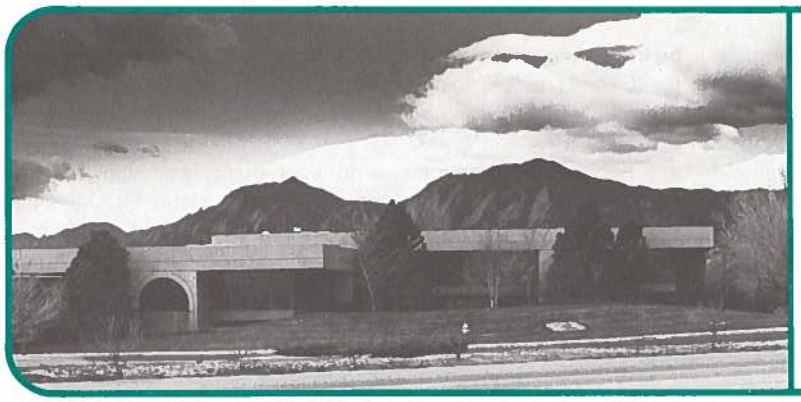

GSA
NEWS & INFORMATION

Monthly Newsletter of
The Geological Society of America

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General Chairman's Welcome

The Meeting You've Been Waiting For

by Robert J. Weimer
Chairman, GSA Centennial Celebration

A decade of planning by GSA councils, committees, and members will culminate in the Centennial Celebration in Denver, Colorado, October 31–November 3, 1988. This is a *special meeting at a special place with special plans for you.* We invite you to attend—prepare now for that once-in-a-century trip.

Extraordinary events and unusual programs will be blended with all of the convention activities that you have come to expect. The highlight will be the Centennial Birthday Bash to celebrate 100 years of successful science, the phenomenal growth of the Society in membership, activities, assets, organization, and scientific influence.

Your busy schedule should make room for these additional

(*continued on p. 106*)

1988 Centennial Celebration Committee. Front row: Kathleen Johnson, Frances Pierce (and Ashley), Barbara Curtis, Robert Weimer. Second row: David MacKenzie, Jackie Meissner, James Lowell, Gregory Holden. Third row: William Hay, Stephen Sonnenberg, Jane Ohl, John Rold, Sam Adams. Absent: Chuck Kluth, Pete Palmer, F. Michael Wahl.

The Meeting . . . (*continued from p. 105*)

special Centennial items: the Sunday night kick-off—the Exhibitors' Centennial Reception; the opening half-day General Session titled "North America in 4-D" organized by authorities on the geology of North America; a GSA Founders' Historical Display at the Denver Convention Complex; Science of Geology displays at several Denver locations, including the Museum of Natural History, Columbia Savings Bank, and the Denver Public Library; the Colorado Mineral Belt Runs (5 and 10 km); and finally—a concert by the GSA Centennial Orchestra.

Guest activities feature trips to Red Rocks Mountain Park, walking tours of historic Denver, the inevitable Centennial fashion show and luncheon, and a geology and luncheon trip to the historic mining town of Georgetown.

To view the backbone of the continent and the adjacent areas as the early territorial surveys did in the 1800s, 26 geology field trips are planned as premeeting and postmeeting events. Several half-day field trips will be available during the meeting week. The program includes symposia, theme, poster, and other technical sessions, the science theater, and short courses to satisfy your scientific appetite. One of the highlights of the 250 scientific and technical exhibits will be the presentation of the newest volumes and maps published by the Decade of North American Geology (DNAG) project, the special 10-year publishing project commemorating the centenary of the Society.

If this convention menu is not enough, you can plan your own activities with friends by taking a short walk to quaint shops and restaurants in Larimer Square and along Denver's 16th Street Mall. You also may choose to visit the Western Art Museum, the Denver Art Museum, the Colorado History Museum, and the State Capitol. Of course, you can make arrangements to attend many other cultural activities.

We welcome you to attend the festivities, to glimpse the past, to partake in the present, and to contemplate the future! Member participation is what will assure a successful celebration, just as participation by delegates launched the Society at the planning meeting of August 14, 1888, held in Cleveland, Ohio. The Society was later formalized at the organizational meeting on December 27, 1888, at Cornell University, Ithaca, New York. Read about these and other background facts in the fascinating history of the Society by Edwin B. Eckel (GSA Memoir 155, 1982).

1989–1990 Competition Opens for Fulbright Scholar Awards

The Council for International Exchange of Scholars has announced the opening of competition for the 1989–1990 Fulbright grants in research and university lecturing abroad.

The awards for 1989–1990 include more than 300 grants in research and 700 grants in university lecturing for periods ranging from three months to a full academic year. There are openings in over 100 countries, and in many regions, the opportunity for multi-country research is available. Fulbright Awards are granted in virtually all disciplines, and scholars in all academic ranks are eligible to apply. Applications from retired faculty and independent scholars are seriously encouraged.

Benefits include round-trip travel for the grantee and, for most full academic year awards, one dependent; maintenance allowance to cover living costs of grantee and family; tuition allowance, in many countries, 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. 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, 1988, for Australasia, India, and Latin America, except lecturing awards to Mexico, Venezuela, and the Caribbean; *September 15, 1988*, for Africa, Asia, Europe, the Middle East, and lecturing awards to Mexico, Venezuela, and the Caribbean; *November 1, 1988*, for institutional proposals for the Scholar-in-Residence Program; *January 1, 1989*, for Administrators' Awards in Germany, the United Kingdom, and Japan; the Seminar in German Civilization; the NATO Research Fellowships, and the Spain Research Fellowships; and *February 1, 1989*, for the France, Italy, and Germany Travel-Only Awards.

For more information and applications, call or write Council for International Exchange of Scholars, Eleven Dupont Circle N.W., Washington, DC 20036-1257; (202) 939-5403.

In Memoriam

David Alsop Carter
Pueblo, Colorado
February 9, 1988

D. Jerome Fisher
Phoenix, Arizona
January 1987

Ralph M. Leggette
San Diego, California
February 2, 1988

John P. Lenzer
Houston, Texas
January 9, 1988

Lewis L. Nettleton
Houston, Texas
January 19, 1988

Leslie E. Spock
Detroit, Michigan

Memorial Preprints

The following memorial preprints are now available, free of charge, by writing to GSA, P.O. Box 9140, Boulder, CO 80301.

André Cailleux, by Marc Deschamps
Roland Kenneth Dodds, by James R. Jensen, Richard W. Galster, and Larry E. Wilkinson
Hollis Mathews Dole, by William L. Fisher
Arthur David Howard, by Troy L. Péwé and William C. Bradley
Richard Wheatly Lewis, Jr., by Gene E. Tolbert and José R. de Andrade Ramos
Richard Bradford McConnell, by Robert M. Shackleton
Charles Meyer, by John P. Hunt
William Harold Stuart, by Robert F. Legget

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

DNAG NEWS

by Allison R. (Pete) Palmer

The Geology of North America: Progress

Sedimentary Cover of the Craton: U.S., edited by Larry Sloss, will be the fourth volume in this set of books to be produced by GSA. All materials went to the printer in March, and this will probably be available in June.

Hydrogeology, edited by Bill Back, Joe Rosenshein, and Paul Seaber, appears to be in line to be the fifth book of this set to be completed. As of mid-March, the editors expected to have all pieces in hand and to be in Boulder to check the final galleys either in late March or early April. By July or August, this book should be available.

Several other books are very close to completion but are still not predictable.

Gravity Map of North America

This map, the second in the series of seven 1:5,000,000 scale maps to depict the geology and geophysics of North America and its surrounding oceans, was printed in Canada in late February and shipped to GSA for distribution in early March. In addition to the spectacular printed full-color maps of gravity and magnetic anomalies now available through GSA, gridded digital data for these maps are available through the National Geophysical Data Center (NGDC) in Boulder. If you are interested in obtaining the digital data tapes for these maps, call or write

DNAG Digital Data
NOAA National Geophysical Data Center
325 Broadway
Boulder, Colorado 80303
(303) 497-6729, 6900, or 6521

The compilers of the *Seismicity Map of North America* are aiming to have their map ready for printing in June. Color proofs of all four sheets are already prepared. As soon as this is printed, the digital data base will be added to the products available through NGDC. The printed DNAG maps, together with their gridded geophysical data bases and other gridded data on topography and bathymetry for North America and surrounding oceans available through NGDC, will represent unique resources for creative thinking about major geologic and geophysical features of the North American plate.

More kudos

Many thanks to all of those listed below who contributed to chapters or pocket plates for *Sedimentary Cover of the Craton: U.S.* This list brings the number of authors and co-authors for the 12 completed volumes of the DNAG project to 1011! Those who have completed their commitments have much to be proud of.

T. W. Amsden
S. B. Anderson
D. L. Baars
M. W. Barratt
B. L. Bartleson
R. R. Bloomer
J. P. Blumle
L. W. Braile
B. J. Bunker
C. G. Carlson
C. E. Chapin
R. B. Cline
C. Collinson
B. F. Curtis
J. M. Cys
R. E. Denison
R. H. DeVoto
W. deWitt, Jr.
J. B. Droste
S. P. Dutton
J. R. Everett
J. H. Fisher
H. N. Frenzel
J. E. Galley
L. C. Gerhard
W. R. Gibson
A. G. Goldstein
J. M. Hills
W. J. Hinze
J. R. Jennings
K. S. Johnson
R. C. Johnson
W. E. King
F. E. Kottlowski
J. D. Love
G. A. Ludvigsen
G. C. Luff
I. S. Merin
R. C. Milici
C. M. Molenaar
B. T. Pearson
F. Peterson
J. A. Peterson
B. Rascoe, Jr.
D. D. Rice
P. R. Rose
R. T. Ryder
M. L. Sargent
C. J. Schenk
W. R. Seager
R. H. Shaver
L. L. Sloss
P. K. Sutherland
W. A. Thomas
D. M. Thompson
S. Thompson III
D. C. VanSiclen
N. B. Waechter
W. L. Watney
B. J. Witzke
L. A. Woodward

1989–1990 Advanced Fellowships in India Available

The Indo-U.S. Subcommission on Education and Culture is offering twelve long-term (6–10 months) and nine short-term (2–3 months) awards for 1989–1990 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. Subcommission 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.

Application deadline is June 15, 1988. Application forms and further information are available from Council for International Exchange of Scholars, Attn: Indo-American Fellowship Program, Eleven Dupont Circle, N.W., Suite 300, Washington, DC 20036-1257; (202) 939-5469.

Report of the July 1987 Penrose Conference Held at Steamboat Springs, Colorado

Introduction
by Bert Bally
President, Geological Society of America

The prime objective of the founders of our Society was "the promotion of the Science of Geology in North America." That objective will forever remain the same. We all believe that good earth science has to be the basis of good environmental and resource management, and we know that the basic concepts of geologic time, of evolution, and of plate tectonics are part of today's intellectual capital. The achievements of the earth sciences combined with space exploration have made us aware of the uniqueness of our planet and of our role as custodians of the earth. The participants of the Steamboat Springs Penrose Conference tried to look ahead and attempted to define the role of geologists in the next century.

I hope that publication of this Penrose Conference Report in *GSA News & Information* will generate additional discussion among GSA members. I suggest that we use *News & Information* as a forum where members express their views on future directions of the GSA. We already have a Committee on Geology and Public Policy, charged to disseminate and promote geological science information in the formulation of public policy issues. However, some GSA members would like to see our society more actively involved in trying to convince the public and their representatives that more public funds should be allocated to geological research. Other GSA members are reluctant to see the GSA involved in this kind of activity. Needless to say, as a nonprofit organization, we are legally restrained from engaging in lobbying!

Inevitably, our science is becoming more and more relevant to the national and international political decision-making process, and each of us will have to decide his or her degree of personal involvement. On the other hand, I suggest that *News & Information* may be a good place to publish thoughtful letters and opinions from our members about the role, if any, the GSA as a scientific society should play in the national and international political process. We have published reports from our Congressional Fellows about issues that are currently being debated in Congress. These reports are not intended to be political statements. Instead, the intent is to relate what is being discussed and what legislation is being proposed.

AAAS members who read *Science* are regularly exposed to discussions concerning science and public policy on both the national and international levels. *GSA News & Information* could play a similar role for GSA members. Of course, any letter or commentary concerning the earth sciences and the public interest will have to address the scientific aspects of the matter and should not include political value judgments. Together, let us explore this possibility, and please let us know what you think about the idea.

The 21st Century: An Introspection

> As we share viewpoints this week about the next century and the role of our profession in the service of mankind, let it be perfectly clear from the outset that the changes we are most likely to face are those that we identify as needed within our own profession. Only if we are able to succeed in this task, can we hope to play an influential role in policy change in other areas—be they social, political, or environmental.—Paul L. Hilpman, July 1987.

This statement, written as an expectation by a participant in a recent Penrose conference, concisely summarizes the results and recommendations of that conference: the need for change within the geoscience profession.

The conference, "Geological Decisions for the 21st Century," held in July 1987 at Steamboat Springs, Colorado, was intended as both an overview of current and projected geologic issues confronting the geoscience community and a probing of the question of how geoscientists can be more effective in dealing with the political decision-making process. That initial intent was loaded, and the outcome of the conference was far more dramatic than the conveners or participants anticipated.

To appreciate why this conference evolved beyond its intent, the intermixture of the participants needs to be understood. The most influential factors in this conference were the variety of geoscience backgrounds and the involvement of its participants. The 73 conferees from across the United States and Canada represented the following areas:

Academic	17 people	(23%)
Industry	19 people	(26%)
Government (51%)		
Federal	24 people	(33%)
State	11 people	(15%)
Other	2 people	(3%)

They included a geologic hazards expert; a political scientist/resource economist; hydrogeologists; petroleum and mining geologists; an ethics specialist; a city water-quality advisor; specialists in high-level radioactive-waste disposal; geologists who have had federal government appointments in Washington, D.C.; university professors; current and former state geologists; a vice president of an electrical utility firm; current, former, and appointed Congressional Fellows; and graduate students. This diversity of participants, together with the controversial Penrose topic, allowed for an auspicious exchange of ideas.

When these individuals convened, they addressed the question of what geoscientists must do (and how) to make appropriate contributions to society in the 21st century. The conveners had identified issues of concern in the conference agenda:

- selection and monitoring of sites for high-level radioactive-waste storage and disposal;
- hazardous-waste and toxic-waste management;
- offshore petroleum and mineral leasing for exploration and development;
- onshore petroleum and mineral exploration and development on restricted areas of public lands;
- hydrogeologic aspects of water-quality and water-supply management;
- interbasin/interstate water transfers;
- liability for catastrophic events in areas of mapped geologic hazards; and
- geotechnical aspects of increased development in currently underdeveloped environments.

The conference participants broadened that discussion of issues to include

- improvement of geoscience education (precollege through postgraduate and the lay public);
- development of interrelational skills (compromise, sharing of credit, respect);
- university/government-agency/industry collaboration;
- interdisciplinary collaboration;

(*continued on p. 110*)

Penrose Conference (*continued from p. 109*)

- development of a professional identity;
- emphasis on the establishment of ethical standards; and
- development of professional quality assurance/quality control.

Several points evolved as major topics, but the overriding issue of political realities sparked the initial discussions.

