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What Should My Neighbor Know?

by Allison R. (Pete) Palmer

What should my neighbor know about the geological sciences—or more broadly, about the earth sciences—or more broadly still, about science in general?

Probably all of you have read something about the current crisis in science education. Survey after survey seems to show that the public hasn't learned much about science, despite Sputnik. A major initiative to address the crisis is being developed by the American Association for the Advancement of Science (AAAS). It is called Project 2061, and subtitled Science for All Americans. Its essential theme is that less is better. If you don't know about it, you should. Well-written and stimulating summary reports of the first phase of this project—to assess what the professionals in all areas of science and technology suggest should be the scientific property of all educated citizens—have already been published and are available from the AAAS.

The essence of the present problem with science education has been eloquently stated by K. C. Cole in an outstanding special section on education in the January 7 edition of the *New York Times*. Cole wrote, "What's happening from grade school to grad school is the suffocation of curiosity under an avalanche of fact." This goes on not only at the precollege level, but in a number of our introductory nonmajor courses as well. Cole went on to point out that by eighth grade as many as 2/3 of the students have decided that they don't like science; that more new terms are introduced in a typical high school biology text (we could substitute earth science) than in the first two years of a foreign language; and that teachers feel forced to cover everything because the students (and parents) say, "They have to know it for the Regents or the SAT," and we repeat a lot of the stuff in our introductory college courses. No wonder a lot of the populace is turned off by science. Hardly anybody has told them what part of the avalanche is worth remembering!

Science is the intelligent pursuit of curiosity about the natural world. To quote once more from Cole, "Students who are made to memorize and reproduce facts are practicing an activity that has little in common with meaningful use of scientific knowledge." The AAAS is saying that we should stand back and take a hard look at what we're doing. Maybe less is better. What does every high school graduate *really* need to know about science? At GSA we have translated this into "What should my neighbor know?" Ask yourself this question as you prepare for any class that deals with the future public. Are you focusing on what your neighbor should know, or are you teaching the vocabulary of a science major and hoping those who learn it well will follow careers in science?

So much for the preamble. I'm an optimist. I'm an optimist to believe that it is possible to provide effective and useful science education for *all* Americans. I'm also an optimist to believe we can make a serious dent in the problem of reform of science education in this decade. That's why GSA is developing a major effort in public education at all levels, to be called the SAGE Program. SAGE is an acronym for Science Awareness through Geoscience Education.

This problem of reform is much like the weather. Everybody talks about it, but ... it's easy to talk, and it's hard to act. At this point in time talking is still important; we're still spreading the word that there is a problem! The level of concern about science education (as well as other areas of education) is fast approaching a critical mass. This leads me to the second phrase from this talk (in addition to the title) that I want you to export to your friends and community, "If you think education is expensive, try ignorance." Let me give some examples from our own backyard:

- Ignorance of processes that control the landscape leads people to build summer mansions on barrier beaches or on steep California mountain slopes, and then want a government bailout when the once-a-generation hurricane or landslide carries their house away.
- Ignorance of the limits of resources permits builders to expand cities across the arid West and Southwest with no concern about where the water will come from for lawns and swimming pools, not to mention dishwashers and toilets; or it permits farmers to deplete ground-water reservoirs for irrigation at rates that far exceed the rate of recharge.
- Ignorance of the fragility of the environment permits us, as "free Americans," to drive anywhere, hike anywhere, or build anywhere that we wish.
- Ignorance of the clear evidence for the vastness of geologic time in relation to human history permits vocal minorities to waste the time of the judicial system, and of school boards, and to diminish the quality of school texts, by resisting the teaching that we live in a universe of change—which includes the biosphere.

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Editor's note: Pete Palmer adapted this article from two talks he gave at the GSA North-Central Section 1990 meeting. He will retire from GSA as Coordinator of Education Programs and Centennial Science Program Coordinator at the end of this year.

Your Neighbors continued from p. 277

This is a challenging time to be involved in science education! We also have a heavy responsibility to do it right.

It's challenging, because we have our work cut out for us. Finally, at high government levels worldwide, the perception is dawning that Spaceship Earth has a major medical problem. A cancerous organism is proliferating wildly and threatens to upset the tricky natural balances that keep the spaceship functional. Most of the crew (us) doesn't really even appreciate that we are on a spaceship, or that *we* are the cancerous organism. We don't yet understand the subtle nature of all of the natural balances, and our formal education has given us (the crew) little in the way of clues about how to start the process of understanding. Our education in the sciences, if we have any at all, has been focused on knowing the words for things, and specific ways to twiddle specific dials.

How are we going to get the crew to identify with the spaceship? How are we going to instill in the crew the vital community value of stewardship? How are we going to recognize and deal with those issues we can affect? How do we learn enough so that we can mitigate those natural processes that affect us?

Can we get our act together before it's too late? The opportunity to change the way that we, as human beings, treat our planet falls squarely in the lap of the earth sciences—in the precollege sense of the word—the geological sciences, the ocean sciences, and the atmospheric sciences. We don't do this in a vacuum. Physics, chemistry, biology—all other areas of human intellectual endeavor in and outside of the sciences—must be involved. The earth sciences are the key, because they are the *integrating* sciences, and the problems we face involve integration within immense interrelated systems. The hydrological system, the resource system, the cultural system, and the ecological system are only a few examples.

We have a heavy responsibility to provide effective public science education, because failure to do so has frightening consequences. When my kids were young, we had a marvelous children's book titled *If Everybody Did....* If everybody picked a daisy in the park; if everybody threw a soda can out of the car window, etc., we would soon be out of daisies, and the roadsides would be a mess.

Let's take this into today's world. What if every manufacturer allowed some pollution to creep into the ground water or the atmosphere? What if everyone wanted a house in the country complete with good road access and convenient schools and shopping centers? What if everyone wanted a swimming pool, long showers, and a sprinkler system for the yard and garden? And the tough question: what if everyone wanted to live as well as we live? What would the consequences be? If we are not successful in getting across some basic ideas about the stewardship of Spaceship Earth at a real gut level, we are in trouble.

We live in a universe of change, infinite in its time and space dimensions. This is a fundamental understanding derived from the earth sciences that is not clearly understood even among large segments of the "educated" populace. We also live on a planet with finite, heterogeneously distributed resources; we face a variety of natural hazards that limit our use of the land; and we can only function within a tenuous band of atmosphere and hydrosphere that needs to stay within rather narrow limits of temperature and chemistry for us to survive. We spend our lives on a landscape that has a history. An appreciation of that history and how we learn about it can be an enriching experience and can also affect how we treat it.

Transmitting these basic earth science ideas, and the consequences that accompany this knowledge, are the responsibility of science educators. An example of our lack of success is the asbestos problem. We are spending billions of dollars on what is mostly a nonproblem, because all asbestiform minerals have been lumped in one basket. Until recently, it seems, policy makers had not thought of asking for input from mineralogists. The mineral chrysotile is the dominant asbestiform fiber used worldwide. It is not the "bad" asbestos. Among miners and among the workers in friction materials plants, whose exposure to chrysotile asbestos is many times greater than it is for individuals in an insulated public building, the lifetime risk for workers employed in these industries, breathing air with fiber content at about twice the proposed OSHA standard, is a small fraction of that associated with smoking one cigarette a day! For this we're spending precious millions of dollars? If you think education is expensive, try ignorance!

Let's consider the problem of public education at the university level. Too few research universities (which includes most of the major large-enrollment state universities) care much about the teaching of science to nonmajors. As a consequence, professors get few brownie points for their efforts at teaching these courses; exciting young instructors commit academic suicide by caring about students instead of raising overhead monies on research grants so the dean can run the university; and too often it's the marginal major who is advised to become the school teacher. A good student who is considering a career as a teacher is thought to be a bit strange.

For many of us, I may have just described the other guy. However, too few universities at any level are seriously approaching the question of what the content of science education should be for the 98% of the populace that chooses careers outside of science and, perhaps more importantly, what the content of science education should be for those who will be the future teachers of that 98%.

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GSA in Education

by David A. Stephenson

More on SAGE

As Chairman of GSA's Education Committee, I am pleased to see that SAGE (Science Awareness through Geoscience Education) is now an official GSA program. GSA's mission is "to advance the science of geology, the scientific growth and development of its members, and the application of geology to the wise use of the Earth." Three of the goals within that mission are: (1) public scientific awareness through geological education; (2) a program on geology and public policy; and (3) a program to enhance participation of minorities in geology. SAGE encompasses many of these goals. (SAGE does not replace the three GSA Standing Committees that were formed to meet the three goals listed above. SAGE activities will support programs of the Standing Committees.) SAGE marks a new direction for the Society. Its challenge is to reach the public through the active support and participation from student associates, members, and fellows. It is also a program designed to encourage increasing numbers of students to seek careers in the geosciences.

SAGE will be administered by the Coordinator for Educational Programs (Pete Palmer until he retires, and then by a newly hired staff person). The Coordinator will work with a SAGE Steering Committee that includes: the Chairs of the Education Committee, the Committee on Geology & Public Policy, and the Committee on Minorities and Women in the Geosciences; the GSA Foundation President; the USGS Education Coordinator; and a teacher representative from the GSA Education Committee. The Education Committee chairperson, who also represents the GSA Council, will chair this Steering Committee.

We ask GSA members to learn more about the 15 active and planned projects within SAGE, and to become involved by visiting

the SAGE booth at the Dallas meeting. There will also be a SAGE PAGE inside your registration packet (printed on sage-green paper, of course) that will highlight SAGE activities.

Resource-policy makers are part of the public to be reached via SAGE activities. The GSA Council has just approved a Guide on Developing and Promoting Testimony on Geologically Significant Public Policy Matters. This adoption of guidelines for an advocacy position is sure to generate discussion. In fact, discussion is requested. Both GSA's Committee on Geology and Public Policy and the SAGE program staff have a major interest in your responses.

An Educational Division?

A major activity for the Committee on Education for the coming year (in addition to implementing SAGE) will be exploring the interest in and potentially proposing a new Education Division for GSA. Why a new Division? It would facilitate communication between the various education-oriented members by providing a grass-roots discussion format, provide critical funding to help support GSA's educational programs, give GSA's educational endeavors more visibility, and serve as a vehicle for presentation of awards for outstanding educational service. If you are interested, a petition for signatures will be available at the SAGE booth in Dallas. At least 100 signatures of GSA members are required prior to submitting a proposal to the Committee on Long-Range Planning.

Next month's guest columnist will be Steve Stow—one of the principal authors of the SAGE program, and originator of the SAGE title.

Your Neighbors *continued from p. 278*

Do you teach user-friendly geoscience to the public at every opportunity? What should your neighbor know about the geosciences? The classification of igneous rocks? The nomenclature of landforms? A few dozen mineral and fossil names? The geologic time scale? I don't think so. What *should* your neighbor know? Think about it.

