State _____ ZIP _____

Daytime telephone () _____

Description of photo: _____

REGISTRATION FORM

Northeastern and Southeastern Sections, GSA

March 14-16, 1991

IMPORTANT

1. Full payment must accompany registration. Make personal checks or money orders payable in U.S. funds to: **NE-SE GSA.**
 2. Use separate form for each registrant: professional, pre-college science teacher, or student.
 3. **PREREGISTRATION MUST BE POSTMARKED NO LATER THAN FEBRUARY 12, 1991.** Preregistration for field trips and short courses is required; cancellation deadline is *March 1, 1991*. No refunds after March 1 unless event is canceled.
- Mail to: **Randall Kerhin, Maryland Geological Survey, 2300 St. Paul Street, Baltimore, MD 21218.**

(PLEASE PRINT OR TYPE)

Name (Last, First, Middle) _____

Name for badge _____

Affiliation for badge (Company, University, School, etc.) _____

Membership affiliation: GSA NAGT SEPM PS AWG GSA Student Associate

Professional address _____ Phone: _____
 _____ Work () _____
 _____ Home () _____

PREREGISTRATION (postmarked on or before February 12, 1991)

| | |
|--|-------------|
| Professional, member of GSA or affiliated society | \$ 50.00 \$ |
| Professional, nonmember | \$ 65.00 \$ |
| Professional, pre-college science teacher | \$ 30.00 \$ |
| Student Associate member of GSA | \$ 20.00 \$ |
| Student, nonmember | \$ 25.00 \$ |
| One-day only (all categories) — Check day: <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday | \$ 35.00 \$ |
| Guest (Name for badge: _____) | \$ 20.00 \$ |

REGISTRATION (after February 12, 1991)

| | |
|--|-------------|
| Professional, member | \$ 65.00 \$ |
| Professional, nonmember | \$ 80.00 \$ |
| Professional, pre-college science teacher | \$ 40.00 \$ |
| Student, member | \$ 25.00 \$ |
| Student, nonmember | \$ 35.00 \$ |
| One-day only (all categories) — Check day: <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday | \$ 40.00 \$ |
| Guest (Name for badge: _____) | \$ 20.00 \$ |

ABSTRACTS WITH PROGRAMS — reserved (on-site pick-up)

| | |
|--|-------------|
| | \$ 15.00 \$ |
|--|-------------|

FIELD TRIPS (preregistration required)

| | |
|---|-------------|
| 1. Terranes and Tectonics of the Northern Maryland Piedmont (March 12-13) | \$110.00 \$ |
| 2. Stratigraphy and Structure of the Great Valley and Valley and Ridge, West Virginia (March 12-13) | \$150.00 \$ |
| 3. Tectonic History of the Blue Ridge Basement and Its Cover—Central Virginia (March 11-13) | \$200.00 \$ |
| 4. Taconic Collisions: Delaware-Pennsylvania Piedmont (March 11-13) | \$175.00 \$ |
| 5. Stratigraphy of Late Precambrian and Early Cambrian Clastics, Virginia-Tennessee (March 12-13) | \$150.00 \$ |
| 6. Tertiary Lithology, Paleontology, and Sequence Stratigraphy, Chesapeake Bay Region (March 11-13) | \$150.00 \$ |
| 7. Bottom Sediments of the Chesapeake Bay: Physical and Geochemical Characteristics (March 13) | \$ 50.00 \$ |
| 8. Sedimentology and Sequence Stratigraphic Framework of the Mahantango Formation (March 16-17) | \$100.00 \$ |
| 9. Geology of the Robertson River Suite, Blue Ridge Anticlinorium, Virginia (March 16-17) | \$ 75.00 \$ |
| 10. Late Proterozoic Sedimentation and Tectonics in Northern Virginia (March 16-17) | \$ 90.00 \$ |
| 11. Sideling Hill Roadcut and Visitor's Center—An Educational Opportunity (March 17) | \$ 40.00 \$ |

SHORT COURSES (preregistration required)

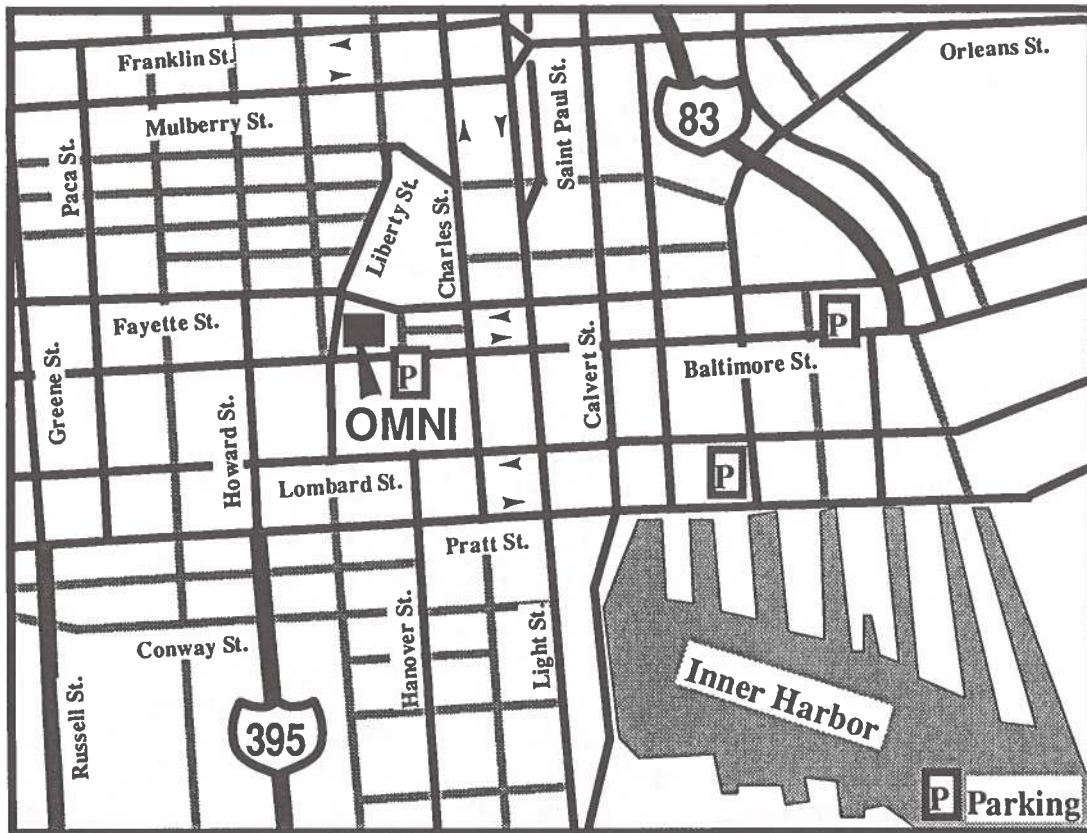
| | |
|--|-------------|
| 1. Geostatistics in the Search for Energy (March 12-13) | \$ 60.00 \$ |
| 2. Radon in the Air and Water (March 13) | \$ 40.00 \$ |
| 3. The Environment, the Geologist, and Consulting (March 13) | \$ 50.00 \$ |

SPECIAL EVENTS (preregistration strongly encouraged)

| | |
|--|-------------|
| 1. Breakfast, Association for Women Geoscientists, Thursday, March 14, 7:00-8:30 a.m. | \$ 12.00 \$ |
| 2. Banquet, 3rd Combined NE-SE GSA, Thursday, March 14, 6:30 p.m.-10:00 p.m. | \$ 25.00 \$ |
| 3. Breakfast, NAGT, Friday, March 15, 7:00-8:30 a.m. | \$ 11.00 \$ |
| 4. Luncheon, SE Paleo, Friday, March 15, 12:00-1:30 p.m. | \$ 16.00 \$ |
| 5. Banquet honoring Richard P. Nickelsen, Friday, March 15, 6:00-10:30 p.m. | \$ 28.00 \$ |
| 6. Luncheon, NAGT, Saturday, March 16, 12:00-1:30 p.m. | \$ 16.00 \$ |

TOTAL FEES

| | |
|--|----------|
| | \$ _____ |
|--|----------|



HOUSING FORM

Northeastern and Southeastern Sections, GSA
 March 14-16, 1991

Arrival date _____ Departure date _____

Arrival time _____

Person requesting housing (type or print):

 Last name First

 Name of institution or firm

 Street address or P.O. box number

 City State ZIP

Phone () _____ () _____
 Day Evening

Send this form and remittance or credit card information to:

Omni Inner Harbor Hotel
 101 W. Fayette Street
 Baltimore, MD 21201

Telephone (301) 385-6700
 fax 301-625-3805

| Type of Room | Rate* per Room per day | Indicate 1st and 2nd Choices |
|--------------|------------------------|------------------------------|
| Single | \$ 83.00 | _____ |
| Double | \$ 94.00 | _____ |
| Triple | \$ 94.00 | _____ |
| Quad | \$116.00 | _____ |

*Rates do not include 12% tax.
 Registered hotel guests have in-out parking garage privileges. Cost is an additional \$7.00 per day.

