



GSA NEWS & INFORMATION

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GSA Centennial Celebration Sets Records

by Sue Beggs
GSA Meetings Manager

Reports. Bills. Photographs. Documents. Good Memories. The party is over. It's time to wrap-up and to say good-bye to a great year and an outstanding first century. We already are working on the first annual meeting of GSA's second century: St. Louis, November 6-9, 1989, is coming up in only 9 months.

As we look back on the Centennial year, it is satisfying to know that in celebrating an historic occasion, we also encouraged a year of firsts. President Bally started it off by urging us to think globally in 3- and 4-D. How else would we be able to meet the challenges of the next century? Everyone at GSA headquarters and on the Centennial Local Committee planned in terms of a unique year. We had both the commitment and the funds for special programs that eventually combined to make the Denver Celebration a long-to-be-remembered event.

It was fitting, for example, that the year's first official Centennial event was "Powell Revisited," a 9-day trip to the Grand Canyon, which was the first vacation trip sponsored by GSA for both geologists and their friends and family. This was such a hit with its 37 participants that it will be remembered as the first in a series of R & R trips that will include New Zealand (January-February 1990) and Grand Canyon (April-May 1990).

The personal character and adventure of the Grand Canyon trip seemed to flow toward the Denver meeting. The Newcomen

Society, founded in 1923 for the purpose of recognizing outstanding achievement in American business and society, chose to honor the contribution of geology and of GSA during a formal dinner on Saturday, October 29. It was a massing of all of GSA's pillars, past and present. It was a "hall of fame" event suitable for celebrating the 100th year of North America's oldest geological society.

The Denver Convention Complex has an exhibit hall that on move-in day, Thursday, October 27, was a 100,000-square-foot bare concrete box with a 40-foot ceiling. By the time GSA was ready to open registration and its Century Exhibit on Sunday, October 30, the hall had been transformed with colorful banners, drapes, and carpeting of magenta, turquoise, and blue. New Age music played while geologists gathered in the comfortable surroundings of the GSA Center Lounge, the Mezzanine "patio," and even the GSA Membership "living room."

On Sunday evening, October 30, the Welcoming Reception guests were treated to complimentary food and beverages hosted, for the first time, by GSA's exhibitors. The hall was filled with more than 4000 opening-night registrants, who were treated to five lively musical groups. Arrangements were made by the Rocky Mountain Association of Geologists. This was the first time (and we hope not the last) that a local geological organization helped to sponsor events.

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November 7, 1988
Dr. Michael Wahl
Executive Director
Geological Society of America
P.O. Box 9140
Boulder, Colorado 80301

Dear Mike,

I'm sure you've heard it a thousand times (or you should have)—the Centennial meeting was a wonderful success. Not only did the logistics work out reasonably well, despite less than ideal facilities, but the meeting was somehow more human and personal than most. That made it a pleasure to be a participant.

Congratulations on a great effort by you and all the staff. Many thanks.

Sincerely,

Brian J. Skinner

Centennial Celebration (continued from p. 25)

In the same spirit, the Colorado Scientific Society generously provided leadership for half-day geologic field trips and for trips to the Denver Museum of Natural History. One of the Society's members coordinated a special program on space exploration by Jack Schmitt for secondary school students.

On Monday morning, October 31, the Opening Ceremonies and Centennial Symposium attracted more than 4300 persons, who listened attentively to the encouraging and challenging words of Jack Schmitt, Ray Price, Jim Zumberge, and Bill Bromery. Following GSA's first self-produced audio-visual presentation, Master of Ceremonies and 1988 General Chairman Bob Weimer turned the program over to the five symposium speakers, whose presentations enveloped the breadth of geologic knowledge of North America.

The speakers included Don Anderson, "From Crust to Core, a Tomographic Global View"; Brian Tucholke, "The Oceans Surrounding North America"; Albert Bally, "North America: The Last 600 Million Years"; Paul Hoffman, "Precambrian Evolution of North America"; and Brian Skinner, "A Century of Resource Use: Can the Next Century's Feast Be As Rich?" (See page 32 for further description of the program.)

By noon on Monday, registrants were praising the Celebration, but three-and-a-half days were yet to come. Sunshine and temperatures in the 60s contributed to the upbeat mood. Denver was comfortable and surprisingly convenient. Even though events were held in five different facilities and staff was challenged with supervision of multiple locations, registrants were reasonably satisfied. All facilities were within walking distance, and the GSA shuttle ran efficiently, at regular intervals. Attendees managed to move quickly between the Radisson Hotel, the location of four technical session rooms (including three of the largest), and the Denver Convention Complex, which housed the other 10 session rooms plus the poster sessions.