NACSN Officers for 1990

Officers of the North American Commission on Stratigraphic Nomenclature for the 1989–1990 term are: Chairman—Fred W. Chandler, Geological Survey of Canada, Continental Geoscience Division, 601 Booth Street, Ottawa, Ontario K1A 0E8, Canada; Vice-Chairman—Robert R. Jordon, Delaware Geological Survey, University of Delaware, Newark, DE, 19716.

The officers and other commissioners invite comments and questions on the 1983 North American Stratigraphic Code (American Association of Petroleum Geologists Bulletin, v. 67, no. 5, p. 841–875) and any other deliberations of the NACSN.

GSA 50-Year Fellows To Be Honored

GSA annually honors those individuals who have attained their 50th year of membership in the Society. Each of the 50-year members listed below, all of whom are GSA Fellows, will receive a specially designed lapel pin and a certificate of recognition.

This list of 50-year Fellows includes all current members who joined the Society in 1941.

R. Wright Barker
Bellaire, Texas

E. C. Olson
Los Angeles, California

Carleton A. Chapman
Urbana, Illinois

C. F. Stewart Sharpe
Falls Church, Virginia

Christina Lochman-Balk
Socorro, New Mexico

Thomas P. Thayer
St. Petersburg Beach, Florida

George W. H. Norman
British Columbia, Canada



Trustee Huffington Appointed Ambassador

Foundation Trustee Roy M. Huffington has been appointed by President Bush as U.S. Ambassador to Austria. Following confirmation by the Senate Foreign Relations Committee in mid-July, he began his service in Vienna in late August. Huffington succeeded Henry Grunwald, former editor-in-chief of *Time* magazine, in the diplomatic post.

Roy M. Huffington received the Ph.D. degree in geology from Harvard University in 1942 and was later employed as a geologist by Humble Oil and Refining Company. In 1956 he formed Roy M. Huffington, Inc., which grew into a highly successful international exploration and producing company. Its primary assets included a 20% interest in the giant Badak field and other gas fields in Indonesia. In April 1990 the company was sold to Chinese Petroleum Corporation, the Taiwan national oil company.

The new ambassadorship is a culmination of Roy Huffington's many civic works over the years. In addition to his membership on the GSA Foundation Board, he has been a leader in many public service groups in the United States and worldwide. Most notably he has served as Chairman of the Asia Society and has been a trustee of several universities and medical organizations.

As a consequence of this move into government service, Huffington has resigned from the Foundation's Board of Trustees. GSA President Ray Price and GSA Foundation Chairman Phil LaMoreaux both expressed regret at Roy Huffington's resignation, but, on behalf of GSA, extended congratulations and gratitude for his leadership and support of GSA and geology.

Frye Fund Grows Rapidly

The announcement that an Environmental Geology Award has been established in memory of former GSA Executive Director and Illinois State Survey Director John C. Frye (see July *GSA News & Information*) has brought about a surge of interest in the John C. Frye Memorial Fund. Led by contributions from Foundation Trustees Peter Flawn and William Heroy and Frye's Illinois Survey successor Jack Simon, the Frye Fund has increased 46% during 1990, to a balance of \$12,000.

The Environmental Geology Award for the best paper on the subject published each year by either GSA or one of the state

geological surveys will be given to a geoscientist by the American Association of State Geologists. The Fund's rapid growth can be attributed to the high esteem in which John Frye was held by fellow scientists and the importance geologists are attaching to the field of environmental geology.

Contributions to the Frye Fund are still being accepted by the Foundation.

Donors to the Foundation in July

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October 1990



The Geological Society of America

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GSA Grants Support Research

by June Forstrom

Research Grants Administrator

General Grants

The purpose of the general research grants program is to provide partial support of master's and doctoral thesis research for graduate students at universities in the United States, Canada, Mexico, and Central America. Applicants need not be members of GSA.

To apply for one of these grants, you must fill out an application form, available from GSA Campus Representatives, from geology departments in the United States and Canada, or from GSA headquarters (Research Grants Administrator, Geological Society of America, P.O. Box 9140, Boulder, CO 80301). Evaluations from two faculty members are required for master's and doctoral candidates. The deadline for applications for the 1991 research grants program is February 15, 1991. Applications must be submitted on 1991 forms. The GSA Committee on Research Grants evaluates all applications and at its early spring meeting at GSA headquarters chooses those to be funded. Grants are awarded in April. In 1990 244 grants were awarded. Grants ranged from \$100 to \$1520; the average amount awarded was \$787.

Specialized Grants

The Robert K. Fahnestock Award is a grant given to the applicant with the best proposal in sediment transport or related aspects of fluvial geomorphology.

The Harold T. Stearns Fellowship Award is earmarked for research on aspects of the geology of the Pacific islands and the circum-Pacific region.

The John T. Dillon Alaska Research Award is to support scientific research that addresses earth science problems particular to Alaska. Special consideration may be given to students whose proposals are (1) field-based studies dealing with the structural and tectonic development of Alaska and (2) studies that include some aspect of geochronology (either paleontologic or radiometric) to provide new age control for significant rock units in Alaska. Candidates with other Alaskan earth-science research objectives will also be considered. Awardees are selected by the Committee on Research Grants from applicants to the general research grants program. Applicants must be master's or doctoral candidates. Applications for this grant are available from GSA headquarters (address under General Grants) and for 1991 must be submitted by February 15, 1991.

Division Grants

The Coal Geology Division of GSA and the Symposium on the Geology of Rocky Mountain Coal jointly sponsor scholarships for research on coal in the Rocky Mountain and northern Great Plains coal provinces. Applicants must be master's or doctoral candidates doing research on coal in Arizona, Alberta, British Columbia, Colorado, Idaho, Montana, New Mexico, North Dakota, Saskatchewan, South Dakota, Utah, or Wyoming. However, the college or university where applicants are doing the work need not be in those states or provinces. Applications for Rocky Mountain Coal Scholarships can be obtained from GSA (address under General Grants) or from Gary B. Glass, c/o Geological Survey of Wyoming, Box 3008, University Station, Laramie, WY 82071. The deadline for 1991 applications is February 1, 1991.

The Coal Geology Division Antoinette Lierman Medlin Scholarship Award is awarded annually to the full-time graduate or undergraduate student who submits the best proposal of a research project in the field of coal geology. Detailed guidelines are available from the chairman of the Coal Geology Division Awards Committee: Robert B. Finkelman, U.S. Geological Survey, 956 National Center, Reston, VA 22092. The deadline for 1991 applications is February 15, 1991.

The Engineering Geology Division supports an annual grant for research in engineering geology through the GSA Research Grants Program.

The Geophysics Division awards the Allan V. Cox Student Research Award for outstanding student research. This grant is awarded annually to an applicant for the general GSA research grants who is working in the field of geophysics. Applicants must be master's or doctoral candidates. Applications for this grant are available from GSA headquarters (address under General Grants) and for 1991 must be submitted by February 15, 1991.

The Hydrogeology Division Graduate Research Grant is awarded annually to an applicant for the general GSA research grants who is working in the field of hydrogeology. Applicants must be master's or doctoral candidates. Applications for this grant are available from GSA headquarters (address under General Grants) and for 1991 must be submitted by February 15, 1991.

GSA's Quaternary Geology and Geomorphology Division established its J. Hoover Mackin Research Grants in 1974 to support graduate student research on Quaternary geology or geomorphology. Applications for this grant are available from the secretary of the division, Deborah R. Harden, Dept. of Geology, San Jose State University, San Jose, CA 95192-0102. The deadline for applications for 1991 is February 15, 1991. Grant awardees are announced in April.

The Sedimentary Geology Division Grant is awarded annually to an applicant for the general GSA research grants who is working in the field of sedimentary geology and stratigraphy. Applicants must be master's or doctoral candidates. Applications for this grant are available from GSA headquarters (address under General Grants) and for 1991 must be submitted by February 15, 1991.

The Structural Geology and Tectonics Division Grant is awarded annually to an outstanding student applicant for the general GSA research grants who is working on structural geology or tectonics. Applicants must be master's or doctoral candidates. Applications for this grant are available from GSA headquarters (address under General Grants) and for 1991 must be submitted by February 15, 1991.

Four GSA divisions—Archaeological Geology, History of Geology, International, and Planetary Geology—do not currently award grants for student research.

Section Grants

Recipients for research grants from the North-Central Section are selected from applicants to the general research grants program. Eligibility is restricted to graduate students attending a college or university within the geographic area of the North-Central Section. Applications are available from GSA

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Grants Support *continued from p. 283*

headquarters (address under General Grants). Deadline for 1991 applications is *February 15, 1991*.

The South-Central Section awards grants to students attending a college or university in the South-Central Section geographic area. Graduate student recipients are selected from applicants for the general research grants program (applications available from GSA headquarters (address under General Grants). Deadline for 1991 applications is *February 15, 1991*. Applications for undergraduate student grants are available from Rena M. Bonem, Department of Geology, Baylor University, Waco, TX 76798. Undergraduate student recipients are selected by the

Management Board of the South-Central Section. The deadline for undergraduate student applications is *October 15, 1991*; the grants will be awarded in late December.

The Southeastern Section awards grants for graduate and undergraduate research to GSA Student Associates who are attending colleges and universities within the geographical boundaries of the Southeastern Section. Application forms can be obtained from the Southeastern Section secretary, Michael J. Neilson, Department of Geology, University of Alabama, Birmingham, AL 35294. The deadline for 1991 applications is *March 1, 1991*. The grants will be awarded in late April.

Award Winners for 1990

The 1990 award winners announced by the Council at its May 1990 meeting are as follows:

Archaeological Geology Division Award

David M. Hopkins
Department of Geology and Geophysics
University of Alaska
Fairbanks, Alaska 99709

Gilbert H. Cady Award (Coal Geology Division)

For 1990, no award to be given

E. B. Burwell, Jr. Award (Engineering Geology Division)

Perry H. Rahn
Department of Geology and Geological Engineering
South Dakota School of Mines and Technology
Rapid City, South Dakota 57701-3995

George P. Woollard Award (Geophysics Division)

Jack E. Oliver
Department of Geological Sciences
Snee Hall
Cornell University
Ithaca, New York 14853

History of Geology Division Award

Gordon Y. Craig
James Hutton Professor (Emeritus)
University of Edinburgh
W. Mains Road
Edinburgh EH9 3JW, Scotland

O. E. Meinzer Award (Hydrogeology Division)

John D. Hem
U.S. Geological Survey
Office of Regional Hydrology
345 Middlefield Road, MS-472
Menlo Park, California 94025

G. K. Gilbert Award (Planetary Geology Division)

Harold Masursky (posthumously)
U.S. Geological Survey
2255 North Gemini Drive
Flagstaff, Arizona 86001

Kirk Bryan Award (Quaternary Geology and Geomorphology Division)

Arthur S. Dyke
Geological Survey of Canada
601 Booth Street
Ottawa, Ontario, Canada K1A 0E8

Victor K. Prest
Geological Survey of Canada
601 Booth Street
Ottawa, Ontario, Canada K1A 0E8

Structural Geology and Tectonics Division Career Contribution Award

John Graham Ramsay
Geologisches Institut
ETH-Zentrum
Sonneggstrasse 5
Zurich Ch 8092, Switzerland

PEOPLE

GSA Member **Lincoln S. Hollister**, Princeton University, received the Past Presidents' Medal of the Mineralogical Association of Canada.