Sharing room with _____

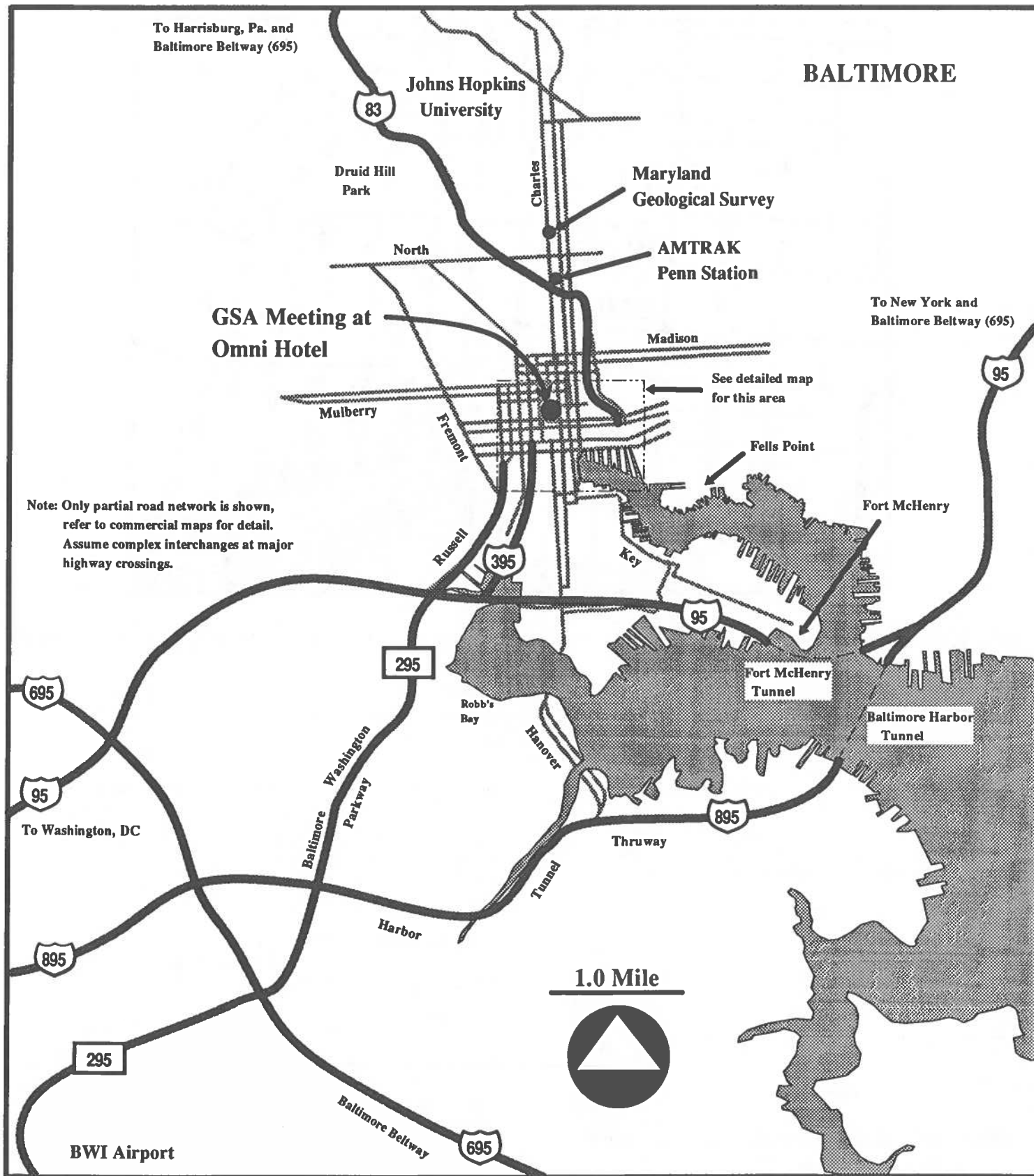
To ensure the conference rate, reservations must be made by February 12, 1991. To guarantee a room, remittance for one night must accompany this form. Make checks payable in U.S. funds to: Omni Inner Harbor Hotel. If remittance by credit card, please provide the following information:

Type of Card: VISA MasterCard American Express

Card Number: _____

Expiration Date: _____

Signature: _____



Northeastern and Southeastern Sections 1991 Meeting

Final Announcement
CORDILLERAN SECTION, GSA, 87th Annual Meeting
and Seismological Society of America
San Francisco, California
March 25–27, 1991

The Cordilleran Section of the Geological Society of America will meet jointly with the Seismological Society of America, the Pacific Coast Section of the Paleontological Society, and the Far Western Section of the National Association of Geology Teachers at the Cathedral Hill Hotel in San Francisco. The meeting is being hosted by the Department of Geosciences, San Francisco State University.

ENVIRONMENT

The meeting will be held at the Cathedral Hill Hotel on Van Ness Avenue in the heart of downtown San Francisco. Certainly one of the most beautiful and exciting cities in the world, San Francisco abounds with the best of restaurants, entertainment, and cultural events. Only a short walk from the hotel or a few minutes by car or public transportation are Golden Gate Park with the California Academy of Sciences and a number of fine museums, Fisherman's Wharf, Ghirardelli Square, the Cannery, Chinatown, Union Square, Ocean Beach, Japantown, and many other attractions. The weather in late March should be spring-like with mild temperatures. The probability of occurrence of a large nearby earthquake (magnitude 7 or greater) during the course of the meeting is considered to be much less than 1%.

The Cathedral Hill Hotel is located at 1101 Van Ness Avenue at the corner of Van Ness and Geary Street. Both streets are major thoroughfares in downtown San Francisco and can be easily reached by ground transportation. Traffic can be, however, very congested at peak commute hours, and thus the use of public transportation is strongly encouraged for those attendees not staying in the immediate vicinity of the hotel.

REGISTRATION

Preregister Today! Preregistration Deadline: February 22, 1991

1. There is a considerable savings in registration fees if you register before the preregistration deadline. Advance registration is suggested for many of the special activities because of participation limits. Use the preregistration form provided in this announcement.
2. Badges must be worn for access to ALL activities and the shuttle bus Monday through Wednesday.
3. Registration discounts are given to GSA or Associated Society members. Associated Societies that qualify for this discount are indicated on the registration form. Please indicate your affiliation(s) and member number and register using the member rates.
4. Full payment MUST accompany registration. Unpaid purchase orders are NOT accepted as valid registration. Charge cards are accepted as indicated on the preregistration form. If using a charge card, please recheck the card number given—errors will delay your registration. Your confirmation letter from GSA will be your receipt. No other receipt will be sent.
5. Register one professional or student per form. Copy the form for your records.

6. Guest registration is required for guests attending guest activities or to visit the exhibit hall. Guest registrants MUST be accompanied by either a registered professional or student.
7. Current student ID is required to obtain student rates at both the on-site and preregistration counters. Students not carrying a current student ID when they arrive to pick up registration materials will be required to pay the professional fee.

CANCELLATIONS, CHANGES, AND REFUNDS

All requests for registration additions, changes, and cancellations must be made in writing and received by *March 1*. GSA will refund advance registration fees for cancellations received in writing by March 1. **NO REFUNDS WILL BE MADE ON CANCELLATION NOTICES RECEIVED AFTER THIS DATE.** Refunds will be mailed from GSA after the meeting. Refunds for fees paid by credit card will be credited according to the card number on the preregistration form. NO refunds for on-site registration and ticket sales.

REGISTRATION FEES

| | Advance by 2/22/91 | Advance One-Day | On-Site | On-Site One-Day |
|-----------------------------|-----------------------|--------------------|---------|--------------------|
| Professional (Member) | \$65.00 | \$25.00 | \$80.00 | \$35.00 |
| Professional (Nonmember) | \$75.00 | \$30.00 | \$90.00 | \$40.00 |
| Student (Member) | \$25.00 | \$10.00 | \$35.00 | \$15.00 |
| Student (Nonmember) | \$30.00 | \$15.00 | \$40.00 | \$20.00 |
| Guest | \$10.00 | N/A | \$10.00 | N/A |

ON-SITE REGISTRATION SCHEDULE

Cathedral Hill Hotel, 2nd Floor

| Sunday March 24 | Monday March 25 | Tuesday March 26 | Wednesday March 27 |
|------------------------------|------------------------------|------------------------------|-------------------------------|
| 1:00 p.m. to 8:00 p.m. | 7:30 a.m. to 4:30 p.m. | 7:30 a.m. to 4:30 p.m. | 7:30 a.m. to 11:30 a.m. |

Cordilleran/Seismological Meeting continued on page 348

STUDENT SUPPORT

The GSA Cordilleran Section has funds available for grants to support GSA Student Associates of the Cordilleran Section who are presenting papers at the meeting. Students are strongly encouraged to apply for these grants, and we anticipate that most students who qualify will be funded to some degree. Application letters must be received by *January 31, 1991*, by the Section Secretary Bruce A. Blackerby, Department of Geology, California State University, Fresno, CA 93740, (209) 278-2955 (direct) or 278-3086 (department). Applications should include certification that the student is a GSA Student Associate of the Cordilleran Section.

SPECIAL EVENTS

After-hours events will include a no-host welcoming party for all registrants from 6:00 to 8:00 p.m. Sunday, March 24, and alumni gatherings from 6:00 to 8:00 p.m. on Tuesday, March 26. The Paleontological Society will have an informal reception on Monday evening. The National Association of Geology Teachers Far Western Section luncheon will be held on Monday, March 25, at noon. The annual luncheon for the Seismological Society of America will be held Tuesday, March 26, at noon. The GSA Cordilleran Section business luncheon is scheduled for Wednesday, March 27, at noon.

ACCOMMODATIONS

A block of rooms at the Cathedral Hill Hotel, site of the meeting, has been reserved for attendees. A special reduced price of \$89 per night for single or double occupancy has been arranged. An additional fee of \$20 will be charged for each additional person beyond two up to a maximum of four persons per room. This rate represents an excellent value for lodging in downtown San Francisco, and so attendees are strongly urged to make their reservations early. Reservations can be made by calling the hotel's toll free numbers (800) 227-4730 (outside California) and (800) 622-0855 (inside California). The local number is (415) 776-8200. Please state that you are attending the 1991 GSA/SSA meeting.

Special Student Accommodations

A limited number of rooms at the Cathedral Hill Hotel have been set aside for students wishing to share multiple occupancy rooms. Rooms will be for four persons (two double beds) at a special rate of \$23 (plus tax) per person per night. These low rates are available on a first-come first-served basis, and require students to preregister for the meeting. Occupancy must be for a minimum of three nights; rate adjustments will be made if the room is not fully occupied. The meeting management will make room assignments. If possible, students should attempt to arrange their own rooming list prior to applying for the special student rate. Do not contact the hotel directly but write to Ray Sullivan, Department of Geosciences, San Francisco State University, San Francisco, CA 94132.

TRANSPORTATION

San Francisco can easily be reached by air via numerous airlines landing at the San Francisco and Oakland International airports. United Airlines is offering special discounts to all attendees traveling to the Bay area. To receive 5% off any applicable fare from First Class to Ultra Saver or 45% off full coach, call the United Convention Desk at (800) 521-4041, 8:00 a.m.–11:00 p.m. EST. Please give the GSA/SSA Convention account number 429QL. Your reservations will be made for all flights and fares. Special discounts are available only on United flights in the United States. United will mail your tickets or you may purchase them from your local travel

agent. Reservations for discounted fares *must* be made through United's Convention Desk.

Economical ground transportation from the San Francisco airport to the Cathedral Hill Hotel and neighboring hotels is available through shuttle vans and buses and the Airporter bus. Very limited parking is available at the Cathedral Hill Hotel. The use of public transportation to the meeting is strongly urged for local attendees.

TECHNICAL PROGRAM

Symposia

Three joint GSA-SSA symposia will highlight the meeting. Scheduled symposia and their conveners are:

1. **Joint GSA-SSA—Neotectonic Framework and Seismic Hazards of the San Andreas Transform Boundary—Hollister to Cape Mendocino.** David Schwartz and Carol Prentice, USGS, Menlo Park; Patrick Williams, Lawrence Berkeley Laboratory.
2. **Joint GSA-SSA—Tectonics of the West Coast of North America: Geological and Geophysical Constraints.** Walter Mooney, USGS, Menlo Park; Phil Gans, Stanford University.
3. **Joint GSA-SSA—Volcanic Hazards and Cenozoic Volcanism in the Cordillera.** Steve McNutt, California Division of Mines and Geology; Gail Mahood, Stanford University.
4. **Paleontological Society—Paleobiology of Oceanic Islands.** Matthew James, Sonoma State University.
5. **National Association of Geology Teachers—Geosciences Department: Collective Effort in a Changing World.** Howard Stensrud, California State University, Chico; Dorothy Stout, GSA Cordilleran Education Committee.
6. **San Francisco Bay System—Past, Present, and Future.** Doris Sloan, University of California, Berkeley; Ed Clifton, USGS, Menlo Park.
7. **Improving Scientific Literacy Through Innovative Earth Science Education Programs.** Edward Geary, San Jose State University; Leslie Gordon, USGS, Menlo Park; Ellen Metzger, San Jose State University.
8. **Cordilleran Pluton Tectonics.** Scott Paterson, University of Southern California; Robert Miller, San Jose State University.
9. **Salina to Baja: How Allochthonous Are They?** David Howell, USGS, Menlo Park.
10. **Recognition and Controls of Depositional Sequences on Tectonically Active Margins.** Scott Morgan, Exxon Production Research; Karen Grove, San Francisco State University.
11. **Use of Hydrogeologic Models in Governmental Decision-Making.** Tim Durbin and Jeff Lefkoff, Hydrologic Consultants, Inc.
12. **Geologic Hazards in the Submarine Environment.** Gary Greene and Sam Clarke, USGS, Menlo Park; Michael Kennedy, California Division of Mines and Geology.
13. **Trans-Alaska Crustal Transect (TACT).** Warren Nokleberg and Robert Page, USGS, Menlo Park.