POLITICAL REALITIES

To be effective in resolving geologic issues, geoscientists must participate in the political arena. But, as various participants indicated, most geoscientists do not know how to be politically effective, and too often their input on geologic issues before local, state, and federal governments is weak or nonexistent. (For example, currently, 40 Congressional committees are dealing with U.S. ground-water issues, but there are no geologists in Congress and just a handful of advisors.) Geologic decisions will continue to be made in the politcal arena, whether or not geologists are willing to participate. Geologists cannot afford to be naive about the political process. Technical decisions almost always take a back seat to political realities.

Moreover, some legislators take on a new issue only if it promises personal high visibility. In order to significantly affect an individual legislator's position over time, geoscientists must get involved with candidates before and during the election process. Then the candidate values the support and has a history for appraising and valuing judgment. Most geoscientists lack an understanding of this political reality mainly because most of their activities are discipline-oriented and are not involved with interdisciplinary communities that function in the political, everyday world. Most important, geoscientists lack a track record in political decision making.

GEOSCIENCE IMAGE

At the heart of this issue of the geoscientist's political effectiveness is *image*: the geoscience community has a significant public relations problem. The public generally perceives scientists as arrogant and condescending, attempting to impress with their knowledge. Scientists talk about methods, not about results and implications. They are perceived as accountable only to themselves: they determine the course of their study, regulate and referee each others' studies, and provide the results to that scientific community. The public seldom understands or appreciates the why and wherefore of research.

Geoscientists, in particular, are viewed as indecisive: "on the one hand, this might be the situation, and on the other, it might be that." It is difficult to quantify uncertainty. However, the geologist must know when to be a scientist—informed, rational, and objective—and when to be an evaluator of a scientific issue—informed, rational, and subjective.

Other disciplines (e.g., medicine, law, and chemistry) have visible, aggressive organizations, but not so the geological community, despite the fact that the geoscience story is interesting and immediately applicable. One possible mechanism to promote the geosciences would be a widespread public education program—not just the occasional public television documentary, but a series of programs.

GEOSCIENCE SOCIETIES

One strongly spoken consensus of the conference participants was that, to resolve the problems of image and political effectiveness, the geoscience community must reorganize itself. All 18 member societies of the American Geological Institute (AGI) should gain one national and/or international voice in the political arena. AGI is not allowed to speak for the whole geoscience community as other professional associations (e.g., American Medical Association, American Bar Association, American Chemical Society) speak for their memberships. A united front could show the public that geology is a relevant and serious science.

BEYOND THE AGENDA

The issues of geology, politics, and image had produced an almost adversarial climate at this conference. The conference had moved through flaunting of pedigrees, discussions on tangents, and conference-room rearranging. By the third day, driven by the dynamics of the issues and the frustration of the participants, the focus of this Penrose Conference took a turn. What participants described as "Brownian movement" and "heat-lightning atmosphere" developed into a dynamic forum on issues of environment, technology transfer, education, and, in particular, ethics of the geoscience community. Spontaneous ad hoc committees formed on ethics and the role of geology in the 21st century and met late into the night. The results of these meetings and of the final two days of the conference were dynamic. A sampling of these discussions is provided below.

ETHICS

An ethics panel report on the moral responsibilities of geologists sparked much excitement among the conferees, to the extent that they encouraged establishment of ethics forums at GSA conferences. Discussion of hypothetical scenarios involving ethical issues confronting geoscientists produced the following issues and recommendations:

1. The boundary between factional decisions and value decisions is determined by ethics.
2. GSA and other geological societies should be encouraged to prepare special publications, to facilitate communication, and to conduct forums on ethical concerns for geoscientists.
3. Geoscientists, as a group, should consider adopting clearly defined ethical guidelines for performance and conduct.
4. Geoscientists should prepare themselves to operate effectively within an increasingly litigious society.
5. Geoscientists should become aware of their ethical obligations to society so that they can respond to an increasing (and increasingly urban) population's demands on energy, resources, environment, and economics, and the evaluation of the quality of life.
6. Geoscientists must learn about the differences between corporate (organizational) ethics and individual ethics, and must become flexible in order to adjust to the inherent problems.
7. Geoscientists should understand that the changeability of corporate organization and of corporate ethics will continue to have a major effect on the career expectations and working conditions of individual geoscientists.

As a result of these insights, a *Task Force on Ethics* will propose to establish a team at GSA's Annual Meeting and in each GSA section meeting to exchange information and to conduct seminars.

ROLE OF GEOLOGY IN THE 21st CENTURY

An ad hoc group generated, and subsequent conference discussion agreed on, the following major issues that will demand increased geoscience input:

1. Population.
2. Climate and climatic change (sea-level rise, atmospheric geochemistry, response of hydrologic systems, etc.).

(*continued on p. 111*)

Penrose Conference (*continued from p. 110*)

3. Food (productivity, especially as affected by soils and ground water).

4. Resource base (water, mineral, soil, energy, forests, and their world distribution and economics of use).

5. Land use (hazard evaluations, urbanization, marginal land).

6. Oceans (basic science, resource utilization, mineral resources, waste sinks, buffering, etc.).

7. Human health (as affected by water quality, risk assessments, geoepidemiology).

8. Technological advances (including information exchange and education).

Possible changes in how geoscientists participate in their profession were identified, including

- an integrated, multidisciplinary approach;
- geologic prediction;
- improved data collection, management, and analytical techniques;
- high-quality, high-resolution data;
- awareness of community and local constraints; and
- perceiving geology as a business as well as a science.

As the discussions proceeded, the participants acknowledged that the realities confronting these probable future issues and changes are the following:

1. Geoscientists generally have a very poor record for making accurate forecasts. Absolute forecasting probably cannot be accomplished.

2. The perception of decision makers (the public) about the irrelevance and utility of the geoscience profession must be changed through an orderly educational process.

3. As a professional community, geoscientists must reverse the present downward trend in earth-science enrollment through universal education.

It is the intent of the ad hoc group to present an appropriate forum for these ideas at a future GSA Annual Meeting.

EDUCATION

The topic of education permeated most of the discussions. Following is a sampling of the issues raised:

1. Geology courses, from the primary grades through college, are thwarting students' natural instincts to learn about the earth. The frequent form of instruction—lecturing by instructors, memorization by students—is utterly obsolete.

2. Communication about geology should be cross-cultural and should be in language that the layperson understands, not in scientific jargon.

3. Education in the geosciences must become more global. The focus for many university courses is regional to that institution. We must broaden that focus so students can understand international conditions for them to be effective worldwide.

4. Many participants were unaware of AGI's National Center for Earth Science Education (NCESE). Established in 1986, the NCESE was created as a result of the AGI Conference of Earth Scientists to Plan Improvements in Pre-College Science Education. The purpse of the NCESE is to assess, evaluate, and produce systems to implement a complete update of education in the earth sciences at all levels, from precollege through university. This scope includes statistics gathering and analysis; curricula research and development; teacher preparation and training; and assessent of ongoing scientific research and technological advances and their application to curricula. (For more detailed information on NCESE, see the April 1987 *Geotimes* article by Andrew J. Verdon, Jr.)

5. Geoscientists are not more involved in precollege education because the rewards (other than personal) are nonexistent. Universities do not recognize the organization and leading of high-school field trips as exemplary scholarship. Instead, at the university level, "grantsmanship" equals scholarship (i.e., good marketing of research programs equals promotion of the science).

6. Peer review of university research and curricula is inbred. The broader geoscience community must be allowed to participate in recommending and reviewing research and program needs in order to produce more useful students.

7. University tenure is a stumbling block that inhibits creativity.

8. The National Science Board report "Educating Americans for the 21st Century" completely ignored the existence of the science of geology. What should the geoscience community think (and do) about such an oversight? As A. G. Unklesbay stated in *Environmental Geology & Water Science* (1987, v. 8, no. 3, p. 105), "Perhaps it happened because the members of the commission and the participants in their many conferences were not aware of geology and geological resources. If this is true, it must be because geologists have failed to make the American public appreciate the fact that we live on Earth and depend on its resources for our well-being. It is time we get on with the job."

9. Geoscience curricula are lacking at the secondary-education level. Only 8% of the U.S. secondary schools have geoscience courses in the curricula. The National Association of Geology Teachers and the National Association of Science Teachers should combine efforts to promote geoscience education and textbooks nationwide.

TECHNOLOGY TRANSFER

Speakers on technology transfer provided some overview thoughts (and just as many challenging questions) for the conferees to consider:

- The geoscience community should emphasize communication with users, including nontraditional users such as the political community.
- Funds need to be solicited/acquired to bridge the gap between basic research results and application. A coordinated national program at technology-transfer centers should be enforced.
- Technology may be more advanced than the user's needs. Therefore, education must accompany research products, and appropriate technology must not be overlooked.

Questions included

- How do we get groups to cooperate and to give as much as they take from technology transfer?
- Should geoscience funding agencies (National Science Foundation, Environmental Protection Agency, and others) require that proposers identify potential technology-transfer applications and methods of information dissemination in their research proposals?
- Is technology transfer self-destructive? Does it give a competitive edge to foreign countries?
- How should geoscientists prepare themselves for the impact of high-tech advances on society and on the geoscience community, within the context of national as well as global economics and international interdependence?

CONCLUSIONS

The overwhelming message that emerged from this Penrose Conference is that geoscientists must evolve beyond the incestuous practice of their science. Geologists have a responsibility to society to share their knowledge of the earth and its processes. Geoscience curricula should not solely be intended for grooming future geoscientists. Geologists, as educators, must go beyond the college

(*contined on p. 112*)

Penrose Conference

(*continued from p. 111*)

classroom to elementary and high schools, and to the public at large. Every applied geologist, each according to his or her own capability, must attempt to tell the geologic story as it pertains to the issues at hand—whether it be the siting of a radioactive-waste disposal facility or the locating of a new subdivision in an area of expandable clay.

The role of geology is interdisciplinary and political. When working with other people, economics-dominated and value-ridden as we all are, geologists must understand the ethics involved in their profession. Otherwise, the science of geology is not useful, not effective, and not credible beyond the college classroom.

ACKNOWLEDGMENT

We thank Heidi A. Horten for writing this report.

David A. Stephenson
Phoenix, Arizona

Allen Agnew
Corvallis, Oregon

Charles Mankin
Norman, Oklahoma

Daniel Miller
Boise, Idaho

1989 ANNUAL MEETING
November 6–9 St. Louis, Missouri
CALL FOR FIELD TRIP PROPOSALS

The theme for the 1989 meeting will be Frontiers in Geoscience. The emphasis of the field trips and the technical program will be on the future and on leading-edge technology. This is in keeping with St. Louis as the Gateway City site and with the beginning of GSA's second century.

The committee would like to structure field trips to complement the Frontiers in Geoscience theme and to coincide with topics of major symposia or theme sessions. Field trips that have this focus will be particularly welcomed.

Selection of trips will be made during July of 1988, leaving 15 months for preparing guidebooks and making arrangements.

To submit your proposal or for further information, contact the 1989 Field Trip Chairman

Jerry D. Vineyard
Dept. of Natural Resources
Div. of Geology and Land Survey
P.O. Box 250
Rolla, MO 65401

(314) 364-1752

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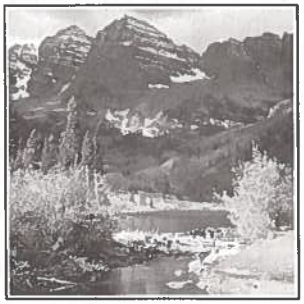

Centennial Field Guide Volume 2

NORTH-CENTRAL SECTION
OF THE
GEOLOGICAL SOCIETY OF AMERICA

Centennial Field Guide Volume 3

SOUTH-CENTRAL SECTION
OF THE
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Professional Horizons
1988 Centennial Celebration Short Courses

GSA Short Courses

All courses sponsored by GSA will be held immediately before and after the GSA Centennial Celebration in Denver, Colorado. 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 1988 Centennial Celebration 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 7, 1988**.

Cancellation. Fees will be refunded if we are notified by October 14. Registration substitutions may be made at any time. For more information, contact the Course Registrar, GSA Headquarters, (303) 447-2020 or 1-(800) GSA-1988.

Use of Microcomputers in Structural Geology. Friday, October 28, 2 to 5 p.m., Saturday, October 29, 9 a.m. to 5 p.m., and Sunday, October 30, 9 a.m. to 1 p.m. University of Colorado, Boulder. Cosponsor: Structural Geology and Tectonics Division

Recent advances in the use of microcomputers in structural geology has significantly changed the direction of research in many aspects of the subject; teaching methods are correspondingly affected. The focus of this course is to bring teachers and researchers up to date on algorithms, applications, and the design and use of computer hardware-software packages which will be of major importance to the subject area during the next decade. Specific topics to be covered include

- introduction to hardware/software systems; major microcomputer set-ups; digitizing hardware and software; plotter hardware and drivers; dot-matrix printers;
- language systems: main emphasis on BASIC with review of concepts of graphics programming;
- algorithms and applications: stereographic and other projections; matrices; stress and strain analysis; fold analysis; section construction and balancing; structure contours; others.

Classroom facilities and computers provided by the University of Colorado School of Business.

Faculty: *Roy Kligfield*, Dept. of Geological Sciences, University of Colorado; Ph.D., Columbia University. He is currently active in the rapidly expanding field of computer use in section construction, restoration and balancing, and strain analysis. *David Sanderson*, Dept. of Geology, Queen's University at Belfast; Ph.D., University of Newcastle. Prominent for pioneering the practical application of matrix methods in structural geology through the use of microcomputers, Sanderson's work in strain analysis and folding is well known on both sides of the Atlantic. *Richard H. Groshong, Jr.*, Dept. of Geology, University of Alabama; Ph.D., Brown University. Groshong has several years of experience in industry and more than a decade of experience in structural geology, including computer applications. Recently, he has been active in providing inexpensive structural geology software to the community.

Limit: 40. Fee: $190; includes course manual, dinner on Friday and Saturday evenings, and lunch on Saturday.

Ore Deposition Associated with Magmas. Friday, October 28, Saturday, October 29, and Sunday, October 30, 8:30 a.m. to 12:30 p.m. and 2 to 6 p.m. Executive Tower Inn. Cosponsor: Society of Economic Geologists

This course is intended as a review and update on many aspects of sulfide ore deposition associated directly with magmas. The level will be suitable for those in industry or government who wish a refresher course, first-year and more senior graduate students, and academics with an interest in magmatic processes or mineral deposition. Half the course will be concerned with ore deposits associated with mafic and ultramafic rocks and will include a half-day devoted to theoretical aspects, followed by a day devoted to discussion of PGE-enriched ores, komatiite-related ores, and Ni-Cu ores in continental environments. The other half will include discussions of chemical processes related to the formation of, or associated with, silicic rocks, porphyry and skarn systems (including Cu, Mo, and Sn-W) and volcanic epithermal systems, and distal ore deposits. Both the descriptive and genetic aspects of the ore types will be emphasized in all cases.

