

GSA NEWS & INFORMATION

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The Geological Society of America

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GSA Welcomes Three More Associated Societies

by Faith Rogers
Managing Editor, GSA

The Association for Women Geoscientists, the National Earth Science Teachers Association, and the Association of Geoscientists for International Development became GSA associated societies in 1988, the Society's centennial year.

The bylaws of GSA provide for associated status for "any national or international society that has aims consistent with those of The Geological Society of America, that is, the advancement of the science of geology." On approval by the GSA Council, societies become associated with GSA "for the purpose of cooperation in annual, sectional, or divisional meetings, in publications, or in other appropriate ways." The GSA Council considers scientific and disciplinary orientation, status as a nonprofit organization, intention to participate in GSA annual meetings on a regular basis, and size of membership (between 200 and 1000). Association with GSA involves no financial obligation. It encourages joint ventures such as symposia, field trips, and publications.

Association for Women Geoscientists

AWG was established in 1977 to encourage participation of women in the geosciences, promote professional growth of those women, and exchange educational, technical, and professional information. The association currently has about 500 members. AWG officers for 1989 are president Marilyn J. Suiter, American Geological Institute, Alexandria, Virginia; vice-president Suzanne Takken, Oklahoma City, Oklahoma; secretary Selena Billington, U.S. Bureau of Mines, Denver; treasurer Catherine L. Gavigan, John S. Herold, Inc., Greenwich, Connecticut; and past president Amy S. Mohler, Texas Eastern Gas Pipeline Company, Houston. The GSA Council approved associated status for AWG at the Council's May 1988 meeting.

National Earth Science Teachers Association

NESTA, established in 1983, promotes precollege earth science education; most of its 1000 members are earth science teachers in primary and secondary school classrooms. NESTA will work with GSA's newly created Committee on Education. The association's officers for 1989 are president Frank Ireton, Washington, D.C.;

president-elect Michael Burton, Fargo, North Dakota; secretary Walter Sharp, Camillus, New York; treasurer and editor Rod Cranson, Lansing, Michigan; and past-president Sharon Stroud, Colorado Springs, Colorado. The GSA Council approved NESTA as an associated society at the Council's fall 1988 meeting.

Association of Geoscientists for International Development

AGID was founded in 1974 to provide a nonpolitical and nonprofit international forum for earth scientists concerned with the effective application of the geosciences to international development. AGID has more than 2000 members, more than two-thirds of whom live in developing nations; its headquarters is in Bangkok, Thailand. Current AGID officers are president Wang Sijing, Academia Sinica, Beijing, China; regional vice-presidents Sandra Barr, Acadia University, Wolfville, Nova Scotia (for developed countries); B.B.S. Singhal, University of Roorkee, Roorkee, India (for Asia); Victor Ricaldi, Cochabamba, Bolivia (for South America); Isabelle Sy-nyang, Université de Dakar, Dakar-Fann, Senegal (for French-speaking Africa); Anthony Muze, Ministry of Minerals, Dodoma, Tanzania (for Africa other than French-speaking); and secretary-treasurer Jon L. Rau, United Nations, ESCAP, Bangkok, Thailand. The GSA Council approved associated status for AGID at the Council's fall 1988 meeting.

GSA's Other Associated Societies

GSA has had associated societies since 1909, when the Paleontological Society became affiliated with GSA in this way. The Mineralogical Society of America, and the Society of Economic Geologists became associated societies in 1920, the Society of Vertebrate Paleontology in 1941, the Geochemical Society in 1956, the National Association of Geology Teachers in 1960, the Geoscience Information Society in 1967, the Cushman Foundation in 1975, and Sigma Gamma Epsilon in 1987. Many of these groups hold their annual meetings in conjunction with GSA's annual meeting and have sponsored symposia, workshops, and field trips at GSA meetings.

**Short Courses Slated for
1989 Annual Meeting**

see p. 116



DNAG NEWS

by Allison R. (Pete) Palmer

The Perils of Pauline

One of the consequences of failure to deliver manuscripts for a book in a timely manner is the crunch that is put on production facilities when a product has an immutable publication date. Such is the case for *The Geology of North America—An Overview*. Heroic efforts have been needed by the copy editors and typesetters as well as in-house GSA production staff, and by those authors whose manuscripts were particularly late, to meet a schedule that will provide this book for the International Geological Congress in July. As of March 10, when this is being written, all but one chapter have been typeset, and only five chapters remain to be dummied. The first eight chapters in the book are ready to go for final paging, and indexing of the book is commencing. Final figures are still needed from three authors, together with two more plates. The other 10 plates are at the printer. The cover art is already being processed, and slip cases for the plates are being prepared. There is still a lot to do, and only about two weeks in which to get it done in order to meet the printer schedule! More next month.

The Arctic, Eastern Pacific, and Surface Water volumes are now so close to being completed that I have asked their editors to plan to wrap up the final pieces, and I have suggested dates in either late April or in May for them to come to Boulder to go over the final book galleys. It looks like a busy year!

Air Transportation to 1989 Annual Meeting

GSA has again designated Cain Travel Group of Boulder, Colorado, as the official airline reservation agent for the GSA Annual Meeting. Meeting participants are encouraged to call Cain's toll-free number to take advantage of discounted fares on selected airlines.

TWA, Delta, and United Airlines have been named the official carriers. Reduced rates are 5% off any available discount fare, generally having restrictions. If you do not meet the requirements for the discount fare, you will be offered 40% to 45% off the unrestricted coach fare.

To make a reservation:

- Call 1-800-346-4747 (toll-free outside Colorado) or 303-443-2246 (inside Colorado or collect from Canada).
- Hours: Monday through Friday, 8:00 a.m. to 5:30 p.m., Mountain Daylight Time.
- Call early for best availability and 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 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 Cervantes Convention Center in St. Louis.

Call for Symposium Topics for GSA Northeastern Section 1990 Meeting

Nominations are invited for symposium topics for the next meeting of the Northeastern Section of GSA, to be held March 4-7, 1990, in Syracuse, New York. We seek topics that are innovative and interdisciplinary, and that highlight the significance of north-eastern geology for global issues in the earth sciences. Please submit symposium topics *and* names of potential organizers to

Cathryn R. Newton, Symposium Coordinator
 1990 NE GSA Meeting
 Department of Geology, Heroy Geology Laboratory
 Syracuse University
 Syracuse, New York 13244-1070.

Symposium nominations must be received no later than **June 1, 1989.**

Coming Soon . . . 1989 GSA Short Course Notes for Sale

If you cannot attend a 1989 GSA-sponsored short course at the Annual Meeting in St. Louis, but you would like a copy of the course notes, copies will be available for sale starting in October. Mail-order forms will be printed in future issues of *GSA News & Information*. During the St. Louis meeting, notes may be purchased at the *Abstracts with Programs* counter in the meeting registration area.

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Prepared from contributions from the staff and membership. Executive Director: F. Michael Wahl; Managing Editor: Meredith L. Larson; Associate Editor: Faith Rogers; Production and Advertising Manager: James R. Clark; Marketing/Advertising Assistant: Ann H. Crawford; Production Assistants: Mona T. Gonzales and Joan E. Manly.

*Advertising: Contact James R. Clark or Ann H. Crawford (303) 447-2020.

FOUNDATION NEWS

by Robert L. Fuchs



Trustees Meet in Denver

The GSA Foundation's Board of Trustees met in conjunction with the Society's Centennial meeting in Denver on November 1, 1988. In addition to seven trustees, the meeting was attended by the Foundation staff, GSA President Bert Bally, Executive Director Mike Wahl, and Controller Leonard Cumley.

Chairman Philip LaMoreaux welcomed new trustees Fred Donath and Roy Huffington. Special note was made of the gift to the GSA Foundation by Fred and Mavis Donath which enabled GSA to establish the Young Scientist Award.

The Board reviewed the funding of the Decade of North American Geology project (DNAG). Present forecasts indicate that the project will result in a deficit, due primarily to a longer than anticipated production schedule. However, projections for the sales of DNAG volumes have been constructed conservatively, and any increase in sales over these projections could ultimately generate a surplus.

Foundation President Bob Fuchs reported on the fund-raising programs underway—Century Challenge and GEOSTAR. The Foundation is active in soliciting special gifts and in the area of planned giving—trusts, wills, and bequests.

A wide-ranging discussion ensued, led by LaMoreaux, Donath, Beach Leighton, and Bally, that explored present and future scientific problems and challenges. In many instances GSA could provide important leadership in working toward solutions, if properly funded through the Foundation. Much future activity will be of an environmental nature, as we try to repair the damage society has

done to planet Earth and to prevent further damage. The task of the Foundation will be to obtain the financial support for programs and facilities that will enable GSA to fulfill its leadership role in this ongoing people/planet relationship.

Student Travel Grants—1988 Results

GSA Sections and the GSA Foundation together spent \$17,231 during 1988 to fund travel expenses for students attending GSA meetings. Each dollar of support from the Sections was matched by a dollar from the Foundation.

This popular program benefited 120 students; the average grant was \$144. Recipients for the most part attended the Centennial meeting in Denver and presented papers. Similar grants will again be available in 1989. Applicants can obtain information from their respective Sections.

Is the Foundation in Your Will?

Recently we have heard from several people that they have designated the GSA Foundation as a bequest recipient in their wills. If you have made or intend to make such a designation, we would very much appreciate being notified.

If you are making or revising a will and are giving thought to including the GSA Foundation, we have information on wills and bequests that might be of interest to you. Please call or write GSA Foundation, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020.

Donors to the Foundation, February 1989

Centennial

William E. Bell
Carl W. Myers

John P. Lockwood
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Carel Otte
Carey E. Peabody
John L. Rosenfeld
Eugene Seibold
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One anonymous gift

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Women in Science
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_____ I want to learn more about wills, bequests, and estate planning. Please send me a copy of Planning Your Bequests.

_____ Please send me information on planned giving.

Please print:

Name _____

Address _____

City/State _____

Phone _____

Committee Service Provides Way to Affect GSA

The GSA Committee on Committees wants your help. As one of his duties, Vice-President Raymond A. Price has appointed a group to look for talent to serve GSA as members of our committees and as our representatives to other organizations.

The Committee on Committees will meet in late August or early September and will present at least two nominations for each open position to the Council at its November 8 meeting in St. Louis, Missouri. During that meeting, individual councilors may add other names to the lists for consideration. The entire Council will then select appointees for all positions, thus completing the process of bringing new expertise into Society affairs.