When not in sessions, registrants had the option of enjoying downtown Denver or of going on a field trip. In addition to the 24 regular field trips, registrants were offered four half-day trips to Denver geologic sites. Tours to the Denver Museum of Natural History and to the GSA headquarters Open House were also available. And finally, everyone was welcome to go on the excursions offered by the hospitable Guest Program Committee.

On Tuesday evening, November 1, the GSA Centennial Orchestra performed in a sell-out concert. Holly Stein, USGS Denver, organized the event as a creative gift for the Centennial. The program of seven selections included Mozart's Toy Symphony, during which the audience was treated to cameo appearances by GSA stars such as Bob Hatcher on the toy telephone. (It's hard to imagine; you had to be there.) The 65 musicians performed well. The concert was a tribute to the diversity among geologists and the relation between geology and art. This was indeed a first and may be

the precursor of other GSA musical events, such as choral or bluegrass group performances.

We were able to fund special activities in 1988 for three major reasons: a large registration base, contributions from corporations, and approval of funding for special projects by the GSA Council. First, a large number of registrants means that the fixed costs, such as labor and facilities, impact each registration fee less, and this leaves funds available for other items. Second, the Finance Committee raised more than \$40,000 from regional oil and mining companies. This is a first for GSA, and we would very much like to make it a tradition. Third, the GSA Council authorized funding of the Centennial Special Projects Committee. Led by GSA Executive Director F. Michael Wahl, this committee launched six major projects that were supported by allocation from GSA funds. In any other meeting year, the meeting's budget is planned to be self-sustaining and does not rely on GSA operating funds.

Of the six projects, the remarkable Century Exhibit and audio-visual presentation were seen by most registrants. The other four, enjoyed primarily by the general public, included the Ron Redfern and the Colorado School of Mines displays at the Denver Museum of Natural History, the Science of Geology display at Columbia Savings Bank, the plate-tectonics display at the Denver Public Library, and the lithographic prints by geologist-explorers at Denver's First Interstate Bank.

By Wednesday, November 2, some of the 7478 registrants were already headed home, but some were still arriving. The exhibit hall, with its 273 booths and 199 exhibitors, closed as planned, at 2:00 p.m. This disappointed some, but was necessary so that the commercial displays could be packed and shipped to the next show. Exhibitors report that most purchasing is done within the first two-and-a-half days, and they are eager to get into the field again because many of them work on commission. We thank our exhibitors who allocated extra funds for GSA's Centennial. Exhibitors made this GSA's best show in terms of quality, variety, and volume.

Wednesday evening featured the great Centennial Birthday Bash. Despite the long lines of the first hour, revelers enjoyed the party. Entertainment, dance, comedy, and good food and beverages lasted throughout the night. Casino gamblers and Bash money moguls bid during the auction for everything from DNAG volumes to airfares. Partygoers could sing along with a piano player, compete in the cowpie toss, try to blow the biggest bubble-gum bubble, or pose for a caricature sketch.

On Thursday, November 3, the last of the meeting's seven poster sessions, eight theme sessions, 31 symposia, and 82 volunteered sessions were to end at 5 p.m. But in an unusual moment that spoke well of the enthusiasm we had experienced throughout the week, the Thursday afternoon poster session was still going strong at 5:15 p.m. Joined by friends and colleagues, we finally said

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

Centennial Celebration (continued from p. 26)

good-bye at 5:45 p.m., as the last person left with a Centennial sign, several T-shirts, and an orphaned abstracts volume, memorabilia of a great meeting.

What made the meeting go so well? Perhaps it was anticipation and expectation. Everyone came expecting something special, something different. It's what they got—and more. Thank you to everyone who made this year unforgettable.

FOR THE RECORD

REGISTRATION

	Preregistered	On-Site	Total
Professionals			
Member	2770	810	3580
Nonmember	462	263	725
Member—one day	40	93	133
Nonmember—one day	29	83	112
Students			
Member	828	266	1094
Nonmember	256	179	435
Member—one day	5	18	23
Nonmember—one day	9	38	47
Guests	449	70	519
	<u>4848</u>	<u>1820</u>	<u>6668</u>
Exhibitors	661	149	810
	<u>5509</u>	<u>1969</u>	<u>7478</u>
Attendance in 1987			5201
Increase over 1987			44%
Previous high—1984			6065

TECHNICAL PROGRAM

	1987	1988
Total papers submitted	2338	2585
Total papers accepted	1904	2104
Symposia papers submitted	333	337
Symposia papers accepted	331	337
Volunteered (oral and poster) papers submitted	2007	2248
Volunteered (oral and poster) papers accepted	1573	1767
Volunteered papers accepted	79%	79%
Poster presentations	503	593
Half-day poster sessions	7	7
Concurrent oral sessions	12	14
Half-day oral sessions (includes Sunday)	101	110
Theme sessions	3	8
Symposia	27	31

Approximately one of every three registrants presented a paper.