GSA Fellow **Gordon P. Eaton**, Iowa State University, was named director of Columbia University's Lamont-Doherty Geological Observatory, beginning November 1, 1990.

IN MEMORIAM

Hugh N. Frenzel
Midland, Texas
January 1, 1990

Guillermo P. Salas
Mexico City, Mexico
June 29, 1990

Seymour O. Schlanger
Evanston, Illinois
July 1, 1990

Harold Masursky
Flagstaff, Arizona
August 24, 1990

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

Preliminary Announcement and Call for Papers
ROCKY MOUNTAIN (44th) and SOUTH-CENTRAL (25th) SECTIONS, GSA,
Annual Meeting
Albuquerque, New Mexico
April 21–24, 1991

The Rocky Mountain and South-Central Sections of the Geological Society of America, the Rocky Mountain Section of the Paleontological Society of America, and the New Mexico Geological Society will meet jointly in Albuquerque, New Mexico. The meeting is sponsored by the University of New Mexico Department of Geology and Institute of Meteoritics, assisted by the New Mexico Bureau of Mines and Mineral Resources, and the University of Texas at El Paso Department of Geological Sciences.

ENVIRONMENT

With scenery that is a veritable textbook of geology, New Mexico has from early days attracted pioneer geologists like Jules Marcou, J. S. Newberry, F. V. Hayden, Benjamin Silliman, Jr., J. W. Powell, G. K. Gilbert, Clarence Dutton, Waldemar Lindgren, N. L. Darton, Kirk Bryan, and E. H. Colbert. Pre-Columbian native Americans digging for turquoise and Spanish conquistadors seeking the gold of Cibola were forerunners of geologists who made New Mexico a leading producer of oil and gas, coal, uranium, copper, molybdenum, gold, silver, and potash. Albuquerque lies near the intersection of four major geologic provinces. To the west and northwest is the Colorado Plateau–San Juan basin region. Precambrian-cored foreland uplifts of the Nacimiento and southern Sangre de Cristo–Taos ranges are exposed to the north. Features related to the Cenozoic Rio Grande Rift continue southward from south-central Colorado through New Mexico. East of the Sandia Mountains and behind Albuquerque is the Great Plains province.

CALL FOR PAPERS

Papers are invited for technical sessions, symposia, and poster presentations. The technical sessions will provide 15 minutes for presentation and 5 minutes for discussion. Symposia conveners may assign more time to invited key speakers. Papers of regional interest to geologists in the Rocky Mountain and South-Central areas as well as papers of general interest will be considered for the program. Poster presentations are encouraged. Please note that abstracts for symposia should be submitted directly to the appropriate convener.

REGISTRATION

Preregistration will be by mail. Forms will accompany the Final Announcement in the January 1991 issue of *GSA News & Information*. On-site registration will take place on Sunday, April 21, 1991, from 3:00 to 8:00 p.m. and will continue daily from 7:45 a.m. to 5:00 p.m. through Wednesday, April 24. For lower registration fees and to assist the local committee in planning, please PREREGISTER BY MARCH 15, 1991.

FIELD TRIPS

Both premeeting and postmeeting field trips will be offered. Unless otherwise noted, all field trips begin and end in Albuquerque, a well-serviced, regional air-travel center. For details about particular field trips, contact the field trip leaders listed, or Gary A. Smith, Field Trip Coordinator, Department of Geology, University of New Mexico, Albuquerque, NM 87131, (505) 277-2348; Betsy Julian, Department of Geological Sciences University of Texas, El Paso, TX, (915) 747-5503.

Premeeting

1. **Modern Rifts and Anorogenic Magmatism** (3 days). Elizabeth Anthony, Department of Geological Sciences, University of Texas, El Paso, TX 79968-0555, (915) 747-5501; Calvin Barnes, Texas Tech University; Jerry Hoffer, Randy Keller, Kathleen Marsaglia, and Virginia McLemore, University of Texas at El Paso. Begins in El Paso and ends in Albuquerque.
2. **Open System Magmatic Evolution of the Summer Coon and Del Norte Volcanoes, Conejos Formation, San Juan Mountains, Colorado** (1-1/2 days). Don J. Parker, Department of Geology, Baylor University, Waco, TX 79798-7354, (817) 755-2361; D. Anne Grau, Baylor University.
3. **Geomorphic and Tectonic Evolution Along the Margin of the Colorado Plateau and Rio Grande Rift, North-Central New Mexico** (2 days). Mark Gonzalez, Department of Geology, University of New Mexico, Albuquerque, NM 87131, (505) 277-4204; David P. Dethier, Williams College.
4. **Stratigraphy and Correlation of Triassic Strata, Colorado Plateau to High Plains** (1 day). Spencer G. Lucas, New Mexico Museum of Natural History, P.O. Box 7010, Albuquerque, NM 87104, (505) 841-8837; Adrian Hunt, New Mexico Museum of Natural History.
5. **Tectonics, Intrusive Rocks, and Mineralization of the Ortiz Porphyry Belt** (2 days). Stephen R. Maynard, Lac Minerals, P.O. Box 21390, Reno, NV 89515, (702) 356-8058; Lee A. Woodward, University of New Mexico.
6. **Proterozoic Tectonic History of the Manzano Mountains, Central New Mexico** (2 days). Amy Thompson, Department of Geology, University of New Mexico, Albuquerque, NM (505) 277-2502; Jeffrey Grambling, University of New Mexico.
7. **Educational Geology of the Albuquerque, New Mexico Area** (1 day, April 21). Rachel Cowan, Leader. *Open to school teachers only, grades K-12*. Organizer: Douglas C. Brookins, University of New Mexico, (505) 277-2310 or 277-4204.

During Meeting

8. **Pennsylvanian Paleogeology of the Kinney Brick Quarry, Manzanita Mountains, New Mexico** (1/2 day). Spencer G. Lucas, New Mexico Museum of Natural History, P.O. Box 7010, Albuquerque, NM 87194, (505) 841-8837; John Lorenz, Sandia National Laboratory.

Postmeeting

9. **A Tale of Two Volcaniclastic Aprons: Espinazo Formation (Oligocene) and Peralta Tuff (Miocene), North-Central New Mexico** (2 days). Gary A. Smith, Department of

ROCKY MOUNTAIN/SOUTH-CENTRAL *continued on p. 287*

- Geology, University of New Mexico, Albuquerque, NM 87131, (505) 277-2348.
10. **Geology of the Valles Caldera and Jemez Volcanic Field** (1 day). Jamie Garner, Los Alamos National Laboratory, ESS-1, MS D462, Los Alamos, NM 87545, (505) 667-1799; Fraser Goff, Los Alamos National Laboratory.
 11. **Quaternary Landscape Evolution: A Transect Across the Colorado Plateau, Rio Grande Rift, and Great Plains** (3 days). Stephen G. Wells, Department of Geology, University of New Mexico, Albuquerque, NM 87131, (505) 277-4204; Charles Harrington, Los Alamos National Laboratory; David Love, New Mexico Bureau of Mines and Mineral Resources; Roger Y. Anderson, University of New Mexico.
 12. **Cenozoic Magmatism and Tectonics of the Southeastern Colorado Plateau, New Mexico** (3 days). W. Scott Baldrige, Los Alamos National Laboratory, ESS-1, MS D462, Los Alamos, NM 87545, (505) 667-4338; Frank V. Perry, Los Alamos National Laboratory and University of New Mexico; A. William Laughlin, Los Alamos National Laboratory.
 13. **Morrowan-Atokan Relations, Type Derry Region, Southern New Mexico and Western Texas** (2 days). Walt Manger, Department of Geology, University of Arkansas, Fayetteville, AR 72701, (501) 575-3355; W. W. Clopine, David Kaiser, and Patrick K. Sutherland, University of Oklahoma. Begins in Albuquerque and ends in El Paso.

SYMPOSIA

The following symposia are planned for the Albuquerque meeting. Please note that abstracts for symposia should be submitted directly to individual conveners.

1. **Gold Deposits of the New Mexico Alkali Porphyry Belt.** Lee A. Woodward. Send abstracts to Lee A. Woodward, Department of Geology, University of New Mexico, Albuquerque, NM 87131.
2. **Volcanic Centers as Targets for Mineral Exploration.** Wolfgang E. Elston and Geoffrey S. Plumlee. Send abstracts to Geoffrey Plumlee, U.S. Geological Survey, MS 973, Box 25046, Federal Center, Denver, CO 80225.
3. **Geology and Paleontology of the Kinney Brick Quarry, Late Pennsylvanian, Central New Mexico.** (Sponsored by the Rocky Mountain Section of the Paleontological Society) Spencer Lucas and Robyn Burnham. Send abstracts to Spencer Lucas, New Mexico Museum of Natural History, P.O. Box 7010, Albuquerque, NM 87104.
4. **Source Region of Magmas in the Rio Grande Rift: Evolution from the Mid-Tertiary to the Present.** Libby Anthony and Nancy MacMillan. Send abstracts to Libby Anthony, Department of Geological Sciences, University of Texas, El Paso, TX 79968.
5. **Early, Middle, and Late Proterozoic Tectonic Evolution of Southwestern North America.** Jeffrey A. Grambling. Send abstracts to Jeffrey A. Grambling, Department of Geology, University of New Mexico, Albuquerque, NM 87131.
6. **Genesis and Mineralogy of Pegmatites in the Central and Southern Rocky Mountains.** William B. Simmons and Gene Ford. Send abstracts to Wm. B. (Skip) Simmons, Department of Geology, University of New Orleans, New Orleans, LA 70148.
7. **Basins of the Rio Grande Rift: Structure and Stratigraphy.** John Hawley and Randy Keller. Send abstracts to John Hawley, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801.