Faculty: *A. J. Naldrett*, Dept. of Geology, University of Toronto; Ph.D., Queen's University. He has worked since 1957 as both a mine and a research geologist on problems related to Ni-Cu and PGE deposits. *P. Candela*, Dept. of Geology, University of Maryland; Ph.D., Harvard University. His work focuses on the thermodynamics of ore-solutions and element distribution between silicic magmas and hydrothermal fluids. *A. H. Clark*, Dept. of Geological Sciences, Queen's University; Ph.D., University of Manchester. His long career has involved work with tin-tungsten skarn deposits and other magmatic ore deposits. *C. M. Lesher*, Dept. of Geology, University of Alabama; Ph.D., University of Western Australia. He worked in western Australia for four years on interpretation of morphology and flow of ore-bearing komatiite-related magmas and is currently doing research in this field. *E. Mathez*, American Museum of Natural History; Ph.D., University of Washington. He has worked for many years on volatiles and sulfides in magmas, particularly ocean ridge basalts, and is a leading authority in this area. *J. A. Whitney*, Dept. of Geology, University of Georgia; Ph.D., Stanford University. He has worked for 16 years on silicic magma systems and related ore deposits.

Limit: 60. Fee: $225; includes course manual, a pre-course reception on Thursday evening, and lunch on Friday, Saturday, and Sunday.

Geographic Information Systems: A Tool for Geological Data Analysis and Interpretation. Saturday, October 29, 8 a.m. to 5 p.m. U.S. Geological Survey, Denver Federal Center

The objective of this course is to teach the principles of Geographic Information Systems, demonstrate their application, and help the participants to evaluate the applicability of GIS for their own purposes. Designed for practicing geoscientists, such as private consultants or members of state surveys, the course will cover examples of the use of GIS in various types of geological and hydrological investigations. An introduction to GIS concepts, characteristics of data for GIS investigations, data availability from public sources, GIS hardware and software systems at various price levels, evaluation of GIS for the needs of the course participants, demonstrations, and hands-on workshop exercises in GIS techniques will be included in the course. Participants should have some knowledge of personal computers.

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1988 Short Courses (*continued from p. 114*)

Faculty: *David A. Hastings*, Chief, Data Integration and Remote Sensing, National Oceanic and Atmospheric Administration, National Geophysical Data Center; M.S., University of Arizona. Hastings has been developing data integration and GIS techniques for more than 10 years. He has worked in geological, mineral, and petroleum assessment and is currently using GIS to investigate the hydrogeology of an area in southeastern Colorado. Prior to working at NGDC, he worked at the USGS EROS Data Center, Michigan Technological University, the University of Science and Technology in Kumasi, Ghana, and the Ghana Geological Survey. *Michael Crane*, Geographic and Cartographic Research Applications Section, Branch of Research Techniques and Applications, National Mapping Division, USGS; M.S., San Diego State University. Crane is currently developing GIS and image processing techniques and applications. Prior to working at USGS, he worked at the U.S. Bureau of Reclamation and Defense Mapping Agency. *Walden P. Pratt*, Office of Central Mineral Resources, Geologic Division, USGS; Ph.D., Stanford University. Pratt has been coordinating integrated geological and mineral resource assessments for more than a decade. With 20 years of field experience in the midcontinental United States, Pratt is one of the pioneering appliers of GIS technology to mineral resources assessment. *Bruce Johnson*, Office of Central Mineral Resources, Geologic Division, USGS; Ph.D., University of Montana. Johnson started his career specializing in the petrology of plutonic and high-grade metamorphic rocks. He is currently Coordinator of the Paducah CUSMAP (Conterminous U.S. Mineral Assessment Program) quadrangle and is investigating the applications of GIS to geological and mineral resource investigations. Classroom facility provided by USGS.

Limit: 30. Fee: $194; includes course manual.

Glacial Facies Models. Saturday, October 29, and Sunday, October 30, 8 a.m. to 5 p.m. Marriott City Center. Cosponsors: Quaternary Geology and Geomorphology Division and Sedimentary Geology Division

Aimed at a cross section of geologists ranging from modern-process people to those working on the rock record, this course will present a summary of physical processes and the lithofacies produced in a variety of glacial environments (terrestrial, coastal, and marine). Glacial facies models representing polar and temperate depositional settings (terrestrial and marine) will be proposed and tested against well-documented (published) stratigraphic sections from the rock record. Course includes the Society of Economic Paleontologists and Mineralogists 1985 Short Course Notes No. 16, *Glacial Sedimentary Environments*, by Ashley, Shaw, and Smith, and the International Geological Congress 1988 Short Course Notes, *Glacial Marine Sedimentation*, by Anderson and Molnia.

Faculty: *Gail M. Ashley*, Dept. of Geological Sciences, Rutgers University; Ph.D., University of British Columbia. Ashley has had 20 years experience working in modern glacially influenced environments and interpreting Quaternary depositional settings. *John Shaw*, Dept. of Geography, Queen's University, Kingston, Ontario; Ph.D., Reading University. With 20 years of experience, Shaw's research interest is in glacial sedimentology and geomorphology, with particular emphasis on glacial meltwater. *John B. Anderson*, Dept. of Geology and Geophysics, Rice University; Ph.D., Florida State University. Well known in the field of glaciomarine geology of Antarctic regions, Anderson is the author of *Sedimentation on the Antarctic Continental Slope*, and the recipient of numerous research grants and contracts to study Antarctic sedimentary processes. *Bruce F. Molnia*, USGS; Ph.D., University of South Carolina. Molnia is Chief of International Polar Programs in the Office of International Geology at USGS. Chief Scientist on more than a dozen research cruises, Molnia's main areas of investigation include the Gulf of Alaska, the Bering Sea, the North Atlantic Ocean, Alaskan fiords, and Antarctica. *Ross D. Powell*, Dept. of Geology, Northern Illinois University; Ph.D., Ohio State University. Powell is internationally known for his work on modern tidewater glaciers and modeling of glacial marine sedimentary environments.

Limit: 50. Fee: $146; includes course manuals and a reception Saturday evening.

Seismic Imaging of the Continental Crust. Saturday, October 29, 1 to 5 p.m. and Sunday, October 30, 8 a.m. to 5 p.m. Executive Tower Inn. Cosponsor: Geophysics Division

Targeted toward the general geologist and geophysicist who may have only a passing familiarity with modern seismic techniques, the goal of this course is to promote the integration of new, high-resolution seismic imaging in geological studies of continental basement. Among the topics to be reviewed will be

- what's new in crustal seismology: reflection and refraction?
- how do the seismic measurements relate to physical properties of deep rocks?
- how does deep structure relate to what the geologist sees at the Earth's surface?
- how does one integrate modern deep seismic reflection and refraction data?
- how does the interpretation of deep seismic reflection results differ from that of standard oil exploration surveys?
- what is really understood about the lower crust? What are the current controversies?
- what have seismic programs like COCORP, PASSCAL, USGS, BIRPS, ECORS, DEKORP, etc., accomplished, and where are they going in the future?
- how does one obtain deep seismic data?
- how important is processing to the geological interpreter?

Lectures on key topics will be combined with exercises using real and synthetic seismic data to emphasize the strengths and uncertainties associated with deep reflection and refraction data. The objective is to provide the short-course participant with a realistic understanding of what seismology can now say about the geology of the crust.

Faculty: *Larry D. Brown*, Institute for the Study of the Continents and Dept. of Geological Sciences, Cornell University; Ph.D., Cornell University. Brown is fluent in virtually all aspects of deep seismic reflection profiling, having been a principal contributor to the COCORP program almost from its inception, and is currently serving as Coordinator of COCORP Computing Facilities. Brown has been a visiting scientist at institutions involved in deep seismic profiling in Germany and Switzerland, and has written or co-written 70 papers in the field. *Walter D. Mooney*, USGS; Ph.D., University of Wisconsin. Mooney is currently the Project Chief of the Crustal Studies Project, the largest seismic refraction research group in North America. He has been concerned with the use of modern seismic methods to unravel the structure, composition, and evolution of the continental crust. He is the author or co-author of 50 papers on diverse topics in crustal seismology. *Nikolas I. Christensen*, Dept. of Earth & Atmospheric Sciences, Purdue University; Ph.D., University of Wisconsin. Currently a Professor of Geophysics at Purdue University, Christensen was honored as one of the top ten teachers in the School of Science in 1982. Director of the Rock Physics Laboratory at Purdue, Christensen has worked for more than 20 years using laboratory measurements for interpreting seismic observations. He has written or co-written 100 papers

(*continued on p. 116*)

1988 Short Courses (*continued from p. 115*)
concerning the composition, structure, and evolution of Earth's crust and upper mantle.

Limit: 50. Fee: $125; includes course manual and lunch on Sunday.

Geological Considerations in Hazardous-Waste Site Characterization. Saturday, October 29, and Sunday, October 30, 8 a.m. to 5 p.m. Marriott City 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 groundwater conditions for site characterization, design and installation of monitoring wells, techniques for monitoring the vadose zone, 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*, Dept. of Geological Engineering, University of Missouri—Rolla; Ph.D., Purdue University. Rockaway has over 20 years 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. *David E. Daniel*, Dept. of Civil Engineering, University of Texas; Ph.D., University of Texas. Daniel has conducted extensive research investigations dealing with the evaluation of geologic parameters for the land disposal of hazardous wastes. Recently he has been involved with the development of procedures for evaluating the effectiveness of clay liners and for the in situ prediction of hydraulic conductivity. *Allen W. Hatheway*, Dept. of Geological Engineering, University of Missouri—Rolla; Ph.D., University of Arizona. Hatheway has 26 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. *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 over 20 years professional experience in ground-water hydrology and recently has been closely associated with the EPA Alternative Remedial Contract Strategy Program.

Limit: 75. Fee: $152; includes course manual.

Quantitative Sedimentary Basin Modeling. Saturday, October 29, and Sunday, October 30, 8 a.m. to 5 p.m. Hyatt Regency. Cosponsor: Sedimentary Geology Division

Aimed at those with a general sedimentary geology background but no previous knowledge of basin modeling, this course stresses the quantitative aspects of basin analysis, focusing particularly on how geodynamic processes influence the evolution of sedimentary basins and control the development of stratigraphic sequences. Covered in the course will be

- the causes of basin subsidence in various tectonic settings,
- generating tectonic subsidence histories (geohistory analysis and backstripping),
- lithospheric flexure and basin formation,
- thermal subsidence mechanisms,
- the interplay between tectonic subsidence, sea level, and sediment transport in the development of stratigraphic sequences.

The course will emphasize the application of these quantitative methods to specific basin examples with the goal of teaching participants the tools necessary to analyze basin evolution on their own.

Faculty: *Charles L. Angevine*, Dept. of Geology and Geophysics, University of Wyoming; Ph.D., Cornell University. Angevine specializes in quantitative modeling of geologic processes; his current research interests include the isostatic compensation of Laramide basins and the formation of depositional sequences at continental margins. *Paul L. Heller*, Dept. of Geology and Geophysics, University of Wyoming; Ph.D., University of Arizona. Heller's research interests include various aspects of sedimentation and basin analysis. He is currently focusing on the interplay between sedimentation, subsidence, and sea level and the evolution of foreland basin sequences. *Chris Paola*, Dept. of Geology and Geophysics, University of Minnesota; Sc.D., Massachusetts Institute of Technology and Woods Hole Oceanographic Institution. Paola's specialty is sediment transport in modern and ancient systems with an emphasis on interaction between subsidence patterns and basin filling.

Limit: 100. Fee: $138; includes course manual and lunch both days.

Seminar in Geoscience Writing. Sunday, October 30, 8 a.m. to 5 p.m. Marriott City Center

In this seminar participants learn a unique method for organizing all kinds of on-the-job writing, from short memos to long reports. This systematic, efficient approach ensures both easier writing and easier reading. Topics covered include how to

- get started easily and reliably every time,
- avoid burying key points,
- handle special problems in writing,
- ensure reader-oriented organization,
- develop a nonsuspenseful outline,
- select illustrations efficiently,
- write topic sentences with impact,
- get long reports approved rapidly,
- prepare lengthy drafts quickly,
- edit your own work less painfully.

This seminar is for professionals and executives who spend a significant time preparing information for readers—whether that information is in letters, memos, reports, manuals, or published articles.

Faculty: *Hugh Hay-Roe*, Murray Associates International; Ph.D., University of Texas. Hay-Roe's diversified background qualifies him as a writer, editor, teacher, petroleum geologist, and executive. He has worked as a research geologist for international oil companies, general manager of an overseas operation, and exploration vice president. His responsibilities have included writing research reports, technical articles, and administrative reports.

Limit: 75. Fee: $88; includes course manual.

The Evolution of Reef Communities. Friday, November 4, and Saturday, November 5, 8 a.m. to 5 p.m. University of Colorado, Boulder. Cosponsor: Paleontological Society

Directed toward graduate students and professional biologists and paleobiologists concerned with the autecology and synecology of reef organisms and the composition of reef ecosystems through time, this course will emphasize the compositional and structural

(*continued on p. 117*)

1988 Short Courses (*continued from p. 116*)

history of communities dominated by reef-building algae, sponges, corals, and rudistid bivalves during the Phanerozoic, their evolutionary and mass extinction history, and their relations to global oceanographic, climatic (e.g., glaciation), and tectonic events. Presentations will include lectures, lab study of reef builders and associated facies, and a final round-table discussion of overall reef history and its importance in exploration for natural resources. Laboratory and lecture facilities provided by the Department of Geological Sciences at the University of Colorado.

Faculty: *J. A. Fagerstrom*, Dept. of Geology, University of Nebraska; Ph.D., University of Michigan. Fagerstrom is a world authority on the biological composition and carbonate facies of middle Paleozoic reefs and author of *The Evolution of Reef Communities*, recently published. *Erle G. Kauffman*, Dept. of Geological Sciences, University of Colorado; Ph.D., University of Michigan. Kauffman is a noted specialist in late Mesozoic reef evolution and especially Cretaceous reefs composed of rudistid bivalves. *George D. Stanley, Jr.*, Department of Geology, University of Montana; Ph.D., University of Kansas. Stanley is an internationally recognized authority on the evolution of Mesozoic-Cenozoic coral reef ecosystems from their late Paleozoic–early Mesozoic ancestors.

Limit: 30. Fee: $138; includes course manual.

Cornell Celebrates GSA Centennial

Thursday, June 9, 1988
3 to 5 p.m.
Cornell University, Ithaca, New York

Three Cornellians and ten others met in the Cornell Botanical Hall in 1888. Could they have predicted that the Society would grow to become the world's premier geological organization?

You are invited to attend a symposium that will be held in commemoration of the Society's founding and its first annual meeting, hosted by Cornell. Cornell President Rhodes will be a featured speaker. A reception and dinner will follow. The event is part of Cornell's Alumni Week program.

For more information, contact Donald Turcotte, Department of Geological Sciences, Cornell University, Ithaca, NY 14853-1504, (607) 255-5267.

AIR TRANSPORTATION

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

Reduced rates are 5% off any available discount fare that generally has restrictions. If you do not meet the requirements for the discount fare, you will be offered a discount 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 a.m. to 5:30 p.m., Mountain 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 request.
- Tickets can be paid for by check (payable to Cain Travel), major credit card, or invoice to company. The final payment must reach Cain Travel no later than seven days prior to departure to allow for mailing time.
- All tickets will be mailed via certified mail upon receipt of payment unless requested otherwise.
- After tickets are issued, you are protected from fare *increases*; if a fare *decreases*, call Cain Travel for an adjustment.
- Cain Travel will have an on-site Customer Service Desk at the Convention Center.