Theme Sessions

The following theme sessions have been proposed:

1. **Landslides Along the Pacific Coast.** David Keefer and John Galloway, USGS, Menlo Park.
2. **Construction of Miogeoclinal Carbonate Platforms.** Calvin Stevens, San Jose State University; Harry Cook, USGS, Menlo Park.
3. **Geosciences and the Arts.** Ray Pestrong, San Francisco State University.

4. **Geology and Geophysics of the San Jose 1:100,000 Sheet** (Poster Session). Clark Blake and Carl Wentworth, USGS, Menlo Park.

Projection Equipment

All slides must be 2" x 2" and fit standard 35 mm carousel trays. Two projectors and two screens will be available for all oral sessions. Overhead projectors will *not* be available. Please bring loaded carousel trays, if possible.

Poster Sessions

Poster Sessions will be located adjacent to the exhibit area. If you wish to take advantage of this highly effective means of communication, please indicate your preference for a poster session on the GSA abstract form. Each poster presenter will be provided at least one board approximately 4' x 8'.

FIELD TRIPS

Both premeeting and postmeeting field trips are planned. For details, contact the respective field trip leaders. General questions should be addressed to the field trip coordinator, Clark Blake, U.S. Geological Survey, MS 975, 345 Middlefield Road, Menlo Park, CA 94025, (415) 329-4951.

Trips begin and end in San Francisco unless otherwise noted. Participants must provide their own transportation to the starting point and from the termination point for those trips not originating or terminating in San Francisco. Trips are technical in nature and can be physically rigorous. Please check with the trip leader if you have any questions.

Trip costs include transportation for the trip, guidebook, and other services as noted by the following symbols: B—breakfast, L—lunch, D—dinner, and ON—overnight lodging.

Preregistration for a field trip is recommended because of participant limitations. All participants are accepted on a first-come, first-served basis through GSA headquarters.

The registration form and procedures are provided in this announcement. All field trip registrants must register for at least one day of the meeting. Registration after the preregistration deadline may be possible if trip logistics and space permit; contact the GSA Registration Coordinator. Although preregistration is advised, on-site registration for postmeeting trips may be possible during the meeting in the registration area.

If GSA must cancel a field trip because of logistics or registration requirements, a full refund will be issued after the meeting. Also, please be aware of cancellation deadlines and penalties imposed by the airlines. You may wish to cancel your flight arrangements if a trip you have registered for is canceled. It is a good idea to plan alternatives ahead of time.

Premeeting

1. **Comparison of Structural and Metamorphic Histories of Terranes of the Western Sierra Nevada, California** (3 days). Scott Paterson, Department of Geological Sciences, University of Southern California, Los Angeles, CA 90089, (213) 743-3388; Richard Schweickert, University of Nevada; Othmar Tobish, University of California, Santa Cruz; Robert Miller, San Jose State University. Friday, March 22—Sunday, March 24. Cost: \$175 (2 ON, 3 L). Limit: 40.

This trip will examine the structures, strains, and metamorphism of different terranes (Foothills, Sullivan Creek, Calaveras, Shoo Fly) and terrane-bounding faults (Bear Mountains, Melones, Sonora, Calaveras-Shoo Fly) in southern parts

(between Highways 120 and 140) of the Western Metamorphic belt, Sierra Nevada. We will also examine the timing and mechanism(s) of emplacement of plutons and the role that plutons played during and after emplacement in the evolution of these terranes.

2. **Franciscan Complex, Coast Range Ophiolite and Great Valley Sequence: Pacheco Pass to Del Puerto Canyon** (2 days). Clark Blake, U.S. Geological Survey, MS 975, 345 Middlefield Rd., Menlo Park, CA 94025, (415) 329-4951; Allan Bennison, Consultant, Tulsa, Oklahoma; Will Elder, USGS, Menlo Park; Gary Ernst, Stanford University; Brett Cox, USGS, Menlo Park; Tor Nilsen, Consultant, Redwood City, California; Tekla Harms, Amherst College. Saturday, March 23—Sunday, March 24. Cost: \$150 (1 ON, 1 B, 2 L, 1 D). Limit: 29.

Emphasis of this trip will be on the structural and metamorphic features of a classical subduction complex, the stratigraphy and paleontology of the overlying forearc basin deposits, and the complex nature of the faults that now bound these two contrasting units. Day one will be spent looking at the Franciscan Complex near Pacheco Pass, followed by the Cretaceous Great Valley sequence near San Luis and Los Banos reservoirs. On day two, we will traverse Del Puerto Canyon to see the Great Valley sequence and underlying Coast Range ophiolite plus a rare exposure of the Coast Range fault. Short hikes to outcrops will be necessary.

3. **Structural and Stratigraphic Development of the Berkeley Hills, California** (1 day). David Jones, Department of Geology and Geophysics, University of California, Berkeley, CA 94720, (415) 642-2514; Garniss Curtis, University of California, Berkeley. Saturday, March 23. Cost: \$50 (1 L). Limit: 20.

This field trip to the Berkeley Hills provides an excellent opportunity to view the complex stratigraphic and structural features of the central Coast Ranges, including the Hayward fault, the Coast Range ophiolite, overlying Great Valley sequence, Cenozoic marine and nonmarine deposits, and Miocene volcanics. Strike, slip thrusts, and extensional faults will be visited, and their role in the structural evolution of the region will be emphasized.

4. **Pleistocene Shallow-marine and Coastal Deformation Facies and Facies Sequences in a Mile-thick Accumulation of Alternating Transgressive/Regressive Cycles in the Merced Formation, San Francisco, California** (1 day). Ed Clifton, U.S. Geological Survey, MS 999, 345 Middlefield Rd., Menlo Park, CA 94025, (415) 354-3112; Ralph Hunter, USGS, Menlo Park. Saturday, March 23. Cost: \$48 (1 L). Limit: 38.

Participants in this one-day field trip will examine the Merced Formation in sea cliffs a few miles south of San Francisco. In these exposures, the Merced consists of about 1750 m of shallow-marine and coastal sediment that appears to be entirely of Pleistocene age. The succession records more than 30 episodes of transgression and regression of the sea, as reflected by well-developed sequences of shelf, nearshore, embayment, and nonmarine depositional facies. After an overview from Fort Funston in the Golden Gate Recreational Area, participants will descend to the beach, where the morning will be spent examining a predominantly marine part of the succession. After lunch at Fort Funston, participants will spend the afternoon examining predominantly nonmarine deposits. Unusual features likely to be seen include structures of probable earthquake origin in shelf siltstone beds, vertebrate footprints in backshore sand deposits, and giant load structures produced

Cordilleran/Seismological Meeting continued on page 350

Cordilleran/Seismological Meeting *continued from page 349*

where a large eolian sand dune advanced over a peaty pond deposit. Tectonic implications, including the role of the San Andreas fault, will be incorporated into outcrop discussions.

5. **Quaternary Tectonics of the Northern San Andreas Fault, San Francisco Peninsula, Point Reyes, and Point Arena** (2 days). Carol Prentice, U.S. Geological Survey, MS 977, 345 Middlefield Rd., Menlo Park, CA 94025, (415) 329-5690; Tina Niemi, Stanford University; Tim Hall, Geomatrix Consultants. Saturday, March 23–Sunday, March 24. Cost: \$105 (1 ON, 1 B, 2 L, 1 D). Limit: 33.

This trip will explore the 1906 rupture segments of the northern San Andreas fault between the San Francisco Peninsula and Point Arena from a neotectonics viewpoint. Saturday morning will be spent at stops on the San Francisco Peninsula; in the afternoon, we will visit a paleoseismic site near Olema, in the vicinity of Point Reyes. We will camp Saturday night near Point Arena (those who desire motel accommodations can stay in the motel in town at their own expense). On Sunday, we will tour around the Point Arena–Fort Ross area. In addition to some of the most beautiful scenery along the California coast, we will see spectacularly faulted marine terranes, 1906 offsets, and the site of a paleoseismic study.

Postmeeting

6. **Tectonostratigraphy of the Loma Prieta–Sierra Azul Area, Santa Clara and Santa Cruz Counties, California** (1 day). Bob McLaughlin, U.S. Geological Survey, MS 975, 345 Middlefield Rd., Menlo Park, CA 94025, (415) 329-4945; Kristin McDougall and Will Elder, USGS, Menlo Park. Thursday, March 28. Cost: \$41 (1 L). Limit: 33.

On this trip we will look at stratigraphy and structure northeast of the San Andreas fault in a complexly deformed, primarily deep-water marine section of Upper Jurassic through Lower Miocene rocks that overlie a Middle and Lower Jurassic ophiolite and the Franciscan Complex. Of primary concern will be: (1) the timing and magnitude of displacement on thrust faults such as the Sargent and Berrocal faults that have elevated and translated the Sierra Azul block; (2) the timing and magnitude of displacement on low-angle attenuation faults that have displaced Mesozoic and Cenozoic rocks; (3) the relation of these faults to the San Andreas fault system; and (4) the possible magnitude of lateral displacement of the Sierra Azul block across the Hayward–Calaveras and San Andreas faults, and/or faults that predate the San Andreas system.

7. **Geology and Wine of Sonoma County** (1 day). Terry Wright, Department of Geology, Sonoma State University, Rohnert Park, CA 94328, (707) 664-2304. Thursday, March 28. Cost: \$60 (1 L, wine tasting). Limit: 35.

The diverse geology of Sonoma County includes Franciscan Complex and Salinian basement divided by the San Andreas fault and overlain by late Cenozoic volcanics and alluvium. We will tour the picturesque coastline and continue through the classic wine regions of the Russian River valley, finishing at the unique exposed fossil logs at the Petrified Forest. We will discuss the geological history and view spectacular outcrops of Franciscan melange, the quartz diorite of Bodega Head, and the Sonoma Volcanics. A wine-tasting and Sonoma County cuisine food-tasting will occur at the Petrified Forest. This will be an enjoyable tour for geologists and non-geologic companions alike.