8. **The Laramide Orogeny in Southwestern North America.** Betsy Julian and Timothy Lawton. Send abstracts to Betsy Julian, Department of Geological Sciences, University of Texas, El Paso, TX 79968.
9. **Hydrogeology and Geochemistry of Waste Disposal and Contaminant Migration in Arid Lands.** Michael Campana, Douglas Brookins, and Carol L. Stein. Send abstracts to Michael Campana, Department of Geology, University of New Mexico, Albuquerque, NM 87131.
10. **Paleozoic Magmatism in Southwestern North America.** Virginia McLemore and M. C. Gilbert. Send abstracts to Virginia McLemore, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM 87801.
11. **Time Framework and Geologic History of the Carboniferous.** (Sponsored by the Midcontinent Section of the Paleontological Society.) Walter L. Manger. Send abstracts to Walter L. Manger, Department of Geology, University of Arkansas, Fayetteville, AR 72701.
12. **Geoscience Education in Public Schools.** Doug Brookins and Monte Wilson. Send abstracts to Doug Brookins, Department of Geology, University of New Mexico, Albuquerque, NM 87131.
13. **The Geology of New Mexico.** This is a special full-day symposium sponsored by the New Mexico Geological Society. Conveners are David W. Love, Bill Chavez, and Neil Whitehead III. Send abstracts to David Love, NMGS, Campus Station, Socorro, NM 87801.
14. **Plate Margin and Foreland Deformation: The Ouachita Orogeny and Ancestral Rocky Mountains.** Kent Nielsen and Kristian Soegaard. Send abstracts to Kent Nielsen, Programs in Geosciences, University of Texas at Dallas, Richardson, TX, 75083-0688.
15. **Pennsylvanian and Wolfcampian Cyclic Sedimentation in the Ancestral Rocky Mountains and Ouachita-Marathon Foreland.** Gary Smith and Thomas Yancey. Send abstracts to Gary A. Smith, Geology, University of New Mexico, Albuquerque, NM, 87131.

ABSTRACTS

Abstracts are limited to 250 words and must be submitted camera-ready on the official 1991 GSA abstracts form, available from Abstracts Coordinator, Geological Society of America, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020.

Send one original and five copies of abstracts to be considered for technical sessions and poster sessions to: Michael Campana or Lee A. Woodward, GSA Technical Program Co-Chairs, Department of Geology, University of New Mexico, Albuquerque, NM 87131, (505) 277-3269 (Campana), 277-5309 (Woodward); Kathleen Marsaglia, Department of Geological Sciences, University of Texas, El Paso, TX 79968, (915) 747-5968.

Abstracts deadline: December 20, 1990

PROJECTION EQUIPMENT

Projection equipment will be provided for 2" x 2" slides and a standard 35 mm carousel tray. Please bring your own carousel tray if possible. Two projectors and two screens will be provided for each session.

EXHIBITS

Exhibits representing education, research, and industry will be displayed at the meeting site. For further information,

ROCKY MOUNTAIN/SOUTH-CENTRAL *continued on p. 288*

contact: Crayton J. Yapp, Exhibits Coordinator, Department of Geology, University of New Mexico, Albuquerque, NM 87131, (505) 277-2000.

STUDENT SUPPORT

The GSA Rocky Mountain and South-Central sections have funds available for grants to GSA Student Associates who are contributing to the meeting. Students are encouraged to apply for these grants. Most students who qualify will be funded to some degree. Send applications to either the Rocky Mountain Section Secretary or the South-Central Section Secretary: Kenneth E. Kolm, Rocky Mountain Section Secretary, Department of Geology and Geological Sciences, Colorado School of Mines, Golden, CO 80401, (303) 273-3651; Rena M. Bonem, South-Central Section Secretary, Department of Geology, Baylor University, Waco, TX 76798, (817) 755-2361.

Application letters must be sent by *March 1, 1991*. Letters should include certification that the student is a GSA Student Associate in either the Rocky Mountain or South-Central Section and is presenting a paper or poster at the Albuquerque meeting.

SPECIAL EVENTS AND ACTIVITIES

Everyone is invited to socialize at Sunday evening's get acquainted or reacquainted party. Tuesday evening features a

New Mexican feast combined with full admittance to the New Mexico Museum of Natural History. Tickets are available by advance registration. Guest program activities include bus tours of the Jemez Mountains-Santa Fe and the Sandia Mountains. Albuquerque is a rapidly expanding southwestern city which still clings to a strong Hispanic and Native American heritage. The mid-April climate is generally mild and clear. Several golf courses are located near the meeting headquarters. At the headquarters, you can play tennis, swim, or relax in the sauna or jacuzzi. Albuquerque's Old Town, with numerous restaurants, art galleries, and shops, is less than 3 km away and easy to reach by trolley bus.

DETAILED INFORMATION

Information concerning registration, accommodations, and activities will appear in a future issue of *GSA News & Information* and as a part of *Abstracts with Programs* for 1991. Requests for additional information or suggestions should be addressed to the General Co-Chairs: John W. Geissman, Wolfgang E. Elston, Department of Geology, University of New Mexico, Albuquerque, NM 87131, (505) 277-3433 (Geissman), 277-5339 (Elston), fax 505-277-8843; G. Randy Keller, Department of Geological Sciences, University of Texas, El Paso, TX, 915-747-5501, fax (915) 747-5111.

Penrose Conference on Flow and Associated Transport in Basins

A GSA Penrose Conference "Flow and Associated Transport in Basins: Driving Forces, Coupling, and Geologic Controls" will be held February 25-March 1, 1991, in the Napa Valley, California, area. Conveners are Stuart Rojstaczer, Dept. of Geology, Old Chemistry Bldg., Duke University, Durham, NC 27706, (919) 684-5843 (direct), (919) 684-5847 (dept.); Kenneth Belitz, Dept. of Earth Sciences, Dartmouth College, Hanover, NH 03755; John D. Bredehoeft, USGS, 345 Middlefield Road, Menlo Park, CA 94025; Patrick A. Domenico, Dept. of Geology, Texas A&M University, College Station, TX 77843, (409) 845-0636; Victor V. Palciauskas, Chevron Oil Field Research, P.O. Box 446, La Habra, CA 90631.

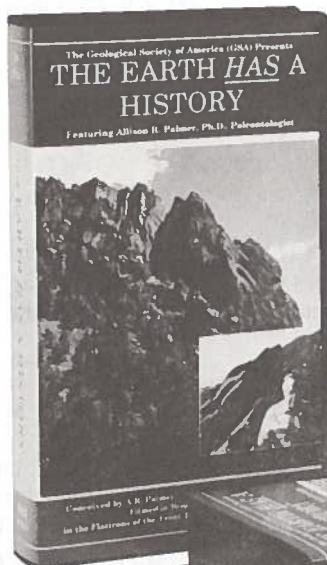
There has been an increasing awareness of the importance of basin-scale subsurface flow and transport in a number of geologic processes. Both theoretical and site-specific studies indicate that the direction and rate of regional flow can be a critical control on such geologic problems as the occurrence of ore deposits, petroleum reservoirs, and large-scale fracturing and faulting. The extent that basin-scale flow influences these processes depends upon a number of common elements such as: (1) the magnitude and variability (both spatial and temporal) of permeability within the basin; (2) the magnitude of topographic driving forces; (3) the rate and magnitude of sedimentation and erosion; (4) the presence or absence of fluid and heat sources. The objective of this conference is to bring together scientists from a number of disciplines to discuss what is known or can be inferred about the driving forces and controls on basin-scale transport.

The emphasis of this conference is on basin-scale flow and its influence on geologic processes in the shallow crust. We are

interested in research that explores the coupling between fluid flow and its driving forces such as deformation and heat. Most of the research on flow and transport at the regional scale has only recently been concerned with coupling between fluid flow and its driving forces. In addition, research on geologic controls on flow and transport at the regional scale and over geologic time is only just beginning. Previous conferences on crustal fluids have focused primarily on petrologic and geochemical evidence for the presence and movement of fluids deep in the crust. The conference will provide a forum for the exchange of current information and exciting ideas concerning topics that are germane to a broad suite of problems involving basin-scale flow and transport.

The organizers are attempting to bring together a diverse group of earth scientists who are united by their interest in low-temperature, upper crustal processes in which basin-scale fluid flow plays a role. These scientists include hydrogeologists, sedimentary petrologists, geophysicists, and petroleum and ore geologists. We intend to utilize the diversity of the attendee's backgrounds by asking that they focus on the implications of their findings on the nature of the driving forces and geologic controls on basin-scale flow and transport.

Prospective participants should send a letter of application stating the relevance of their research to the conference to Stuart Rojstaczer or Patrick Domenico. **THE DEADLINE FOR APPLICATIONS IS NOVEMBER 16, 1990.** The conference fee, which is not yet determined, will include registration, food, lodging, and the field trip. Limited support will be available for qualified graduate students.



“... an excellent resource for introducing the concept of geologic time; an opportunity for a super field trip without the hassle.”

Betty Wade Jones, Presidential Award Winning Earth Science Teacher, Clements Jr. High, Prince George, Virginia

THE EARTH HAS A HISTORY

GSA Educational Video/Film Series 1 • 1989

In this study-module, A.R. Palmer demonstrates the simple principles that form the basis for understanding geologic time, literally “walking the viewer through time” in the colorful Flatirons area of the Rocky Mountain Front Range near Boulder, Colorado. Geologic time—or “deep time”—and the changes to the Earth’s surface over time are mind-boggling ideas, beyond the human scale of perception and thus difficult for students to comprehend. Yet, understanding these ideas is essential to an education in the sciences, and *should* be part of the curriculum of *all* students.

Educators can now help their students grasp these ideas in one class period with this 20-minute presentation, and give them a powerful and lasting perception of deep time and an introduction to the processes at work in our ever-changing Earth.

Recommended as an opening module for the geology section of earth science courses or for a biology section on the record of life on Earth.

Best for grades 7 and above. Available in VHS and PAL video or 16mm film.

(Specify VHS or PAL when ordering.)

EVS001VHS or PAL cassette (1/2”), 20 min., **\$25.00**

EFS001, 16mm film, 20 min., **\$200.00**

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The Geological Society of America

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Preliminary Announcement and Call for Papers
NORTH-CENTRAL SECTION, GSA
25th Annual Meeting
Toledo, Ohio
April 18–19, 1991

The North-Central Section of the Geological Society of America will meet at the University of Toledo SeaGate Centre. The meeting will be hosted by the Department of Geology at the University of Toledo. Several associated societies will be meeting in conjunction with the GSA North-Central Section: the North-Central Section of the Paleontological Society, the Great Lakes Section of SEPM, and the East Central Section of the National Association of Geology Teachers.

CALL FOR PAPERS

Technical sessions will include all topics listed on the GSA abstracts form. Papers, poster sessions, and symposia on these and other subject areas (including symposia listed below) are solicited. Special sessions focused on specific themes or subjects will be arranged by the local program committee after review of the abstracts. The time allotted for the oral presentations will be 15 minutes followed by 5 minutes for discussion.

There will be a special symposium of interest to many, involving consultants' and industries' innovative approaches to solving environmental problems. This session is especially organized so students can be exposed to various methodologies and technologies utilized in hydrogeological, geophysical, and engineering geological investigations.

To further GSA's focus on geoscience education, a special symposium is planned on resources available to geoscience teachers, with special emphasis on state geological surveys and museums. Elementary, junior high, high school, junior college, and college and university teachers of earth science or general science are encouraged to attend.