THE 1988 GSA CENTENNIAL ORCHESTRA

The 1988 GSA Centennial Orchestra is seeking musically active geologists and their spouses interested in participating in this musical celebration to take place at the GSA Centennial Celebration. So that we may begin to plan a balanced orchestra, indicate your interest by providing (1) your name, address, and telephone number and (2) the instrument you play and current level of ability.

Please send to
Holly Stein, Organizer
U.S. Geological Survey
M.S. 905, Federal Center
Denver, CO 80225

(303) 236-5592
(303) 985-2797

Important Deadlines

ABSTRACTS DUE JUNE 10
for abstract forms (303) 447-8850

PREREGISTRATION DUE OCTOBER 7
for meeting information (303) 447-2020
or 1-800-GSA-1988

HOUSING FORMS DUE OCTOBER 7

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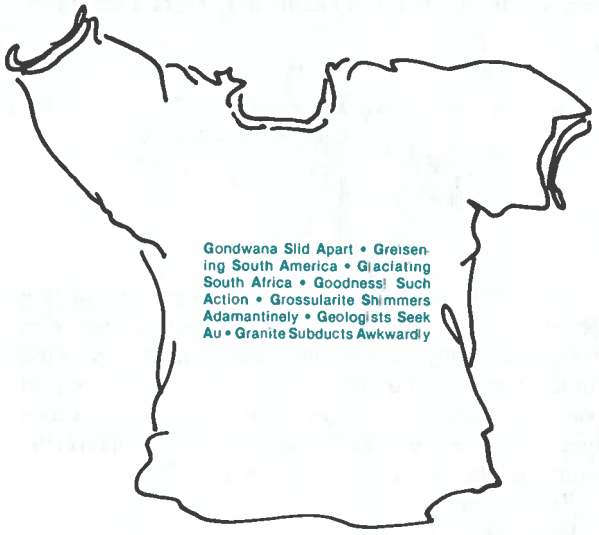
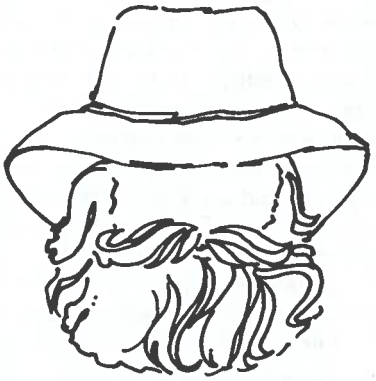
GSA'S CENTENNIAL CONTESTS

GREAT CENTENNIAL CELEBRATION T-SHIRT CONTEST

As part of the celebration of the GSA Centennial, we are planning Centennial T-shirts, one of which will be decorated with 100 three-word phrases using the letters G, S, and A, and having some geological content. For example: Granite Subducts Awkwardly, Grossularite Shimmers Adamantinely, Grenville Seems Ancient. Send your brilliant ideas (as many as you wish) to Centennial T-shirt, P.O. Box 9140, Boulder, CO 80301. Join the competition for the 100 best phrases. Maybe you'll see your phrase(s) immortalized! All entries must be received by *June 1, 1988* in order to be considered.

Other brilliant geological one-liners for individual T-shirts, as well as geological T-shirt designs, are also requested.





GREAT BEARD AND FIELD DRESS CONTEST

What is a centennial celebration without a beard contest? In conjunction with the 100th anniversary of the Geological Society of America, prizes will be awarded for the best field beard, the most unusual beard, the beard that most looks like that of a nineteenth-century geologist, and the most "unnatural" beard. Judging will take place during the evening Welcoming Party of the GSA Centennial Celebration in Denver on October 30, 1988.

Given the inability of a significant part of our membership to grow a beard, Centennial awards will be given to the best dressed and most unusually dressed field geologist also. These costumed geologists will represent the field explorer of 1888 and the modern, fully equipped field geologist of 1988. Here is an opportunity for creativity! Potential contestants should begin growing beards now and assembling their collection of modern and ancient field gear in time for the 1988 Centennial Celebration.

If you plan to participate in this contest, call or write Laura Wray, Amoco Production Co., 1670 Broadway, Rm. 2122, Denver, CO 80201, (303) 280-6227.

GSA'S CENTENNIAL CELEBRATION

DENVER, COLORADO ■ OCTOBER 31–NOVEMBER 3, 1988

For information: GSA, P.O. Box 9140, Boulder, CO 80301
(303) 447-2020 or 1-(800) GSA-1988

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Denver Convention Complex and Currigan Hall

October 31–November 3, 1988

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. . . companies with products and services used by geologists to exhibit during the 1988 Centennial Celebration. Should you answer YES! to any one of the questions below, please turn your company in to the GSA Exhibits Manager today:

- Are your products and services used by geologists?
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- Do you advertise in geoscience publications?
- Do you have a special product line targeted for a specific type of geologist?
- Do you find marketing and promotion expense growing and need a cost-effective way to make your sales?
- Are your services, as well as your products, well known?
- Do you find increasing competition?
- Are you finding the economic situation a real test of survival?

There is always a benefit in exhibiting your products and services to a qualified audience. Exhibiting can deliver good leads with a high probability of sales. But, every exhibitor must ask if the benefits are likely to meet the expectations. In other words, is the 1988 GSA Centennial Exhibit right for you?

Kathy Ohmie, GSA's Exhibits Manager, is available to help answer this question. She has accurate, in-depth information on GSA's Centennial Exhibit. Call Kathy or turn in your hot prospects today.

CLIP & MAIL TODAY

____ Yes! I'm **WANTED**. Send more exhibitor information immediately.

____ As a GSA member, I **WANT** the products or services of the following company to be represented in the exhibit hall.

Name _____ Phone ( ) _____

Company _____ Product or Services _____

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Mail to: GSA Exhibits Manager, P.O. Box 9140, Boulder, CO 80301

Or call toll free 1-800-GSA-1988.

Report from Washington

by Jim Evans
GSA Congressional Science Fellow

Hard Mineral Mining in the EEZ

A bill that is being considered in the House of Representatives would establish the administrative framework for seabed mining in the Exclusive Economic Zone (EEZ). H.R. 1260, the National Seabed Hard Minerals Act, was introduced by Rep. Mike Lowry (D–Washington), and has been referred to the House Merchant Marine and Fisheries Committee and the House Interior and Insular Affairs Committee. Sen. Daniel Inouye (D–Hawaii) is planning to introduce a similar bill in the Senate soon. A substitute version of H.R. 1260 has recently gone through mark-up at the full-committee level in Merchant Marine.

Background

One of the primary purposes of the bill is to settle a long-standing dispute between the Commerce and Interior departments over which agency should regulate mining activities within the EEZ. The Mineral Management Service (MMS) in the Department of Interior has asserted that it has sole jurisdiction over seabed mining in the EEZ by virtue of its authority under the 1953 Outer Continental Shelf Lands Act (OCSLA). On the other hand, the Commerce Department controls leasing outside the continental shelf under the 1980 Deep Seabed Hard Mineral Resources Act. When the EEZ was declared by President Reagan in 1983, problems of overlapping jurisdiction became apparent.

Several factors have led to a consensus among industry, environmental groups, and coastal states that a new regulatory framework was needed for seabed mining. The first was the concern that because the Outer Continental Shelf Lands Act was designed to regulate oil and gas development, it has inadequate provisions for environmental monitoring and protection during exploration and recovery of seabed minerals. The second factor was that the OCSLA requires up-front payments for lease sales and does not provide claim protection to firms that conduct expensive exploration work. Both of these problems would make it difficult for a new seabed industry to succeed. Finally, coastal states want a guarantee that any mining activities in federal waters will be consistent with their federally approved coastal zone management plans. This "consistency" provision of the Coastal Zone Management Act of 1972 has recently been taken away, as a result of lawsuits over offshore oil development, leaving coastal states with little say in how offshore oil development can proceed.

Legislation

The substitute form of H.R. 1260 now under consideration would give the National Oceanic and Atmospheric Adminstration sole authority over seabed mining regulations. The bill would authorize $28 million to the USGS and NOAA for a program of geological and biological research of the seabed and overlying waters. The Under Secretary of Commerce for Oceans and Atmosphere would establish "preservational stable reference areas" in which no exploration or commercial recovery could be carried out. These areas are to provide baseline data to evaluate the effects of seabed mining in adjacent regions.

Industries that engage in seabed mining would be required to obtain licenses for exploration and permits for commercial-recovery activities. There is an exemption for any type of basic marine scientific research, including seafloor mapping and taking of any geophysical, geochemical, oceanographic, or atmospheric measurements or random bottom samples. Exploration licenses would require descriptions of the planned activity, area, schedule, methods and technology involved, and provisions for environmental protection. Commercial recovery permits would require similar information, in addition to a discussion of proposed monitoring activities, a description of proposed disposal of mining-related waste products, and a full environmental impact statement. Permits would be issued for 20-year periods. NOAA would be required to determine that the proposed exploration and recovery activities would not significantly affect the environment before it issued a license or permit.

The bill also establishes an elaborate framework to protect the interests of coastal states in seabed mining activities off their shores. Each state would establish a joint federal-state task force to provide scientific advice and recommendations regarding research, exploration, and recovery activities. NOAA would be required to consult with the governors of affected states before issuing a license or permit. The bill sets up the framework for dispute-resolution panels in the event that states and the federal government cannot reach agreement concerning seabed mining activities.

Seabed mineral production royalties would be 12.5%. Revenue-sharing provisions would be changed to 50% to the federal government and 50% split among the affected states. Half of the federal income would go toward activities under the Coastal Zone Management Act to mitigate the effects of seabed mining.

Non-U.S. Subscribers To Receive Final Announcement for 1988 Annual Meeting by Air Mail

This year, in honor of GSA's Centennial, the August issue of *GSA News & Information* will be mailed to all non-U.S. subscribers via air rather than via the usual second-class, surface mail.

This important issue will contain the final announcement, plus registration and housing forms, for GSA's 100th Annual Meeting, scheduled for Denver, Colorado, October 31–November 3, 1988.

We repeat that this service applies only to the August issue. The other eleven 1988 issues will move by second class mail, as usual.

We will welcome reports from non-U.S. subscribers on how much this service improved your delivery and how important the improvement is to you. Comments will help us evaluate the service and its related cost, and decide on procedures for future years. Send comments to: GSA Production Manager, P.O. Box 9140, Boulder, CO 80301 USA.

Please remember, however, that some non-U.S. subscribers may receive the August issue before they receive the July issue. Please allow the normal delivery time for the July issue before sending in a claim for nondelivery.

FOUNDATION NEWS

by Robert L. Fuchs

Life Insurance—A Versatile Financial Tool

Just about everyone has contact with life insurance during the course of a lifetime. Heads of families purchase insurance to provide financial security for spouses and children in the event of death. Life insurance is a very common type of benefit provided to employees by employers. Policies are purchased to provide funding for college educations. Retirement programs can be financed by life insurance proceeds. Charitable gifts to institutions can be in the form of a life insurance policy or proceeds.

Life insurance takes many different forms—term, endowment, whole life, universal, variable, and single premium. Each type has specific attributes that can allow the insured to achieve desired financial planning results.

There are many features of life insurance that can be used to financial advantage:

- Your life insurance policy is a source of money. You can borrow at low interest rates against the cash value.
- Beneficiaries of life insurance policies receive the money free of income tax.
- With proper design, life insurance proceeds can pass from your estate without being subjected to estate taxes.
- Life insurance can be used in business arrangements such as for a buyout in a closely held company.
- Life insurance can be converted to an annuity that will provide retirement income.
- A life insurance policy can be the method of making a very meaningful contribution to the GSA Foundation.

Tax planning is just as important in the case of life insurance as it is with other components of an estate, such as stocks, bonds, and real estate. Normally, the entire proceeds paid to a beneficiary will be included in the estate for estate tax purposes. While a married person can leave his or her estate to the surviving spouse free of tax, there may be tax upon the subsequent death of the spouse. Similarly, insurance proceeds received by a beneficiary can be taxed again when the beneficiary dies. Avoidance or reduction of this dual tax can be accomplished through the use of trusts, a topic that will be discussed in a future Foundation News article.

Life insurance is an excellent and popular charitable gift device. A substantial gift can be made by making a series of modest payments during the donor's lifetime. Such a gift is certain in amount and does not become tied up in estate administration. The gift does not become a matter of public record, as do wills, and it is simple to accomplish by using insurance company forms.

A USGS geologist, age 55 and in the 28% tax bracket, has a $20,000 life insurance policy that he contributes to the GSA Foundation. The cash value of this policy is $8000, and the annual premium is $600. This contribution can generate a tripartite tax saving. There is an immediate income tax savings of $2240, based on the current cash value of $8000. Assuming a $700,000 estate, estate taxes are reduced by $7500. Finally, if the geologist makes annual contributions equal to the $600 premium, this will produce a tax saving each year of $168. Total income and estate tax savings during a 20-year life span would be $13,100. The GSA Foundation receives $20,000 at the donor's death.

A periodic review of your estate plan is important because of changing conditions. Not only should your will and retirement arrangement be examined, but also life insurance. Perhaps more insurance is needed, or the total amount may exceed your needs now. We have a booklet about life insurance that will be helpful in analyzing this part of your estate and developing plans for better utilization of the life insurance tool. Call the Foundation office at (303) 447-2020, or clip and mail the accompanying coupon.

Century Challenge Report

At the end of February 1988, there were 408 gifts and pledges to the Century Challenge, totaling $56,963. Challenge partners, those giving $250 or more, remain at 29. Don't miss out— send your birthday gift to GSA today.

Donors to the GSA Foundation, February 1988

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Committee Service Provides Way To Affect GSA

The GSA Committee on Committees wants your help. As one of his duties, Vice-President Randolph W. Bromery 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 2 meeting in Denver, Colorado. 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 1988 consists of the following people: Chairman Charles A. Baskerville, 6713 Van Fleet Drive, McLean, VA 22101, (703) 764-6239 or (703) 648-6788; Thomas D. Barrow, 1010 Lamar, Suite 400, Houston, TX 77002, (713) 739-0542; Rosemary V. Buden, Montbello, Unit 1614, 5901 Mt. Eagle Drive, Alexandria, VA 22303, (703) 329-2420; William G.E. Caldwell, Department of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0, Canada, (306) 966-5725; George W. Fisher, Department of Earth & Planetary Sciences, Johns Hopkins University, 34 and Charles Street, Baltimore, MD 21218, (301) 338-7237 or 7135.

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 123.

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. **DEADLINE: JULY 15, 1988.** Information requested on this form will assist the Committee on Committees with their recommendations for the 1989 committee vacancies. 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 Denver in November.

COMMITTEES AND QUALIFICATIONS

Day Medal (1 vacancy)

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."

Geology & Public Policy (3 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 (3 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 (3 vacancies)

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."

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 (1 vacancy)

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.

Treatise on Invertebrate Paleontology (1 vacancy)

Advises the *Treatise* editor in all phases of *Treatise* policy including planning of new volumes as well as revisions; also gives advice on special editorial matters such as acceptance or rejection of contributed manuscripts.

Committee members should be familiar with and have a broad understanding of Paleontology.

(continued on p. 123)

Committee Service
(continued from p. 122)

Joint Technical Program Committee GSA Representatives-at-Large (2 vacancies)

Supervises the review of abstracts for papers to be presented at the GSA annual meeting. Representatives-at-large should have expertise in general geology or stratigraphy. 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.