8. **Geology of the Sutter Buttes** (2 days). Brian Hausback, Department of Geology, California State University at Sacramento, 6000 J St., Sacramento, CA 95819, (916) 278-6521; Tor Nilsen, Consultant. Thursday, March 28–Friday, March 29. Cost: \$215 (1 ON, 1 B, 2 L, 1 D, plus entrance fees to private land). Limit: 30.

This trip provides an overview of the igneous, sedimentary, and structural framework of the Sutter Buttes volcano. This Pleistocene extrusive center lies in the Sacramento Valley, near Yuba City. Field trip stops will include: (1) upturned Cretaceous through Tertiary sediments in the southern volcanic moat; discussions of stratigraphic relations to volcanism; (2) deposits of the Rampart volcanoclastic apron surrounding the buttes; mode of description; relationships to volcanism; (3) exposures of andesitic through rhyolitic domes in the eastern part of the core of the Sutter Buttes. Stops will include at least three short hikes, 1–3 miles each.

9. **San Francisco to Point Reyes: Both Sides of the San Andreas Fault; Displacement on the San Gregorio Fault** (2 days). Clyde Wahrhaftig, U.S. Geological Survey, MS 904, 345 Middlefield Rd., Menlo Park, CA 94025, (415) 329-5697; Earl Brabb, USGS, Menlo Park; Joseph Clark, Indiana University of Pennsylvania, Indiana, Pennsylvania; N. Timothy Hall, Geomatrix Consultants, San Francisco; Tina Niemi, Stanford University. Thursday, March 28–Friday, March 29. Cost: \$150 (1 ON, 1 B, 2 L, 1 D). Limit: 20.

This trip visits classic exposures in Marin County of the Franciscan Complex; pillow basalt of the Marin Headlands and Nicasio terranes, radiolarian chert of the Marin Headlands terrane, and melange; the Cretaceous granitic rocks and Cenozoic marine sedimentary rocks of the Point Reyes Peninsula, with particular emphasis on features that match the geology of the Santa Cruz area and Monterey Peninsula and indicate an approximate 150 km displacement on the San Gregorio fault in the past 15 Ma; and the sites of recent excavations along the San Andreas fault made in an attempt to establish a chronology of major earthquakes in the past millenium. Localities will include the Golden Gate, Marin Headlands, Bolinas, Olema, Point Reyes, Kehoe Beach, and Nicasio Reservoir. Overnight will be spent at the Point Reyes AHY hostel (sleeping bag required). Travel will be in seven-passenger vans. There will be a 5.2 mile hike on Friday involving a total uphill climb of about 300 feet to examine critical relations of the Tertiary stratigraphy.

10. **Soils, Paleosols, and Quaternary Sediments Offset along the Hayward Fault near Point Pinole Regional Shoreline, Richmond, California** (1 day). Glenn Borchardt, California Division of Mines and Geology, 380 Civic Drive, Pleasant Hill, CA 94532, (415) 646-5926; Kimberly Seelig, California Division of Mines and Geology. Thursday, March 8. Cost: \$44 (1 L).

This full-day field trip entails a 7 km hike around the shoreline at Point Pinole. We will examine the tectonic geomorphology of the Hayward fault, emphasizing the results of our recent USGS/CDMG-sponsored work on the paleoseismology of the fault. Fault features we will observe and discuss include a prominent fault scarp, sidehill benches, linear troughs, active and offset landslides, and sidewalks and streets offset 20 cm by fault movement. Quaternary features we will observe and discuss include bay mud cliffs, salt pans, a 1300-year-old sedimentary peat layer found at a 60 cm depth in the tidal marsh, and a Sangamon terrace (122,000 years old), including its associated wavecut platform buried by beach sand, showing that the bay was once 6 to 8 m higher than at present. The highlights of

the trip include outstanding exposures of the Tertiary Garry Formation and of Wisconsin paleosols developed in beach sand and in alluvium.

11. **Geological Setting of the San Francisco Bay Area** (1 day). Raymond Sullivan and Jon Galehouse, Department of Geosciences, San Francisco State University, San Francisco, CA 94132, (415) 338-7730. Thursday, March 28. Cost: \$25 (1 L). Limit: 14 (preference given to students).

The first part of this field trip will view the subsidence area along the bay margins and the terrane setting of San Francisco. This will be followed by a study of the Tertiary sections along the coast south of the city. The last component of the trip will focus on geologic hazards along the San Andreas fault on the San Francisco peninsula.

FIELD TRIP GUIDEBOOK

Each field trip registrant will receive a single copy of the guidebook, which will contain information on all trips. The guidebook is being published by the California Division of Mines and Geology. The book will also be on sale during the meeting at a special meeting price to other attendees.

EXHIBITS

Exhibits will be located in the main floor of the hotel. The cost of standard booths will be \$300 for commercial exhibitors and \$150 for educational or nonprofit institutions. For further information and space reservations, please contact Exhibits Chairman Jim Marrone, Bechtel Corporation, P.O. Box 3965, MS 45/31, San Francisco, CA 94119, (415) 768-7297.

SCIENCE THEATER

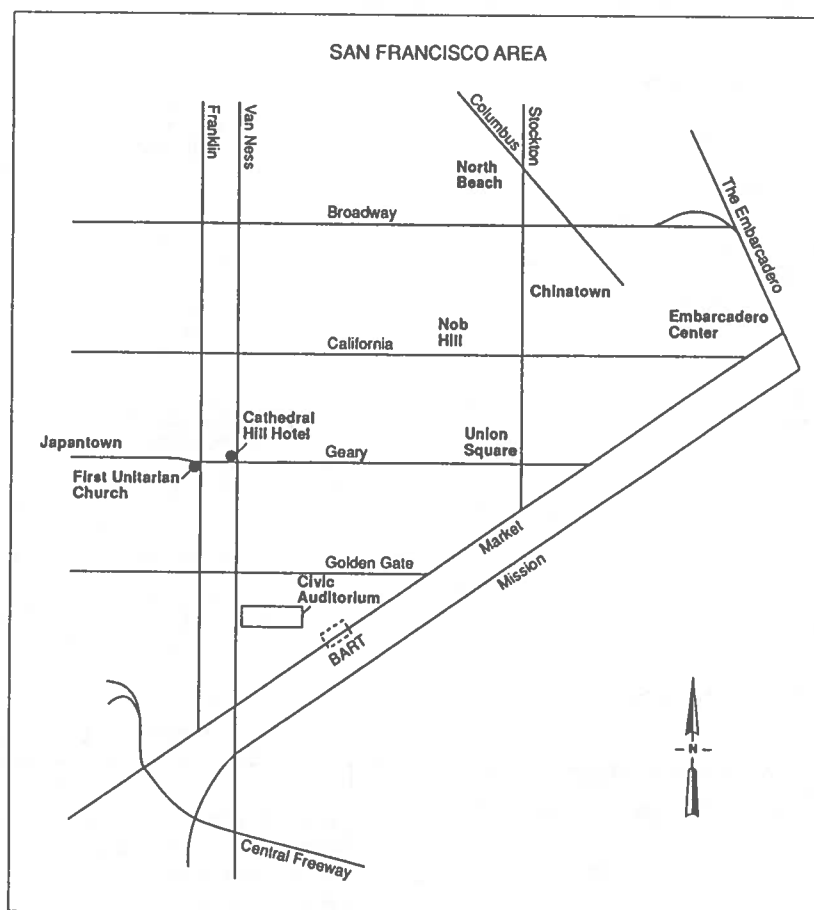
A science theater will be running concurrently with the technical sessions, offering the latest geologic films and videos available for both professional and educational interests. For further information or suggestions, contact Richard Lambert, Skyline College, 3300 College Drive, San Bruno, CA 94066, (415) 355-7000 ext. 4162.

GEOLOGIC PHOTO CONTEST

A photo contest, open to all registrants, will tap the broad spectrum of geologic aesthetics. Only prints will be accepted; they must be at least 8 1/2" x 11". Prints must be mounted on mat board, with a description on the front lower edge. Your name and address should be on the back of the mat board. Only one entry per photographer. Please send entries to Ray Pestrong, Department of Geosciences, San Francisco State University, San Francisco, CA 94132, (415) 338-2080. The first-prize photo will be published in *GSA Today*, a new, expanded monthly publication that replaces *GSA News & Information* beginning in January 1991. All prints will be returned.

GENERAL INFORMATION

For additional information, please contact Co-Chairmen Ray Sullivan, Department of Geosciences, San Francisco State University, San Francisco, CA 94132, (415) 338-7730, or Ivan Wong, Woodward-Clyde Consultants, 500 12th Street, Suite 100, Oakland, CA 94607, (415) 874-3014.



PREREGISTRATION FORM

GSA Cordilleran Section Meeting, March 25–27, 1991

San Francisco, California

Held jointly with the Seismological Society of America, the Pacific Coast Section of the Paleontological Society,
and the Far Western Section of the National Association of Geology Teachers.

Preregistration must be RECEIVED by *February 22, 1991*. Full payment and form must accompany all preregistration requests. Unpaid purchase orders are not accepted as valid registration. One form per registrant. The cancellation deadline is *March 1, 1991*. For registration information call the GSA Registration Coordinator at (303) 447-2020.

Type or print (Keep a copy for your records)

Name (Last) (First)

Institution/Employer

Mailing Address

City State ZIP code

Country (_____) Business phone (_____) Home phone

Guest/Spouse Name (Last) (First)

City State/Country

Check Member Affiliation(s): (A) GSA (number _____) (B) SSA (C) PS (D) NAGT

| PREREGISTRATION FEES (registration required for technical sessions) | Price (Check One) | | Qty | Amount |
|---|-------------------------------------|-------------------------------------|-----|----------|
| | Full Registration | One Day | | |
| Professional Member | (1) \$65 <input type="checkbox"/> | (2) \$25 <input type="checkbox"/> | 1 | \$ _____ |
| Professional Nonmember | (3) \$75 <input type="checkbox"/> | (4) \$30 <input type="checkbox"/> | 1 | \$ _____ |
| Student Member | (5) \$25 <input type="checkbox"/> | (6) \$10 <input type="checkbox"/> | 1 | \$ _____ |
| Student Nonmember | (7) \$30 <input type="checkbox"/> | (8) \$15 <input type="checkbox"/> | 1 | \$ _____ |
| Guest (fill in name above for badge) | (9) \$10 <input type="checkbox"/> | N/A | -- | \$ _____ |

| SPECIAL EVENTS | | Price | Qty | Amount |
|---|----------|-----------|-----|----------|
| NAGT Luncheon | March 25 | (40) \$20 | 1 | \$ _____ |
| SSA Luncheon | March 26 | (41) \$20 | 1 | \$ _____ |
| GSA Cordilleran Section Business Luncheon | March 27 | (42) \$20 | 1 | \$ _____ |

| FIELD TRIPS (meeting registration required) | | Price | Qty | Amount |
|---|-------------|-------------|-----|----------|
| 1. Terranes of Western Sierra Nevada | March 22–24 | (100) \$175 | 1 | \$ _____ |
| 2. Pacheco Pass to Del Puerto Canyon | March 23–24 | (101) \$150 | 1 | \$ _____ |
| 3. Berkeley Hills | March 23 | (102) \$ 50 | 1 | \$ _____ |
| 4. Merced Formation, San Francisco | March 23 | (103) \$ 48 | 1 | \$ _____ |
| 5. Tectonics of Northern San Andreas | March 23–24 | (104) \$105 | 1 | \$ _____ |
| 6. Loma Prieta–Sierra Azul Area | March 28 | (105) \$ 41 | 1 | \$ _____ |
| 7. Geology and Wine, Sonoma County | March 28 | (106) \$ 60 | 1 | \$ _____ |
| 8. Sutter Buttes | March 28–29 | (107) \$215 | 1 | \$ _____ |
| 9. Both Sides of San Andreas Fault | March 28–29 | (108) \$150 | 1 | \$ _____ |
| 10. Hayward Fault near Point Pinole | March 28 | (109) \$ 44 | 1 | \$ _____ |
| 11. San Francisco Bay Area | March 28 | (110) \$ 25 | 1 | \$ _____ |