The Committee on Committees for 1989 consists of the following people: Chairman John S. Scott, Geological Survey of Canada, 580 Booth Steet, Room 2048, Ottawa, Ontario, K1A 0E9 Canada, (613) 995-0623; Gerard C. Bond, Lamont-Doherty Geological Observatory, Columbia University, Palisades, NY 10964, (914) 359-2900; Robin Brett, U.S. Geological Survey, 959 National Center, Reston, VA 22092, (703) 648-6164; Erle G. Kauffman, Department of Geological Sciences, Campus Box 250, University of Colorado, Boulder, CO 80309-0250, (303) 492-6629; Eldridge M. Moores, Department of Geology, University of California-Davis, Davis, CA 95616, (916) 752-0352; Mary Lou Zoback, U.S. Geological Survey, MS-977, 345 Middlefield Road, Menlo Park, CA 94025, (415) 329-4760.

This group is broadly based, both geographically and in disciplines, but its members cannot possibly know all the GSA members who are potential candidates for serving the Society. You can help them by volunteering yourself or by suggesting names of others you think should be considered for any of the openings and submitting your nomination on the form on page 110.

In making recommendations, please give serious consideration to the special qualifications of the individual for a particular committee. To assist you in nominating GSA members for these various positions, see the following brief summaries of what each committee does and what qualifications are desirable. Please be sure that your candidates are Members or Fellows of the Society and that they meet fully the requested qualifications.

All nominations received at headquarters on the official one-page form will be forwarded to the committee members. **DEAD-LINE: JULY 15, 1989.** Information requested on this form will assist the Committee on Committees with their recommendations for the 1990 committee vacancies. Council has determined that "unless the nomination form is complete in every respect, the nomination will not be considered. Complete backup material must be supplied by the volunteer or the nominator." Please use one form per candidate. (Additional forms may be copied or requested from GSA headquarters.)

Listed below are the committees and the number of vacancies that will occur. Appointments will be made by the GSA Council at its meeting in St. Louis in November.

COMMITTEES AND QUALIFICATIONS

Day Medal (2 vacancies)

Selects candidates for the Arthur L. Day Medal.

Committee members should have knowledge of those who have made "distinct contributions to geologic knowledge through the application of physics and chemistry to the solution of geologic problems."

Education (2 vacancies)

Stimulates interest in the importance and acquisition of basic knowledge in the earth sciences at all levels of education.

Committee members work with other interested scientific organizations and science teachers' groups to develop precollege earth-science education objectives and initiatives. The committee also promotes the importance of earth science education to the general public.

Geology & Public Policy (2 vacancies)

Translates knowledge of the earth sciences into forms most useful for public discussion and decision making.

Committee members should have an awareness of public policy and decisions involving the science of geology. They should also be able to develop, disseminate, and translate information from the geologic sciences into useful forms for the general public and for the Society membership; they should be familiar with appropriate techniques for the dissemination of information.

Honorary Fellows (2 vacancies)

Selects candidates for Honorary Fellows, usually non-North Americans.

Committee members should have knowledge of geologists throughout the world who have distinguished themselves through their contributions to the science.

Investments (2 vacancies)

Meets with GSA money managers and informs the Council about investment of GSA's funds, securities, equities, etc.

Committee members should have knowledge of and experience in portfolio management and be able to make recommendations concerning investment policies.

Membership (2 vacancies)

Screens Member and Fellow applications; evaluates membership benefits and makes recommendations to the Council about them.

Committee members must be GSA Fellows and must be able to attend one meeting a year. Previous experience in recruitment programs and in the evaluation of professional qualifications is desired.

Nominations (5 vacancies; one position for a member from Canada or Mexico)

Recommends to the Council nominees for the positions of GSA officers and councilors.

Committee members should be familiar with a broad range of well-known and highly respected geological scientists.

Penrose Conferences (2 vacancies)

Accepts or rejects Penrose Conference proposals; recommends and implements guidelines for the success of the conferences.

Committee members must either be past conveners or have attended two or more Penrose Conferences.

Penrose Medal (1 vacancy)

Selects candidates for the Penrose Medal.

Committee members should be familiar with outstanding achievements in the geological community that are worthy of consideration for the honor. Emphasis is placed on "eminent research in pure geology which marks a major advance in the science of geology."

Publications (2 vacancies)

Makes recommendations to the Council concerning Society publications.

Committee members should be familiar with a wide range of scientific publications and especially GSA publications. Should also have some knowledge of publication processes and costs and

should have concern for the quality of content and presentation of GSA publications.

Research Grants (2 vacancies)

Evaluates research grant applications and selects grant recipients.

Committee members must be able to attend the spring meeting and should have experience in directing research projects and in evaluating research grant applications.

Short Courses (2 vacancies)

Will direct, advise, and develop the Society's short course program, accept or reject proposals, recommend and implement guideline changes, and monitor the scientific quality of courses offered. Committee members should be familiar with short courses or have short-course teaching experience.

Young Scientist Award (Donath Medal) (3 vacancies)

Selects candidates for the Donath Medal.

Committee to have members covering a broad range of disciplines, i.e., geophysics, economic geology, stratigraphy, etc.

Committee members should have knowledge of young scientists with "outstanding achievement(s) in contributing to geologic knowledge through original research which marks a major advance in the earth sciences."

Joint Technical Program Committee GSA Representatives-at-Large (1 vacancy)

Supervises the review of abstracts for papers to be presented at the GSA annual meeting. Representative-at-large should have expertise in Precambrian geology. Subdisciplines not represented by any of the associated societies or GSA divisions are covered by the GSA representatives-at-large.

GSA Representative to the North American Commission on Stratigraphic Nomenclature (1 vacancy)

Must be familiar with and have expertise in stratigraphic nomenclature.

Nomination form on page 110.

**Advanced Research Fellowships in India
Available for 1990-1991**

The Indo-U.S. Subcommittee on Education and Culture is offering twelve long-term (6-10 months) and nine short-term (2-3 months) awards for 1990-1991 research in India. These grants will be available in all academic disciplines, except clinical medicine. Applicants must be U.S. citizens at the postdoctoral or equivalent professional level. The fellowship program seeks to open new channels of communication between academic and professional groups in the United States and India and to encourage a wider range of research activity between the two countries than now exists. Therefore, scholars and professionals with limited or no prior experience in India are especially encouraged to apply.

Fellowship terms include \$1500 per month, of which \$350 per month is payable in dollars and the balance in rupees; an allowance for books and study/travel in India; and international travel for the grantee. In addition, long-term fellows receive international travel for dependents; a dependent allowance of \$100-\$250 per month in rupees; and a supplementary research allowance up to 34,000 rupees. This program is sponsored by the Indo-U.S. Subcommittee on Education and Culture and is funded by the United States Information Agency, the National Science Foundation, the Smithsonian Institution, and the Government of India.

The application deadline is **June 15, 1989**. Application forms and further information are available from
Council for International Exchange of Scholars
Attn: Indo-American Fellowship Program
3400 International Drive, Suite M-500
Washington, DC 20008-3097
(202) 686-4013.

Geo-Videos

**1989 GSA Science Theater
St. Louis Annual Meeting • November 6-9, 1989
Cervantes Convention Center**

In keeping with the 1989 GSA Annual Meeting theme, **Frontiers in Geoscience**, the organizing committee for the Science Theater encourages the submission of innovative audiovisual presentations for our review. Two media of particular interest are new professional-quality video and slide presentations, like those now available from numerous geology groups around the country. As always, we hope to obtain and show a variety of materials that will interest and educate professional geologists, geology students, and the populace.

If you have presentation-quality audiovisual materials that could be shown in the 1989 GSA Science Theater, please send your name, address, telephone number, and a description of the material (AV type and format, running time, age of suggested audience, program content) by June 30 to

Guy M. Smith
Dept. of Earth & Atmospheric Sciences
St. Louis University
3507 LaClede
St. Louis, MO 63156
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NOMINATION FOR GSA COMMITTEES FOR 1990

(One form per candidate, please. Additional forms may be copied.)

Name of candidate _____
Address _____ _____
Phone _____

(Please Print)

COMMITTEE(S) BEING VOLUNTEERED or NOMINATED FOR (please check):

Committee(s):

Comment on special qualifications:

GSA Fellow () Section affiliation:
GSA Member () Division affiliation(s):

Candidate's year of birth:

Brief summary of education:

Brief summary of work experience (include scientific discipline, principal employer—e.g., mining industry, academic, USGS, etc.):

If you are nominating someone other than yourself to serve GSA and are not volunteering, please give your name, address, and phone number (please print):

DEADLINE: Please return this form to headquarters by July 15, 1989.

To be considered, form must be complete in every respect.

More GSA Representatives Needed!

Four years ago, GSA launched a new representative program, targeting companies, agencies, and consultants throughout the country. The purpose was to broaden GSA's representation to include all employment sectors. The program was modeled on the successful campus representative program that was begun in 1979 and now includes 486 representatives at colleges and universities throughout North America.

We now have 103 company, 62 agency, and 47 consultant GSA representatives. However, we need more volunteers. Our goal is to designate a representative at all major company offices and governmental agencies throughout the country. For example, we hope to have a GSA representative for the Geological Survey of Alabama in Tuscaloosa, for the Geological Survey of Canada in Vancouver, for the U.S. Geological Survey in Tucson, etc. We want to develop a similar liaison with GSA members who are self-employed and serve as consultants. They would also represent major cities and geographic regions.

Representatives serve as liaisons between GSA headquarters and their constituency in a particular city or region. They provide information on the programs and benefits of the Society to other members in the region and explain to prospective members the benefits of joining GSA. Each representative receives a notebook containing complete information on all programs, activities, publications, meetings, and other benefits that the Society provides its membership. Examples include

- *Bulletin*, *Geology*, and *News & Information* every month
- 20% discount on GSA books, maps, and charts
- \$30 discount for GSA's Employment Service (applicants)
- \$10 discount for registration fees for Penrose Conferences
- \$20 reduction in Student Associate registration fees for GSA's Annual Meeting
- \$40 reduction on Member/Fellow registration fees for GSA's Annual Meeting
- Reduced registration fees for many GSA section meetings
- Reduced dues for GSA spouse members
- 25% discount on Member Standing Order Plan
- Special discounts on Decade of North American Geology publications
- Group term life insurance plan at reduced member rates
- Opportunity to participate in GSA's specialized divisions and to receive their newsletters
- Opportunity to apply for student grants-in-aid in the Southeastern Section and the North-Central Section
- Discount for subscriptions to *Engineering Geology Abstracts* for Engineering Geology Division affiliates
- Discount for National car rentals
- 25% discount on many Geological Society of London publications
- Reduced subscription rate for publications of the American Institute of Physics
- Discount on subscriptions to *Geoarchaeology* or *Neotectonics* for GSA Division affiliates

We need your help to continue this communications link between GSA headquarters and the membership of the Society. If you are a Member or Fellow (not Student Associate) and are interested in serving GSA as a representative for your company, agency, or group of the employment sector, please complete and return the form below. Play an active role in the affairs of your Society and be the first in your area to represent GSA!