REGISTRATION

Preregistration will be by mail. On-site registration will take place on Wednesday, April 17, from 6 to 9 p.m. at the Sheraton Westgate Hotel. Thereafter, registration will continue daily at the UT SeaGate Centre from 7:30 a.m. to 5:30 p.m. for the duration of the meeting. Preregistration fees will be \$40 for professional GSA members or members of associated societies and \$10 for GSA Student Associates. For those not affiliated with GSA, preregistration fees will be \$45 for professionals and \$15 for students. On-site registration will be \$5 more for professionals and students. Please take advantage of the lower preregistration fees.

Preregistration deadline: March 31, 1991.

SYMPOSIA

The following symposia have been organized. Authors are encouraged to contact the individual symposia organizers for information.

1. **The Geology of Radon.** James A. Harrell, University of Toledo; Michael C. Hansen, Geological Survey, Ohio Department of Natural Resources.
2. **Quaternary Paleoecology of the Lower Great Lakes.** Barry Miller, Kent State University.
3. **Tectonics of the Northern Cincinnati Arch Area.** Stuart L. Dean, University of Toledo; Byron R. Kulander, Wright State University.
4. **State Geological Surveys and Natural History Museums—A Resource for the Earth Science Teacher (East-Central Section, National Association of Geology Teachers).** Mark J.

Camp, University of Toledo; Charles E. Mason, Morehead State University.

5. **Late Quaternary Time Classification in the Great Lakes Region.** Paul F. Karrow, University of Waterloo.
6. **Consultants' Innovative Applications in Geophysical/Hydrogeological/Engineering Geological Techniques in Environmental Investigations.** Lon C. Ruedisili, University of Toledo; Kevin Wolka, Geraghty-Miller Consultants.
7. **Silurian Systems of Cratonic North America (Great Lakes Section, SEPM).** Bruce H. Wilkinson, University of Michigan.
8. **The Biological Underpinning of Global Diversity Trends (North-Central Section, Paleontological Society).** Arnold Miller, University of Cincinnati.
9. **Scientific Drilling and Geophysical Investigation in the Mid-Continent.** Jeffrey Daniels, Ohio State University.
10. **Utilization of High-Sulfur Coals of the Eastern United States.** William A. Kneller, University of Toledo.

FIELD TRIPS

Field Trip Coordinator is V. Max Brown, (419) 537-4571.

1. **Kellys Island, Ohio: Subglacial and Shoreline Erosion Features, Carbonate Petrology and Paleontology.** R. Scott Snow, Department of Geology, Ball State University, Muncie, IN 47301; Thomas V. Lowell, Department of Geology, University of Cincinnati, Cincinnati, OH 45221; Robin Frank Rupp, Bloomington, Indiana.
2. **Joint Patterns and Geomorphological Features of Northern Ohio.** Stuart L. Dean, Department of Geology, University of Toledo; Byron R. Kulander, Department of Geological Sciences, Wright State University, Dayton, OH 45435; Jane L. Forsyth, Department of Geology, Bowling Green State University, Bowling Green, OH 43403; Ronald M. Tipton, France Stone Co., Sylvania, OH 43560.
3. **Middle Devonian Silica Shale of Northwest Ohio.** Craig B. Hatfield and Mark J. Camp, Department of Geology, University of Toledo, Toledo, OH 43606.
4. **Slumps, Slides, Mud Diapirs, and Associated Fracturing in Mississippian Delta Deposits, Berea Sandstone, Cleveland, Ohio.** Neal A. Wells, Alan H. Coogan, and Judy J. Majoras, Department of Geology, Kent State University, Kent, OH 44242.

POSTER SESSIONS

We strongly encourage student and professional members to take advantage of this highly effective means of communication. Please indicate "poster session" on the GSA abstracts form. Each poster booth will provide three 4' x 4' boards arranged at table height. Poster sessions will be scheduled adjacent to the exhibits and will be available for viewing for one-half day.

NORTH-CENTRAL SECTION *continued on p. 291*

ABSTRACTS

Abstracts must be submitted camera-ready on official 1991 GSA abstracts forms in accordance with instructions on the forms. Abstracts forms are available from:

Abstracts Coordinator
Geological Society of America
P.O. Box 9140
Boulder, CO 80301
(303) 447-8850

and from the GSA Campus Representatives at most college and university campuses.

Abstracts deadline: December 12, 1990

Send one original and five copies to:
Donald J. Stierman
Program and Abstracts Coordinator
Department of Geology
University of Toledo
Toledo, OH 43606
(419) 537-2046

All abstracts will be reviewed for informative content, correct structure, reliability of data, appropriate geographic coverage, and originality. Authors will be notified of acceptance well in advance of the meeting.

STUDENT PAPERS AND TRAVEL ASSISTANCE

The North-Central Section of GSA will award \$100 for each of the four best papers written and presented solely by graduate or undergraduate students. Abstracts submitted for these awards must be clearly indicated. In addition, awards for travel assistance will be made to students who are members of the GSA North-Central Section as of January 1, 1991. To receive a travel grant, the student must present a paper (oral or poster) at the meeting (can be a co-author). Applications for awards may be obtained by writing to the General Chairman. Applications must be submitted by *February 7, 1991*.

PROJECTION EQUIPMENT

One standard 35 mm carousel projector will be provided for 2" x 2" slides only in each meeting room. Please bring your own loaded carousel trays identified with your name, session, and speaker number. A speaker ready room equipped with projectors will be available for review and practice.

BUSINESS MEETING

The GSA North-Central Section Management Board will hold its business meeting with breakfast at the UT SeaGate Centre, Room 310, on April 18, 1991, at 7 a.m.

EXHIBITS

Exhibits of educational and commercial organizations will be on display at SeaGate Centre in proximity to the area for poster sessions. Exhibit space must be reserved by *February 1, 1991*. For further information, contact:

James A. Harrell
Exhibits Chairman
Department of Geology
University of Toledo
Toledo, OH 43606
(419) 537-2193

SOCIAL EVENTS

A reception will be held on the evening of Wednesday, April 17, 1991, at the Sheraton Westgate Hotel from 7:00 to 9:00 p.m. On Thursday evening the annual banquet of the North-Central Section will be held at 7:00 p.m. in SeaGate Centre.

The Society of Economic Paleontologists and Mineralogists will hold a luncheon on Thursday, April 18, and the Paleontological Society will hold a luncheon on Friday, April 19. The National Association of Geology Teachers and NCGSA Education Committee will hold a joint luncheon on Friday, April 19. The NCGSA Campus Representatives will hold a breakfast on Friday, April 19 at 7 a.m.

HOUSING

Hotel accommodations will be available at both the downtown area adjacent to the SeaGate Convention Centre and at the Westgate area in West Toledo, which has easy access to Interstate 475 and a variety of restaurants. A shuttle service will provide free transportation between the Westgate area and SeaGate daily on Thursday and Friday. This service will also be available for transportation to and from the banquet on Thursday evening.

TRAVEL ARRANGEMENTS

Toledo is on Interstate 80-90 (the Ohio Turnpike) and Interstate 75. UT SeaGate Centre is located approximately 5 miles from the University of Toledo main campus in downtown Toledo. Convention hotels are centered at the Secor Road intersection of Interstate 475 and adjacent to SeaGate Centre.

Toledo Express Airport is served by Delta and US Air. Air link service connects with O'Hare Airport (United Express, American Eagle) in Chicago, with Detroit Metro Airport (Northwest Mesaba Express), and with Hopkins International Airport (Continental British Express) in Cleveland. Amtrak provides daily east-west service.

DETAILED INFORMATION

All sessions, registration, and the banquet will be held at the UT SeaGate Centre. Special arrangements can be made for luncheons and/or special meetings by contacting the NCGSA General Chairman. Information concerning registration, hotel accommodations, and other activities will appear in a future issue of *GSA News & Information* and as part of *Abstracts with Programs* for 1991. Symposia and field trips listed for this meeting are tentative; further suggestions are always appreciated. Inquiries, additional information, requests, or suggestions should be directed to:

Lon C. Ruedisili
General Chairman
Department of Geology
University of Toledo
Toledo, OH 43606
(419) 537-2634
or
Mark J. Camp
Vice-Chairman
Department of Geology
University of Toledo
Toledo, OH 43606
(419) 537-2398

Call for Nominations for 1991 Penrose and Day Medals and Honorary Fellows

Nominations for GSA's Penrose and Day Medals and for Honorary Fellowships of the Society are due at headquarters by **February 1, 1991**. Members and Fellows of the Society are encouraged to participate in this important process by nominating candidates for these high honors.

Penrose Medal

The Penrose Medal was established in 1927 by R.A.F. Penrose, Jr., to be awarded in recognition of eminent research in pure geology, for outstanding original contributions or achievements that mark a major advance in the science of geology. The award is made only at the discretion of the Council. Nominees are selected by the Council, may or may not be members of the Society, and may be from any nation. Penrose's sole objective in making the gift was to encourage original work in purely scientific geology. **Scientific achievements should be considered rather than contributions in teaching, administration, or service. Mid-career scientists who have already made exceptional contributions should be given full consideration for the award.**

Day Medal

The Day Medal was established in 1948 by Arthur L. Day to be awarded annually, or less frequently, at the discretion of the Council, for outstanding distinction in contributing to geologic knowledge through the application of physics and chemistry to the solution of geologic problems. Day's intent was to recognize outstanding achievement and inspire further effort, rather than reward a distinguished career.

Honorary Fellows

Geologists who have distinguished themselves in geological investigations or in notable service to the Society may be elected as Honorary Fellows. In practice, nearly all candidates have lived and worked outside of North America. The most noteworthy exceptions were astronauts.

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
Administrative Department
Geological Society of America

Most Honorary Fellows have been elected toward the evenings of their careers, after lifetimes of outstanding and internationally recognized contributions to the science.

How To Nominate

To ensure thorough consideration by the respective committees, please submit for each candidate a brief biographical sketch, such as used in *American Men and Women of Science* and *Who's Who in America*, a summary of the candidate's scientific contributions to geology that qualify the individual for the award, and a selected bibliography of no more than 20 titles. In choosing candidates for the Penrose and Day Medals, **scientific achievements should be considered rather than contributions in teaching, administration and service.**

A nomination for any one of these three awards **MUST BE SUPPORTED** by signed letters from each of five (5) GSA Fellows or Members. The letters may be attached to this form or may be sent to the Executive Director separately. For Honorary Fellow nominations, please *verify degrees received, publications, positions held, etc.*

The names of unsuccessful candidates proposed to the Council by the respective committees will remain for consideration by those committees for three years. **FOR THOSE STILL UNDER CONSIDERATION, IT IS RECOMMENDED THAT AN UPDATED LETTER OF RENOMINATION BE SENT TO THE EXECUTIVE DIRECTOR.**

The deadline for receipt of nominations at the office of the Executive Director is **FEBRUARY 1, 1991**.