ABSTRACTS WITH PROGRAMS (reserved for on-site pick up) (301) \$ 8 1 \$ _____

TOTAL PAYMENT ENCLOSED (Remit in U.S. funds) \$ _____

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| Refund Date _____ | _____ |

GeoVentures 1991

Registration Starts January 2, 1991

By Sue Beggs, Meetings Manager

Where will you be spending your free time next year? Some of GSA's members and friends will be enjoying trips to New Zealand, Great Britain, Grand Canyon, and Colorado as part of GSA's 1991 GeoVenture program. GeoVentures offer an array of trips and classroom experiences. They are especially designed for geologists who would like to experience an interesting travel destination in the company of other geologists who share similar educational interests.

GeoVentures are a special benefit created for members, but are open to guests and friends also. GeoVentures is the overall name for adult educational and adventure experiences of two kinds: GeoTrips or GeoHostels. Both are known for expert scientific leadership. Fees for both are low to moderate (relative to the length, time of year, and destination) and include lodging and meals as designated.

1991 GeoTrips

Up to three weeks long and involving adventure and travel almost every day, the GeoTrips may go to any destination worldwide. Three offerings are being made available in 1991. The first, a trip to New Zealand, March 3-23, is fully subscribed. The next two will take place this summer and begin registering *January 2*.

GT912. **Great Britain's Classical Geology**, June 15-July 6, 1991
Cosponsored by NAGT

GT913. **Grand Canyon Adventure**, July 14-22, 1991
George Billingsley, Ken Hamblin

1991 GeoHostels

A GeoHostel is also an adult learning experience for geologists and their guests. It is site-specific, with a combination of classroom and field experiences that start from the same location each day. A GeoHostel is held for five to seven days at a destination that is rich in geological interest as well as plentiful in opportunities for side excursions.

GeoHostels offer (1) an enjoyable experience with an educational focus on topics appealing to a wide range of geologists and their guests; (2) ample free time to enjoy the special environmental and cultural aspects of the location; (3) leadership by enthusiastic, well-organized geologists who can speak well, and who can cover the topics at a level appropriate for the non-expert.

GH91. **Colorado School of Mines**, Golden, Colorado
June 23-27, 1991. Kenneth Kolm, Gregory Holden

GeoVentures descriptions on pages 354-355 (registration form on p. 356)

THE NATURE & ORIGIN OF CORDILLERAN MAGMATISM

Edited by
J. Lawford Anderson

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The North American Cordillera records the tectonic, metamorphic, and magmatic history of a continental margin active since the middle Paleozoic. Many fine volumes deal with regional tectonics, metamorphism, core complexes, and paleogeography, but until now no comparable set of papers has dealt with the remarkable compositional span of igneous activity that characterizes the orogen. These papers are from individuals doing research in specific areas of the orogen, and emphasize magma genesis (including the role of multiple source control and changes of magmatic trends caused by fractional crystallization), assimilative fractional crystallization, and mixing. Here is an abundance of new data and exciting interpretations of the Mesozoic and Tertiary igneous suites of the Cordillera from Baja California to Alaska, including work in the Peninsular Ranges batholith, Transverse Ranges, Mojave Desert and Lake Mead regions, Sierra Nevada batholith, Salinian magmatic arc, Great Basin, Klamath Mountains, Idaho batholith, Colville igneous complex, and Coast batholith.

MWR174, 440 p., indexed, hardbound, ISBN 0-8137-1174-6, \$65.00

Great Britain's Classic Geologic Sites

Co-sponsored by GSA and NAGT

21 Days: June 15–July 6, 1991

SCIENTIFIC LEADERSHIP

The trip will be coordinated by Dorothy (Dottie) L. Stout, Cypress College, California. Dottie, currently serving as NAGT President, has abundant experience with coordinating geology trips in Great Britain. Expert geologists from England, Wales, and Scotland will be sharing in the scientific leadership. Participants will also enjoy the interpretive insights provided by persons familiar with other environmental, cultural, and social aspects of Great Britain.

FOCUS

The purpose of the trip is to visit the classic sites in England and Scotland that have molded understanding of Earth's geology. The potential participant is a geologist who would enjoy visiting these classic sites under the guidance of geological experts. GeoTrips are not standard field trips, however. Fascinating non-geological activities are woven into the itinerary, and guests are welcome.

ITINERARY

During its 21 days, the trip will visit nearly all the classic geological sites in Great Britain, beginning with the Geological Museum of London and the grand old Geological Society of London. During the London evenings, as in the evenings in most of the cities and towns, there will be theater or other local cultural options. England, Wales, and Scotland lie ahead as the trip explores the type sections for the various geologic periods. The itinerary includes visits to the following geologically and historically colorful places: the Sedgwick Museum, Chalk Cliffs, Lyme Regis, Sidmouth, Cornwall, Stonehenge, Bath, Stratford, Isle of Arran, Glasgow, parallel roads of Glenroy, Whin Sill, Hadrian's Wall, Edinburgh, and Sycar Point. It's back to London on the evening of the 20th day, for return home the next day.

LIMITS

The trip is limited to 30 participants plus leaders. The minimum age is 18 years old. GeoTrippers should be in good health, and although the trip is not strenuous, there will be some hiking and persons must be able to carry their own luggage.

TRIP COST

The estimated cost will be between \$3090 and \$3390 U.S. for the 21 days. This is a reasonable fare considering the trip is going at the best time of year and is based on an exchange rate that is

currently unfavorable to the U.S. dollar. The fee includes double occupancy, lodging, most morning and evening meals, ground transportation, entry fees, transfer costs, and taxes. Notice that since double occupancy is assumed in this special rate, the solo traveler will be paying an additional single occupancy surcharge. We will do our best to pair solo travelers who wish to share accommodations. We will let you know more about this later.

AIR FARE

Since the trip fee does not include air fare, we will be providing a special travel package on a certified International Air Transport Association carrier. The air travel arrangements will be made only through the official travel agent designated for this trip. Everyone's participation is assumed in the fare. An extra fee of \$160 will be due from those not using the specially arranged fare, for example, those using frequent flier miles.

REGISTRATION

Registration is open to everyone, but GSA and NAGT members will be given preference during the advance period up to January 30, 1991. Interest in GeoTrips has been very high, so if you are thinking about this trip, let us know soon. Your \$250 deposit will secure a place on the trip and is totally refundable through February 28.

DEPOSIT AND PAYMENT

Trip price: \$ 3090 (based on 30 person minimum)
Special discount rate for GSA and NAGT members: \$ 2990. *
\$250 deposit is due with your reservation. It will be applied to the total due.

| | |
|---|--|
| If your reservation is made: | You will pay: |
| Before January 30, 1991 | \$100 less per person during advance registration |
| Between February 1 and 28, 1991 | \$2990 for GSA and NAGT members, \$3090 for nonmembers |
| On or after March 1, 1991 | \$100 more per person during late registration |

*Members must be in good-standing with current, paid membership. The member discount applies to members only, and does not include their guests.

Please see GeoVentures registration form on page 356

Grand Canyon Adventure

**A Summer Educational Adventure:
Rafting, Hiking, and Camping
Nine Days, Eight Nights on the River—
Lee's Ferry to Pearce Ferry
250 Miles of River Ride
July 14–22, 1991**

Scientific Leaders:
George H. Billingsley, U.S. Geological Survey, Flagstaff
William K. Hamblin, Brigham Young University

Guests welcome with a GSA member.



- July 13, Saturday Travel day from home to Las Vegas
- July 14, Sunday Depart Las Vegas for arrival at Lee's Ferry put-in by 10:00 a.m.
- July 15–22 River days
- July 22, Monday Arrive Pearce Ferry (Lake Mead) for bus back to Las Vegas
- July 23, Tuesday Travel day from Las Vegas to home

Cost: \$1440. \$100 less for GSA members. Limit: 35 persons

REGISTER BEFORE FEBRUARY 10 — SAVE \$50

GSA Members \$1290
Guests and Nonmembers \$1390

Included in the fee: Tents, sleeping bags and pads, meals, dry bags, waterproof river guidebook, geologic reading materials, comfortable transportation to and from Las Vegas and the Grand Canyon, and, of course, the companionship of expert and engaging scientific leaders.

(Please make your decision early. This trip will fill quickly.)

When you are ready to decide,
\$150 per person will hold your place.

The deposit is completely refundable up to April 9.

Science and vacation in one glorious river ride for the spirited and adventurous

Colorado GeoHostel Program

**Colorado School of Mines, Golden, Colorado
Five Days: Sunday, June 23–Thursday, June 27**

Faculty:
*Kenneth E. Kolm and Gregory S. Holden,
Colorado School of Mines*



Colorado School of Mines is set in the foothills of the Colorado Rockies and is conveniently located between Denver and Boulder. June will be a wonderful time to visit Colorado and the spectacular high country of the Rockies.

- GH1A Evolution of Geologic Landscapes in the Colorado Rockies, 8:00–9:30 a.m.**
- GH1B Environmental and Engineering Issues in Colorado, 9:30–11:00 a.m.**

These two geology classes will be offered each morning and include local field trips. They are meant for geologists who are not experts in this area. A person may take one or both classes.

- GH2B Old Mining Towns of the Rockies, 9:30–11:00 a.m.**

Also offered, primarily for the nongeologist, is a fascinating class on Colorado's mining towns. This class will include at least one full-day trip to visit several mining towns. Persons registering in this class will not be able to take either of the geology classes.

REGISTRATION LIMITS

Minimum age is 21. No other limits.

GENERAL PROGRAM

Saturday, June 22 Welcoming Get-together
Sunday, June 23 through
Wednesday, June 26 Morning Classes
Thursday, June 27 Full Day Field Excursion
and Farewell Party

DEPOSIT AND PAYMENT

GeoHostel cost: \$350 (non-members and guests)
Special discount rate for GSA members: \$325

Fee includes classroom programs and materials, field excursions, lodging (double occupancy), breakfast, welcoming and farewell events. Not included is transportation to and from Colorado, transportation during nonclass hours, meals or other expenses not specifically included.