We thank the following GSA representatives now serving to keep the program growing.

CURRENT GSA REPRESENTATIVES

Cordilleran Section

Alaska

Steven W. Nelson—U.S. Geological Survey, Anchorage

Arizona

David R. Annis—Arizona Department of Water Resources, Phoenix

Peter A. Drobeck—Kingman

Frederic B. Loomis—Green Valley

Donald A. Parks—Parks Petroleum Company, Carefree

David A. Stephenson—Harding Lawson Associates, Phoenix

California

Richard T. Bachman—Naval Ocean Systems Center, San Diego

Kenneth S. Baldwin—U.S. Forest Service, Happy Camp

John L. Burnett—California Department of Conservation, Sacramento

David M. Burt—Intellus Corporation, Irvine

Paul R. Carlson—U.S. Geological Survey, Menlo Park

Richard George Chalcraft—Chevron Oil Field Research, La Habra

Ray A. Eastman—Anaheim

Dorian Elder-Mills—J. H. Kleinfelder & Associates, San Diego

G. Thomas Farmer, Jr.—Ecology & Environment, Inc., Los Angeles

John Ferguson—U.S. Army Corps of Engineers, Los Angeles

Michael A. Fisher—U.S. Geological Survey, Menlo Park

Gerard M. Flaherty—Chevron, U.S.A., Inc., San Ramon

John H. Foster—Schaefer Dixon Associates, Santa Ana

John J. Francis—Earth Technology Corporation, Long Beach

S. Thomas Freeman—Woodward-Clyde Consultants, Santa Ana

Wilbert P. Gaston—Alton Geoscience, Irvine

Robert G. Hickman—Union Oil Company of California, Brea

David B. Kelley—California Central Valley

Franklyn G. Koch—Chevron, U.S.A., Inc., San Francisco

Elizabeth T. Lafferty—California Department of Health Services,

Los Angeles

E. Dean B. Laudeman—Unocal Corporation, Los Angeles

Kenneth H. Lister—SCS Consultants, Long Beach

Dalton F. Lockman—EXXON Company, U.S.A., Thousand Oaks

John D. Matthey—Terratech, Inc., San Jose

Douglas D. McGinnis—K-C Geotechnical Associates, Santa Barbara

Eric McHuron—Roger Foott Associates, Inc., San Francisco

Mark P. Molinari—Dames & Moore, Santa Barbara

William C. Paris, Jr.—EMCON, San Jose

David C. Pieri—Jet Propulsion Laboratory, Pasadena

Richard James Proctor—Richard J. Proctor, Inc., Arcadia

Glenn R. Roquemore—Naval Weapons Center, China Lake

Donn C. Schwartzkopf—Leighton & Associates, Riverside

Grayce S. Teal—San Bernardino County Government, San Bernardino

Stephen M. Testa—Engineering Enterprises, Inc., Long Beach

James W. Tucker—ARCO International Oil & Gas Company, Los Angeles

Stephen P. Vonder Haar—Berkeley

C. Penny Webster-Scholten—Lawrence Livermore National Laboratory,
Livermore

Mark R. Wood—ERT, Inc., Irvine

Hawaii

John P. Lockwood—U.S. Geological Survey, Hawaii National Park

Nevada

Ray H. Davis—J. H. Kleinfelder & Associates, Reno

James J. Hodos—Onstream Resource Managers, Inc., Carson City

Steven R. Mattson—SAIC, Las Vegas

Washington

Russell B. Axelrod—CH2M Hill Northwest, Inc., Bellevue

Randall E. Brown—Tri Cities (Pasco, Kennewick, Richland)

Glenn R. Bruck—U.S. Environmental Protection Agency, Seattle

Michael G. Foley—Battelle, Pacific Northwest Laboratories, Richland

Peter N. Gabby—U.S. Bureau of Mines, Spokane

Richard W. Galster—Seattle

Rand D. Miller—Everett, Puget Sound area

William H. Price—Rockwell Hanford Operations, Richland

Weldon W. Rau—Department of Natural Resources, Olympia

(continued on p. 112)

GSA Representatives (continued from p. 111)

British Columbia

Robert F. Gerath—North Vancouver area

Rocky Mountain Section

Colorado

William P. Bosworth—Marathon International Oil Company, Littleton
William L. Chenoweth—Museum of Western Colorado, Grand Junction
Steven W. Cox—UNOCAL Corporation, Parachute
Stephen M. Decker—Texaco, Denver
David E. Eby—Champlin Petroleum Company, Englewood
Donald L. Everhart—Grand Junction
Charles Frederick Kluth—Chevron, U.S.A., Inc., Denver
Rex A. Knepp—Marathon International Oil Company, Littleton
Anthony S. Murer—Mobil Company, Denver
Stephen C. Parsons—U.S. Office of Surface Mining Reclamation and Enforcement, Denver
John W. Rold—Colorado Geological Survey, Denver
Mark S. Roth—UNC Technical Services, Grand Junction
Susan Soloyanis—Amoco Production Company, USA, Denver
Donald S. Stone—Sherwood Exploration Company, Littleton
Harry A. Tourtelot—U.S. Geological Survey, Denver
Stephanie B. Urban—Petroleum Information Corporation, Denver
J. Peter Weidenheim—Denver

Montana

Michael G. Boston—Western Energy Company, Butte
William B. Hansen—U.S. Bureau of Land Management, Billings

New Mexico

Rhea L. Graham—Deuel & Associates, Inc., Albuquerque
Loughlon C. Quinn—Chevron U.S.A., Inc., Hobbs
Michael L. Pierce—Antweil Oil Company, Hobbs
Robert Raymond, Jr.—Los Alamos National Laboratories, Los Alamos
Robert E. Riecker—Los Alamos National Laboratories, Los Alamos
Margaret A. Rogers—Margaret Anne Rogers & Associates, Inc., Los Alamos

South Dakota

Timothy J. Vogt—Black Hills area

Utah

Richard F. Riordan—Utah Geological Association and Salt Lake City area

Wyoming

Gary B. Glass—Geological Survey of Wyoming, Laramie
Karl S. Ovald—Wyoming Geological Association, Casper
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Meredith Eggers Ostrom—Wisconsin Geological and Natural History Survey, Madison

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Adrienne N. Nunan—EXXON Company, U.S.A., Houston
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Paul H. Pausé—Midland
Harold P. Raveling—Champlin Petroleum Company, Ft. Worth
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Eric J. Dougherty—Maryland Department of Health and Mental Hygiene, Baltimore
William C. B. Gates—U.S. Army Environmental Hygiene Agency, Aberdeen Proving Ground

Massachusetts

Timothy H. Ling—U.S. Geological Survey, Woods Hole

(continued on p. 113)

GSA Representatives (continued from p. 112)

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Danna B. Truslow—Portsmouth

New Jersey

James O. Brown—Langan Environmental Services, Elmwood Park
Karl W. Muessig—New Jersey Geological Survey, Trenton
Stephen J. Urbanik—New Jersey Department of Environmental Protection, Trenton

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Robert H. Fickies—New York State Geological Survey, Albany
James M. Gibson—Amerada Hess Corporation, New York
Eileen D. Gilligan—Syracuse, New York State
Andrew J. Kucserik—Empire Soils Investigations, Kenmore
David L. Palmerton, Jr.—Buffalo/western New York State
Demetrius C. Pohl—American Museum of Natural History, New York
C. John Suen—Brookhaven National Laboratory, Upton
Walter S. Urbanski, Jr.—Intermagnetics General Corporation, Albany

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John C. B. Simonson—Environmental Research Management, Exton
Kevin D. Svitana—Benatec Associates, Camp Hill
Daniel Threlfall—Chemviron, Inc., Pittsburgh

Province Quebec

Pierre LaSalle—Quebec Department of Energy & Resources

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Gerald G. Parker, Sr.—Parker & Associates, Tampa
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Barry J. Rava—Conoco, Inc., Lafayette
Arthur T. Smith—Chevron U.S.A., New Orleans

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Wilbur H. Knight—Jackson
Allen Lowrie—U.S. Naval Oceanographic Office, Picayune

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M. L. Babuin—North Carolina Department of Human Resources, Raleigh
Ivan K. Gilmore—Texasgulf, Inc., Aurora
C. Edward Howard—Research Triangle Institute, Research Triangle Park
Garry C. Maurath—Ebasco Services, Inc., Greensboro

South Carolina

Steven K. Mittweide—South Carolina Geological Survey, Columbia

Tennessee

RaNaye B. Dreier—Oak Ridge National Laboratory, Oak Ridge
Phyllis M. Garman—Garman Geologic Consulting, Nashville
Edward T. Luther—Tennessee Department of Conservation, Nashville

Virginia

Bruce Doe—U.S. Geological Survey, Reston
Wilson N. Felder—TRW Systems, Fairfax
John J. Hnat—Amherst
Jean D. Juillard—U.S. Bureau of Land Management, Vienna
Robert C. Milici—Virginia Division of Mineral Resources, Charlottesville
(continued on p. 114)

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Anthony S. Scales—Virginia Department of Mines, Minerals, and
Energy, Big Stone Gap
Eileen M. Sullivan—Virginia Water Control Board, Richmond

West Virginia

Peter Lessing—West Virginia Geological Survey, Morgantown

Other

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Mary N. Gilzean—Minera Utah de Las Americas, Salta

Australia

Willard F. Coffin—Bureau Mineral Resources, A.C.T.

Dominican Republic

Gerald M. Ellis—Dominican Directorate General of Mines,
Santo Domingo

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Ram N. Choudhary—Oil & Natural Gas Commission, Bombay

In Memoriam

Edward S. Deevey
Gainesville, Florida
November 29, 1988

James R. Jensen
Deer Park, Washington
December 9, 1988

G. Donald Emigh
Burley, Idaho
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Paul M. Johnston
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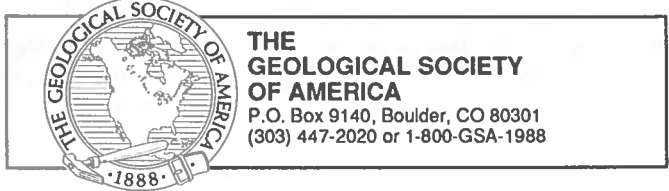
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The Art of Geology, edited by Eldridge M. Moores and F. Michael Wahl, 1988. Deluxe hardbound edition, 140 p., full color throughout, 9"X12", with dust jacket, ISBN 0-8137-2225-X. List price \$37.50.