FIELD TRIPS

	1987	1988
Premeeting trips offered	19	16
Postmeeting trips offered	15	8
Trips canceled	5	4
Half-day trips	—	4
Field trip leaders	98	73
Total number of participants	852	811
Percentage of total registrants	17%	12%

Guides to the 1988 field trips are available in an excellent single volume. Those interested in the guidebook may contact: Colorado School of Mines, Publications Office, Golden, CO 80401.

EXHIBITS

	1983	1987	1988	Increase
Number of booths in base year 1983	144			
Increase over base year 1983	90%			
Number of exhibit booths	212	273		29%
Number of exhibitors	149	199		34%

GSA BOOKSTORE

The Centennial Bookstore was a major focal point in the exhibit hall. Many new GSA and DNAG publications were on display and for sale. Traffic and sales at the bookstore were steady throughout the show. The Decade of North American Geology (DNAG) project had several new publications available. These included the complete set of Centennial Field Guides, *Geomorphic Systems of North America* (Centennial Special Volume 2), three new titles from the Geology of North America series—*Sedimentary Cover of the North American Craton* (Vol. D2), *The Atlantic Continental Margin: U.S.* (Vol. I2), and *North America and the Adjacent Oceans during the Last Deglaciation* (Vol. K3), as well as the Magnetic, Gravity, and Seismicity maps from the Continent-Scale Maps of North America series.

PROFESSIONAL HORIZONS

	1987	1988
GSA short courses offered	8	9
Attendees	479	341
Short course manuals printed under GSA supervision	5	7

EMPLOYMENT SERVICE

	1987	1988	Increase
Employers	30	50	67%
Number of applicants at the meeting	273	315	15%
Number of interviews	529	629	
Types of jobs available			
Corporate	11	56	
Government	21	7	
Academic	26	43	

Several employers commented that this was the best field of candidates they had seen in several years.

Exhibitor Contributions

The following exhibitors contributed to the Centennial Welcoming Reception. GSA is most appreciative of this support and thanks the following companies and individuals.

Merrill Publishing Company	Desert Research Institute	W. H. Freeman & Company Publishers
Earth Observation Satellite Company	Kevox Corporation	Artcraft Imports
Scintag, Incorporated	Nature's Own	Lubrecht & Cramer
John Wiley & Sons, Incorporated	Pergamon Press	Schweizerbart Publishing Company, Germany
Williams and Heintz Map Corporation	Pikes Peak Lithographing	JCPDS
28th International Geological Congress	Rocklabs	Oklahoma Geological Survey
Blackwell Scientific Publications	Saunders College Publishing	Princeton University Press
William C. Brown Publishers	Siemens	Don Hoskins
Computer Oriented Geological Society	Schonstedt Instrument Company	John P. Wilshusen

1988 Annual Meeting General Contributors and Sponsors

Many corporations contributed to a general fund or to specific events. GSA is most appreciative of this support and thanks the following companies and individuals.

Adolph Coors Company
 AMAX Mineral Resources Company
 Amoco Production Company
 Dr. George G. Anderman
 Apache Corporation
 Atlas Corporation
 Axem Resources Incorporated
 Bass Enterprises Production Co.
 Battle Mountain Gold Company
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GSA Centennial Orchestra Tape Recordings

\$10.00 per set

Now you can enjoy your very own copy of the GSA Centennial Orchestra Concert of musical entertainment by geoscientists, Jurgen deLemos, conductor.

This two-tape audio set includes the concert performed on Tuesday, November 1, 1988, at the Hyatt Regency, Denver, Colorado,

and

the seven-minute story, including interviews with orchestra members, that aired on National Public Radio's Morning Edition on November 1.

Complete order form and mail to: GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301.

Allow two weeks for delivery. *Please, no phone orders.*

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Centennial Celebration Makes News

by Joann T. Dennett and Sandra Rush
RDD Consultants, Inc.

News and information from the Centennial Celebration will extend far beyond 1988. In addition to the complement of daily news media—*Boston Globe*, *Rocky Mountain News*, *Denver Post*, *Boulder Daily Camera*, *Tokyo Shimbun*, and *Associated Press*—and weekly and monthly magazine and journal media—*Science News*, *People*, *Mining Engineering Magazine*, *Geotimes*, *Geobyte*, *Washington Remote Sensing Letter*, and *Western Oil World*—who covered the meeting, editors from the *National Geographic Society*, *Natural History* magazine, *Science*, *World Book Publishers*, *Stanford University Press*, and the *Washington Post* attended to find ideas for future magazine and journal articles.