\$50 deposit is due with your reservation. It will be applied to the total due and is refundable up to April 1.

March 1 50% of balance is due
April 1 100% of balance is due

GeoVentures registration opens January 2, 1991

GeoVentures Registration Form

REGISTRATION OPENS JANUARY 2, 1991

We will be glad to answer questions during December, but in fairness to everyone, registration will not be accepted until after *January 2*. Please keep in mind that the GeoVentures fill quickly and it is best to make a decision early.

If you would like to send a deposit to hold your reservation, please pay by check or credit card number which will be used only for this deposit. (Future charges will be authorized by you first.) You will receive further information and a confirmation of your registration after January 2.

CANCELLATION

Each GeoVenture has its own set of cancellation dates which will be sent out to registrants or in response to queries, but basically fees become nonrefundable 60 days prior to departure for GeoTrips and 30 days prior for GeoHostels.

Name _____
 Institution/Employer _____
 Mailing Address _____
 City _____ State _____ Country _____ ZIP _____
 Business phone () _____ Home phone () _____
 Guest Name _____
 GSA Member # _____ or NAGT Member # _____

| | Deposit Per Person | No. of Persons | Total Paid Deposit |
|---|-----------------------|-------------------|-----------------------|
| GT912— Great Britain's Classical Geologic Sites | \$250 | _____ | _____ |
| GT913— Grand Canyon Adventures | \$150 | _____ | _____ |
| GH91 — Colorado GeoHostel Program | \$ 50 | _____ | _____ |

No deposit, but
I'm interested.
Please Send More
Information

Please check the GeoHostel programs you would like to take:

- GH91 A (8:00 a.m.) Evolution of the Rockies
- GH91 B (9:30 a.m.) Environmental Issues
- GH92 B (9:30 a.m.) Mining Towns

TOTAL DEPOSIT _____

- VISA MasterCard Diners Club/Carte Blanche American Express

Credit Card # _____ Exp. Date _____

Registration begins *January 2, 1991*. Mail reservation form and check or credit card information to:

1991 GSA GeoVentures
 GSA Meetings Department
 P. O. Box 9140
 Boulder, CO 80301

Non-U.S.-based registrants are encouraged to use GSA's fax number: 303-447-1133

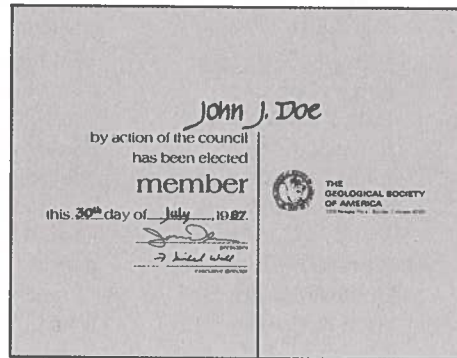
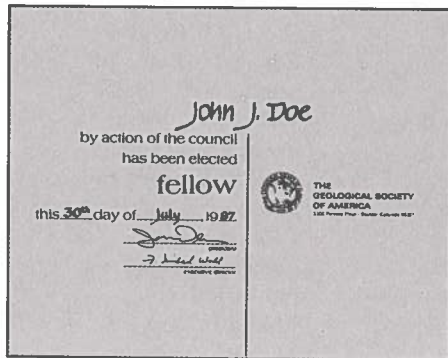
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NEW GSA MEMBERS

The following 371 Members have been elected to Membership by Council action during the period from February 1990 through August 1990 (*indicates transfer from Student Associate to Member).

- | | | | | |
|---|--|---|--|--|
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|---|--|---|--|--|

New Members continued on p. 359

New Members *continued from p. 358*

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|-----------------------|-----------------------|----------------------|-----------------------|-----------------------------|
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| * Catherine A. Rigsby | Kevin D. Russell | Deana S. Sneyd | * Wanda J. Taylor | Mary J. Wesling |
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| Elizabeth F. Robinson | John R. San Filippo | William Spence | Wendy B. Thornton | Mona S. Williams |
| * James V. Robinson | Bridget R. Scanlon | Gail W. Stanley | D. Ronald Thorp | * Patrick L. Williams |
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NEW GSA STUDENT ASSOCIATES

The following 341 Student Associates became affiliated with the Society during the period from March 1991 through September 1991.

- | | | | | |
|----------------------|---------------------------|-------------------------|-----------------------|----------------------|
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| Kimberly A. Balsis | Charles E. Cline | Allan C. Fernandes | Jonathan M. Harbor | Peter J. Jaumann |
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| Jay Patrick Busch | Karen A. Dolan | Lorena L. Goerger | | |
| Keith W. Butler | | Robin Golnazarians | | |

New Student Associates continued on page 360

Recently released titles from GSA

from the
GSA Bookshelf
available from
GSA Publication Sales
1-800-472-1988

Geophysical Framework of the Continental United States, edited by L. C. Pakiser and W. D. Mooney, 1990, MWR172, \$92.50

The Nature and Origin of Cordilleran Magmatism, edited by J. L. Anderson, 1990, MWR174, \$65.00

Mesozoic Volcanism and Volcanogenic Iron-Ore Deposits in Eastern China, by Xu Zhigang, 1990, SPE237, \$23.75

Volcanism and Tectonism in the Columbia River Flood-Basalt Province, edited by S. P. Reidel and P. R. Hooper, 1990, SPE239, \$52.50

Style and Mechanics of Liquefaction-Related Deformation, Lower Absaroka Volcanic Supergroup (Eocene), Wyoming, by P. L. Decker, 1990, SPE240, \$32.50

Plutonism from Antarctica to Alaska, edited by S. M. Kay and C. W. Rapela, 1990, SPE241, \$45.00

Establishment of a Geologic Framework for Paleanthropology, edited by L. F. Laporte, 1990, SPE242, \$22.50

Dawn of the Age of Mammals in the Northern Part of the Rocky Mountain Interior, edited by T. M. Bown and K. D. Rose, 1990, SPE243, \$45.00

Volcanism and Fossil Biotas, edited by M. Lockley and A. Rice, 1990, SPE244, \$27.50

Geology of the Composite Avalon Terrane of Southern New England, edited by A. D. Socci, J. W. Skehan, and G. W. Smith, 1990, SPE245, \$45.00

Ore-Bearing Granite Systems; Petrogenesis and Mineralizing Processes, edited by H. J. Stein and J. L. Hannah, 1990, SPE246, \$65.00

Recent Advances in Coal Geochemistry, edited by L. L. Chyi and C.-L. Chou, 1990, SPE248, \$22.50

The Cretaceous/Tertiary Boundary Interval, Raton Basin, Colorado and New Mexico..., by G. A. Izett, 1990, SPE249, \$30.00

GSA Centennial Articles, Reprinted from Vol. 100 of GSA Bulletin, edited by R. D. Hatcher, Jr., and W. A. Thomas, 1990, SPE253, \$24.50

The Appalachian-Ouachita Orogen in the United States, edited by R. D. Hatcher, Jr., W. A. Thomas, and G. W. Viele, 1989, GNA-F2, \$75.00

The Arctic Ocean Region, edited by A. Grantz, L. Johnson, and J. F. Sweeney, 1990, GNA-L, \$85.00

Surface Water Hydrology, edited by M. G. Wolman and H. C. Riggs, 1990, GNA-O1, \$60.00

Archaeological Geology of North America, edited by N. P. Lasca and J. Donahue, 1990, CSV004, \$62.50

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New Student Associates continued from page 359

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GSA Annual Meetings

1991 GSA Annual Meeting San Diego, California October 21-24, 1991

R. Gordon Gastil, General Chair, Dept. of Geological Sciences,
San Diego State University, San Diego, CA 92182

Theme session and symposia proposals due: *January 2, 1991*

1992 GSA Annual Meeting Cincinnati, Ohio October 26-29, 1991

Call for Field Trip Proposals

Send proposals to Thomas M. Berg, State Geologist and Chief,
Division of Geological Survey, Ohio Dept. of Natural Resources,
Fountain Square, Columbus, OH 43224; (614) 265-6605.

Future

| | | |
|------------|---------------|------|
| San Diego | October 21-24 | 1991 |
| Cincinnati | October 26-29 | 1992 |
| Boston | October 25-28 | 1993 |
| Seattle | October 24-27 | 1994 |

For general information on program participation (1991 or beyond)
contact: Sue Beggs, Meetings Manager, GSA headquarters.

GSA Section Meetings

1991

Cordilleran

Cathedral Hill Hotel, San Francisco, California, March 25-27

Raymond Sullivan
Dept. of Geosciences
San Francisco State University
San Francisco, CA 94132
(415) 338-7730

North-Central

University of Toledo, Toledo, Ohio, April 18-19

Lon Ruedisili or Mark Camp
Dept. of Geology
University of Toledo
Toledo, OH 43606
(419) 537-2009

Northeastern-Southeastern

Omni Inner Harbor Hotel, Baltimore, Maryland, March 14-16

| | |
|--|--|
| Emery Cleaves Maryland Geological Survey 2300 St. Paul Street Baltimore, MD 21218 (301) 554-5504 | Juergen Reinhardt U.S. Geological Survey 926 National Center Reston, VA 22092 (703) 648-6789 |
|--|--|

Rocky Mountain-South-Central

University of New Mexico, Albuquerque, New Mexico, April 22-24

| | |
|---|---|
| G. Randy Keller Dept. of Geological Sciences University of Texas at El Paso El Paso, TX 79968-0555 (915) 747-5501 | John Geissman or Wolfgang Elston Dept. of Geology University of New Mexico Albuquerque, NM 87131 (505) 277-4204 |
|---|---|

National Research Council to Award Ford Foundation Postdoctoral Fellowships for Minorities

The National Research Council plans to award approximately 25 Ford Foundation Postdoctoral Fellowships for Minorities in a program designed to provide opportunities for continued education and experience in research for Native American Indians, Alaskan Natives (Eskimo or Aleut), Black/African Americans, Mexican Americans/Chicanos, Native Pacific Islanders (Micronesians or Polynesians), and Puerto Ricans. Fellows will be selected from among scientists, engineers, and scholars in the humanities who show greatest promise of future achievement in academic research and scholarship in higher education.

In this national competition sponsored by the Ford Foundation, citizens of the United States who are (1) members of one of the designated minority groups, (2) preparing for or already engaged in college or university teaching, and (3) hold the Ph.D. or Sc.D. degree may apply for a fellowship award of one year's duration.

Awards in the Ford Foundation Postdoctoral Fellowships for Minorities Program will be made in the behavioral and social sciences, humanities, engineering, mathematics, physical sciences, and biological sciences, or for interdisciplinary programs composed of two or more eligible disciplines. Tenure of a fellowship provides postdoctoral research experience at an appropriate not-for-profit institution of higher education or research of the Fellow's choice. Appropriate institutions include universities, museums, libraries, government or national laboratories, privately sponsored not-for-profit institutes, government chartered not-for-profit research organizations, and centers for advanced study.