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Professional Horizons

1989 Annual Meeting Short Courses

GSA Short Courses

All courses sponsored by GSA will be held immediately before the GSA Annual Meeting in St. Louis, Missouri. Increase the benefits of attending the GSA meeting by participating in one of GSA's professional instruction programs. The courses are designed for several different professional levels. We hope you will find one that meets your needs.

Enrollment. Course participation is open to GSA members and nonmembers. Registration for the 1989 Annual Meeting is not required. Registration forms for the short courses and the Annual Meeting will appear in the August issue of *GSA News & Information*. **However, if you would like to register now, contact the course registrar and receive a registration form and the GSA Short Course brochure.** Save significantly by registering in advance. On-site registration will be \$25 additional and based on availability. **PREREGISTRATION DEADLINE IS OCTOBER 6, 1989.**

Cancellation. Fees will be refunded if we are notified by October 13. Registration substitutions may be made at any time. For more information, contact Edna Collis, Course Registrar, GSA Headquarters, (303) 447-2020 or 1-800-GSA-1988.

Contaminant Hydrogeology: Practical Monitoring, Protection, and Cleanup. Saturday, November 4, 8 a.m. to 5 p.m.; Sunday, November 5, 8 a.m. to 5 p.m. Cervantes Convention Center.

This course is of interest to newcomers to practical contaminant hydrogeology as applied daily to soil and ground-water contamination problems. The presentation will include discussion of theoretical and practical elements of geologic and hydrogeologic investigations, subsurface drilling, and water sampling techniques. Also covered are contaminant transport and fate, data interpretation, aquifer analysis, criteria for selecting monitoring and remediation procedures, and site cleanup. Emphasis is also placed on operating within the existing regulatory world and client and budgetary considerations. Case histories will include discussions of applying techniques in LUST, CERCLA, and RCRA projects, hazardous waste landfill siting, and contaminated properties in several states.

Faculty: *Christopher M. Palmer*, Senior Geologist, Gettler-Ryan, Inc.; M.A., California State University. Palmer has 11 years of consulting experience in engineering geology and hydrogeology for soil and ground-water quality, LUST, RCRA, and landfill siting studies. He teaches a contaminant hydrogeology course for the University of California, Santa Cruz, and is a registered geologist in California, Arkansas, and Florida. *Jeffrey L. Peterson*, Senior Hydroecologist, Gettler-Ryan, Inc.; M.S., California State University. Peterson has 11 years of consulting experience in soil and ground-water quality, geology, and contaminant hydrogeology dealing with LUST, RCRA, and CERCLA investigations. He has performed RI/FS investigations for the U.S. Navy and Air Force for Installation Restoration Programs.

Limit: 40. Fee: \$180; includes course manual and lunch both days.

Creating Geological Applications with Macintosh HyperCard. Saturday, November 4, 8 a.m. to 5 p.m.; Sunday, November 5, 8 a.m. to 5 p.m. Cervantes Convention Center. Cosponsor: National Association of Geology Teachers.

Apple Computer's HyperCard for the Macintosh has been hailed as one of the most innovative and versatile pieces of computer software since spreadsheets or BASIC. Since 1987,

hundreds of HyperCard "stacks" have appeared. Many educators believe that the program has immeasurable implications for pedagogy and the potential to change how academic computing is done. HyperCard places an enormous amount of creative power in the hands of the user. In the business world, outstanding HyperCard stacks are being created for training purposes. Many researchers now have begun to use HyperCard as a valuable tool, as this unique program can be used to organize, file, and associate information. This hands-on short course will introduce participants to the capabilities of HyperCard, demonstrate a wide range of existing applications, and provide a reasonably thorough grounding in using HyperCard. Appropriate for all geologists, including graduate students, academics, and industry representatives, the course will include demonstrations of numerous stacks with a geological emphasis as well as stacks from other scientific disciplines.

Covered in the course will be

- organizing and using information in stacks; basic navigation
- creating stacks: how to create backgrounds, graphics, new fields; working with buttons; creating and modifying cards
- introduction to scripting: programming in HyperCard, basic commands, card scripting, visual effects, field information
- linking cards to other programs
- incorporating animation and sound
- controlling videodisc players
- developing your own stack.

Course participants will receive disks containing several stacks, tools, and scanned images to use in preparing their own stacks. Only limited experience with a computer is necessary.

Faculty: *H. Robert Burger*, Department of Geology, Smith College; Ph.D., Indiana University. Burger has used computers in teaching and research for more than 20 years and has taught computer programming and software development concepts in numerous seminars and workshops. Involved with HyperCard since its release, Burger has developed several Macintosh software packages for use in physical geology, structural geology, and exploration geophysics. The Macintosh computers used in this course are provided by Apple Computer, Inc., Chesterfield, Missouri.

Limit: 40. Fee: \$135; includes course manual and disks.

Current Aspects of Basin Analysis and Sedimentary Geology: A Two-Day Overview. Saturday, November 4, 8 a.m. to 5 p.m.; Sunday, November 5, 8 a.m. to 5 p.m. Cervantes Convention Center. Cosponsor: Sedimentary Geology Division.

This course is devoted to providing an overview of both basin analysis and sedimentary geology. The content is intended for earth scientists in advanced academic and governmental programs as well as those in oil, mining, or hydrologic/engineering companies. The goal is to stress interdisciplinary aspects of basin analysis, focusing particularly on how geodynamic processes of basin formation influence both the nature of sediment fills and the maturation of the sediment through diagenesis, fluid circulation, and thermal history. The course includes discussion of methods of tectonic subsidence analysis and geohistory analysis. Additional topics include basin classification, cratonic sequences, sea-level history, seismic stratigraphy, paleogeography, sedimentary facies, black shales, pelagic cycles, fluid migration through sedimentary basins, and clastic diagenesis. These topics are used to illustrate the role of interpreting sediments as a barometer of basin tectonic

(continued on p. 117)

Short Courses (continued from p. 116)

processes, and extrinsic basinal processes during basin evolution. The course incorporates basin analyses from the Illinois Basin and the North Sea to illustrate the interdisciplinary approaches discussed in the lectures. This is an expanded version of the one-day course Klein presented at the 1987 GSA Annual Meeting in Phoenix.

Faculty: *George deV. Klein*, Department of Geology, University of Illinois at Urbana-Champaign; Ph.D., Yale University. Well known in the fields of basin analysis and clastic sedimentary geology, Klein has more than 25 years of experience and is the author of more than 100 publications.

Limit: 100. Fee: \$135; includes course manual and lunch both days.

ATTENTION, STUDENTS: The Sedimentary Geology Division will subsidize students who are valid division members. Students MUST PAY THE FULL COURSE FEE when registering, but will be reimbursed \$50 after the GSA meeting by the Sedimentary Geology Division.

***Fission-Track Analysis: Theory and Applications.** Saturday, November 4, 8 a.m. to 5 p.m.; Sunday, November 5, 8 a.m. to 5 p.m. Sheraton Hotel.

This introductory-level course will review the theory of fission-track dating methods and their application to a variety of geoscience problems. Designed for academic and industry geoscientists, including advanced graduate students, the course will consist primarily of lecture, demonstration, and discussion. Topics to be covered include the formation and revelation of fission tracks in solids, the measurement of fission-track ages (derivation and calibration of the age equation; error estimation; laboratory techniques), the interpretation of measured ages (effects of environmental factors, particularly temperature, on measured ages), and applications of fission-track analysis in geochronology and thermochronology. Several applications will be discussed, including

- thermal histories of sedimentary basins, particularly with regard to hydrocarbon generation
- timing of mineralization
- timing of tectonic or erosional unroofing of geologic terrains
- dating ash beds and lava flows
- dating landform development
- reconstructing provenance from sedimentary rocks.

Faculty: *Kevin D. Crowley*, Department of Geology, Miami University at Oxford, Ohio; Ph.D., Princeton University. Crowley has more than 7 years of experience in the development of fission-track techniques and their application to aspects of intraplate deformation, particularly the formation of intracratonic sedimentary basins and the timing of continental epeirogeny. *Charles W. Naeser*, Branch of Isotope Geology, USGS, Denver; Ph.D., Southern Methodist University. Naeser has 24 years of experience in the field of fission-track dating. He has been responsible for the development of the technique and its application to the study of sedimentary basins, tephrochronology, mineral deposits, tectonics, plutonic and volcanic rocks, and landform evolution. *Nancy D. Naeser*, Branch of Central Regional Geology, USGS, Denver; Ph.D., Victoria University, Wellington, New Zealand. Naeser has specialized over the last 13 years in the application of the fission-track method to the thermal and depositional histories of sedimentary basins and to tephrochronology. The Nikon microscopes used in this course are provided by Frank E. Fryer, Inc., Carpentersville, Illinois.

Limit: 75. Fee: \$135; includes course manual and lunch on Saturday.

Geologic Considerations in Hazardous-Waste Site Characterization. Saturday, November 4, 8 a.m. to 5 p.m.; Sunday, November 5, 8 a.m. to 5 p.m. Cervantes Convention Center.

Designed for the professional, this course will be directed toward the solution of geologic, hydrogeologic, and geotechnical problems encountered in the characterization of sites for hazardous-waste management. The course will include discussion of such topics as evaluation of geologic and ground-water conditions for site characterization, design and installation of monitoring wells, geophysical techniques for site characterization, geologic and hydrogeologic factors influencing the selection and implementation of remedial actions, design of engineered liners, covers, and cut-off walls, and remedial action contract negotiation.

Faculty: *John D. Rockaway*, Department of Geological Engineering, University of Missouri—Rolla; Ph.D., Purdue University. Rockaway has more than 20 years of experience in teaching and professional practice. He has previously directed several short courses presented to practicing engineering geologists. He has published several papers on environmental geologic studies for land-use planning. *Allen W. Hatheway*, Department of Geological Engineering, University of Missouri—Rolla; Ph.D., University of Arizona. Hatheway has 27 years of professional experience. He is a Fellow of the Geological Society of America, past-chairman of the Engineering Geology Division, and recipient of the 1981 Burwell Award. He currently serves as a U.S. Environmental Protection Agency national lecturer on remedial engineering at hazardous-waste cleanup sites. *Gregory L. Hempen*, U.S. Army Engineer District, St. Louis; M.S., University of Minnesota. A geophysicist, Hempen is experienced in engineering geophysics (for bedrock topography, foundation considerations, karst detection and ground-water availability), hydrogeology (including flow modeling), environmental engineering duties for hazardous waste mitigation, foundation evaluation, and borehole geological and geophysical logging. *Christopher R. Ryan*, president, Geo-Con, Inc.; M.S., Massachusetts Institute of Technology. Ryan founded and is the chief executive officer of Geo-Con, one of the leading companies involved with the development of techniques and procedures for using positive cut-off walls and synthetic liners for the isolation of hazardous-waste sites. *Charles Riggs*, Sverdrup Corporation; Ph.D., University of Missouri—Rolla. Riggs serves as Project Manager for Hazardous Wastes and Senior Hydrologist for Sverdrup. He has more than 20 years of professional experience in ground-water hydrology and recently has been closely associated with the EPA Alternative Remedial Contract Strategy Program.