GSA Representative to the American Association for the Advancement of Science (AAAS) (1 vacancy—Section W, Atmospheric and Hydrospheric Sciences)

Must be a member of AAAS who will be attending AAAS meetings under other auspices; term February 16, 1988, to February 15, 1991.

NOMINATION FOR GSA COMMITTEES FOR 1989

(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 ( )
GSA Member ( )

Section affiliation:
Division affiliation(s):

Candidate's year of birth:

Brief summary of education:

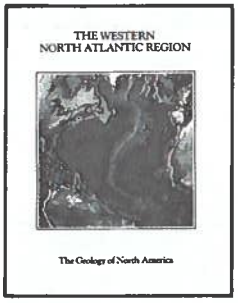
Brief summary of work experience (include scientific discipline, principal employer—e.g., mining industry, academic, USGS, etc.):

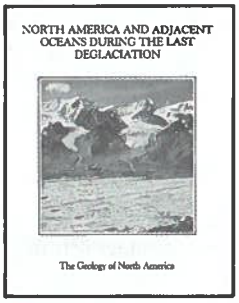
If you are nominating someone other than yourself to serve GSA and are not volunteering, please give your name, address, and phone number (please print):

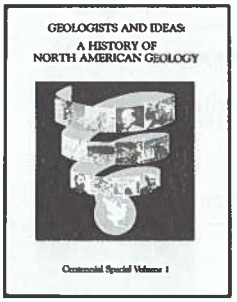
DEADLINE: Please return this form to headquarters by July 15, 1988.

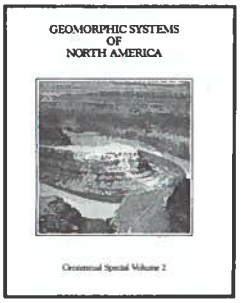
The Decade of North American Geology DNAG

VOLUMES









GEOLOGY OF NORTH AMERICA

The centerpiece of the DNAG project. When complete the series will contain 28 matched volumes, in two sets: 19 U.S. and Mexican volumes, and nine from Canada.

The Western North Atlantic

edited by P.R. Vogt and B. E. Tucholke, 1986

The award-winning first volume in this 28-volume series. Complete coverage of the geology and geophysics of the western North Atlantic Ocean basin in 41 chapters, organized into 8 sections: Introduction; Present Accretion Axis; Regional Geology and Geophysics; Plate Tectonic Evolution; Surficial Sedimentation; Biofacies; Paleoceanography; and Resources and Law of the Sea. The editors received the 1986 Alan Berman Research Publication Award for thisvolume. Includes 11 plates, several in color, in a separate, matching slipcase.

GNA-M, 720 p., 11 plates in slipcase, indexed, ISBN 0-8137-5202-7, CIP, hardbound, $47.50

North America and Adjacent Oceans during the Last Deglaciation

edited by W. F. Ruddiman and H. E. Wright, Jr., 1987

Most Quaternary sediments in North America north of 45°N postdate the last deglaciation. This volume looks at those extensive deposits from the standpoints of timing, cause, and mechanism of the wastage of North American ice during the last deglaciation and the accompanying environmental changes in the nonglaciated and deglaciated areas. It particularly examines the mechanisms by which a mass of ice equivalent to 100 m of global sea-level was returned to the the ocean within about 8,000 years. A truly comprehensive synthesis of marine and terrestrial information in 22 chapters grouped into five sections: Chronology of Disintegration of the North American Ice Sheets, Ice Core and Other Glaciological Data, the Nonglacial Physical Record on the Continent, Biological Record on the Continent, and Analysis and Summary. Includes two oversize pocket-plates in color showing time-series maps of pollen densities and vegetation changes since 18 ka.

GNA-K3, 509 p., 2 pocket plates, indexed, ISBN 0-8137-5203-5 hardbound, $43.50

The Atlantic Continental Margin: U.S.

edited by R.E. Sheridan and J.A. Grow, 1988

This synthesis covers stratigraphy, depositional processes, and geophysical interpretation of the major onshore and offshore marginal basins from Maine to the Bahamas, and includes an up-to-date review of thinking on regional tectonic history. Additional chapters discuss the theoretical aspects of thermal evolution, subsidence, and seismic stratigraphy as applied to this region. Geological resources including petroleum, water, sand and gravel, hard minerals, and heat flow are reviewed, and environmental hazards such as seismicity, coastal erosion, waste disposal and submarine instability as it relates to site of drilling platforms and mining are evaluated. A summary chapter reviews areas of controversy and suggests key topics for research.

GNA-I2, 632 p., 8 plates in slipcase, indexed, ISBN 0-8137-5204-3, hardbound, $49.50

CENTENNIAL SPECIAL VOLUMES

Four special, topical voumes prepared by four of GSA's Divisions as their contribution to the DNAG project.

Geologists and Ideas: A History of North American Geology

edited by Ellen T. Drake and William M. Jordan, 1985

An unusually coherent, well-written volume. Prepared for DNAG by the History of Geology Division of GSA. Spotlights events, ideas, and people, and sheds light on the history of North American geology as a whole. Thirty-four papers are organized into four categories: (1) The Evolution of Significant Ideas; (2) Contributions of Individuals; (3) Contributions of Organized Groups; and (4) Application of Significant Ideas. Excellent as a course-book or for additional reading for classed related to the history of geology or general science. Light blue spine.

CSV001, 520 p., indexed, ISBN 0-8137-5301-5, CIP, hardbound, $37.50

Geomorphic Systems of North America

edited by W. L. Graf, 1987

New ideas, new techniques, new data, even new access to extraterrestrial worlds—all these are in greater abundance now than ever, making this, the editor says, a marvelous time to be a geomorphologist! This 14-paper volume has been prepared by the Geomorphology Division of GSA as its contribution to DNAG. Subjects treated are Regional Geomorphology of N. America; Applachian Mountains and Plateaus; Atlantic and Gulf Coast Province; Central Lowlands; Canadian Shield; Great Plains; Rocky Mountains; Colorado Plateau; Basin and Range; Central America and the Caribbean; Columbia and Snake River Plains; Interior Mountains and Plateaus; Pacific Coast and Mountain Systems; and Arctic Lowlands. Yellow spine.

CSV002, 661 p., indexed, ISBN 0-8137-5302-3, CIP, hardbound, $48.50

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THE GEOLOGICAL SOCIETY OF AMERICA

Geological Society of London Offers Special Prices on Publications to GSA Members

With the aim of disseminating geological literature to individual geologists as widely as possible, the Geological Society of London offers members of the Geological Society of America an opportunity to purchase publications at prices substantially below the normal list price. The special prices include postage (surface mail) and packing. Only one copy of each publication may be purchased by a member and this should be for his/her own use.

A list of selected titles is given below. A full list may be obtained from the Geological Society of London (see order form).

Special Publications

Diagenesis of Sedimentary Sequences, edited by J. D. Marshall; 1987, 368 p., ISBN 0-632-01939-5, $90. This collection of papers from a research meeting will be of interest to academic and industrial researchers, teachers and students of advanced courses in sedimentology and sedimentary geochemistry, petroleum geologists, and anyone with a general interest in the postdepositional history of sedimentary basins.

Desert Sediments: Ancient and Modern, edited by L. E. Frostick and I. Reid; 1987, 416 p., ISBN 0-632-1905-0, $82.50. An exchange between scientists concerned with living deserts of Earth and beyond, on the one hand, and with ancient Earth counterparts, on the other. This book includes sections on fluvial sediments, aeolian sediments, chemical sediments, and remote sensing of desert sediments.

Fluid Flow in Sedimentary Basins and Aquifers, edited by J. C. Goff and B.P.J. Williams; 230 p., ISBN 0-632-1804-6, $48. This volume presents the proceedings of a meeting, organized by the Petroleum and Hydrogeological Specialist Groups, on different aspects of fluid flow in sedimentary basins, case histories of flow in different types of basin, and economically important aspects of fluid flow.

Geochemistry and Mineralization of Proterozoic Volcanic Suites, edited by T. C. Pharaoh, R. D. Beckinsale, and D. T. Rickard; 1987, 576 p., ISBN 0-632-1806-2, £90. This volume contains the edited proceedings of an international conference held in 1986. High-quality geochemical data are presented together with field descriptions to provide a worldwide overview of Proterozoic volcanism. The book provides a unique insight into processes of volcanism, metallogenesis, and crustal evolution from 2500 to 550 Ma.

Coal and Coal-bearing Strata: Recent Advances, edited by A. Scott; 1987, 340 p., ISBN 0-632-01906-9, $67.50. These proceedings of the International Symposium on Coal and Coal-bearing Strata cover a wide range of topics, including the formation of peat, coalification, coal geochemistry, paleobotanical and palynological studies, sedimentology, coal exploration, and oil-prone coal basins.

Geology and Geochemistry of Abyssal Plains, edited by P.P.E. Weaver and J. Thompson; 1987, 256 p., ISBN 0-632-017449, $56.50. This volume presents the proceedings of an international conference that brought together various aspects—geological, geophysical, and geochemical—of recent studies of abyssal plain sediments. A large number of the papers concern work coordinated by the Seabed Working Group of the Nuclear Energy Agency on an international program sponsored by several countries to examine the feasibility of disposal of radioactive waste in such sediments.

Alkaline Igneous Rocks, edited by J. G. Fitton and B.G.J. Upton; 1987, 584 p., ISBN 0-632-01616-7, $90. In this book an international team of authors provides an up-to-date overview of the nature, origin, and evolution of alkaline magmas. Particular attention is paid to carbonatites, lamprophyres, and lamproites.

Deformation of Sediments and Sedimentary Rocks, edited by M. E. Jones and R.M.F. Preston; 1987, 358 p., ISBN 0-632-01733-3, $67.50. This text presents theoretical and field studies from throughout the world and deals with both descriptive accounts of the areas and the mechanisms of sediment deformation.

Continental Extensional Tectonics, edited by M. P. Coward, J. F. Dewey and P. L. Hancock; 1987, 650 p., ISBN 0-632-01605-1, $90. This volume deals with the geometry of extensional fault systems, the mechanics of basin formation, and implications for the sedimentary and thermal history of a basin or continental margin.

Evolution of the Lewisian and Comparable Precambrian High Grade Terrains, edited by R. G. Park and J. Tarney; 1987, 324 p., ISBN 0-632-01683-3, $59.50. The volume covers the main fields of Lewisian research with papers on various aspects of petrology, geochemistry, petrogenesis, structure, and geophysics of the Lewisian rocks, as well as six papers dealing with related or comparable high-grade terrains in Greenland, Labrador, Antarctica, and China.

Marine Petroleum Source Rocks, edited by J. Brooks and A. J. Fleet; 1987, 452 p., ISBN 0-632-01137-8, $86.50. This volume reviews the state of the art, presents significant new findings and highlights the areas on which future research must focus. It will be of interest to sedimentologists, stratigraphers and many oceanographers as well as petroleum geologists and geochemists.

Sedimentation in the African Rifts, edited by L. E. Frostick, R. W. Renaut, I. Reid, and J. J. Tiercelin; 1986, 396 p. ISBN 0-632-01534-9, $82.50. This book aims to provide a clearer picture of the interrelationship of structure and patterns of sedimentation during the early and middle phases of continental rift development.

The Nature of the Lower Continental Crust, edited by J. B. Dawson, D. A. Carswell, J. Hall, and K. H. Wedepohl; 1986, 402 p., ISBN 0-632-01561-6, $71.50. This book, resulting from the Third Alfred Wegener Conference, reviews the physical and geochemical properties of the lower continental crust. Papers cover heat flow, rheology, seismic properties, electrical resistivity, metasomatism, geochemistry, and isotope characteristics. The terrains include the western United States, Canada, Labrador, west Greenland, northern Britain, Finland, West Germany, the Massif Central, the Alps, the Himalayas, southern India, South Africa, and Australia.

Habitat of Palaeozoic Gas in NW Europe, edited by J. Brooks, J. Goff, and B. van Hoorne; 1986, 276 p., ISBN 0-7073-0491-1, $45. This book results from a joint meeting between the Geological Society of London and the Petroleum Exploration Society of Great Britain. It will provide a useful reference for those working in the oil and gas industry, not only in northwestern Europe but also worldwide, and for academic researchers and students in earth sciences wishing to understand and appreciate some of the recent advances in gas exporation.

The English Zechstein and Related Topics, edited by G. M. Harwood and D. B. Smith; 1986, 256 p., ISBN 0-632-01067-3, $67.50. This collection of papers resulting from a discussion workshop covers many aspects of Zechstein geology. The papers are grouped

(*continued on p. 126*)

Geological Society of London (*continued from p. 125*)
geographically into four regions: United Kindom, Germany, Poland, and the USSR.

North Atlantic Palaeoceanography, edited by C. P. Summerhayes and N. J. Shackleton; 1986, 480 p., ISBN 0-632-01516-0, $82.50. Thirty contributions from a conference represent a unique, multidisciplinary, state-of-the-art summary, especially the North Atlantic Basin.

Palaeoecology and Biostratigraphy of Graptolites, edited by C. P. Hughes and R. B. Rickards, assisted by A. J. Chapman; 1986, 288 p., ISBN 0-632-01071-1, $71.50. This volume, a result of an international conference of the Graptolite Working Party of the International Palaeontological Association, emphasizes the uses of graptolites in biostratigraphy and contains contributions from numerous countries, including China. Some paleobiology and some systematic paleontology are included, and one paper reveals startling new discoveries about the mode of life of the extant hemichordate zooid which is directly relevant to graptolite research.

Collision Tectonics, edited by M. P. Coward and A. C. Ries; 1986, 432 p., ISBN 0-632-01211-01, $63.50. This book gives a comprehensive and systematic view of collision tectonics, covering tectonics, structure, geochemistry, paleomagnetism, metamorphism, and magmatism.

Sedimentology: Recent Developments and Applied Aspects, edited by P. J. Brenchley and B.P.J. Williams; 1985, 342 p., ISBN 0-632-01192-0 (hard cover), $45, or 0-632-01416-0 (soft cover), $24. This book reflects some of the important developments in sedimentology over the past two decades. It is a collection of papers resulting from the meeting celebrating the 21st anniversary of the British Sedimentological Research Group.

The Geological Evolution of the Eastern Mediterranean, edited by J. E. Dixon and A.H.F. Robertson; 1985, 824 p., ISBN 0-632-01144-0, $90. This book included 61 contributions from most of the major research teams working in the area and represents a state-of-the-art review of this segment of the Alpine-Himalayan belt.

Marginal Basin Geology: Volcanic and Associated Sedimentary and Tectonic Processes in Modern and Ancient Marginal Basins, edited by B. P. Kokelaar and M. F. Howells; 1984, 322 p., ISBN 0-632-01073-8, $56.50. This book, resulting from a conference on Volcanic Processes in Marginal Basins, uses data from modern environments to provide a framework for more precise determination of the origin of the ancient rocks.

Fine-Grained Sediments: Deep-Water Processes and Facies, edited by D.A.V. Stow and D.J.W. Piper; 1984, 659 p., ISBN 0-632-01075-4, $90. This volume contains 38 papers, including short regional contributions and longer review papers.