Deadline for submission of applications is *January 11, 1991*. All inquiries concerning application materials and program administration should be addressed to the Fellowship Office, GR420A, National Research Council, 2101 Constitution Avenue, Washington, DC 20418.

San Diego

GLOBAL PERSPECTIVE

1991 San Diego Annual Meeting Theme

More than anything else, plate tectonics called attention to the need for a global perspective in geology. Global perspective emphasizes the worldwide occurrence of many geologic processes and phenomena as well as the devotion of geological scientists, internationally, to the task of describing and understanding the Earth. The meeting theme also relates to our global environment: atmosphere, hydrosphere, and lithosphere. Geoscientists play a role in preserving the environment of planet Earth while extracting and utilizing resources necessary for the support of society. The rapid growth of environmental geology as a discipline and source of employment attests to the importance of its role in today's world. It is time to emphasize a global perspective in our GSA Annual Meeting.

The 1991 Annual Meeting program will be built around symposia, theme, and discipline sessions.

- Symposia are organized only by GSA divisions and associated societies.
- Theme sessions serve to focus volunteered presentations, frequently from a variety of disciplines, on a topic of broad interest.
- Discipline sessions consist of volunteered papers submitted to scientific (rather than topical) classifications.

Theme topics may be proposed by any individual or group. Proposed topic titles and a short explanatory paragraph should be submitted to either Richard W. Berry, Technical Program Chairman, or Gary H. Girty, Technical Program Co-Chair, Dept. of Geological Sciences, San Diego State University, San Diego, CA 92182, (619) 594-5586. *Submission of theme topics is due by January 2, 1991.*

Organizations or groups of individuals submitting theme topics should designate one person as official theme advocate. The theme advocate may solicit contributions but may not guarantee acceptance of any abstract. Abstracts contributed to theme sessions are entirely volunteered and are reviewed by three independent reviewers appointed by the Joint Technical Program Committee (JTPC). The advocate may serve as a fourth reviewer.

Abstracts submitted to a theme session but not deemed relevant to the topic by the official advocate will be reviewed and considered for presentation in a discipline session.

The following ideas have been compiled by the 1991 Annual Meeting Local Committee. They are not intended to be comprehensive nor exclusive. Neither are they necessarily the ones that will emerge as the final titles of theme sessions to which abstracts will be submitted.

1991 Candidate Themes

1. Neotectonics and structural geology of Baja California
2. Sedimentary records of terrane accretion
3. San Andreas fault system seismicity and prediction
4. Geologic maps of southern California
5. Environmental geology, techniques, and case histories

Preliminary List of Theme Topics to Date

- T1. Correlation of Devonian stratigraphic boundaries in marine and nonmarine facies
- T2. Jurassic magmatism and tectonics of the North American Cordillera
- T3. Mesozoic structural and tectonic evolution of the southwestern margin of North America
- T4. Sands and sandstones: Clues to paleoclimatic and paleotectonic settings
- T5. Comparison of transpressional and transtensional tectonics and landforms

The Geological Society of America

Research Grants Program 1991



The Geological Society of America will continue its annual Research Grants Program in 1991. Eligibility is not restricted to GSA members. New application forms for the current year and detailed requirements are available each fall in the geology departments of colleges and universities offering graduate degrees in earth sciences. Forms are mailed annually to

GSA Campus Representatives and department secretaries and chairmen in the United States and Canada. They are also available upon request from the Research Grants Administrator, Geological Society of America, P.O. Box 9140, Boulder, Colorado 80301. *Please use only the 1991 application and appraisal forms.*

The primary role of the Research Grants Program is to provide partial support for research of graduate students who are candidates for the M.S. or Ph.D. degree at universities in the United States, Canada, Mexico, and Central America. GSA strongly encourages women, minorities, and persons with disabilities to participate fully in this grants program.

The Geological Society of America awarded \$190,900 in grants in 1990. The grants went to 244 students doing research for advanced degrees. The average amount awarded was \$787. The largest grant was \$1,520, but there is no predetermined maximum amount.

Confidential evaluations from two faculty members are required from candidates for the M.S. or Ph.D. degree and must accompany applications submitted. PLEASE USE THE "APPRAISAL OF APPLICANT" FORMS, WHICH ACCOMPANY THE 1991 APPLICATION FORMS.

The Committee on Research Grants will meet in March to evaluate applications and award grants. In April, all applicants for grants will be informed of the committee's actions by the Executive Director of the Geological Society of America.

**ALL APPLICATIONS MUST BE SUBMITTED ON THE 1991 FORMS
AND POSTMARKED BY FEBRUARY 15, 1991**

MEETINGS

(Asterisk indicates new or changed information)

1990

American Geophysical Union, December 3–7, 1990, San Francisco, California. Information: 1990 Fall Meeting, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, DC 20009; (202) 462-6900; fax 202-328-0566.

1991

American Geophysical Union 1991 Front Range Meeting: Our Changing Environment, February 11–12, 1991, Boulder, Colorado. Information: Rush Services, 5106 Forsyth Place, Boulder, CO 80303; 303-443-8489; fax 303-449-4394.

Seventh Annual V.E. McKelvey Forum on Mineral and Energy Resources, February 11–14, 1991, Reno, Nevada. Information: Buhler and Abraham, Inc., 8700 First Avenue, Silver Spring, MD 20910; (301) 588-4177.

United Nations Development Programme 5th International Conference on Heavy Crude and Tar Sands, February 17–22, 1991, Caracas, Venezuela. Information: Sigfrid Steinhold S., 5th UNITAR/UNDP Conference, 801 U.N. Plaza, 5th Floor, New York, NY 10017; (212) 370-1122; fax 212-986-5779.

10th Annual Symposium on Caribbean Geology: Tectonics and Mineral Deposits of the Caribbean, February 20–24, 1991, Mayagüez, Puerto Rico. Information: J. H. Schellekens, Dept. of Geology, University of Puerto Rico, P.O. Box 5000, Mayagüez, Puerto Rico 00709-5000; (809) 265-3845.

Society for Mining, Metallurgy, and Exploration Annual Meeting, February 25–28, 1991, Denver, Colorado. Information: Meetings Department, Society for Mining, Metallurgy, and Exploration, P.O. Box 625002, Littleton, CO 80162; (303) 973-9550; fax 303-979-3461.

AAPG/SEPM/SEG/SPWLA Pacific Sections 66th Annual Meeting, March 5–10, 1991, Bakersfield, California. Information: Robert Horton, 1991 Annual Pacific Sections Convention, 4909 Stockdale Highway, Suite 251, Bakersfield, CA 93309.

Second International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics (including special session on the Loma Prieta [California] earthquake of October 17, 1989), March 11–15, 1991, St. Louis, Missouri. Information: Shamsher Prakash, Dept. of Civil Engineering, 308 Butler Carlton Hall, University of Missouri, Rolla, MO 65401-0249; (314) 341-4489; fax 314-341-4729.

GSA Northeastern and Southeastern Sections, March 14–16, 1991, Baltimore, Maryland. Information: Emery Cleaves, Maryland Geological Survey, 2300 St. Paul Street, Baltimore, MD 21218, (301) 554-5504; Juergen Reinhardt, U.S. Geological Survey, 926 National Center, Reston, VA 22092, (703) 648-6789.

Appalachian Karst Symposium, March 23–26, 1991, Radford, Virginia. Information: Ernst H. Kastning, Department of Geology,

Radford University, Radford, VA 24142; (703) 831-5336 or 5652; fax 703-831-5970.

Sixth Biennial Meeting of the European Union of Geosciences, March 24–28, 1991, Strasbourg, France. Information: Organizing Committee of E.U.G. VI, University of Trieste, Institute of Mineralogy, Piazzale Europa, 1-34100 Trieste, Italy.

GSA Cordilleran Section, March 25–27, 1991, San Francisco, California. Information: Raymond Sullivan, Dept. of Geosciences, San Francisco State University, San Francisco, CA 94132; (415) 338-7730.

***Fifth SIAM Conference on Parallel Processing for Scientific Computing**, March 25–27, 1991, Houston, Texas. Information: SIAM Conference Coordinator, Dept. CC0990, 3600 University City Science Center, Philadelphia, PA 19104-2688; (215) 382-9800; fax 215-386-7999; E-mail siamconfs@wharton.upenn.edu.

Petroleum-Reservoir Geology in the Southern Midcontinent, March 26–27, 1991, Norman, Oklahoma. Information: Kenneth S. Johnson or Jock A. Campbell, Oklahoma Geological Survey, University of Oklahoma, 100 E. Boyd, Rm. N-131, Norman, OK 73019; (405) 325-3031.

Engineering Geology and Geotechnical Engineering, 27th Symposium, April 9–13, 1991, Logan, Utah. Information: James McCalpin, Dept. of Geology, Utah State University, Logan UT 84322-4505; (801) 750-1220.

Permian Basin Section—SEPM Annual Field Seminar: Sequence Stratigraphy, Facies, and Reservoir Geometries of the San Andres/Grayburg/Queen Formations, Guadalupe Mountains, New Mexico and Texas, April 11–13, 1991, Permian Basin, Texas. Information: Sally Meador-Roberts, PBS-SEPM 1991 Annual Field Seminar, P.O. Box 1595, Midland, TX 79702; (915) 684-7122.

Association of American Geographers Annual Meeting, April 13–17, 1991, Miami, Florida. Information: AAG, 1710 16th Street NW, Washington, DC 20009-3198; (202) 234-1450.

International Conference on Environmental Pollution, April 15–19, 1991, Lisbon, Portugal. Information: ICEP Conference Office, ICTR Secretariat, 11–12 Pall Mall, London SW1Y 5LU, England; phone 01-930-6825; telex 925312 REICO G; fax 01-976-1587.

GSA North-Central Section, April 18–19, 1991, Toledo, Ohio. Information: Lon Ruedisili or Mark Camp, Dept. of Geology, University of Toledo, Toledo, OH 43606. (*Abstracts deadline: December 12, 1990.*)

International Symposium on Geophysical Hazards in Developing Countries and Their Environmental Impacts, April 21–27, 1991, Cairo, Egypt. Information: T. S. Murty, Hazards-91, c/o Institute of Ocean Sciences, P.O. Box 6000, Sidney, B.C. V8L 4B2, Canada; (604) 356-6311; telex 04-97281; fax 604-356-6390; Mohammed I. El-Sabh, Hazards-91, Dept. Océanographie, Université du Québec,

300, Allée des Ursulines, Rimouski, Québec G5L 3A1, Canada; (418) 724-1707; telex 051-31623; fax 418-723-7234.

GSA Rocky Mountain and South-Central Sections, April 22–24, 1991, Albuquerque, New Mexico. Information: G. Randy Keller, Dept. of Geological Sciences, University of Texas, El Paso, TX 79968-0555, (915) 747-5501; John Geissman or Wolfgang Elston, Dept. of Geology, University of New Mexico, Albuquerque, NM 87131; (505) 277-4204. (*Abstracts deadline: December 20, 1990.*)

European Geophysical Society XVI General Assembly, April 22–26, 1991, Wiesbaden, Federal Republic of Germany. Information: EGS Office, Postfach 49, 3411 Katlenburg-Lindau, Federal Republic of Germany; phone 49-5556-1440; fax 49-5556-4709; telex 965564 zil d.