Limit: 50. Fee: \$150; includes course manual.

Planning Hydrologic and Geologic Investigations and Reports. Saturday, November 4, 8 a.m. to 5 p.m.; Sunday, November 5, 8 a.m. to 5 p.m. Cervantes Convention Center. Cosponsor: Hydrogeology Division.

Designed for those with some experience in hydrologic and geologic investigations, the objective of this short course is to provide guidelines to improve the technical quality, readability, and timeliness of hydrologic and geologic investigations and technical reports. The major sections of the course are

- planning project proposals, cost estimates
- project management and project review (use of management by objectives)
- report planning and organization
- report writing
- report review.

The course will include lectures and several exercises.

(continued on p. 118)

*Courses featured as part of the 1989 theme, *Frontiers in Geoscience*.

Short Courses (continued from p. 117)

Faculty: *John E. Moore*, USGS; Ph.D., University of Illinois. Moore is a hydrologist with the Water Resources Division of the USGS and has more than 30 years of experience. Currently Chief of the Scientific Publications Branch at USGS, Reston, he is responsible for evaluating the technical and editorial quality of more than 1200 technical reports prepared each year. Moore is the president of the American Institute of Hydrology and is editor for the American Water Resources Association. He is the author of more than 30 technical reports. *Terry L. Steinborn*, Dames & Moore; Ph.D., University of New Mexico. Steinborn is a geochemist with more than 15 years of experience, much of it in radioactive waste disposal. He has managed large and small government-funded projects and has produced many reports and proposals.

Limit: 75. Fee: \$150; includes course manual and lunch both days.

Quantitative Interpretation of Joints and Faults. Saturday, November 4, 8 a.m. to 5 p.m.; Sunday, November 5, 8 a.m. to 5 p.m. Holiday Inn Riverfront Hotel. Cosponsor: Structural Geology and Tectonics Division.

This will be a general course for the structural geologist who needs to brush up on the modern methods of field interpretation of joints and faults. The course will focus on the treatment of field examples (i.e., the outcrop and core samples) but will include an introduction to laboratory techniques and theoretical analysis. Four sessions will include the following topics:

- Observational approaches: the morphology of outcrop scale joints and fault surfaces

- Kinematics: kinematic analysis of faults and joints; sampling the field methods
- Lab and theory: fracture toughness testing; triaxial and friction tests; an introduction to fracture mechanics
- Dynamic interpretation: fault-slip techniques; regional patterns and genesis; local problems in crack propagation.

Faculty: *Terry Engelder*, Department of Geosciences, Pennsylvania State University; Ph.D., Texas A&M University. Engelder's interests include a combination of laboratory rock mechanics, field measurements of rock properties and in situ stress, and field structural geology. His field mapping has focused on the deformational processes associated with the evolution of foreland fold-thrust belts. Of particular interest is the development of those structures associated with rock-water interaction, including disjunctive cleavage and hydraulically driven joints. In mapping joints and fractures, he has worked on the Appalachian Mountains, the Umbrian Apennines of Italy, and the Salt Range of Pakistan. His latest work involves an estimation of the fluid-pressure history of foreland fold-thrust belts based on the distribution of joints and fluid inclusion data. *Richard W. Allmendinger*, Department of Geological Sciences, Cornell University; Ph.D., Stanford University. Allmendinger is a field structural geologist with a practical background in reflection and earthquake seismology. He has worked extensively in both the Andes and in the western U.S. Cordillera. Since 1983, a major research focus has been the application of kinematic and dynamic methods of fault-slip data analysis to problems of continental plateau uplift in the Altiplano-Puna of the central Andes. *Atilla Aydin*, Department of Earth and Atmospheric Sciences, Purdue University; Ph.D., Stanford University. Aydin is interested in the

(continued on p. 119)

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Short Courses (continued from p. 118)

processes involved in initiation, propagation, interaction, and evolution of natural fractures at various scales. He has, together with colleagues, published more than 20 journal articles dealing with faulting in sandstone, thermal fracturing, jointing in sedimentary rocks, the number and orientation of normal fault sets, strike-slip fault patterns, and associated pull-apart basins and push-up ranges. Aydin is co-director of the Rock Fracture Program, a joint venture of Purdue and Stanford universities. *David D. Pollard*, Department of Applied Earth Sciences, Stanford University; Ph.D., Stanford University. Pollard has gained an international reputation for rock fracture research by integrating detailed field mapping of geologic structures with rigorous theoretical analyses using continuum and fracture mechanics. He and his students have published more than 40 journal articles on rock-fracture topics, including the structural evolution of volcanic rifts, the growth of strike-slip fault zones, and the propagation of joints, veins, and dikes. This research has identified new methods for deducing the state of stress from field measurements and has elucidated the mechanisms of fracture propagation in rock at scales ranging from centimetres to kilometres. Pollard is co-director of the Rock Fracture Program, a joint venture of Purdue and Stanford universities.

Limit: 100. Fee: \$135; includes course manual and lunch both days.

Fabric of Cements in Paleozoic Limestones. Sunday, November 5, 8 a.m. to 5 p.m. Washington University, St. Louis. Cosponsor: Sedimentary Geology Division.

This course is designed for intermediate to advanced graduate students and for professionals working on Paleozoic carbonate

rocks in terms of depositional environments, or on carbonates of other ages, and interested in comparing the results of their diagenetic analyses with those in Paleozoic rocks. It will consist of short, illustrated presentations on principles of cement-fabric interpretation and on the fabrics characteristic of various diagenetic environments, as well as brief case-study reports. There will be a "hands-on" laboratory session in which participants will rotate among a group of work stations, at each of which the characteristic fabrics of a particular diagenetic environment or those in the rocks of one of the case studies will be examined.

Faculty: *Kenneth R. Walker*, Department of Geological Sciences, University of Tennessee; Ph.D., Yale University. Currently, Carden Professor of Geology at the University of Tennessee, Walker is the author of several books and more than 50 articles related to lower Paleozoic carbonate sedimentology and paleoecology. *Stephen O. Moshier*, Department of Geology, University of Kentucky; Ph.D., Louisiana State University. Moshier, an Assistant Professor of Geology at the University of Kentucky, is the author of several articles on the origin and diagenesis of micritic sediments. *Robert E. Johnson*, Resource Applications, Inc.; Ph.D., University of Tennessee. Johnson is currently involved in waste isolation and other ground-water geochemistry consulting projects. *Lawrence J. Weber, Jr.*, Mobil Oil Production Co.; Ph.D., University of Tennessee. Weber is employed in hydrocarbon exploration by Mobil Exploration & Producing, U.S., Midland, Texas. *J. Lincoln Foreman*, Oak Ridge National Laboratory; M.S., Bowling Green State University. Now completing a Ph.D. degree at the University of Tennessee, Foreman is a Graduate Research Fellow at Oak Ridge National Laboratory and involved in research on low-temperature

(continued on p. 120)

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Short Courses (continued from p. 119)

water-rock interaction. *D. Gregory Jernigan*, Martin Marietta Energy Systems; M.S., University of Tennessee. A Waste Management Compliance Analyst at Oak Ridge National Laboratory, Jernigan is involved with ground-water aspects of waste management. *Keith E. Roberson*, Department of Geological Sciences, University of Tennessee; M.S., University of Alabama. Formerly employed by the Geological Survey of Alabama, Roberson is completing a Ph.D. degree at the University of Tennessee. *D. Mark Steinhaff*, Department of Geological Sciences, University of Tennessee; M.S., Ohio State University. Formerly with the California Division of Mines and Geology, Shell Oil Company, and Exxon Company, Steinhaff is completing a Ph.D. degree at the University of Tennessee.

Limit: 30. Fee: \$150; includes course manual.

ATTENTION, STUDENTS: The Sedimentary Geology Division will subsidize students who are valid division members. Students **MUST PAY THE FULL COURSE FEE** when registering, but will be reimbursed \$50 after the GSA meeting by the Sedimentary Geology Division.

Glaciotectonic Structures and Landforms. Sunday, November 5, 8 a.m. to 5 p.m. Sheraton Hotel. Cosponsor: Quaternary Geology and Geomorphology Division.

Designed for professional geologists and graduate students with some experience in glacial and/or structural geology, this course will include recognition, description, classification, distribution, and methods of analysis of glaciotectonic structures and landforms. Glaciotectonic features are those deformations of bedrock and sediment due to movement or loading of glaciers or ice sheets. Such disruptions extend as deep as 200 m below the surface and may involve areas exceeding 1000 km². They are increasingly recognized in regions of former glaciation, particularly the north-central United States and Canadian plains, where thick glacial deposits rest on sedimentary bedrock. The case-example approach will be used to illustrate various typical glaciotectonic settings from the United States, Canada, and Scandinavia. Applied aspects of mining and construction in glacially disrupted terrain will also be illustrated.

Faculty: *James S. Aber*, Department of Earth Science, Emporia State University; Ph.D., University of Kansas. Aber has extensive field experience in the northeastern and north-central United States, the Canadian prairies region, and in Scandinavia. He has received a Fulbright-Hays Grant (Denmark, 1979), and a Marshall Fund Award (Norway, 1987).

Limit: 30. Fee: \$75; includes course manual and lunch.

***Quaternary Climates: The Ocean Sedimentary Record.** Sunday, November 5, 8 a.m. to 5 p.m. Cervantes Convention Center.

During the next century questions about climatic processes and climate change will become increasingly important to the well-being of humanity. To understand the critical aspects of future climatic changes and how they may affect society, the earth science community needs to become familiar with the causes and consequences of prior changes. Earth scientists are the custodians of the climate records and thus have the responsibility for discovering and interpreting that record and presenting it to a broader audience. This short course is designed to acquaint geologists with the latest advances in understanding the climates of the late Cenozoic glacial ages and the techniques that provided those insights. The general objectives of the course are to summarize our knowledge of climatic

*Courses featured as part of the 1989 theme, *Frontiers in Geoscience*.

controls of oceanic sedimentation and to show how that record has been used to infer the history and mechanisms of climate change. This will be done by presenting a series of lectures on the topics of the nature of and interactions among the several climatic subsystems; the Milankovitch theory of orbital forcing of climate systems; the marine stratigraphy of the Quaternary; the processes and patterns of oceanic sedimentation during the Quaternary and their temporal variability; and the techniques for establishing links between the oceanic and terrestrial records of Quaternary climatic change. Each topic will be illustrated with case studies based on the instructors' research and that of other marine geologists and paleoclimatologists. The course will provide material that can be used as a state-of-the-art unit for a class in Quaternary geology.