Variscan Tectonics of the North Atlantic Region, edited by D.H.W. Hutton, and D. J. Sanderson; 1984, 270 p., ISBN 0-632-01203, $56.50. During the past 20 years it has become increasingly clear that an understanding of the tectonics around the edges of the world's fold belts offers valuable insights into the general nature of the orogens themselves. This volume attempts to throw light on the enigmatic and intriguing Variscan-Alleghenian orogen.

Ophiolites and Oceanic Lithosphere, edited by I. G. Gass, S. J. Lippard, and A. W. Shelton; 1984, 413 p., ISBN 0-632-01219-6, $60. This volume arose from an international conference intended to encourage and stimulate oceanographic-ophiolite research, recognition, and collaboration. In the first section the nature and formation of oceanic lithosphere are discussed from integrated and individual studies of the present oceanic crust and ophiolite complexes. The second section contains both review and original articles on the emplacement (obduction) of ophiolites and the use to which they can be put in understanding the processes of plate collision.

Petroleum Geochemistry and Exploration of Europe, edited by J. Brooks; 1983, 379 p., ISBN 0-632-01076-2, $44.50. This book contains papers by experts in geology, geochemistry, sedimentology, data analysis, petroleum exploration, and government policy, presented at an international conference.

Residual Deposits: Surface Related Weathering Processes and Materials, edited by R.C.L. Wilson; 1983, 258 p., ISBN 0-632-01072-X, $41.50. This book resulted from a meeting that brought together earth scientists with interests in geomorphology, geochemistry, pedology, sedimentology, and applied geology. The multidisciplinary approach to the study of residual deposits is reflected in the 25 chapters of the book, on weathering processes, kaolinites, laterites and bauxites, red beds, duricrusts, karst-related fluorite-barite deposits, and Cenozoic pedogenesis and landform development in southeast England.

Trench-Forearc Geology: Sedimentation and Tectonics on Modern and Ancient Active Plate Margins, edited by J. K. Leggett; 1982, 576 p., ISBN 0-632-00708-7, $72. The emphasis of this volume is on tectonics and sedimentation, but metamorphic and igneous phenomena are also considered.

The Caledonides of the British Isles—Reviewed, edited by A. L. Harris, C. H. Holland, and B. E. Leake; 1979, 768 p., ISBN 0-7073-0257-9, $60. This major reference work on the type localities of the Caledonian orogen discusses basement/cover relations, tectonics, metamorphism, floras and faunas, stratigraphy and sedimentology, volcanism, and plutonism.

Memoirs

The Ophiolite of Northern Oman, by S. J. Lippard, A. W. Shelton, and I. G. Gass; 1986, 320 p., ISBN 0-632-01587-X, $82.50. This memoir presents the major findings of a 10-year study in the Sultanate of Oman by the Open University and associated personnel.

The Chronology of the Geological Record, edited by N. J. Snelling; 1985, 343 p., ISBN 0-632-01285-4, $86.50. This volume is based on papers presented at a symposium sponsored by the Geological Society of London and the IUGS Subcommission on Geochronology. Papers review the Phanerozoic time scale and discuss the main alternative views. Possible Precambrian time scales are briefly reviewed. An interim time scale for the Phanerozoic summarizes and draws a compromise between the views of the contributors. Other papers are concerned with the bearing of the refined estimates of the time scale on the rates of geologic processes such as postorogenic uplift, the cooling segments of the crust following orogeny and other thermal disturbances, polar wandering, ocean-floor spreading, sedimentation, deformation, and faunal evolution.

The Nature and Timing of Orogenic Activity in the Caledonian Rocks of the British Isles, edited by A. L. Harris; 1985, 53 p., ISBN 0-632-01298-6, $56.50. These maps and explanatory text form an important part of the contribution by the United Kingdom and Ireland to International Correlation Programme Project 27, The Caledonide Orogen.

Special Reports

Geophysical Logs in British Stratigraphy, by A. Whittaker, D. W. Holliday, and I. E. Penn; 1985, 74 p., ISBN 0-632-01488-1, $16.50.

(*continued on p. 127*)

Geological Society of London (*continued from p. 126*)

This book outlines the stratigraphical applications of the main geophysical logging tools. It characterizes the British geological succession by means of the geophysical log signatures of its principal constituent formations. The book unites modern developments of petroleum industry geophysical techniques with long-established stratigraphical discovery and research.

Acritarchs in British Stratigraphy, by C. Downie; 1984, 26 p., ISBN 0-632-01225-0, $7. To explain what acritarchs are like and what they achieve in biostratigraphy, this book presents charts illustrating a substantial sample of the British Palaeozoic acritarchs, from which a good idea of the appearance of these fossils can be obtained. The charts also show the stratigraphical range of each species, and give an indication of their usefulness in biostratigraphy.

Trilobites in British Stratigraphy, by A. T. Thomas, R. M. Owens, and A.W.A. Rushton; 1984, 78 p., ISBN 0-632-01201-3, $16.50. This book presents charts showing the stratigraphical distribution of all named species and subspecies known to occur in the British Isles in relation to the "standard" stratigraphical schemes presented in earlier Special Reports. The stratigraphical potential of the trilobite faunas, both locally and internationally, and the influence of such factors as lithofacies and provinciality on trilobite distribution are discussed.

A Correlation of the Jurassic Rocks in the British Isles, Part Two: Middle and Upper Jurassic, by J.C.W. Cope, K. L. Duff, C. F. Parsons, H. S. Torrens, W. A. Wimbledon, and J. K. Wright; 1980, 109 p., ISBN 0-632-00714-1, $19.

A Correlation of Jurassic Rocks in the British Isles, Part One: Introduction and Lower Jurassic, by J.C.W. Cope, T. A. Getty, M. K. Howarth, N. Morton, and H. S. Torrens; 1980, 73 p., ISBN 0-632-00712, $16.

A Correlation of Triassic Rocks in the British Isles, by G. Warrington, M. G. Audley-Charles, R. E. Elliott, W. B. Evans, H. D. Ivimey-Cook, P. E. Kent, P. L. Robinson, F. W. Shotton, and F. M. Taylor; 1980, 78 p., ISBN 0-632-00638-2, $13.

A Correlation of Tertiary Rocks in the British Isles, by D. Curry, C. G. Adams, M. C. Boulter, F. C. Dilley, F. E. Eames, B. M. Funnell, and M. K. Wells; 1978, 72 p., ISBN 0-903317-22-2, $9.

A Correlation of Silesian Rocks in the British Isles, by W.H.C. Ramsbottom, M. A. Calver, R.M.C. Eagar, F. Hodson, D. W. Holliday, C. J. Stubblefield, and R. B. Wilson; 1978, 81 p., ISBN 0-7073-0234-X, $11.50.

A Correlation of Cretaceous Rocks in the British Isles, by P. F. Rawson, D. Curry, F. C. Dilley, J. M. Hancock, W. J. Kennedy, J. W. Neale, C. J. Wood, and B. C. Worssam; 1978, 70 p., ISBN 0-7073-0221-8, $11.50.

A Correlation of the Devonian Rocks in the British Isles, by M. R. House, J. B. Richardson, W. G. Chaloner, J.R.L. Allen, C. H. Holland, and T. S. Westoll; 1977, 110 p., ISBN 0-7073-01221-1, $13.50.

A Correlation of Dinantian Rocks in the British Isles, by T. N. George, G.A.L. Johnson, M. Mitchell, J. E. Prentice, W.H.C. Ramsbottom, G. D. Sevastopulo, and R. B. Wilson; 1976, 87 p., ISBN 0-7073-0120-3, $9.

A Correlation of the Precambrian Rocks in the British Isles, edited by A. L. Harris, R. M. Shackleton, J. Watson, C. Downie, W. B. Harland, and S. Moorbath; 136 p., ISBN 0-7073-0112-2, $13.

A Correlation of Quaternary Deposits in the British Isles, by G. F. Mitchell, L. F. Penny, F. W. Shotton, and R. G. West; 99 p., ISBN 0-632-00656-0, $11.50.

A Correlation of Cambrian Rocks in the British Isles, by J. W. Cowie, A.W.A. Rushton, and C. J. Stubblefield; 42 p., ISBN 0-903317-14-1, $10.

A Correlation of Silurian Rocks in the British Isles, by L.R.M. Cocks, C. H. Holland, R. B. Rickards, and I. Strachan; 34 p., ISBN 0-632-00662-5, $15.

Engineering Geology Special Publications

Planning and Engineering Geology, edited by M. G. Culshaw, F. G.

(*continued on p. 128*)

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Geological Society of London (*continued from p. 127*)

Bell, J. C. Cripps, and M. O'Hara; 1987, 656 p., ISBN 0-903317-38-9, $90. This volume reviews the relation between planning and engineering geology and its development in response to increasing public awareness of environmental conservation and restoration needs. It clarifies the information needs of planners and the best ways in which these can be met by engineering geologists.

Groundwater in Engineering Geology, edited by J. C. Cripps, F. G. Bell, and M. G. Culshaw; 1986, 571 p., ISBN 0-903317-35-4 (hard cover), $87, or 0-903317-36-2 (soft cover), $43.50. This volume, the proceedings of the 21st Annual Conference of the Engineering Group, contains papers on engineering problems posed by groundwater; changes in groundwater conditions; effects of groundwater on soils, rocks, and construction materials; natural chemistry of groundwater and contamination; engineering investigation for quality; investigations for quantity and flow; prediction and monitoring of conditions; control of groundwater by exclusion and removal; and contractual and legal matters.

Site Investigation Practice: Assessing BS 5930, edited by A. B. Hawkins; 1986, 423 p., ISBN 0-903317-33-8 (hard cover), $72, or 0-903317-34-6 (soft cover), $39. BS 5930 is the British Standard advising of the Code of Practice for Site Investigations. Although this book centers on the British Standard, many of the papers have an international significance. Topics covered include planning and design of site investigations; desk studies, air photograph interpretation, and reconnaissance for site investigation; field testing; sample disturbance; laboratory testing; rock descriptions; soil descriptions; planning engineering geophysical surveys; water in site investigation; and contractual matters.

Aggregates: Sand, Gravel, and Crushed Rock Aggregates for Construction Purposes, edited by L. Collis and R. A. Fox; 220 p., ISBN 0-903317-28-1 (hard cover), $52.50, or 0-903317-29-X (soft cover), $30. This volume reviews the influences of occurrence, mineral composition, and geologic history on the engineering properties of aggregate materials. These include both coarse and fine natural or crushed rock aggregates, whether for use in a bound or unbound condition, the main fields of use being in concrete and mortar, road pavements, railway track ballast, and biological and drainage filter media.

Miscellaneous Papers

Guidelines for the Curation of Geological Materials, edited by C.H.C. Brunton, T. P. Besterman, and J. A. Cooper; 1985, 200 p., ISBN 0-903317-30-3 (with binder), $29.50, or 0-903317-31-1 (loose-leaf), $25.50. These guidelines start at the site of collection and develop an unbroken thread of curation that continues in the museum. Handling, pereservation, documentation, storage and display of specimens are considered in detail.

Project to Study Global Aspects of Cretaceous Geology

The Cretaceous Resources, Events & Rhythms (CRER) Project has been announced by the Global Sedimentary Geology Program (GSGP), a new commission of the International Union of Geological Sciences. The Project CRER goal is to increase understanding of sedimentary products and the Cretaceous processes responsible for them. Research will test global synchroneity of rhythms and events; characterize and explain sedimentary deposits that are widely distributed; analyze global patterns of resources to better understand controls on their formation and to help in discovery and development; and seek connections of processes in the biosphere, hydrosphere, atmosphere, and lithosphere. In addition, the project will be a guide for other GSGP projects and will promote international exchange and training of sedimentary geologists.

Five working groups will identify research objectives, formulate plans, and monitor progress of work on sequence stratigraphy and sea-level change, sedimentation in oxygen-deficient oceans, paleogeography and paleoclimatology, cyclostratigraphy, and development and demise of carbonate platforms. Two coordinating committees will oversee geochronology and data management.

Conveners of each working group, working with colleagues worldwide, will develop position papers for each of the five topics. These reviews will be considered at a series of workshops to be held in southern France in September. The expected final products are plans for global-scale research that will be executed by scientists from various countries working together.

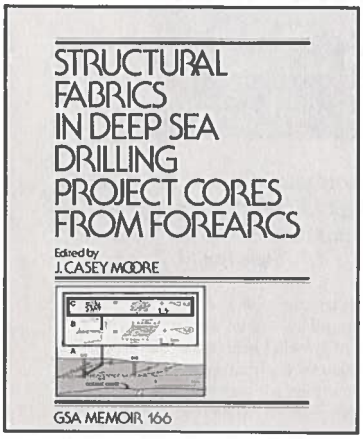
The Program Development Committee consists of members Liu Baojun, Chengdu Institute of Geology & Mineral Resources, China; Bernard Beaudoin, Ecole des Mines, Paris; Keith Crook, Australian National University, Canberra; Gerhard Einsele, University of Tübingen, West Germany; Robert Ginsburg (chairman), University of Miami, Fisher Island; Luis Spalletti, University of La Plata, Argentina; and Peter Timofeev, Geological Institute, USSR Academy of Sciences, Moscow.

For information, write to GSGP Secretariat, University of Miami, Fisher Island, Miami Beach, FL 33139.

FUTURE GSA ANNUAL MEETINGS

1988	October 31–November 3	Denver, Colorado
1989	November 6–9	St. Louis, Missouri
1990	October 29–November 1	Dallas, Texas
1991	October 21–24	San Diego, California
1992	October 26–29	Cincinnati, Ohio
1993	October 25–28	Boston, Massachusetts

GSA MEMOIRS

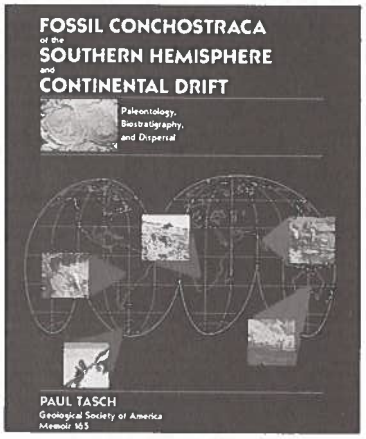


Structural Fabrics in Deep Sea Drilling Project Cores from Forearcs

edited by J. Casey Moore, 1987

DSDP cores from forearcs have a known tectonic setting and catch deformational and diagenetic-metamorphic processes while they are occurring. Analysis of the fabrics from these cores has great potential for furthering understanding of initial structural processes in accretionary wedges and for providing new insight into the evolution of ancient subduction complexes. Although studies of these cores, conducted in the context of each drilling leg, have elucidated the structural development of forearcs, those studies have lacked consistency between legs in terminology, approach, and detail. To bring this critical information to a broad geological audience in a uniform and condensed format, a group of geologists from several disciplines undertook the extensive structural study of all cores collected from forearcs during the DSDP. These ten papers summarize that work; each paper could stand alone as an important contribution.

MWR166, 168 p., 2 pocket plates, ISBN 0-8137-1166-5, hardbound, **$18.00**



Fossil Conchostraca of the Southern Hemisphere and Continental Drift: Paleontology, Biostratigraphy, and Dispersal

by Paul Tasch, 1987

Does the record of fossil conchostracan of the southern continents contain credible evidence of nonmarine dispersal between them during portions of Paleozoic and Mesozoic? The author presents results of field studies and biostratigraphic collections of fossil conchostrcans in pursuit of this question. His own fossil collections extended to Africa, Australia, Antarctica, India, and South America, and he supplemented his own with fossils from collections of colleagues and museums. The data, he claims, indicate a need for reexamination of pre-Drift placement of India and Africa. He describes several new taxa, and provides 49 outstanding plates, six appendices, and his personally prepared index.