Association of Exploration Geochemists 15th International Geochemical Exploration Symposium, April 29–May 1, 1991, Reno, Nevada. Information: Harold Bonham, 15th IGES, P.O. Box 9126, Reno, NV, 89507; (702) 784-6691; fax 702-784-1709.

Eighth Thematic Conference on Remote Sensing for Exploration Geology, April 29–May 2, 1991, Denver, Colorado. Information: Robert H. Rogers, ERIM Thematic Conferences, P.O. Box 8618, Ann Arbor, MI 48107-8618; (313) 994-1200.

Society for the Preservation of Natural History Collections, 6th Annual Meeting, May 6–11, 1991, Ottawa, Ontario. Information: G. R. Fitzgerald, Canadian Museum of Nature, Earth Sciences (Paleobiology), P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, Canada.

14th Annual Spring Systematics Symposium: Origin of Anatomically Modern Humans, May 11, 1991, Chicago, Illinois. Information: Sophia L. Brown, Symposium Coordinator, Department of Geology, Field Museum of Natural History, Roosevelt Road and Lake Shore Drive, Chicago, IL 60605-2496; (312) 922-9410 x298.

***Third International Seminar on Coastal Parks and Protected Areas**, May 11–June 5, 1991, Florida and Costa Rica. Information: John R. Clark, University of Miami-RSMAS, 4600 Rickenbacker Causeway, Miami, Florida 33149-1098; (305) 361-4620; telex 317454; fax 305-361-9306; Easylink mailbox 62845425.

International Symposium on Land Subsidence, May 12–18, 1991, Houston, Texas. Information: Ivan Johnson, A. Ivan Johnson, Inc., 7474 Upham Ct., Arvada, CO 80003; (303) 425-5610.

Brazil Gold '91, May 13–17, 1991, Belo Horizonte, Brazil. Information: Organizing Committee, Av. Afonso Pena, 3880-3/5 andares, 30130 Belo Horizonte MG, Brazil, or Charles Thorman, U.S. Geological Survey, Box 25046, MS 905, Denver Federal Center, Denver, CO 80225, (303) 236-5601; fax 303-236-5603.

14th International Radiocarbon Conference, May 20–24, 1991, Tucson, Arizona. Information: Austin Long, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721; (602) 621-8888; fax 602-621-2672, telex 650-3839821.

Geological Association of Canada–Mineralogical Association of Canada Annual Meeting held jointly with the Society of Economic Geologists, May 27–29, 1991, Toronto, Ontario. Information: J. J. Fawcett, Dept. of Geology, Earth Sciences Center, University of

Toronto, 22 Russell St., Toronto, Ontario M5S 3B1, Canada; (416) 978-3027.

***Second International Conference on Industrial and Applied Mathematics (ICIAM 91)**, July 8–12, 1991, Washington, DC. Information: SIAM Conference Coordinator, Dept. CC0990, 3600 University City Science Center, Philadelphia, PA 19104-2688; (215) 382-9800; fax 215-386-7999; E-mail siamconfs@wharton.upenn.edu.

11th International Symposium on Ostracoda, July 8–13, 1991, Warrnambool, Victoria, Australia. Information: Peter J. Jones, Bureau of Mineral Resources, P.O. Box 378, Canberra A.C.T. 2601, Australia; phone (06) 249 9737; fax 06-257 6465.

Sixth International Symposium on the Ordovician System, July 15–19, 1991, Sydney, Australia. Information: Earth Resources Foundation, Edgeworth David Building, University of Sydney, Sydney, N.S.W., Australia, 2006; (02) 692 2038 (Int. 61+2); fax 02- 692 0184 (Int. 61+2).

150th Anniversary Conference on the Permian System, August 1991, Perm, USSR. Information: A.E.M. Nairn, Perm Conference, Earth Sciences & Resources Institute, University of South Carolina, Columbia, SC 29208; (803) 777-6484; fax 803-777-6437; telex 9102501347 USC ESRI UQ.

Sedimentary and Paleolimnological Records of Saline Lakes, August 13–16, 1991, Saskatoon, Saskatchewan. Information: Robin W. Renaut, Dept. of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0, Canada; fax 306-966-8593; W. M. Last, Dept. of Geological Sciences, University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada; fax 204-261-7581.

SEPM Midyear Meeting—Continental Margins, Tectonics, Eustasy and Climate Change, August 15–18, 1991, Portland, Oregon. Information: Sam Boggs, Jr., Dept. of Geology, University of Oregon, Eugene, OR 97403; (503) 686-4573.

1st International Meeting of Young Geologists, August 22–28, 1991, Budapest, Hungary. Information: Anna Balog, Dept. of Geology, Technical University of Budapest, H-1521 Budapest, Hungary; phone (36-1) 16-67-370; fax 36-1-16-66-808; telex 225931.

Third U.S. Conference on Lifeline Earthquake Engineering, August 22–23, 1991, Los Angeles, California. Information: American Society of Civil Engineers, Specialty Conference Dept., 345 E. 47th St., New York, NY 10017; (212) 705-7139.

***International Symposium on Computer Applications in Geoscience**, September 2–6, 1991, Beijing, China. Information: Zhang Bojun, 31 Xue Yuan Rd., Beijing 100083, China; phone 2012233, ext. 312; fax 2024674; telex 222484 GBCC CN.

Geometry of Naturally Deformed Rocks (John Ramsay Meeting), September 9–11, 1991, Zürich, Switzerland. Information: E. Pour, Geologisches Institut, ETH-Zentrum, CH-8092, Zürich, Switzerland; phone 256 36 80; fax 252-70-08. (*Abstracts deadline: June 1, 1991.*)

International Symposium on Fossil Cnidaria Including Archaeocyatha and Porifera, September 9–14, 1991, Münster,
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Germany. Information: Fossil VI. Cnidaria, Pferdegassee 3, D-4400 Münster, Germany.

Gold and Platinum in Central Africa, September 11–13, 1991, Bujumbura, Burundi. Information: W. Pohl, Institute of Geosciences, Technical University, P.O. Box 3329, D–33 Braunschweig, Germany.

Second International Conference on the Abatement of Acidic Drainage, September 16–18, 1991, Montreal, Québec. Information: Pamela Friedrich, Centre des Recherches Minérales, 1665, boulevard Hamel, Édifice 2, 1^{er} étage, Québec G1N 3Y7, Canada.

2nd International Symposium on Environmental Geochemistry, September 16–19, 1991, Uppsala, Sweden. Information: Mats Olsson, Dept. of Forest Soils, Swedish University of Agricultural Sciences, Box 7001, S-750 07 Uppsala, Sweden; phone 46-18-672212; fax 46-18-300831. (*Abstracts deadline: March 28, 1991.*)

Second Hutton Symposium on Granites and Related Rocks, September 23–28, 1991, Canberra, Australia. Information: ACTS, GPO Box 2200, Canberra City, ACT 2601, Australia.

***International Mine Water Association Fourth Congress**, September 25–30, 1991, Ljubljana, Yugoslavia. Information: Miron Veselic, S.P. Geoloski Zavod Ljubljana, Dimiceva 14, 61000 Ljubljana, Yugoslavia; fax 38 61 371 557. (*Abstracts deadline: December 31, 1990.*)

1991 American Association of Petroleum Geologists International Conference and Exhibition, September 29–October 2, 1991, London, England. Information: 1991 AAPG International Conference, P.O. Box 979, Tulsa, OK 74101-0979.

Fifth International Congress on Pacific Neogene Stratigraphy and IGCP 246, October 6–10, 1991, Shizuoka, Japan. Information: V-CPNS-IGCP246 Organizing Committee, Geoscience Institute, Faculty of Science, Shizuoka University, Shizuoka 422, Japan; fax 81-542-37-9895.

International Symposium on Debris Flow and Flood Disaster Protection, October 14–20, 1991, Emeishan City, Sichuan Province, China. Information: Tong Yuling, International Research and Training Centre on Erosion and Sedimentation (IRTCES), P.O. Box 366, Beijing, China 100044; phone 8413372; telex 22786 ITCES CN; fax 8412539.

American Institute of Professional Geologists Annual Meeting, October 16–19, 1991, Gatlinburg, Tennessee. Information: Lawrence I. Benson, ERC/EDGE, P.O. Box 22879, Knoxville, TN 37933-0879; (615) 966-9761; fax 615-966-4155.

International Symposium on Geological Hazards and Prevention, October 20–25, 1991, Beijing, People's Republic of China. Information: Chu Zhanchang, Secretariat, Organizing Committee, International Symposium on Geological Hazards and Prevention, 64, Funei St., Beijing, People's Republic of China; phone 658561-410. (*Abstracts deadline: December 31, 1990.*)

Geological Society of America Annual Meeting, October 21–24, 1991, San Diego, California. Information: GSA, Meetings Dept., P.O. Box 9140, Boulder, CO 80301; (303) 447-2020; fax 303-447-1133.

Brazilian Geophysical Society Second International Congress, October 28–November 1, 1991, Salvador City, Bahia, Brazil. Information: Brazilian Geophysical Society—ABGf, Alberto Brum Novaes, Universidade Federal da Bahia/UFBA-PPPG, Rua Caetano Moura 123, Federação 40.210, Salvador BA, Brasil; phone 55-071-2370408. (*Abstracts deadline: May 31, 1991.*)

5th International Circum-Pacific Terrane Conference, November 11–28, 1991, Santiago, Chile. Information: D. G. Howell, U.S. Geological Survey, MS 902, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 329-5430.

Mining Indonesia '91, December 4–7, 1991, Jakarta, Indonesia. Information: Eileen M. Lavine, Information Services, Inc., 4733 Bethesda Ave., #735, Bethesda, MD 20814; (301) 656-2942; fax 301-656-3179.

1991 Penrose Conferences

Flow and Associated Transport in Basins: Driving Forces, Coupling and Geologic Controls, February 25–March 1, 1991, Napa Valley, California. Information: Stuart Rojstaczer, Dept. of Geology/Old Chemistry Bldg., Duke University, Durham, NC 27706, (919) 648-5847; Patrick A. Domenico, Dept. of Geology, Texas A&M University, College Station, TX 77843, (409) 845-2451 (dept.), (409) 845-0636 (dir.).

Development and Evolution of Foreland Basins, October 6–11, 1991, Oñana, Spain. Information: James H. Meyers, Dept. of Geology, Winona State University, Winona, MN 55987; (507) 457-5266 (dir.), (507) 457-5000 (dept.), fax 507-457-5586; Douglas W. Burbank, Dept. of Geological Sciences, University of Southern California, Los Angeles, CA 90089-0740; Lee J. Suttner, Dept. of Geology, Indiana University, Bloomington, IN 47405; Cai Puigdefabregas, Dept. de Política Territorial, Servei Geològic de Catalunya, Diputació, 92, 5e, 08015 Barcelona, Spain.

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