The Centennial Celebration sparked news stories before the technical sessions even began. The Front Range of Colorado in and around Boulder offers a near-complete record of Earth's past 100 million years. A.R. (Pete) Palmer, Technical Program co-chair for the GSA Centennial Celebration, mapped out a half-day trip to these sites, which he offered as a field trip for the meeting. A few reporters previewed the trip, and Pete's "answer to the creationists" in the evident rock record made long feature stories in the Denver papers.

GSA's hometown paper, the *Boulder Camera*, kicked off the Centennial Celebration coverage with a full-page overview of GSA's first 100 years and a detailed "travelog" of GSA Headquarters and the unusual use of specimens in the art and architecture of the building.

When the meeting began, the focus shifted to news in the technical program. The daily news media covered several "hot topics" at the meeting. The subjects spanned the breadth of GSA interests. International coverage began with Don Anderson's suggestion that evidence of long-missing pieces of Earth's crust had been revealed through variations in the travel times of seismic waves produced by naturally occurring earthquakes that have traveled through Earth's interior. Coverage of Anderson's paper included wire stories from California, a news magazine interview, and a phone feed to a BBC talk show, "Tomorrow's World," in London.

Other major story topics from the technical sessions included

- findings by Lowell Stott and James Kennett that a precipitous climate change occurred 200,000 years before the extinction of dinosaurs
- predictions of saved lives because of reduction of geologic hazards in the twenty-first century
- discussions of the controversy surrounding asbestos hazard reduction
- U.S. and USSR plans to explore Mars and its satellites

- reasons to assess indoor radon pollution
- surveys of the "dinosaur highway" near Morrison, Colorado, under the unlikely headline of "Go Brontos!" (a spoof of the Denver Broncos football team cheer)
- a method for providing short-term warning of impending landslides
- the discovery of extensive young lava flows near the Hawaiian Islands, which may force scientists to revise their ideas about the volcanic system that formed these islands.

Aside from the technical sessions, GSA's Centennial Orchestra was heard coast to coast on National Public Radio and was featured by the *Denver Post*, and footage of the GSA Birthday Bash was part of the CBS 10 o'clock news on Denver television. Throughout the meeting, local radio stations carried stories about the meeting, and radio stations nationwide conducted telephone interviews with various presenters.

Many meeting attendees met with the news media, in formal background briefings, in one-on-one interviews, or at the booths during the poster sessions. Background briefings were held on the history of humankind as reflected in the geologic record, the radon hazard, fractals in geology, and hazard reduction in the twenty-first century. These "backgrounders" were designed to brief news media on the general topics to enhance future coverage. Additionally, written backgrounders were released on global climate change and geohydrology.

The broad range of these backgrounders is illustrative of the breadth of GSA interests—a breadth that makes GSA uniquely able to offer an authoritative voice on topics that span the earth and planetary sciences. Thus, it is important that we continue to exploit all the information-dissemination routes available to us. These include the popular and technical news media as well as the more traditional outlets of reviewed articles, research reports, and publications for special audiences such as educators and legislators. Members of GSA are urged to contact the GSA Communications Coordinator, June Forstrom, to inform us of newsworthy topics in which they have an interest, and are encouraged to supply news releases at the meetings.

RDD Consultants, Inc., manages GSA's media relations for the annual meeting. Services include technical research and writing, author interviews, media contact, information distribution to science editors and wire services, and press briefings and conferences. Joann Dennett and Sandra Rush worked with AGU for several years, and have been with GSA for both the 1987 Phoenix and 1988 Denver meetings. This team also is available for GSA section meetings.



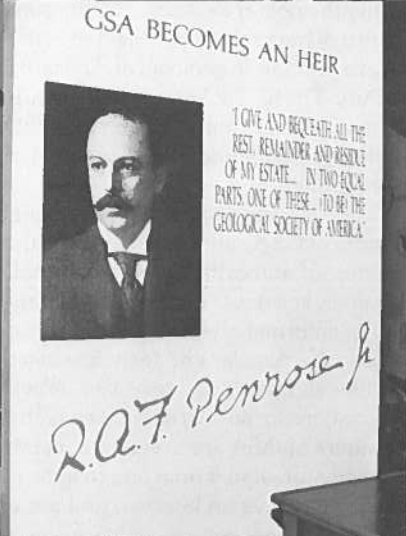
photo by Pat Palmer



photo by Bill Cronin



photo by Pat Palmer





Photos by Bill Cronin and Faith Rogers

CENTENNIAL CELEBRATION

Opening Ceremonies and Centennial Symposium

THE CHALLENGE OF CHANGE

—Robert J. Weimer



At this historic meeting of the GSA, opportunity is available to members to glimpse the past and contemplate the future of a dynamic Society. What can we reason but from what we know? To use the experience of the past 100 years to chart a future course may be a sound approach in some planning. But scientific inquiry into the things we don't know—the questions we ask today and in the future—will likely have the greatest impact over the next 100 years of our science and the GSA.