The form for submitting the name of a candidate for any one of the awards is on pages 295-296.

Recipients of the awards to date are listed on p. 294.

About the Honorary Fellow Program

In this issue of *GSA News & Information* you will find a form to be used in nominating candidates for Honorary Fellowship in the Geological Society of America. Each year this honor is bestowed on those individuals who have lived and worked outside of North America and have distinguished themselves in geological investigations or in notable service to the Society. Under exceptional circumstances, North Americans have been named Honorary Fellows. This amendment to the bylaws was made in 1969 when the Apollo II astronauts who first walked on the moon—Neil Armstrong, Edwin A. Aldrin, Jr., and Michael Collins—were elected.

The program was established by the GSA Council in 1909, and since then, except during a few war years, one or more Honorary Fellows have been elected annually. Most Honorary Fellows have been elected after many years of outstanding and internationally recognized contributions to the science. At present there are 55 living geologists who have received this honor.

The Council of the Society encourages the membership to submit the names of qualified candidates for this honor. In preparing a nomination, it is imperative that the original research and scientific advances of the candidate be stressed. All supporting data, especially degrees received, publications, positions, etc., should also be verified by the nominator. The form for nominating a candidate for Honorary Fellow is on p. 295-296.

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*. The form for submitting the name of a candidate for the Young Scientist Award is on p. 297-298.

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

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.*

1990 Honorary Fellows Named

The work of two internationally known geologists will be recognized at the 1990 GSA Annual Meeting this month in Dallas. German K. Müller and B. P. Radhakrishna will be named GSA Honorary Fellows, following action last May by the GSA Council.

Honorary Fellowship is awarded to foreign geologists who have distinguished themselves through their geological work or have rendered special service to the Society.

German K. Müller

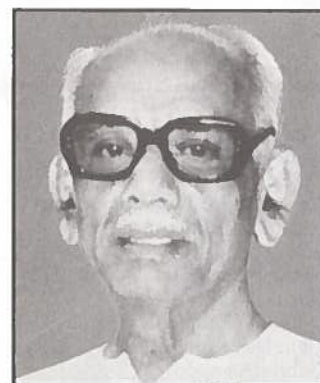
Müller is considered one of the most outstanding European scientists in environmental and geochemical sedimentology. In recent years he has directed his research efforts to geochemistry and problems of heavy metals and toxic wastes in the environment. He has, through his many publications on these subjects, set the standard for research in this field and influenced environmental policy on waste disposal in Germany and surrounding European countries.

Müller received his B.A. degree from the University of Cologne in 1950 and a Dr. rer. nat from the University of Bonn in 1952. Upon graduation he headed the Sedimentology Laboratory for Mobil Oil AG Germany. In 1957 he worked in Addis Ababa, Ethiopia, as a geologist for the Texas Africa Exploration Company. Three years later Müller began teaching, serving as an assistant and associate professor at the University of Tübingen and later as a full professor of mining and petrology at the University of Heidelberg. Finally, as director of Heidelberg University's Institut für Sedimentforschung, Müller developed one of the most respected sedimentological centers in Germany.

Müller's honors include AAPG Distinguished Lecturer (1974); President of the 8th International Conference on Heavy Metals in the Environment; Diploma of Honor for Outstanding



German K. Müller



B. P. Radhakrishna

Contributions to the Petroleum Industry; Pi Epsilon National Petroleum Engineering Society; and the Morris Prize for his 20 years of research into the accumulation and deposition of heavy metals in rivers and lakes in western Europe.

Müller's scientific achievements and personal dedication to his students and the advancement of the geological sciences continues in Heidelberg, Germany, where he lives and works.

B. P. Radhakrishna

Over the past 50 years, the science of geology in India has benefited from the work of B. P. Radhakrishna. His contributions include original research on the Precambrian geology of southern India, distinguished service as a public servant, leadership of the Geological Society of India, and inspiration to many young geologists. Recognizing the urgency of conservation and development of groundwater in drought-prone southern India, Radhakrishna has vigorously worked toward advancing research and educational and institutional aspects of ground-water development in India.

Honorary Fellows continued on p. 294

Richard A. F. Penrose, Jr., Medalists

1927 Thomas Chrowder Chamberlin	1942 Charles Kenneth Leith	1958 James Gilluly	1975 Francis J. Pettijohn
1928 Jakob Johannes Sederholm	1943 <i>No award given</i>	1959 Adolf Knopf	1976 Preston Cloud
1929 <i>No award given</i>	1944 Bailey Willis	1960 Walter Herman Bucher	1977 Robert P. Sharp
1930 Francois Alfred Antoine Lacroix	1945 Felix Andries Vening-Meinesz	1961 Philip Henry Kuenen	1978 Robert M. Garrels
1931 William Morris Davis	1946 T. Wayland Vaughan	1962 Alfred Sherwood Romer	1979 J Harlen Bretz
1932 Edward Oscar Ulrich	1947 Arthur Louis Day	1963 William Walden Rubey	1980 Hollis D. Hedberg
1933 Waldemar Lindgren	1948 Hans Cloos	1964 Donnel Foster Hewett	1981 John Rodgers
1934 Charles Schuchert	1949 Wendell P. Woodring	1965 Philip Burke King	1982 Aaron C. Waters
1935 Reginald Aldworth Daly	1950 Morley Evans Wilson	1966 Harry H. Hess	1983 G. Arthur Cooper
1936 Arthur Philemon Coleman	1951 Pentti Eskola	1967 Herbert Harold Read	1984 Donald E. White
1937 <i>No award given</i>	1952 George Gaylord Simpson	1968 J. Tuzo Wilson	1985 Rudolf Trümpy
1938 Andrew Cowper Lawson	1953 Esper S. Larsen, Jr.	1969 Francis Birch	1986 Laurence L. Sloss
1939 William Berryman Scott	1954 Arthur Francis Buddington	1970 Ralph Alger Bagnold	1987 Marland P. Billings
1940 Nelson Horatio Darton	1955 Maurice Gignoux	1971 Marshall Kay	1988 Robert S. Dietz
1941 Norman Levi Bowen	1956 Arthur Holmes	1972 Wilmot H. Bradley	1989 Warren Bell Hamilton
	1957 Bruno Sander	1973 M. King Hubbert	1990 Norman D. Newell
		1974 William Maurice Ewing	

Arthur L. Day Medalists

1948 George W. Morey	1959 Sir Edward C. Bullard	1969 Harold C. Urey	1980 Henry G. Thode
1949 William Maurice Ewing	1960 Konrad B. Krauskopf	1970 Gerald J. Wasserburg	1981 Donald L. Turcotte
1950 Francis Birch	1961 Willard F. Libby	1971 Hans P. Eugster	1982 Eugene M. Shoemaker
1951 Martin J. Buerger	1962 Hatten Schuyler Yoder	1972 Frank Press	1983 Harmon Craig
1952 Sterling Hendricks	1963 Keith Edward Bullen	1973 David T. Griggs	1984 Wallace S. Broecker
1953 John F. Schairer	1964 James Burleigh Thompson, Jr.	1974 A. E. Ringwood	1985 Freeman Gilbert
1954 Marion King Hubbert	1965 Walter H. Munk	1975 Allan Cox	1986 E-an Zen
1955 Earl Ingerson	1966 Robert M. Garrels	1976 Hans Ramberg	1987 Don L. Anderson
1956 Alfred O. C. Nier	1967 O. Frank Tuttle	1977 Akiho Miyashiro	1988 Claude J. Allègre
1957 Hugo Benioff	1968 Frederick J. Vine	1978 Samuel Epstein	1989 Dan McKenzie
1958 John Verhoogen		1979 Walter M. Elsasser	1990 William S. Frye

Young Scientist Award (Donath Medal)

1989 Mark Cloos

1990 Leigh H. Royden

Honorary Fellows

Neil Armstrong
Jean A. Aubouin
V. V. Belousov
Krzysztof Ludwik Birkenmajer
Roland Brinkmann
S. Warren Carey
Maria Bianca Cita
Michael Collins
William Compston
Douglas Saxon Coombs
Gabriel Dengo
Kingsley C. Dunham
Stanislaw Dzulynski

William S. Fyfe
Augusto Gansser
David Headley Green
Dorothy Hill
Kenneth J. Hsü
Jiqing Huang
Emilie Jager
Ihsan Ketin
Teiichi Kobayashi
Henno Martin
Michael W. McElhinny
Mervyn Silas Paterson
Leo Y. Picard

Wallace S. Pitcher
Jean Piveteau
Isabella Premoli-Silva
Desmond A. Pretorius
Hans Ramberg
John G. Ramsay
Alfred Rittmann
Alexander B. Ronov
Rupert W. R. Rutland
Rushdi Said
Hitoshi Sakai
Mircea Sandulescu
Harrison Hagan Schmitt

Eugen Seibold
Ahti J. Simonen
Boris Sergeevich Sokolov
John Sutton
Rashid A. Khan Tahirkheli
Bernard P. Tissot
Livio Trevisan
Rudolf Trümpy
Guangzhi Tu
Harry B. Whittington
Alwyn Williams
Quido Zaruba

Honorary Fellows continued from p. 293

Radhakrishna received his B.S. degree in geology with honors and a Gold Medal in 1937 from Central College in Bangalore. Immediately following his graduation he joined the state agency, the Mysore Geological Department (MGD), as a geological assistant. He was director of the department from 1965 to 1974, when he retired, earning the Rajyotsava Award of the State of Karnataka for distinguished public service. During his tenure with the MGD he obtained his Ph.D. from the University of Mysore in 1954; organized the Board of Mineral Development for the state; founded the Geological Society of India; organized the Ground-water Cell within MGD, to work toward rational development of the state's ground-water resources; was founder Secretary of the Geological Society of India; was an advisor to the Government of India on ground-water resource development between 1975 and 1979; and served as the chairman and managing director of the

Karnataka Copper Consortium, where he was instrumental in setting up a copper extraction plant using hydrometallurgical methods. Recently he has devoted his time to geological research and his position as editor of the *Journal of the Geological Society of India*, which, under his leadership, has attained international status.

Radhakrishna's many awards include a Fellowship from the Indian Academy of Sciences, Bangalore; the Indian government's National Mineral Award; election to the Indian National Science Academy; and Honorary Fellowship in the Geological Society of London.

Radhakrishna's work has enriched the science of geology as a whole and contributed greatly to the advancement of the science in India. He continues to work as the editor for the *Journal of the Geological Society of India* and to do geological research. He lives in Bangalore.