Faculty: *David K. Rea*, Department of Geological Sciences, University of Michigan; Ph.D., Oregon State University. When not deciphering the eolian record of paleoclimate preserved in deep-sea sediments, Rea serves as chairman of the Pacific Ocean Advisory Panel of the Ocean Drilling Program and is currently Director of the University of Michigan's Center for Great Lakes and Aquatic Sciences. He spent most of 1986-1987 serving as the Associate Director of the Climate Dynamics Program of the National Science Foundation. *Margaret Leinen*, Graduate School of Oceanography, University of Rhode Island; Ph.D., University of Rhode Island. Leinen's research centers on the quantitative and paleoclimatic interpretation of the mineralogy and geochemistry of ocean sediments. Leinen serves on the Ocean Drilling Program Planning Committee and is the Associate Dean of the Graduate School of Oceanography at the University of Rhode Island. She has served on several review and advisory committees at the National Science Foundation. Rea and Leinen have been studying the geologic record preserved in ocean basins for a total of 40 years. Between them they have participated in two dozen ocean research cruises and have been chief scientists on standard, ocean drilling, and research submersible vessel voyages. They are the authors of more than 100 reviewed articles and numerous reports and abstracts.

Limit: 75. Fee: \$90; includes course manual and lunch.

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1990 GSA Annual Meeting—Dallas, Texas

October 29–November 1
Dallas Convention Center

General Chairman: David E. Dunn,
University of Texas at Dallas

Field Trips Deadline August 15, 1989

If you would like to lead a trip or have an idea for a trip, please contact one of the chairmen immediately.

By working with a division or associated society, you may be able to focus in depth on a topic by coordinating a technical session, short course, and field trip. Plans must be made early because theme session, symposia, and short course deadlines occur by the end of this year.

Field Trip Chairmen

Robert T. Clarke (Chairman), Mobil Research & Development Corp., DRD—P.O. Box 819047, Dallas, TX 75381, (214) 851-8481

Kent C. Nielsen (Co-Chairman), Program in Geosciences, University of Texas at Dallas, Richardson, TX 75083-6088, (214) 690-2401 (dept.), (214) 690-2448 (direct)

Short Course Deadline December 15, 1989

Proposals are encouraged from members and nonmembers. Proposals will be reviewed by GSA's Short Course Committee no later than January 31, 1990.

For short course proposal guidelines contact:

Short Course Coordinator

Edna Collis, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020

Theme Session and Symposia Deadline ... January 2, 1990

For 1990 program specifics contact:

Technical Program Chairman

Richard M. Mitterer, Program in Geosciences, University of Texas at Dallas, Richardson, TX 75083-6088, (214) 690-2401 (dept.), (214) 690-2462 (direct)

For general information on program participation (1990 and future years) contact:

GSA Meetings Manager

Sue Beggs, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020



The Age of Dinosaurs Short Course

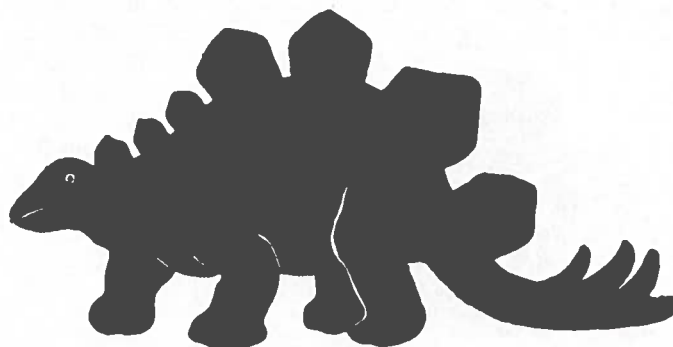
Sunday, November 5, 8:15 a.m. to 5:30 p.m. Adam's Mark Hotel.
Cosponsors: National Association of Geology Teachers, Paleontological Society, and Society of Vertebrate Paleontology.

This course is designed to bring nonspecialists up to date on recent advances in the knowledge of dinosaurs and to provide participants with a basis on which to develop an introductory dinosaur course in their own institutions. Dinosaurs are an endless source of interest for students, and they can be used to teach a spectrum of concepts from molecular evolution to geophysics. Dinosaur courses currently enroll 600 or more students and can stimulate all kinds of students to learn more about earth and life history. (Department Chairs, please note!) This course will be taught by 12 dinosaur specialists, and ample discussion time is planned. Short course notes will supplement lectures and provide references. Geological, ecological, and evolutionary aspects will be covered along with new ideas and issues. The focus will be on both explaining recent advances and on showing participants how to set up a dinosaur course.

Faculty: K. Padian, D. Fastovsky, B. H. Tiffney, P. Sereno, D. B. Norman, J. McIntosh, T. Rowe, P. J. Currie, J. A. Gauthier, M. Lockley, J. D. Archibald, D. Chure.

No cost. Short course notes will be available on-site for approximately \$15. **PREREGISTRATION IS REQUIRED.** To reserve a seat, please fill out the form and send by **OCTOBER 1, 1989** to

Kevin Padian
Museum of Paleontology
University of California
Berkeley, CA 94720



Please reserve a seat for me at the Age of Dinosaurs Short Course, Sunday, November 5, 1989 at the GSA Annual Meeting in St. Louis.

Name _____

Institution _____

Address _____



PHOTOGRAPHY

Frontiers Photo Salon

An attraction at the GSA Annual Meeting in St. Louis this year will be GSA's first photo contest. Entries will be judged on basis of impact, content, composition, and overall presentation.

- Color or black and white prints.
- Print size: minimum of 8" x 10"; up to maximum of 20" x 24".
- Prints mounted on white, blue, beige, or black mat board.
- Description of print on front lower edge of mat board.
- Your name and address on back of mat board.
- Only 1 entry per photographer.

Entries will be screened for suitability. Photos will be displayed on the second level of Cervantes Convention Center. Judging, by GSA's editors, will take place on Sunday, November 5. First, second, and third place prizes will be awarded. First place color winner will appear on the cover of *Geology*. (Photos that have already appeared on the cover of *Geology* are not eligible.)

All entries will be returned by November 30, 1989.

To enter, fill out the entry form and send it, along with your photo, before **OCTOBER 1** to

Raymond E. Arvidson
Dept. of Earth & Planetary Sciences
Washington University
Campus Box 1169
St. Louis, MO 63130

Questions? Call GSA Meetings Dept., (303) 447-2020

Clip and send with entry by October 1

Name _____

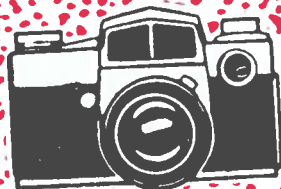
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Schleicher Is New Maps and Charts Editor

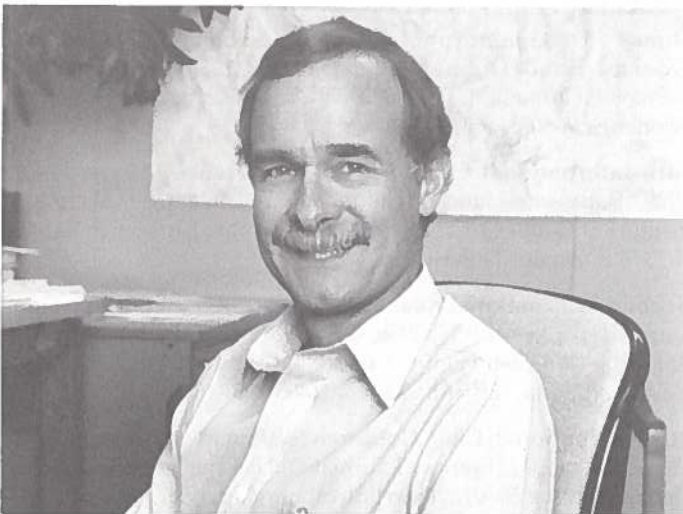
The GSA Council has appointed David Schleicher to be GSA's Editor of Maps and Charts. Schleicher replaces Wallace R. Hansen, editor since 1986.

Schleicher, a GSA Fellow, is with the U.S. Geological Survey in Denver. He has worked on the Apollo lunar missions, done geologic mapping in Arizona and Idaho, and served as chief of the USGS Branch of Technical Reports in Denver. His current assignment is coordinating documents that must be prepared in considering Yucca Mountain, Nevada, as a potential repository for nuclear waste.

Schleicher has what he calls an obsessive interest in the process of getting ideas down on paper and with the mechanics, philosophy, and protocol of editing. His ideas appear in recent papers in the *Journal of Technical Communication* and in a symposium volume, *Teaching Technical Writing*.

As GSA Maps and Charts editor, Schleicher will see that maps are appropriately reviewed and will instruct authors of accepted maps about preparation for printing.

If you have questions about GSA map publication, contact David Schleicher, U.S. Geological Survey, MS 913, Box 25046, Federal Center, Denver, CO 80225-0046, or Lee Gladish, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020.



David Schleicher

1990-1991 COMPETITION OPENS FOR FULBRIGHT SCHOLAR AWARDS

The Council for International Exchange of Scholars has announced the opening of competition for 1990-1991 Fulbright grants in research and university lecturing abroad.

The awards for 1990-1991 include about 1000 grants in research and university lecturing for periods ranging from three months to a full academic year. There are openings in more than 100 countries and, in many regions, the opportunity exists for multi-country research. Fulbright awards are granted in virtually all disciplines, and scholars in all academic ranks are eligible to apply. Applications are especially encouraged from professionals, retired faculty, and independent scholars.

Grant benefits, which vary by country, generally include round-trip travel for the grantee and, for most full academic-year awards, one dependent; stipend in U.S. dollars and/or local currency; in many countries, tuition allowance for school-age children; and book and baggage allowances.

The basic eligibility requirements for a Fulbright award are U.S. citizenship; Ph.D. or comparable professional qualifications; university or college teaching experience; and, for selected assignments, proficiency in a foreign language. It should be noted that there is no limit on the number of Fulbright grants a single scholar can hold, but there must be a three-year interval between awards.

Application deadlines for the awards are

- **June 15, 1989:** Australasia, India, and Latin America, except lecturing awards to Mexico, Venezuela, and the Caribbean;
- **September 15, 1989:** Africa, Asia, Europe, the Middle East, and lecturing awards to Mexico, Venezuela, and the Caribbean; travel-only awards to France, Italy, and Federal Republic of Germany (travel awards have new deadline);
- **November 1, 1989:** institutional proposals for Scholar-in-Residence Program;
- **November 1, 1989:** International Education Administrators Program in Federal Republic of Germany, United Kingdom, and Japan; Seminar in German Civilization (all these programs have new deadlines);
- **January 1, 1990:** NATO Research Fellowships and Spain Research Fellowships.