MWR165, 304 p., indexed, ISBN 0-8137-1165-7, **$55.00**

PUBLICATIONS IN PREPARATION

Geology of the Henry Mountains, Utah, As Recorded in the Notebooks of G. K. Gilbert, 1875-76

edited by Charles B. Hunt

Go back in time with this volume and experience the thrill of discovering brand new geologic concepts. Travel alongside one of America's greatest geologists, Grove Karl Gilbert, whose early discoveries and theories have now become fundamental principles of our science. These day-by-day field notes of Gilbert's trip into Utah's Henry Mountains in 1875-1876 are an exciting, firsthand record of new discoveries and new ideas. They became the guide for Charles Hunt's many seasons of work in the same area. Now he shares Gilbert's original entries and maps with us, adding asides and clarifications of his own to create a fascinating combination of geologic history and frontier Americana. An enjoyable book, and one you can use to aid your own exploration of this scenic section of the great American West.

MWR167, 325 p., ISBN 0-8137-1167-3, hardbound, **$52.50**

Watch For These ...

The Cretaceous System of Southern South America
by A.C. Riccardi

Geology and Paleontology of Seymour Island, Antarctic Peninsula
edited by R.M. Feldman and M.O. Woodburne

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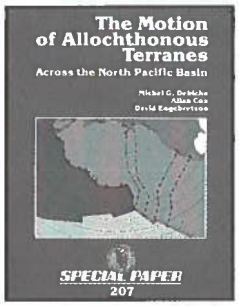

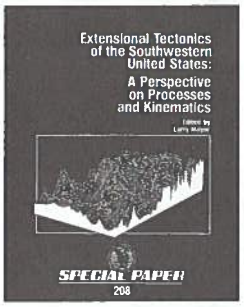

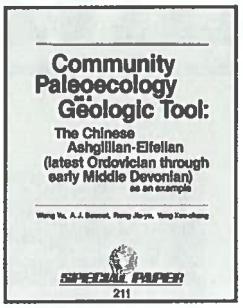

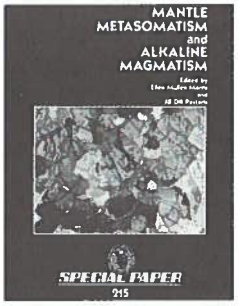

The Motion of Allochthonous Terranes Across the North Pacific Basin

by Michel G. Debiche, Allan Cox, David Engebretson, 1987

This report studies the trajectories of terrane movement across the Pacific basin and along the margin of North America and looks at possible points of origin of the terranes. More than 12 tables and 40 figures of unusually high quality. Special computer software was created to simulate terrane movement and plate age. Methods and results of Terrane Trajectories, Paleolatitude versus Time, and Coastwise Translation are presented. Models and data were compared, and trajectories were tested for internal consistency with paleomagnetic results.

SPE207, 56 p., ISBN 0-8137-2207-1, paperback, **$11.00**

Extensional Tectonics of the Southwestern United States: A Perspective on Processes and Kinematics

edited by Larry Mayer, 1986

What are the driving forces of rifting? How do initial lithospheric conditions affect subsequent rifting? What are the linkages between plate forces and regional stresses? What are the kinematics? Do different lithospheric thinning models generate unique geophysical signatures? How does rifting relate to regional topography? What about detachment structures? Seven papers in this volume will help you gain a better understanding of continental rifting processes in general and in the Basin and Range and Mojave Desert provinces in particular.

SPE208, 130 p., ISBN 0-8137-2208-X, paperback, **$17.50**

Community Paleoecology as a Geologic Tool: The Chinese Ashgillian-Eifelian (latest Ordovician through early Middle Devonian) as an example

by Wang Yu, A.J. Boucot, Ron Jia-yu, and Yang Xue-chang, 1987

This volume is part of an overall collaboration by A.J. Boucot and several members of the Nanjing Institute on varied problems of Silurian-Devonian community paleoecology, biogeography, and Silurian correlation—problems that are interrelated and that influence current basic taxonomic research. Chinese data are compared and contrasted with similar data from other parts of the world. Included are chapters that trace community evolution, name and list the communities, and illustrate brachiopod taxa in 20 plates.

SPE211, 106 p., ISBN 0-8137-2211-X, paperback, **$18.50**

Mantle Metasomatism and Alkaline Magmatism

edited by Ellen Mullen Morris and Jill Dill Pasteris, 1987

Contains 26 papers originally presented at the Symposium on Alkalic Rocks and Kimberlites, in April, 1985, a noteworthy outgrowth of which was a heightened awareness that alkaline magmatism is not restricted to any single scenario but may occur in virtually all tectonic and petrologic settings. The editors focus on mantle matasomatism and the origin of alkaline magmas, kimberlites, and related rocks; alkalic rocks in oceanic settings, and alkalic rocks in continental settings.

SPE215, 392 p., ISBN 0-8137-2215-2, sewn paperback, **$45.00**

Paleosols and Weathering through Geologic Time: Principles and Applications

edited by W.R. Sigleo and J. Reinhardt, 1987

A timely, unique volume. Earth scientists from many disciplines will be keenly interested because of growing recognition that paleosols (Ps) contain such a treasure of clues to tectonics, structural geology, erosional history, geography, geomorphology, and climate that they can no longer be ignored. Many believe the time is right to extend the use of Ps through the geologic time scale. This volume arose from the first symposium dedicated to Ps at a GSA Annual meeting. Ten papers deal with Recognition of Ps; Ps and the Evolution of the Atmosphere; Recognition and Chemical Characterization; Pedogenesis, Ground-water, Topographic, and Tectonic Controls; Interpretation for Profiles Exhibiting Subaerial Exposure Crusts from the Mississippian; Calcareous Ps in the Triassic Dolores Formation; Ps from Some Cretaceous Environments in the S.E. U.S.; Pedofacies Analysis, a New Approach to Reconstructing Ancient Fluvial Sequences; and Climatic Influences on Rates and Processes of Soil Development in Quaternary Deposits of S. Cal.

SPE216, 200 p., indexed, ISBN 0-8137-2216-0, paperback, **$22.50**

Early Permian Fusulinids from the Owens Valley Group, East-Central California

by R. T. Magginetti, C. H. Stevens, and P. Stone, 1987

Sixty fusulinid species from the Lower Permian part of the Owens Valley Group in east-central California, 17 of which are newly named, are described in this volume: 2 species of *Triticites*, 1 of *Leptotriticites*, 16 of *Schwagerina*, 1 of *Pseudofusulina*, 3 of *Chusenella*, 1 of *Paraschwagerina*, 9 of *Stewartina*, 6 of *Pseudoschwagerina*, 3 of *Chalaroschwagerina*, 6 of *Cuniculinella*, 3 of *Eoparafusulina*, and 6 of *Parafusulina*. In addition, a new genus, *Reticulosepta* (with three species), is described. Most of the fusulinids are from sediment-gravity-flow deposits, and they provide evidence for biostratigraphic subdivision of the Lower Permian part of the Owens Valley Group.

SPE217, 72 p., indexed, paperback, ISBN 0-8137-2217-9 **$11.25**

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MEETINGS

(Asterisk indicates new or changed information)

1988

Geology of Industrial Minerals, 24th annual meeting, May 2-5, 1988, Greenville, South Carolina. Information: Alan-Jon Zupan, South Carolina Geological Survey, Harbison Forest Rd., Columbia, SC 29210; (803) 737-9440.

First Catamarca International Mining Exposition and Fair, May 7-15, 1988, Catamarca, Argentina. Information: FEMICA, Uruguay 435, 3° piso, Of. E, Buenos Aires (1015), Argentina; Telex 17808 ANCYA-AR.

Canadian Institute of Mining and Metallurgy 90th Annual General Meeting, May 8-12, 1988, Edmonton, Alberta. Information: Ivana Savic, CIM, 1130 Sherbrooke St. W., Suite 400, Montreal, Quebec H3A 2M8, Canada; (514) 842-3461.

V. M. Goldschmidt Conference for geochemistry, May 11-13, 1988, Baltimore, Maryland. Information: Goldschmidt Conference Coordinator, Pennsylvania State University, 410 Keller Bldg., University Park, PA 16802.

Evolutionary Innovations: Patterns and Processes, Spring Systematics Symposium, May 14, 1988, Chicago, Illinois. Information: Matthew H. Nitecki, Field Museum of Natural History, Roosevelt Rd. at Lake Shore Dr., Chicago, IL 60605-2496; (312) 922-9410.

International Conference on Fluid Flow in Fractured Rocks, May 15-18, 1988, Atlanta, Georgia. Information: Ram Arora, Dept. of Geology, Georgia State University, University Plaza, Atlanta, GA 30303; (404) 651-2272.

Sixth Thematic Conference on Remote Sensing for Exploration Geology, May 16-19, 1988, Houston, Texas. Information: Thematic Conference, Environmental Research Institute of Michigan, P.O. Box 8618, Ann Arbor, MI 48107; (313) 994-1200, ext. 3382; Telex 4940991 ERIMARB.

American Geophysical Union Spring Meeting, May 16-20, 1988, Baltimore, Maryland. Information: Ann E. Singer, American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009; (202) 462-6903.

Bicentennial Gold 88, May 16-20, 1988, Melbourne, Australia. Information: R. R. Keays, Dept. of Geology, University of Melbourne, Parkville, Victoria 3052, Australia; phone (03) 345 1844; Telex AA35185.

Geological Association of Canada-Mineralogical Association of Canada-Canadian Society of Petroleum Geologists Joint Annual Meeting, May 23-25, 1988, St. John's, Newfoundland. Information: John Fleming, St. John's '88, P.O. Box 13577, Postal Station A, St. John's, Newfoundland A1B 4B8, Canada; (709) 576-2768.

Society for the Preservation of Natural History Collections Annual Meeting, May 30-June 3, 1988, Pittsburgh, Pennsylvania. Information: Duane A. Schlitter or Stephen L. Williams, Carnegie Museum of Natural History, 5800 Baum Blvd., Pittsburgh, PA 15206; (412) 665-2611.

Radon in the Northeast: Perspectives and Geologic Research, May 31-June 2, 1988, Troy and Albany, New York. Information: Gerald M. Friedman, Northeastern Science Foundation, 15 Third St., P.O. Box 746, Troy, NY 12180-0746; (518) 273-3247.

Case Histories in Geotechnical Engineering 2nd International Conference, June 1-5, 1988, St. Louis, Missouri. Information: Shamsher Prakash, Room 308, Dept. of Civil Engineering, University of Missouri, Rolla, MO 65401; (314) 341-4461.

WaterTech China '88, International exposition and congress of water technologies, June 3-8, 1988, Beijing, China. Information: Management Committee, WaterTech China '88, c/o MartLink Communications Group, GPO Box 13477, Hong Kong; phone 5-225705; Telex 72091 HX.

Second International Symposium on Rockbursts and Seismicity in Mines, June 8-10, 1988, Minneapolis, Minnesota. Information: Charles Fairhurst, Dept. Civil and Mineral Engineering, University of Minnesota, 500 Pillsbury Dr. S.E., Minneapolis, MN 55455-0220.

29th U.S. Symposium on Rock Mechanics, June 13-16, 1988, Minneapolis, Minnesota. Information: Jan Becker, Dept. Professional Development, University of Minnesota, 315 Pillsbury Dr. S.E., Minneapolis, MN 55455; (612) 626-1358.

Fourth Symposium on the Geology of the Bahamas, June 17-22, 1988, San Salvador Island, Bahamas. Information: Donald T. Gerace, CCFL Bahamian Field Station, 270 Southwest 34th St., Fort Lauderdale, FL 33315.

Shelf Sedimentation: Events and Rhythms (SEPM research conference), June 26-July 1, 1988, Santa Cruz, California. Information: M. Field or E. Clifton, USGS, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 354-3088 or 3112.

Seismic Probing of the Continents and Their Margins International Symposium, July 6-8, 1988, Canberra, Australia. Information: Jim Leven, Bureau of Mineral Resources, P.O. Box 378, Canberra, ACT 2601, Australia; phone (062) 499 111; Telex AA62109.

International Working Meeting on Soil Micromorphology (meeting of Subcommission B of the International Society of Soil Science), July 10-15, 1988, San Antonio, Texas. Information: L. P. Wilding, Dept. of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474; (409) 845-3604.

First International Conference on Radiolaria, July 18-20, 1988, Marburg, Federal Republic of Germany. Information: Joyce R. Blueford, U.S. Geological Survey, MS 144, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 329-4004, or R. Schmidt-Effing, Interrad Conference, Dept. of Geosciences, Philipps-Universität, Lahnberge, D-3550 Marburg, Federal Republic of Germany.

5th International Symposium on Fossil Cnidaria, including Archaeocyatha and spongiomorphs, July 25-29, 1988, Brisbane, Australia. Information: John Jell, Uniquest Ltd., University of Queensland, St. Lucia, QLD 4067, Australia; phone (07) 344 2733.

Soil and Water Conservation Society Annual Meeting, July 31-August 3, 1988, Columbus, Ohio. Information: Alan C. Epps, 7515 NE Ankeny Rd., Ankeny, IA 50021-9764; (515) 289-2331.

Permafrost 5th International Conference, August 2-5, 1988, Trondheim, Norway. Information: V International Conference on Permafrost, Norwegian Institute of Technology, Studies Administration, N-7034 Trondheim-NTH, Norway.

(*continued on p. 132*)

MEETINGS (*continued from p. 131*)

Eighth International Conference on Basement Tectonics, August 8-12, 1988, Butte, Montana. Information: M. J. Bartholomew, Montana Bureau of Mines and Geology, Montana Tech, Butte, MT 59701; (406) 496-4177.

Fifth International Symposium on the Ordovician System, August 9-12, 1988, St. John's, Newfoundland. Information: Chris R. Barnes, ISOS, Dept. of Earth Sciences, Memorial University, St. John's, Newfoundland A1B 3X5, Canada; (709) 737-8143.

Mineralogy of Precious Metal Deposits, August 12-15, 1988, Golden, Colorado. Information: James A. McGlasson, 7387 South Flower St., Littleton, CO 80123; (303) 972-0376; or James F. Hurlbut, 2240 So. Adams, Denver, CO 80401; (303) 279-7796.

Paleozoic Biogeography and Paleogeography, August 14-19, 1988, Oxford, England. Information: C. R. Scotese, Shell Development Co., P.O. Box 481, Houston, TX 77001, (713) 663-2688, or W. S. McKerrow, Dept. Earth Sciences, Parks Rd., Oxford OX1 3PR, England.

39th Annual Highway Geology Symposium, August 17-19, 1988, Park City, Utah. Information: Highway Geology Symposium, T. Leslie Youd, 368 Clyde Bldg., Dept. Civil Engineering, Brigham Young University, Provo, UT 84602; (801) 378-6327.

American Association of Petroleum Geologists Rocky Mountain Section, August 21-24, 1988, Bismarck, North Dakota. Information: Roger N. Borchert, Box 5006, Bismarck, ND 58501; (701) 223-3588.