THE GEOLOGICAL SOCIETY OF AMERICA
Nomination for Penrose Medal, Day Medal, or Honorary Fellowship
(please circle one)

DEADLINE: Please return this form to headquarters by *February 1, 1991*

NAME OF CANDIDATE:

ADDRESS:

BIOGRAPHICAL INFORMATION: (suggested sources)

American Men and Women of Science

Who's Who in America

GSA Service Record (obtainable from headquarters)

Other

SUMMARY OF SCIENTIFIC CONTRIBUTIONS TO GEOLOGY: (not more than 200 words)

SELECTED BIBLIOGRAPHY: (no more than 20 titles)

A nomination for any one of these three awards **MUST BE SUPPORTED** by signed letters from five (5) GSA Fellows or Members. The letters may be attached to this form or may be sent to the Executive Director separately. Supporting letters must discuss the original research and scientific advances of the candidates. Please also verify all other supporting data.

Name of person making the nomination: _____

Address: _____

Date: _____ Signature: _____

LETTERS OF SUPPORT WILL BE SUBMITTED BY:

1. _____
2. _____
3. _____
4. _____
5. _____

RETURN TO: Executive Director
The Geological Society of America
P.O. Box 9140
Boulder, CO 80301
(303) 447-2020

DEADLINE: Please return this form to headquarters by **February 1, 1991.**

APP 25/87-131

THE GEOLOGICAL SOCIETY OF AMERICA
Nomination for 1991 Donath Medal (Young Scientist Award)

DEADLINE: Please return this form to headquarters by *February 1, 1991*

NAME OF CANDIDATE:

ADDRESS:

BIOGRAPHICAL INFORMATION: (similar to that found in *American Men and Women of Science, Who's Who in America*)

Date of birth: _____

(For the year 1991, only those candidates born on or after January 1, 1956, are eligible for consideration.)

SUMMARY OF SCIENTIFIC CONTRIBUTIONS TO GEOLOGY: (not more than 200 words)

SELECTED BIBLIOGRAPHY: (no more than 10 titles)

Nominations for the Donath Medal **MUST BE SUPPORTED** by signed letters from five (5) scientists. The letters may be attached to this nomination form or may be sent to the Executive Director separately.

Name of person making the nomination: _____

Address: _____

Date: _____ Signature: _____

LETTERS OF SUPPORT WILL BE SUBMITTED BY:

1. _____
2. _____
3. _____
4. _____
5. _____

RETURN TO: Executive Director
The Geological Society of America
P.O. Box 9140
Boulder, CO 80301
(303) 447-2020

DEADLINE: Please return this form to headquarters by **February 1, 1991.**

GeoVentures Grow and Go in 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 they 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 destination and length of time) and include lodging and meals as designated. There are some differences between them, though:

GSA GeoVentures

	<i>GeoHostels</i>	<i>GeoTrips</i>
Length	5 days	1 to 4 weeks
Cost	Under \$500	Over \$1000
Site	College campuses or resort towns, North America	Worldwide
Time of year	Summer	Anytime
Traveling	Limited. Possibly one or two half-day field trips	Daily change of site
Ground transportation	May need to be provided by participants	Provided by GSA
Physical requirements	None	May be physically demanding
Education	Half-day daily classroom programs plus one to two field excursions	Informal. Outdoor field instruction

GeoTrips

GSA's first GeoTrip was its memorable 1988 Grand Canyon trip led by Stan Beus and Ivo Lucchitta. Its enormous success prompted the recent 1990 Grand Canyon trip led by the same dynamic duo plus Ken Hamblin. These trips have been welcomed so enthusiastically by members that GSA is sponsoring the following trips in 1991:

GT911. **New Zealand**, March 3–23, 1991 (filled)

Douglas S. Coombs, Otago; Jarg Pettinga, Canterbury

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

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

Full descriptions of these trips will appear in the December issue of *GSA News & Information*.

All of GSA's trips are popular and fill immediately. The New Zealand trip, for example, filled within two weeks. So keep us in mind come January 2.

Registration requires a deposit of \$200 per person which is accepted by mail, fax, or phone on a first-come, first-served basis. Credit card charges are welcomed. To register call 1-800-GSA-1988 or 1-303-447-2020.

REGISTRATION BEGINS JANUARY 2

GeoHostels

A GeoHostel is a learning experience for geologists. It is site-specific and has 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 place that is rich in geological interest as well as plentiful in opportunities for side excursions.

GeoHostels offer:

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

1991 GeoHostel Colorado Program:

Golden, Colorado, Estimated cost: \$325

Ken Kolm and Greg Holden, Colorado School of Mines
Sunday, June 23 through Thursday, June 27.

Morning classes:

GH1A. **Evolution of Geologic Landscapes in the Colorado Rockies**, 8:00–9:30

GH2B. **Environmental and Engineering Issues in Colorado**, 9:30–11:00

GH3B. **Old Mining Towns of the Rockies**, 9:30–11:00

Fee includes classroom programs, field excursion, lodging (double occupancy), breakfast, welcoming, and farewell events.

More information will appear in the December issue of *GSA News & Information*.

REGISTRATION BEGINS JANUARY 2 with the same guidelines shown for GeoTrips.

• GeoVentures • GeoVentures • GeoVentures •

If you would like to receive information on any of the GeoVenture programs as soon as it becomes available, please let us know:

Name _____

Address _____

City/State/Country _____

Phone: (Home) _____ (Work) _____

Please send information on the following 1991 GeoVentures:

- GT912 GeoTrip: Great Britain Classical Geology
- GT913 Grand Canyon
- GH911 GeoHostel: Golden, Colorado
- All of the above

Mail to: *GeoVentures, Meetings Dept., GSA, P.O. Box 9140, Boulder, CO 80301*

GSA Annual Meetings

1990 GSA Annual Meeting Dallas, Texas October 29–November 1, 1990

For registration and housing information: see August, *GSA News & Information*

For Technical Program Schedule: see September, *GSA News & Information*

For general information: GSA Meetings Department, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020

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

Short course proposals due: December 1, 1990

Theme session and symposia proposals due: January 2, 1991



Air Transportation to 1990 Annual Meeting

SAVE 40% OR MORE!

GSA'S official travel agent, Cain Travel Group, has negotiated discounted rates of 40% or more with the major Dallas carriers: Delta, American, USAir, TWA, and United. For already discounted fares, Cain will offer 5% off. In addition, Cain will meet or beat any fare offered by another travel agency.

As with all airline reservations, please use caution regarding change and cancellation penalties that accompany low-fare tickets. This applies especially to field trip participants whose trips may be canceled after the September 28 preregistration deadline.

Advance bookings with Saturday night stayovers are the best route to lowest fares. So call today for best availability.

To make a reservation:

- Call 1-800-346-4747 (toll-free outside Colorado) or (303) 443-2246 (collect from Colorado or Canada), fax 303-443-4485.
- Hours: Monday through Friday, 8 a.m. to 5:30 p.m., Mountain Daylight Time.
- Identify yourself as a GSA traveler.
- Be sure that you understand the restrictions on the type of ticket you purchase.
- Tickets can be paid for by check (payable to Cain Travel) or major credit card or can be invoiced to your company. The final payment must reach Cain Travel no later than seven days prior to departure to allow for mailing time.
- All tickets will be mailed via certified mail upon receipt of payment unless requested otherwise.
- After tickets are issued, you are protected from fare *increases*; if a fare *decreases*, call Cain Travel for an adjustment.
- Cain Travel will have an on-site Customer Service Desk at the Dallas Convention Center.

1991 Annual Meeting • October 21–24 • San Diego, California
1992 Annual Meeting • October 26–29 • Cincinnati, Ohio

CALL FOR SHORT COURSE PROPOSALS

Have you thought about giving a short course? The GSA Committee on Short Courses invites those interested in proposing a GSA sponsored or cosponsored short course to contact GSA headquarters for proposal guidelines.

Short courses may be conducted in conjunction with all GSA annual or section meetings, but we are particularly interested in identifying short courses to be offered during the 1991 Annual Meeting in San Diego or the 1992 Annual Meeting in Cincinnati.

Proposals for the San Diego meeting must be received by *December 1, 1990*. Selection of courses will be made by February 1, 1991, leaving eight months for preparing course manuals and making arrangements.

For proposal guidelines or information contact: Edna A. Collis, Short Course Coordinator, GSA headquarters, (800) 472-1988.

In conjunction with the 1990 Annual Meeting, GSA's Geology and Public Policy Committee is hosting a session, **Antarctic Mineral Resources Policy**, to be held on Sunday, October 28, 1990 at the Dallas Hyatt Regency from 2:00 to 4:30 p.m. The session will include panel members representing the government, environmental organizations, mining companies, and leading scientific researchers. For more information contact Eileen McLellan, (301) 454-3548.

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 terrain 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.

GSA Section Meetings

1991

Cordilleran

Cathedral Hill Hotel
San Francisco, California
March 25-27

Contact:

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

Contact:

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

Contact:

Emery Cleaves
Maryland Geological Survey
2300 St. Paul Street
Baltimore, MD 21218
(301) 554-5504

or

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

Contact:

G. Randy Keller
Dept. of Geological Sciences
University of Texas at El Paso
El Paso, TX 79968-0555
(915) 747-5501

or

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MEETINGS

(Asterisk indicates new or changed information)

1990

European Geological Societies, September 29–October 7, 1990, Lisbon, Portugal. Information: MEGS 6, Sociedade Geológica de Portugal, Apto. 2361, P1109 Lisboa Codex, Portugal.

Workshop on the Death Valley–Yucca Flat Transect: A Combined Continental Scientific Drilling and Geodynamics Project, October 1–3, 1990, Las Vegas, Nevada. Information: David J. Borns, Org. 6233, Geochemistry Division, Sandia National Laboratories, P.O. Box 5800, Albuquerque, NM 87185; (505) 846-3572; fax 505-846-3464.

Association of Engineering Geologists 33rd Annual Meeting, October 1–5, 1990, Pittsburgh, Pennsylvania. Information: 33rd AEG Meeting, MEMS, One Northgate Sq., Suite 211, P.O. Box 270, Greensburg, PA 15601; (412) 836-6813; fax 412-836-6817

Soils and Landscape Evolution, Binghamton Symposium in Geomorphology, October 6–7, 1990, Binghamton, New York. Information: Peter L.K. Knuepfer, Dept. of Geological Sciences, SUNY, Binghamton, NY 13901; (607) 777-2389; Leslie D. McFadden, Dept. of Geology, University of New Mexico, Albuquerque, NM 87131; (505) 277-2307.

Clay Minerals Society 27th Annual Meeting, October 6–11, 1990, Columbia, Missouri. Information: W. D. Johns, Dept. of Geology, University of Missouri, Columbia, MO 65211; (314) 882-3785.

Geoscience Data Conference, October 7–9, 1990, Dallas, Texas. Information: Infomart Registration Services, 1950 Stemmons Freeway, Dallas, Texas 75207; (214) 746-3500, fax 214-746-3501.

Federation of Analytical Chemistry and Spectroscopy Societies 17th Annual Meeting, October 7–12, 1990, Cleveland, Ohio. Information: Charles J. Belle, Lucas Aerospace, PEC, 4259 W. 192 St., Fairview Park, OH 44126.