For more information and applications, call or write Council for International Exchange of Scholars, 3400 International Drive, Suite M-500, Washington, DC 20008-3097, (202) 686-7866.

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MEETINGS

(Asterisk indicates new or changed information)

1989

The Earth: Planet in Transition, University of Michigan Department of Geological Sciences Sesquicentennial Symposium, May 4-5, 1989, Ann Arbor, Michigan. Information: J.C.G. Walker, Dept. Geological Sciences, 1006 C. C. Little Building, University of Michigan, Ann Arbor, MI 48109-1063; (313) 764-2466; Telex 258 869 JCGW UR; GTE mail: JWALKER/KOSMOS/EDUNET.

Geological Society of America Cordilleran and Rocky Mountain Sections Annual Meeting, May 8-10, 1989, Spokane, Washington. Information: Ernest H. Gilmour, Eastern Washington University, Cheney, WA 99004; (509) 359-2406.

American Geophysical Union Spring Meeting, May 8-12, 1989, Baltimore, Maryland. Information: AGU, Convention Director, 2000 Florida Ave., N.W., Washington, DC 20009; (202) 462-6903.

Pacific Sections of American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, Society of Exploration Geophysicists, and Society of Professional Well Log Analysts Annual Meeting, May 10-12, 1989, Palm Springs, California. Information: 1989 AAPG/SEPM/SED/SPWLA Pacific Sections, AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101-0979.

12th Annual Spring Systematics Symposium, History and Evolution, May 13, 1989, Chicago, Illinois. Information: Kristine L. Bradof, Symposium Coordinator, Dept. of Geology, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605-2496; (312) 922-9410, ext. 298.

***Association of American State Geologists Meeting**, May 13-17, 1989, Norman, Oklahoma. Information: Charles J. Mankin, Oklahoma Geological Survey, University of Oklahoma, Norman, OK 73019; (405) 325-3031.

Geological Association of Canada-Mineralogical Association of Canada Joint Annual Meeting, May 14-17, 1989, Montreal, Quebec, Canada. Information: Colin Stearn, Rm. 238, 3450 University St., Montreal, Quebec H3A 2A7, Canada; (514) 398-4082.

40th Annual Highway Geology Symposium, May 17-19, 1989, Birmingham, Alabama. Information: Kathy Keller, Alabama Highway Department, Bureau of Materials and Tests, 1409 Coliseum Blvd., Montgomery, AL 36130; (205) 261-5788.

Gold '89 in Europe, May 23-25, 1989, Toulouse, France. Information: F. Tollon, Lab. de Minéralogie, Université Paul Sabatier, 39 Allées Jules Guesde, 31400 Toulouse, France.

Engineering Geology in Tropical Terrains, June 26-29, 1989, Selangor Darul Ehsan, Malaysia. Information: Organising Secretary, Conference on Engineering Geology in Tropical Terrains, Dept. of Geology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor Darul Ehsan, Malaysia.

IGCP Project 257, Mafic Dyke Swarms, Annual Meeting, July 1, 1989, Santa Fe, New Mexico. Information: John W. Geissman, Dept. of Geology, University of New Mexico, Albuquerque, NM 87131; (505) 277-2644 or (505) 277-0887 (lab).

28th International Geological Congress, July 9-19, 1989, Washington, D.C. Information: 28th International Geological Congress, P.O. Box 1001, Herndon, VA 22070-1001; (703) 648-6053; Telex 248418.

***SIAM 1989 Annual Meeting**, July 17-21, 1989, San Diego, California. Information: SIAM Conference Coordinator, 117 S. 17th St., 14th Floor, Philadelphia, PA 19103-5052; (215) 564-2929.

Society for the Preservation of Natural History Collections 4th Annual Meeting, July 23-28, 1989, Drumheller, Alberta. Information: SPNHC Conference Secretary, Tyrrell Museum of Palaeontology, P.O. Box 7500, Drumheller, Alberta T0J 0Y0, Canada; (403) 823-7707.

6th International Symposium on Water-Rock Interaction, August 3-8, 1989, Malvern, England. Information: W. M. Edmunds, Hydrogeology Research Group, British Geological Survey, Wallingford, Oxon OX10 8BB, England; phone (0) 491-38800, ext. 2293; Telex 849365 HYDROL G; Fax (0) 491-32256.

12th Caribbean Geological Conference, August 7-11, 1989, Christiansted, St. Croix, Virgin Islands. Information: Frederick Nagle, 12th Caribbean Geological Conference, c/o Dept. of Geological Sciences, P.O. Box 249176, University of Miami, Coral Gables, FL 33124.

Dunes '89: Geomorphology and Ecology of Desert and Coastal Sand Dunes, August 14-17, 1989, Swakopmund, Namibia. Information: Dunes '89, c/o J. D. Ward, P.O. Box 2168, Windhoek 9000, Namibia.

14th International Cartographic Conference, August 17-24, 1989, Budapest, Hungary. Information: Conference Secretary, Institute of Geodesy, Cartography and Remote Sensing, POB 546, H-1373 Budapest, Hungary.

Second International Research Symposium on Clastic Tidal Deposits, August 22-25, 1989, Calgary, Alberta. Information: Ray Rahmani, Canadian Hunter Exploration Ltd., 435-4th Ave., S.W., Calgary, Alberta T2P 3A8, Canada; (403) 260-1818.

9th International Clay Conference, August 28-September 2, 1989, Strasbourg, France. Information: Hélène Paquet, Inst. de Géologie, 1, rue Blessig, 67084 Strasbourg, France.

Montana Geological Society Centennial Field Conference: Geologic Resources of Montana, August 31-September 3, 1989, Bozeman, Montana. Information: MGS Field Symposium, P.O. Box 844, Billings, MT 59103; (406) 256-3034.

New Frontiers for Hazardous Waste Management Third International Conference, September 10-13, 1989, Pittsburgh, Pennsylvania. Information: NUS Corporation, Park West Two, Pittsburgh, PA 15275.

***Crustal Geochemical Cycles Symposium**, during American Chemical Society National Meeting, September 10-15, 1989, Miami Beach, Florida. Information: James R. Herring, U.S. Geological Survey, M.S. 939, Box 25046, Federal Center, Denver, CO 80225; (303) 236-5559.

3rd International Conference on Palaeoceanography, September 10-16, 1989, Cambridge, England. Information: I. N. McCave or N. J. Shackleton, Dept. of Earth Sciences, University of Cambridge, Downing St., Cambridge CB2 3EQ, England; phone 223-333422/334876.

(continued on p. 125)

Meetings (continued from p. 124)

***23rd International Conference of Safety in Mines Research Institutes**, September 11-15, 1989, Washington, D.C. Information: John N. Murphy, U.S. Bureau of Mines, Pittsburgh Research Center, P.O. Box 18070, Pittsburgh, PA 15236; (412) 892-6601.

Focus '89, Nuclear Waste Isolation in the Unsaturated Zone, September 18-21, 1989, Las Vegas, Nevada. Information: D. Burton Slemmons, School of Mines, Center for Neotectonic Studies, University of Nevada, LME 400, Reno, NV 89557-0047.

SIAM Conference on Mathematics of Geophysical Sciences, September 18-21, 1989, Houston, Texas. Information: SIAM Conference Coordinator, 1400 Architects Bldg., 117 S. 17th St., Philadelphia, PA 19103-5052; (215) 564-2929.

14th International Conference of Organic Geochemistry, September 18-22, 1989, Paris, France. Information: Yolande Rondot, Institut Français du Pétrole, BP 311, 92506 Rueil-Malmaison cedex, France; phone 33(1) 47.49.02.14; Telex A 203050 F.

***7th Annual Denver GeoTech**, September 23-26, 1989, Denver, Colorado. Information: Denver GeoTech 1989, c/o C. B. & Associates, 13 S. Van Gordon, #200, Lakewood, CO 80228. (Abstracts deadline: June 9, 1989.)

***Clay Minerals Society**, September 23-28, 1989, Sacramento, California. Information: J. L. Past, Dept. of Civil Engineering, California State University, Sacramento, CA 95819; (916) 278-6081.

SIAM Conference on Mathematical and Computational Issues in Geophysical Fluid and Solid Mechanics, September 25-28, 1989, Houston, Texas. Information: SIAM Conference Coordinator, 117 S. 17th St., 14th Floor, Philadelphia, PA 19103-5052; (215) 564-2929.

3rd Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst, October 1-4, 1989, St. Petersburg, Florida. Information: 3rd Multidisciplinary Conference, Florida Sinkhole Research Institute, University of Central Florida, Orlando, FL 32816.

Association of Engineering Geologists 32nd Annual Meeting, October 1-6, 1989, Vail, Colorado. Information: Michael W. West, Michael W. West & Associates, Inc., 290 Bank Western Bldg., 8906 West Bowles Ave., Littleton, CO 80123; (303) 972-1537. (Abstracts deadline: May 1, 1989.)

XIII International Geochemical Exploration Symposium and II Brazilian Geochemical Congress, October 1-6, 1989, Rio de Janeiro, Brazil. Information: RIO '89 (XIII IGES-II CBGq), A/C CPRM-LAMIN, Av. Pasteur, 404 - Urca, CEP 22292 - Rio de Janeiro, RJ, Brazil; phone (55-21) 295-5297; Telex (55-21) 22685.

7th Thematic Conference on Remote Sensing for Exploration Geology, October 2-6, 1989, Calgary, Alberta, Canada. Information: Robert H. Rogers, ERIM, P.O. Box 8618, Ann Arbor, MI 48107-8618; (313) 994-1200, ext. 3382.

American Institute of Professional Geologists 26th Annual Meeting, October 4-7, 1989, Hyatt Crystal City, Virginia. Information: Stan Johnson, 1016 Holmes Ave., Charlottesville, VA 22901; (804) 293-5121.

18th Geochautauqua: Mineral-Resource Assessment, October 13-14, 1989, Newark, Delaware. Information: J. H. Schuenemeyer, Dept. of Mathematical Sciences, University of Delaware, Newark, DE 19716; (302) 451-1883.

***Institute for Tertiary-Quaternary Studies Annual Meeting**, October 13-15, 1989, Fort Collins, Colorado. Information: Frank G. Ethridge, Dept. of Earth Resources, Colorado State University, Fort Collins, CO 80523; (303) 491-6195.

New York State Geological Association 61st Annual Meeting and Field Trips, October 13-15, 1989, Middletown, New York. Information: Lawrence E. O'Brien, Orange County Community College, Middletown, NY 10940; (914) 343-6222, ext. 2570.