The history of science, and geology as well, clearly records that, at every point in time, mankind has accepted as truth some incorrect concepts that became dogma. The challenge to each new generation is to identify today's incorrect dogma and to change it. The challenge to older generations is to assist, guide, or lead, but not to stand in the way of change.

Despite pressures of change, future geology will follow the past and retain a core of 4-dimensional field-oriented subjects. The ageless proverb will still apply throughout the next century—books are written by men, but men are sometimes wrong; the field is always right, if you can read it.

Robert J. Weimer, Professor Emeritus, Colorado School of Mines, has taught courses in stratigraphy, regional geology, field geology, and energy resource exploration and development for 30 years. He holds B.A. (1948) and M.A. (1949) degrees from the University of Wyoming and a Ph.D. (1953) from Stanford. Weimer has been honored for teaching excellence, the blending of basic and applied research, national and international continuing education (technology transfer), and service to scientific societies. Most notable of the awards are the AAPG Sidney Powers Medal, the AIPG Ben H. Parker Medal, the Mines Medal, and the University of Wyoming's Distinguished Alumni Award. He has been Visiting Professor to universities in Adelaide, Australia; Calgary, Canada; and Bandung, Indonesia. He currently serves on national and state scientific advisory boards and also has been active in civic affairs.

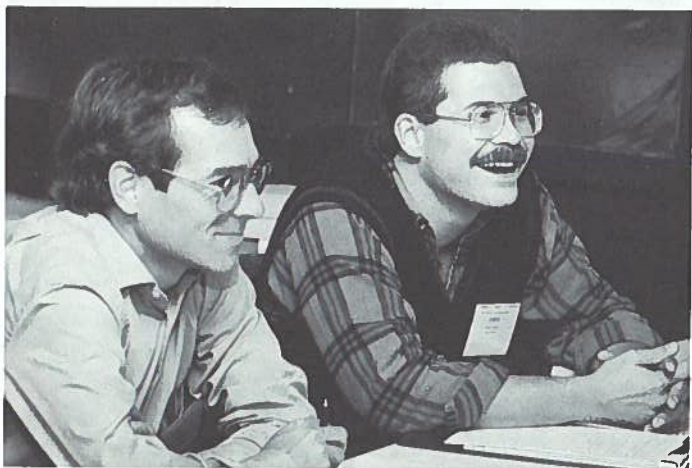


photo by Bill Cronin

CHALLENGES: EARTH AND THE UNIVERSE

—Harrison H. Schmitt



Earth scientists are in a position of political as well as scientific influence as the Geological Society of America and, indeed, humankind looks to the Third Millennium. Both the impact of increasing demands on the resources of Earth by increasing population and the opportunities for the human settlement of the solar system away from Earth are forcing us back to the activism that accompanied the exploration and development of the American West. Not only is the quality of life for our progeny at stake, but freedom itself is at issue.

Harrison "Jack" Schmitt has the varied experience of a geologist, scientist, astronaut, pilot, administrator, educator, writer, and United States Senator. He trained as a geologist and scientist at the California Institute of Technology, as a Fulbright Scholar at the University of Oslo, and at Harvard University. He received his Ph.D. in geology from Harvard in 1964 on the basis of earlier field studies conducted in Norway. He was selected for the Apollo Scientist-Astronaut Program in 1965 and served as the lunar module pilot for Apollo 17—the last Apollo mission to the Moon. Schmitt's studies of the Valley of Taurus-Littrow on the Moon in 1972, as well as his earlier scientific work, made him one of the leading experts on the history of the terrestrial planets. As the only scientist to go to the Moon, he was also the last of twelve men to step on the Moon. After organizing and directing the activities of the Scientist-Astronaut Office and of the Energy Program Office for NASA in 1973-1975, Schmitt fulfilled a long-standing commitment by entering politics. He was elected to the U.S. Senate from his home state of New Mexico in 1976.

CHALLENGES: GEOSCIENCES AND GLOBAL SYSTEMS

—Raymond A. Price



The basic goal of geoscience is to understand the nature and evolution of the solid earth. The push of new capabilities for acquiring, integrating, and analyzing data, including geoscience data on a global scale, and of the pull of a burgeoning human population facing the challenge of sustainable global development and the threat of catastrophic global disasters foster a growing appreciation of Earth as an evolving dynamic system. In this system, the various terrestrial spheres—asthenosphere, lithosphere, hydrosphere, atmosphere, biosphere—are closely coupled, interactive subsystems. This new renaissance in the earth sciences provides new challenges and opportunities for the solid earth sciences. GSA should play a lead role in meeting them.