Society of Economic Paleontologists and Mineralogists Fifth Midyear Meeting, August 21-24, 1988, Columbus, Ohio. Information: SEPM, P.O. Box 4756, Tulsa, OK 74159-0756; (918) 743-9765.

6th International Fission Track Dating Workshop, September 5-9, 1988, Besançon, France. Information: J.-L. Janier-Dubry, Lab. de Microanalyses Nucléaires, U.F.R. des Sciences et Techniques, 16 Route de Gray, 25030 Besançon cedex, France; phone 81-53-81-22.

International Symposium on Geochemistry and Mineralization of Proterozoic Mobile Belts, September 6-10, 1988, Beijing, China. Information: Proterozoic Geochemistry Symposium, c/o Prof. Sun Dazhong, Tianjin Inst. Geology and Mineral Resources, CAGS No. 4, 8th Rd., Dazhigu, Tianjin 300170, People's Republic of China.

Wyoming Geological Association Annual Field Conference and Symposium: Eastern Powder River Basin-Black Hills, September 9-11, 1988, Casper, Wyoming. Information: Janet de Vries, Dwight's Hotline, P.O. Box 2934, Casper, WY 82602, (307) 237-1004.

International Symposium on Rock Mechanics and Power Plants, September 12-16, 1988, Madrid, Spain. Information: ISRM Symposium, Sociedad Española de Mecánica de las Rocas, Paseo Bajo de la Virgen del Puerto, 3, 28005 Madrid, Spain.

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MEETINGS (*continued from p. 132*)

Clay Minerals Society Annual Meeting, September 18-21, 1988, Grand Rapids, Michigan. Information: T. J. Pinnavaia, Dept. of Chemistry, Michigan State University, East Lansing, MI 48824; (517) 353-4511.

ECORS Program: International Meeting on a Deep Seismic Line with Field Trip across the Pyrenees, September 19-22, 1988, Toulouse, France, to Balaguer, Spain. Information: Société Géologique de France, 77 rue Claude Bernard, 75005 Paris, France; phone 331-43-31-77-35.

International Symposium on Engineering Geology: Study, Preservation and Protection of Ancient Works, Monuments and Historical Sites, September 19-23, 1988, Athens, Greece. Information: Paul G. Marinos, Greek Committee of Engineering Geology, 1988 Symposium Secretariat, P.O. Box 19140, GR-117 10 Athens, Greece; Telex 45 4312 POLX.

International Conference on Disposal of Radioactive Waste in Seabed Sediments, September 20-21, 1988, Oxford, England. Information: Society for Underwater Technology, 1 Birdcage Walk, London SW1H 9JJ, England; phone 01-222 8658; Telex 917944.

Fourth International Tectonostratigraphic Terrane Conference, September 23-October 7, 1988, Nanjing University, Nanjing, People's Republic of China. Information: Tom Wiley, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo Park, CA 94025; (415) 354-3067.

Mediterranean Basins Conference, September 25-28, 1988, Nice, France. Information: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101-0979; (918) 584-2555.

Geographic Information Symposium, September 26-30, 1988, Denver, Colorado. Information: Thomas Usselman, GIS Symposium, National Academy of Sciences, 2101 Constitution Ave., Washington, DC 20418.

Environments and Physiology of Fossil Organisms Symposium, September 28-30, 1988, Edinburgh, Scotland. Information: Meetings Secretary, Royal Society of Edinburgh, 22, 24 George St., Edinburgh EH2 2PQ, Scotland.

Mars: Evolution of Volcanism, Tectonism and Volatiles, October 5-7, 1988, Washington, D.C. Information: Projects Office, Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058-4399; (713) 486-2150.

Geological Association of New Jersey Annual Meeting, October 7-9, 1988, Lawrenceville, New Jersey. Information: Jonathan Husch, Dept. of Geosciences, Rider College, 2083 Lawrenceville Rd., Lawrenceville, NJ 08648; (609) 896-5330.

New York State Geological Association Annual Field Trip Meeting, October 7-9, 1988, Plattsburgh, New York. Information: Tom Wolosz, Center for Earth and Environmental Science, SUNY College, Plattsburgh, NY 12901; (518) 564-4031.

***Association of Engineering Geologists 31st Annual Meeting**, October 16-21, 1988, Kansas City, Missouri. Information: William Bryson, Kansas Corporation Commission, 4th Floor, State Office Bldg., Topeka, KS 66612; (913) 296-5113.

Global Catastrophes in Earth History: An Interdisciplinary Conference on Impacts, Volcanism and Mass Mortality, October 20-23, 1988, Snowbird, Utah. Information: Global Catastrophes Conference, Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058-4399; (713) 486-2150.

International Symposium on Remote Sensing of Environment, October 20-26, 1988, Abidjan, Ivory Coast. Information: Alan K. Pakder, P.O. Box 8618, Ann Arbor, MI 48107-8618; (313) 994-1200, ext. 3886.

***American Society of Civil Engineers Convention**, October 23-27, 1988, St. Louis, Missouri. Information: ASCE Conventions and Exhibits Dept., 345 East 47th St., New York, NY 10017; (212) 705-7543.

Geological Society of America 100th Annual Meeting, October 31-November 3, 1988, Denver, Colorado. Information: Meetings Department, GSA, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020.

***Second International Gold Mining Conference**, November 7-9, 1988, Vancouver, British Columbia. Information: C. O. Brawner, P.O. Box 91651, West Vancouver, B.C. V7V 3P3, Canada; (604) 922-3717.

American Association of Stratigraphic Palynologists Annual Meeting, November 10-12, 1988, Houston, Texas. Information: John A. Clendening, Amoco Production Company, P.O. Box 3092, Houston, Texas 77253; (713) 556-3549.

Advances in Ground-Water Hydrology, November 16-18, 1988, Tampa, Florida. Information: American Institute of Hydrology, 3416 University Ave. S.E., Suite 200, Minneapolis, MN 55414; (612) 379-1030.

Symposium on Hot Spots in the South Pacific, November 21, 1988, Paris, France. Information: Société Géologique de France, 77 rue Claude Bernard, 75005 Paris, France; phone 331-43-31-77-35.

Geochemistry of Gulf Coast Oils and Gases, December 4-7, 1988, New Orleans, Louisiana. Information: Dietmar Schumacher, Pennzoil Co., P.O. Box 2967, Houston, TX 77252; (713) 546-4028; or Mahlon C. Kennicutt, Geochemical and Environmental Research Group, Texas A&M University, Ten South Graham Rd., College Station, TX 77840; (409) 690-0095.

American Geophysical Union Fall Meeting, December 5-9, 1988, San Francisco, California. Information: Ann E. Singer, American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009; (202) 462-6903.

ECORS Program: Deep Seismic Line across the Western Alps, joint meeting of French, Swiss, and Italian geological societies, December 12-13, 1988, Paris, France. Information: François Roure, Inst. Français du Pétrole, 1-4 ave. du Bois Préau, 92506 Rueil-Malmaison, France.

GSA 1988

Rocky Mountain Section, May 16-18, Sun Valley, Idaho
Centennial Celebration, October 31-November 3, Denver, Colorado

PENROSE CONFERENCES

Paleozoic and Early Mesozoic Paleogeographic Relations Between the Klamath Mountains, the Northern Sierra Nevada, and North America, June 5-10, 1988, Redding, California. Information: David S. Harwood, U.S. Geological Survey, MS 975, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 329-4932.

Origin of Massif Anorthosites and Related Rocks, August 14-19, 1988, Chugwater, Wyoming. Information: B. Ronald Frost, Dept. of Geology and Geophysics, University of Wyoming, Laramie, WY 82071; (307) 766-4290.

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MEETINGS (*continued from p. 133*)

Marine Evaporites: Genesis, Alteration, Associated Deposits, August 28-September 2, 1988, Detroit, Michigan, and Windsor, Ontario. Information: Peter Sonnenfeld, Dept. of Geology, University of Windsor, Windsor, Ontario N9B 3P4, Canada; (313) 963-6112 or 6113, ext. 2490.

Volcanic Influences on Terrestrial Sedimentation, August 28-September 3, 1988, Crystal Mountain, Washington. Information: Gary A. Smith, Dept. of Geology, University of New Mexico, Albuquerque, NM 87131; (505) 277-4204.

Criteria for Establishing the Relative Timing of Pluton Emplacement and Regional Deformations, September 10-15, 1988, California. Information: Scott R. Paterson, Earth Science Board, University of California, Santa Cruz, CA 95064; (408) 429-3251.

1989

***Australasian Tectonics**, February 6-10, 1989, Kangaroo Island, Australia. Information: A. Grady, c/o Dept. of Earth Science, Flinders University, Bedford Park, SA 5042, Australia.

Society of Mining Engineers Annual Meeting, February 27-March 2, 1989, Las Vegas, Nevada. Information: Society of Mining Engineers, Meetings Dept., P.O. Box 625002, Littleton, CO 80162.

***Symposium on Energy and Mineral Potential of the Central America-Caribbean Region**, March 5-9, 1989, San Jose, Costa Rica. Information: Mary Stewart, Circum-Pacific Council for Energy and Mineral Resources, 5100 Westheimer Road, Houston, TX 77056.

European Geophysical Society XIV General Assembly, March 13-17, 1989, Barcelona, Spain. Information: EGS Office, c/o MPI für Aeronomie, D-3411 Katlenaburg-Lindau, Federal Republic of Germany. (*Abstracts deadline: December 15, 1988.*)

International Symposium on the Silurian System (Murchison Symposium), March 28-April 9, 1988, Keele, England. Information: M. G. Bassett, Dept. of Geology, National Museum of Wales, Cardiff CF1 3NP, Wales; phone 02222-397951.

American Association of Petroleum Geologists Annual Meeting, April 23-26, 1989, San Antonio, Texas. Information: AAPG, P.O. Box 979, Tulsa, OK 74101; (918) 584-2555.

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.

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.

***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.

***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.

***World Gold '89**, October 22-25, 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. (*Abstracts deadline: July 1, 1988.*)

Women Geoscientists Sponsor Raft Trip

The Association for Women Geoscientists is sponsoring a four-day raft trip down the Green River in northwest Colorado and northeast Utah, July 7-10, 1988. The trip will follow Lodore Canyon where the Green River cuts through the Uinta Mountains and exposes Precambrian metasedimentary and Paleozoic and Mesozoic sedimentary rocks. A visit to the dinosaur quarries in Dinosaur National Monument will be included in the trip.

Two Ph.D. candidates from the University of Colorado at Boulder, Mary Gillam and Emmett Evanoff will lead the geological expedition. Both have led previous raft trips along this part of the Green River and have done research in the area.

Cost of the raft trip including meals is $340 for Association members and $390 for nonmembers. For additional information, write to AWG—Field Trip, M. Knadle, 20201 SE 216th St., Maple Valley, WA 98038, or call Knadle at (206) 442-1641.

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GEOLOGIST, M.S. Currently with major oil company. Desire position in environmental or petroleum field in Pittsburgh area. Experience in hydrogeology, basin and field studies, prospecting, geological/geophysical software application. Excellent writing skills. Reply GSA code 1045.

Positions Open

FLORIDA INTERNATIONAL UNIVERSITY
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The Department of Geology invites applications for a tenure-track geophysics/geology position at the assistant professor level in the areas of crustal dynamics or paleomagnetism, or related fields. The successful applicant will be expected to teach courses at undergraduate and graduate levels, and to initiate and pursue a vigorous program of original research complementing the department's existing interests in geophysics, structural geology, and tectonics. The department is well equipped with facilities that include Lacoste-Romberg gravimeter, field magnetometer, 12 channel seismograph, data logger, XRD, microprobe and IC spectrometer. Starting date for the position is August 1988.

Applicants should send a current resume, a brief statement of teaching and research interests, transcripts and at least three letters of recommendation to: Dr. Florentin Maurrasse, Department of Geology, Florida International University, Miami, Florida 33199. Deadline for application is June 10, 1988.

Florida International University is an equal opportunity/affirmative action employer and is a member of the state university system of Florida.

FACULTY POSITION

New York, N.Y. Hunter College, City University of New York. SENIOR FACULTY POSITION—Geology, Fall, 1988. Rank, salary and tenure commensurate with experience and accomplishments. Possible appointment to department chair for a leading candidate. Participation in a doctoral program in Earth and Environmental Sciences at the City University. Potential areas of research interest include geophysics, hydrogeology, and applications of remote sensing technology in geological investigations. Proven extramural funding ability required; administrative experience desirable. First round of applications due April 1, but applications accepted until position is filled. Send vitae, recent publications, names of at least three referees to: Dr. Alan H. Strahler, Room 1006-North Building, Hunter College, 695 Park Ave., N.Y., N.Y. 10021.

FLORIDA INTERNATIONAL UNIVERSITY
(The State University of Florida at Miami)
HYDROGEOLOGIST/AQUEOUS GEOCHEMIST

The Department of Geology at Florida International University invites applications for a full-time tenure-earning position at the assistant professor level in Hydrogeology/Aqueous Geochemistry. The successful applicant will be expected to teach at the undergraduate and graduate levels, and must demonstrate an ability to conduct high quality teaching and the potential to establish a vigorous research program. A completed Ph.D. is required. The department includes modern analytical equipment such as ARL microprobe, ICPES, X-ray diffraction, etc.

Deadline for application: May 5.

Appointment will begin: August 1988.

Send a brief resume, brief description of teaching and research interests, transcripts and three letters of recommendation to: Dr. Florentin Maurrasse, Dept. of Geology, Florida International University, University Park, Miami, FL 33199. Florida International University is a member of the state university system of Florida, and is an affirmative action/equal opportunity employer.

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WANTED: Everett Community College needs to purchase a used petrographic microscope (binocular preferred) for developing Geoscience Department. Funds available. Please call Brian Mahoney, (206) 259-7151 ext. 450, 429. Everett Community College, Department of Geology, Everett, WA 98201.

Exposed Cross Sections of Continental Crust Meeting Scheduled for September

A NATO Advanced Study Institute, Exposed Cross Sections of the Continental Crust, will be held September 19–27, 1988, at Killarney, Ontario. The meeting will focus on exposed terrains regarded as cross sections of the continental crust, such as the Ivrea zone and Kapuskasing structure. Participants will review the latest geological, geochemical, petrological, and geophysical research on the terrains, conduct a critical review of the evidence that these terrains represent cross sections through the crust, and study the mode of emplacement of these terrains. Discussions will center on the implications of cross-section research on continental drilling and geophysical exploration programs. What questions from the cross-section studies can be put to the test by these projects? Field trips through the Kapuskasing structure and Grenville front, led by scientists from the Geological Survey of Canada, will provide ample opportunity to observe and discuss many features treated in formal lectures.

For further information, contact David Fountain, Dept. of Geology and Geophysics, University of Wyoming, Laramie, WY 82070, or Matthew Salisbury, Centre for Marine Geology, Dept. of Geology, Dalhousie University, Halifax, Nova Scotia B3H 3J5, Canada.

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OCTOBER 31–
NOVEMBER 3, 1988

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CENTENNIAL MEETING & EXHIBIT

ABSTRACTS DEADLINE: JUNE 10

Abstracts must be typed on 1988 abstract forms, available from Abstracts Secretary, Geological Society of America, P.O. Box 9140, Boulder, CO 80301, or call (303) 447-8850. Volunteered abstracts must be mailed to the same address in time to arrive on or before June 10, 1988.

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