International Symposium on Environmental Studies on Tropical Rain Forests, October 7–13, 1990, Manaus, Brazil. Information: Organizing Committee–Forest '90, P.O. Box 3591, 2001 Rio de Janeiro, RJ, Brasil; phone 55-21-211-5581; telex 55-21-22395; fax 55-21-252-9269.

Petroleum Computing in the '90s Symposium, October 8–9, 1990, Midland, Texas. Information: Permian Basin Graduate Center, P.O. Box 1518, Midland, TX 79702; (915) 683-2832.

5th Australasian Remote Sensing Conference, October 8–12, 1990, Perth, Western Australia. Information: Golden West Conventions, P.O. Box 411, West Perth, W.A. 6005, Australia; phone 619-3227922; telex AA 95380; fax 619-4814029.

American Institute of Professional Geologists Annual Meeting, October 9–12, 1990, Long Beach, California. Information: Stephen M. Testa, Applied Environmental Services, 6695 E. Pacific Coast Highway, Second Floor, Long Beach, CA 90803; (213) 594-9485; fax 213-596-6376.

American Association of Stratigraphic Palynologists Annual Meeting, October 10–12, 1990, Banff, Alberta, Canada. Information: David J. McIntyre, Institute of Sedimentary and Petroleum Geology, 3303-33 St. N.W., Calgary, Alberta T2L 2A7, Canada; (403) 292-7089.

Coal and Coal Bed Methane: An Introduction to Sampling Techniques for the Petroleum Industry, October 10–12, Calgary, Alberta. Information: Slavko Stuhec, Alberta Geological Survey, Alberta Research Council, P.O. Box 8330, Station F, Edmonton, Alberta T6H 5X2, Canada; (403) 438-7619.

Society of Vertebrate Paleontology 50th Anniversary Meeting, October 10–13, 1990, Lawrence, Kansas. Information: SVP 90, Vertebrate Paleontology Division, Museum of Natural History—Dyche Hall, University of Kansas, Lawrence, KS 66045-2454; (913) 864-3216.

***FOCUS Conference on Eastern Regional Ground Water Issues**, October 17–19, 1990, Springfield, Massachusetts. Information: FOCUS Eastern Conference, National Water Well Association, P.O. Box 182039, Dept. #017, Columbus, OH 43218; (614) 761-1711.

Geodynamics of the Arabian Plate, October 20–25, 1990, Safat, Kuwait. Information: Waris E.K. Warsi, Dept. of Geology, University of Kuwait, P.O. Box 5969, Safat 13060, Kuwait; or Muawia Barazangi, INSTOC, Snee Hall, Cornell University, Ithaca, NY 14853-1504.

Biodiversity and Landscapes: Human Challenges for Conservation in the Changing World, October 22–25, 1990, University Park, Pennsylvania. Information: K. C. Kim, 117 Land and Water, Center for BioDiversity Research, Penn State, University Park, PA 16802; (814) 863-0159.

Alberta Geological Survey Field Trip to the San Juan Basin, October 24–26, Edmonton. Information: Dennis Nikols, Alberta Geological Survey, Alberta Research Council, P.O. Box 8330, Station F, Edmonton, Alberta T6H 5X2, Canada; (403) 438-7622; fax 403-438-3364.

Metalliferous Black Shales and Related Ore Deposits, October 27–28, 1990, Dallas, Texas. Information: Bartholomew Nagy, Laboratory of Organic Geochemistry, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-6973; Philip A. Meyers, Dept. of Geological Sciences, University of Michigan, Ann Arbor, MI 48109-1063, (313) 764-3335; Joel S. Leventhal, U.S. Geological Survey, MS 973 Denver Federal Center, Denver, CO 80225, (303) 236-1522; Lisa M. Pratt, Dept. of Geology, Indiana University, Bloomington, IN 47405, (812) 855-9203.

Geological Society of America Annual Meeting, October 29–November 1, 1990, Dallas, Texas. Information: GSA, Meetings Department, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020.

MEETINGS continued on p. 304

MEETINGS *continued from p. 303*

Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection and Restoration, October 31–November 2, 1990, Houston, Texas. Information: Petroleum Hydrocarbons Conference, National Water Well Association, P.O. Box 182039, Dept. #017, Columbus, OH 43218; (614) 761-1711.

***Large Igneous Provinces**, November 4–6, Woods Hole, Massachusetts. Information: M. F. Coffin, Institute for Geophysics, 8701 Mopac Boulevard, Austin, TX 78759-8345; (512) 471-0429; fax 512-471-8844; Email: mikec@utig.ig.utexas.edu.

Eastern Oil Shale Symposium, November 6–8, 1990, Lexington, Kentucky. Information: Geanita H. Caylor, Symposium Coordinator, University of Kentucky/OISTL, 201 Porter Bldg., Lexington, KY 40506-025; (606) 257-2820.

Computational Science in Industry and the Comprehensive University, November 8–10, 1990, Pomona, California. Information: Bruce P. Hillam, Dept. of Computer Science, California State Polytechnic University, 3801 West Temple Avenue, Pomona, CA 91768; (714) 869-3440.

Supercomputing '90, November 12–16, 1990, New York, New York. Information: Joanne L. Martin, IBM T. J. Watson Research Center, P.O. Box 218, Rte. 134, Yorktown Heights, NY 10598; (914) 945-3285.

***Grant-writing Workshop**, November 26–29, 1990, Jackson, Wyoming. Information: Western Wyoming RC&D Area Office at 1471 Dewar Drive #106, Rock Springs, WY 82901; (307) 382-3982.

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

Penrose Conferences

New Methods for Dating of Geomorphic Surfaces, October 12–17, 1990, Mammoth Lakes, California. Information: Fred M. Phillips, Dept. of Geoscience, New Mexico Tech, Socorro, NM 87801; (505) 835-5540 (direct); (505) 835-5634 (dept.).

***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) 684-5843 (direct); (919) 648-5847 (dept.).

1991

***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 Institute for Training and Research; United Nations Development Programme 5th International Conference on Heavy Crude and Tar Sands, February 17–22, 1991, Caracas, Venezuela. Information: Sigfrid Steinhilb 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: Shamsheer 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. (*Abstracts deadline: November 15, 1990.*)

Sixth Biennial Meeting of the European Union of Geosciences, March 24–28, 1991, Strasbourg, France. Information: Organizing Committee of E.U.G. VI at the 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. (*Abstracts deadline: November 15, 1990.*)

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. (*Abstracts deadline: November 15, 1990.*)

MEETINGS *continued on p. 305*

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

International Conference on Environmental Pollution, April 15–19, 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 Albuquerque, 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, Nevada, 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 KIP 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.

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.

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.

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Notice of Council Meeting

The Council of the Society reminds you that meetings of Council are open to all Fellows, Members, and Student Associates as observers, except during executive sessions. Only Councilors, officers, and section representatives may speak to agenda items, except by invitation of the chair. Because of space and seating problems, notification of attendance must be received by the Executive Director in advance of the meeting. The next meeting of the Council will be Wednesday morning, October 31, 1990, at the Annual Meeting in Dallas.

Meetings continued from p. 305

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.

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, Federal Republic of Germany. Information: Fossil VI. Cnidaria, Pferdegasse 3, D-4400 Münster, Federal Republic of 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, Federal Republic of 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, 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.

1991 AAPG 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 (IRTCS), 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.

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.

***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.

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UNIVERSITY OF PITTSBURGH Sedimentology/Stratigraphy/ Sedimentary Geochemistry

The Department of Geology and Planetary Science invites applications for a tenure-track faculty appointment at the Assistant Professor level in sedimentology or stratigraphy and/or laboratory-based sedimentary geochemistry. Exceptionally qualified, experienced candidates may be considered for appointment at higher rank. This position is expected to be available, subject to budgetary approval, with a starting date of September 1991. We seek an individual who is a competent teacher, has a strong research commitment, and can develop a successful research program that is competitive for external funding. Responsibilities will include teaching introductory level geology courses (both for majors and non-majors) as well as upper level and graduate offerings in the individual's area of expertise.

The Department of Geology and Planetary Sciences has 13 full time faculty members and has active research programs in several areas of sedimentary geology, including upper Paleozoic stratigraphy, coastal sedimentology and ecology, paleomagnetism, and geochronology.

Applicants should submit a statement of research interests, curriculum vitae, reprints of recently published articles, and a list of at least three references to Professor Thomas H. Anderson, Chairman, Department of Geology and Planetary Science, University of Pittsburgh, Pittsburgh, PA 15260.

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FLORIDA INTERNATIONAL UNIVERSITY COLLEGE OF ARTS AND SCIENCES GEOLOGY DEPARTMENT Paleontologist/Stratigrapher

The Department of Geology at Florida International University invites applications for a full-time tenure-earning position at the Assistant or Associate Professor level in Paleontology/Stratigraphy. The successful applicant will be expected to teach at the undergraduate and graduate levels, and must have demonstrated an ability to conduct high quality teaching and the potential to establish a vigorous research program. A completed Ph.D. is required, and applicants should have a background in Micropaleontology.

Deadline for application: November 8, 1990. Appointment will begin in January 1991.

Send a resume, brief description of teaching and research interest, transcripts and three (3) letters of recommendation to Dr. Florentin Maurrasse, Chairman, Department of Geology, Florida International University, University Park Campus, Miami, Florida 33199. Florida International University is a member of the State University System of Florida, and an Affirmative Action/Equal Opportunity Employer. X11/90

GEOCHEMISTRY TECHNICIAN

Miami University invites applications for a technical position in the geochemistry-petrology group of the Department of Geology. The successful candidate will have an advanced degree (or equivalent experience) in one of the physical sciences or a cognate area, and will assist in the operation and maintenance of a direct current argon plasma spectrometer, a solid source mass spectrometer, and associated chemical laboratories. A significant aspect of the position involves training and assistance for faculty, students, and visitors who use the above facilities. The successful candidate is also expected to actively participate in developing analytical methods for both spectrometers; thus, prior experience with solid source or optical emission spectrometers, or knowledge of one or more of the fields of analytical chemistry, microcomputing, or electronics is required. The twelve month salary is negotiable, but is commensurate with experience.

Apply by December 1, 1990 with a letter of application, a resume, copies of all transcripts and names of three individuals who may be contacted for letters of recommendation. Address all communications to Maryellen Cameron, Chair, Department of Geology, Miami University, Oxford, Ohio 45056. Women and minority candidates are encouraged to apply. Miami University offers equal opportunity in education and employment. X10/90

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1990 GSA ANNUAL MEETING OCTOBER 29–NOVEMBER 1

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For Technical Program information see the September issue of *GSA News & Information*.

For registration and housing information see the August issue of *GSA News & Information* or contact the Meetings Department, (303) 447-2020; GSA, P.O. Box 9140, Boulder, CO 80301.

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