Raymond A. Price is a research scientist with the Geological Survey of Canada and Visiting Professor in the Department of Geological Sciences, Queen's University. He received his B.A. from the University of Manitoba (1955) and his M.A. (1957) and Ph.D. (1958)

from Princeton. He recently retired from the position of Assistant Deputy Minister of Energy, Mines and Resources in Canada. Price is a Fellow of the Royal Society of Canada; Past-President of the International Council of Scientific Unions, Inter-Union Commission on the Lithosphere; and a foreign associate of the U.S. National Academy of Sciences. His personal research has been focused on tectonics and structural geology in the Canadian Cordillera, particularly in the Canadian Rockies.

CHALLENGES: UNIVERSITIES AND RESEARCH

—James H. Zumberge



Research in the geosciences during the 21st century will depend on the ability of teacher-scholars in academic institutions to develop creative minds through a curriculum undergirded in the basic sciences and mathematics, coupled with basic geologic principles. This philosophy produced a 20th-century cadre of research scientists who advanced the knowledge and understanding of Earth and its planetary neighbors enormously.

As the geosciences continue to expand into related fields, new research opportunities will emerge as our unborn successors build on the framework already erected, apply new technologies to old problems, and are alert to new avenues of investigation.

James H. Zumberge was educated in his native state at the University of Minnesota (B.A. 1946, Ph.D. 1950) and taught geology at Duke University (1947-1948) and the University of Michigan (1950-1962). His research focused on the Pleistocene geology of the Great Lakes region. His elementary textbooks and laboratory manuals served a generation of geology students. Zumberge's research turned to Antarctica during the International Geophysical Year (1957-1958), an interest he has followed to the present. Since 1962 he has occupied administrative posts in several universities. He was a member of the National Science Board (1974-1980), President of the Scientific Committee on Antarctic Research (1982-1986), and President of the Arctic Research Commission (1984-1987). Zumberge is President of the University of Southern California at Los Angeles.

CHALLENGES: GSA'S ROLE

—Randolph W. Bromery



The primary challenge for the future of our Society is to increase the efficiency and effectiveness of the dissemination of the scientific and technological advances of our geological discipline. Our Society's functions will be more costly, competition for financial resources will be more intense, and our discipline will be more directly involved in economic and political policy formulations. GSA must join

with others in the important effort to have the word *geology* appear in the vocabulary of our young people at a much earlier age. Our Society must develop longer term, more carefully considered strategic planning efforts for both our information dissemination programs and our financial resource base.

Randolph W. Bromery received his B.S. degree in mathematics from Howard University, his M.S. in geology from The American University, and his Ph.D. in geology from The Johns Hopkins University.

He served as an exploration geophysicist with the U.S. Geological Survey from 1948 until joining the faculty at the University of Massachusetts in 1967. At the University of Massachusetts he served as Professor of Geophysics, Chairman of the Department of Geology and Geography, Vice Chancellor, Chancellor, Executive Vice-President of the university's central office, and Commonwealth Professor of Geophysics. He is currently serving as Interim President of Westfield State College.

Bromery is President of Geoscience Engineering Corporation and a Corporate Director of Exxon, NYNEX, and Chemical Banking corporations and of John Hancock Mutual Life Insurance Company. He is a member of the Board of Trustees of The Johns Hopkins University and of Mount Holyoke and Talladega colleges.

FROM CRUST TO CORE—A TOMOGRAPHIC GLOBAL DYNAMIC VIEW

—Don L. Anderson



Thanks to modern seismology we can now look deep into Earth. Although we obtain only snapshots of the present, we can, in effect, look backward in time because of the large thermal inertia of the mantle and subducted plates. North America was propelled away from Pangea and its hot mantle and settled into a geoid low and a mantle cooled by oceanic lithosphere which it overrode.