Structural and Tectonic Modelling and Its Application to Petroleum Geology, October 18-20, 1989, Stavanger, Norway. Information: Norwegian Petroleum Society, P.O. Box 1897 - Vika, 0124 Oslo 1, Norway; phone 47-2-207025; Telex 77 322 nopet n.

***Late Cambrian-Ordovician Geology of the Southern Mid-continent Symposium**, October 18-19, 1989, Norman, Oklahoma. Information: Kenneth S. Johnson, Oklahoma Geological Survey, University of Oklahoma, Norman, OK 73019; (405) 325-3031.

Supercomputing World Conference and Exposition, October 18-20, 1989, San Francisco, California. Information: Carol Y. Hurley, Meeting Brokers International, Inc., 5 Science Park, New Haven, CT 06511; (203) 786-5132.

20th Annual Geomorphology Symposium: Geomorphic Evolution of the Appalachians, October 20-22, 1989, Dickinson College, Carlisle, Pennsylvania. Information: W. D. Sevon, Pennsylvania Geological Survey, P.O. Box 2357, Harrisburg, PA 17120; (717) 787-6029.

(continued on p. 126)

**NATO / Advanced Study Institute on
TRANSPORT PROCESSES IN POROUS MEDIA**

A NATO/ASI will be held at Washington State Univ., Pullman, Washington on July 9-18, 1989, to present the fundamentals and recent developments in transport phenomena in porous media. Because of the pressing needs in areas of practical interest, the meeting will address various aspects of contamination and flow in soils and groundwater. Lectures will be given by leading experts in the field. Oral and poster presentations by participants are also planned. Travel and/or accommodation grants are available for selected participants from NATO countries. The meeting will be directed by M. Yavuz Corapcioglu of Washington State University & Jacob Bear of Technion, Israel. Those who are interested in participating should contact Dr. M. Yavuz Corapcioglu, Dept. of Civil & Env. Engg., Washington State University, Pullman, WA 99164-3001. USA. Phone: (509) 335-4678, FAX: (509) 335-7632

List of Contributors and Topics

P.M. Adler (CNRS, France) Fractal Porous Media
J. Auriault (Grenoble, France) Dynamic Behavior of Porous Media
J. Bear & Y. Bachmat (Technion, Israel).. Deletion of
Nondominant Effects in Transport Models;
J.M. Buchlin (Von Karman Inst., Belgium). Transport in Process
Associated with Nuclear Reactors
T. H. Christensen (Tech. Univ., Denmark).. Heavy Metals in Soils
M. Y. Corapcioglu (Wash. St. U.) .. Wave Propagation
in Porous Media: A Review;
F.A.L. Dullien (Waterloo, Canada) .. Structure of Porous Media
B.D. Kay & E. Perfect (Guelph, Canada) Transport in Freezing Soils
W. Kinzelbach (Kassel, FRG) Random Walk Modeling
P.K. Kitanidis (Stanford, Univ.) ... Parameters for 3-D Flow
J.C.S. Long (Lawrence Berkeley Lab) .. Fractured Porous Media
P. L. McCarty, C.S. Criddle & L. Alvarez (Stanford Univ.)..
Microbial Processes in Porous Media
P.V. Roberts (Stanford Univ.) Migration of Organics in Aquifers
K. R. Rushton (U. Birmingham, UK) .. Groundwater Modeling:
A Review
D. Schweich (CNRS-ENSIC, France).. Theory of Chromatography
F. Schuille (FRG) and H. O. Schiegg (Switzerland) .. Movement of
Hydrocarbons in Groundwater
W.J. Weber (U. Michigan). Adsorption Processes in Porous Media
S.W. Wheatcraft (U. Nevada) .. Applications of Fractal Geometry
Additional Contributors and topics may be added

Meetings (continued from p. 125)

***1989 Joint International Waste Management Conference**, October 22-28, 1989, Kyoto, Japan. Information: Leslie Friedman, ASME Meetings Dept., 345 E. 47th St., New York, NY 10017; (212) 705-7795.

***MAPFRE International Meeting on Catastrophes and Society**, October 24-26, 1989, Madrid, Spain. Information: Ignacio G. Peso, Paseo de Recoletos, 25. 28004, Madrid, Spain; phone (1) 581 11 00; Telex: 48902 MAPFRE; Fax: (1) 419 91 95.

***Society for Organic Petrology Annual Meeting**, October 29-31, 1989, Urbana, Illinois; and **Workshop on Fluorescence Microscopy**, November 1-2, 1989, Carbondale, Illinois. Information: Richard Harvey, Illinois State Geological Survey, 615 E. Peabody Dr., Champaign, IL 61820; (217) 244-0836.

Sociedad Española de Paleontología 5th Annual Meeting, November 2-3, 1989, Valencia, Spain. Information: Ana Márquez-Aliaga, Depto. Geología. Facultad de Ciencias Biológicas, 46100 Burjassot, Valencia, Spain.

World Gold '89, November 5-8, 1989, Reno, Nevada. Information: Meetings Dept., World Gold '89, Society of Mining Engineers, P.O. Box 625002, Littleton, CO 80162; (303) 973-9550; Telex 881988.

Geological Society of America Annual Meeting, November 6-9, 1989, St. Louis, Missouri. Information: Meetings Department, GSA, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020.

***1989 Eastern Oil Shale Symposium**, November 15-17, 1989, Lexington, Kentucky. Information: Geaunita H. Caylor, 201 Porter Building, Lexington, KY 40506-0205; (606) 257-2847.

***American Society of Mechanical Engineers Winter Annual Meeting**, December 10-15, 1989, San Francisco, California. Information: ASME Meetings Dept., 345 E. 47th St., New York, NY 10017; (212) 705-7795.

Penrose Conferences 1989

Late Eocene-Oligocene Climatic and Biotic Evolution, July 31-August 6, 1989, Rapid City, South Dakota. Information: Donald R. Prothero, Dept. of Geology, Occidental College, Los Angeles, CA 90041; (213) 259-2823; Philip R. Bjork, Museum of Geology, South Dakota School of Mines, Rapid City, SD 57701; (605) 394-2461.

The Eocene Tectonic Transition: Oregon to Alaska, September 4-10, 1989, Penticton, British Columbia. Information: Ralph A. Haugerud, U.S. Geological Survey, MS 975, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 329-4910.

Large Lake Systems and Their Stratigraphic Record, September 1990, Lake Tahoe area. Information: Andrew S. Cohen, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721; (602) 621-4691 (direct), (602) 621-6024 (dept.).

1990

First PNG Petroleum Convention, February 12-14, 1990, Port Moresby, Papua New Guinea. Information: Mick McWalter, First PNG Petroleum Convention, c/o PNG Chamber of Mines and Petroleum, P.O. Box 7059, Boroko, Port Moresby, Papua New Guinea; phone 675-25-2836; Fax 675-21-7107; Telex NE 23482.

Society of Mining Engineers Annual Meeting, February 26-March 1, 1990, Salt Lake City, Utah. Information: Meetings Department, Society of Mining Engineers, P.O. Box 625002, Littleton, CO 80162; (303) 973-9550; Fax 303-973-3845; Telex 881988.

Symposium on Geology and Ore Deposits of the Great Basin, April 1-5, 1990, Reno, Nevada. Information: Geological Society of Nevada, P.O. Box 12021, Reno, NV 89510.

***International Conference on Mechanics of Jointed and Faulted Rock**, April 18-20, 1990, Vienna University of Technology, Vienna, Austria. Information: H. P. Rossmannith, Wiedner, Jaupstrasse 8-10/325, A-1040 Wien, Austria; phone 0222-588-01.

***Orogenesis In Action: Tectonics and Processes in the West Equatorial Pacific Margin**, April 18-20, 1990, London, England. Information: Robert Hall, Department of Geological Sciences, University College, Gower St., London, WC1E 6BT, England.

European Geophysical Society XV General Assembly, April 23-27, 1990, Copenhagen, Denmark. Information: EGS Office, Postfach 49, D-3411 Katlenburg-Lindau, Federal Republic of Germany; phone 49-5556-1140; Fax 49-5556-4709; Telex 965564 zil d. (Abstracts deadline: January 31, 1990.)

Geological Association of Canada-Mineralogical Association of Canada Joint Annual Meeting, May 16-18, 1990, Vancouver, British Columbia. Information: R. I. Thompson, c/o GAC-MAC '90 Secretariat, 801 - 750 Jervis St., Vancouver, B.C. V6E 2A9, Canada; (604) 681-5226; Fax 604-681-2503; Telex 04-352848 VCR.

International Association on the Genesis of Ore Deposits 8th Symposium, August 12-18, 1990, Ottawa, Ontario. Information: L. M. Cumming, 8th IAGOD Symposium, Geological Survey of Canada, 601 Booth St., Ottawa, Ontario K1A 0E8, Canada.

International Conference on Water Resources in Mountainous Regions, August 27-September 1, 1990, Lausanne, Switzerland. Information: Aurèle Parriaux, Laboratory of Geology EPFL, 1015 Lausanne, Switzerland; phone 021-47-23-55; Telex 454478 EPFV CH.

***Geological Association of Canada Nuna Research Conference**, Late Proterozoic Rifting, Glaciation and Eustasy, as Illustrated by the Windermere Supergroup, September 8-14, 1990, Windermere and Valemount, British Columbia. Information: J. D. Aitken, Geological Survey of Canada, 3303 33rd St. NW, Calgary, Alberta T2L 2A7, Canada.

***3rd International Archaean Symposium**, September 17-21, 1990, Perth, Western Australia. Information: Susan E. Ho, P.O. Box 435, Nedlands, Western Australia 6009, Australia. (Abstracts deadline: December 31, 1989.)

7th International Conference on Geochronology, Cosmochronology and Isotope Geology, September 24-29, 1990, Canberra, Australia. Information: Organizing Committee, ICOG 7, Research School of Earth Sciences, Australian National University, G.P.O. Box 4, Canberra, A.C.T. 2601, Australia; phone 062-49-3406; Fax 062-47-4639; Telex 62693.

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 619-4814029; Telex AA 95380.

Future GSA Annual Meeting Sites

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San Diego	October 21-24	1991
Cincinnati	October 26-29	1992
Boston	October 25-28	1993

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If interested, send resume and three professional references. Also, request an application packet from: Oregon Department of Geology and Mineral Industries, 1400 SW Fifth Avenue, Room 910, Portland, Oregon 97201, (503) 229-5580.

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INSIDE _ _ _

Committee Nominations	p. 108
GSA Representatives Needed	p. 111
Annual Meeting Short Courses	p. 116



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