Don Anderson is Director of the Seismological Laboratory of the California Institute of Technology, Pasadena, California. He is also Professor of Geophysics in the Division of Geological and Planetary Sciences at California Institute of Technology. He received his B.S. in geology and geophysics from Rensselaer Polytechnic Institute in 1955 and his Ph.D. in geophysics and mathematics from California Institute of Technology in 1962. He served with Chevron Oil Company, the Air Force Cambridge Research Center, and the Arctic Institute of North America from 1955 to 1958. He was elected to the American Academy of Arts and Sciences in 1972 and the National Academy of Sciences in 1982. He has received the Emil Wiechert Medal of the German Geophysical Society, the Arthur L. Day Medal of the Geological Society of America, and the Gold Medal of the Royal Astronomical Society. He is President of the American Geophysical Union. Anderson is interested in the origin, evolution, structure and composition of Earth and the other planets. His work integrates seismological solid-state physics and petrological data.



photo by Bill Cronin

GEOLOGY OF THE NORTH AMERICAN PLATE: LESSONS FROM THE OCEANS

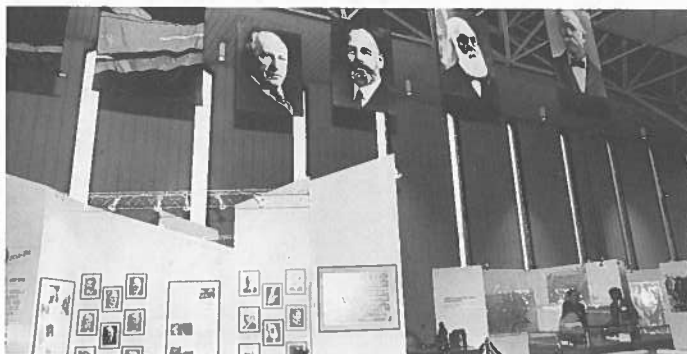
—Brian E. Tucholke



The geologic record in the oceans is only about 180 m.y. long, equivalent to less than 5% of the age of the oldest known rocks in North America. Yet the ocean basins probably best represent the uniformitarian ideal; processes of crustal generation, accumulation and erosion of rock records, deformation, and crustal consumption all are occurring in these basins beneath a wide variety of conditions in both atmospheric and oceanic climate. The oceans also have provided much of the information used to develop and refine the Mesozoic-Cenozoic time scale. In addition, rates and patterns of tectonism and volcanism, which in turn directly or indirectly control the form of most of the geologic record, can be deduced in large part from plate-motion histories recorded in the structure of ocean basins. Greatly increased understanding of all these factors through the development of plate tectonics theory over the past 25 years has allowed accurate, broad-scale reconstruction of the geologic evolution of both the ocean basins and continents. Future studies will detail the geologic processes and interrelations that we currently understand only in broad outline, and they will iteratively improve our ability to reconstruct the evolution of the ocean basins. Some of the most exciting research, however, will deal with determining the driving mechanisms for plate tectonics and with gaining a much improved understanding of how tectonics and volcanism “downlink” through such geologic filters and responses as climate, circulation, sea level, and ocean chemistry to produce the ultimate rock record.

Brian Tucholke is a marine geologist, a senior scientist at Woods Hole Oceanographic Institution, and Adjunct Senior Research Scientist at Lamont-Doherty Geological Observatory of Columbia University. He currently holds the Seward Johnson Chair in Oceanography at WHOI.

He received his B.S. in geology from South Dakota School of Mines and Technology in 1968 and his Ph.D. in oceanography from the Massachusetts Institute of Technology-Woods Hole Oceanographic Institution Joint Program in Oceanography in 1973. He was a postdoctoral fellow and then a senior research associate at Lamont-Doherty Geological Observatory 1973 to 1979. Tucholke has served as a member of the Interim U.S. Science Advisory Committee for the Advanced Ocean Drilling Program, the JOIDES Planning Committee, the Passive Margin Panel, and the Atlantic Regional Panel for deep-sea drilling. He is an associate editor of *The Geological Society of America Bulletin*, Co-Editor of *DNAG Geology of North America: The Western Atlantic Region*, scientist on 21 research cruises, author of about 90 scientific articles and books. His principal research is in stratigraphy, structure, and evolution of ocean basins and margins.



NORTH AMERICA: THE LAST 600 MILLION YEARS

—Albert W. Bally

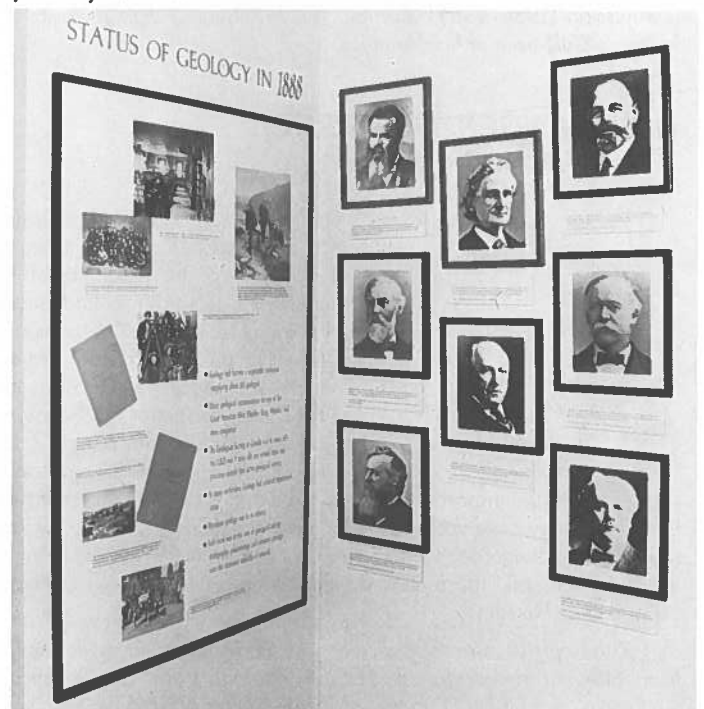


The Phanerozoic folded belts of North America may be best viewed as transpressional orogenic floats. Three-dimensional reconstructions through time are required to adequately depict the kinematic development of these folded belts and to evaluate the fate of lithospheric roots that are reflected by the amounts of compressional deformation derived from cross sections. Transtensional regimes are superposed on these folded belts and lead to a resetting of the Moho.

North America's sedimentary basins serve to illustrate various subsidence mechanisms. Synchronous stratigraphic sequences suggest coeval subsidence of sedimentary basins occurring in widely different plate tectonic scenarios. The synchronicity of stratigraphic sequences may be the effect of structural enhancement of sequence boundaries controlled by eustatic sea-level changes. Alternatively, synchronous sequences may simply reflect correlatable plate-tectonic subsidence regimes.

Albert (Bert) Bally received his Ph.D. from the University of Zurich in 1953. After a brief postdoctoral stay at the Lamont-Doherty Geological Observatory of Columbia University, he worked first for Shell Canada and then for Shell Oil. As a petroleum geologist, he was involved with onshore and offshore exploration all over North America. He is now a professor at Rice University in Houston. Work in the Canadian Rockies developed Bally's interest in the evolution of folded belts and sedimentary basins. His preferred approach involves the integration of seismic reflection profiles with surface and subsurface geologic information. The work of his graduate students reflects his research interests. The students work on Melville Island, Canada; the Apennines, Italy; the Betic Cordillera, Spain; the Sierra Perija, Venezuela; offshore Gulf of Mexico; offshore Brazil; offshore Peru; and the eastern Java Sea, Indonesia.

photos by Bill Cronin



PRECAMBRIAN EVOLUTION OF NORTH AMERICA

—Paul F. Hoffman



The core of North America is a cluster of seven Archean cratons, each of which is a rifted fragment of crust constructed by accretion of island arcs and microcontinents before 2.6 Ga. The cratons are welded by a network of 2.0 to 1.8 Ga collision orogens, characterized by passive-margin and foredeep prisms, foreland thrust-fold belts, calc-alkaline magmatic arcs, and reactivated hinter-

lands. From 1.9 to 1.6 Ga, extensive areas of Proterozoic crust were accreted to the western, southern, and southeastern margins of the composite Archean protocontinent. Widespread 1.7–1.3 Ga anorogenic magmatism, overlapping the Early Proterozoic orogens, may record mantle upwelling beneath the assembled super (?) continent. Rifting followed by convergent tectonism along the southeastern and northwestern margins between 1.3 and 1.0 Ga was accompanied by mafic magmatism in the respective forelands. Episodic rifting from 0.8 to 0.6 Ga (the coeval Avalon arcs were in Gondwana until the mid-Paleozoic) ultimately led to continental breakup in the latest Proterozoic.

Raised in Toronto, where his father was a chemist and his mother an artist and teacher, Paul Hoffman was attracted to geology while in primary school as a result of field trips sponsored by the Royal Ontario Museum. His 25 summers of field work began as an undergraduate at McMaster University, and his Ph.D. thesis at The Johns Hopkins University stemmed from the first of many projects concerned with Early Proterozoic basins and related orogenic belts in northwest Canada, which he compared with Phanerozoic mountain belts. He joined the Geological Survey of Canada in Ottawa as a research scientist in 1969, but has taken teaching leaves at Franklin & Marshall College, the University of California at Santa Barbara, and the University of Texas at Dallas, and he was a Fairchild Scholar at the California Institute of Technology. He serves on the International Lithosphere Program, Circum-Pacific Map Project, International Commission on Stratigraphy, and the Canadian Lithoprobe program.

photos by Bill Cronin



A CENTURY OF RESOURCE USE: CAN THE NEXT CENTURY'S FEAST BE AS RICH?

—Brian J. Skinner



Geologists played an essential role in finding and exploiting the energy, mineral, and water resources that met the past century's explosive growth in demand. They still play that role. Even though the intensity of resource exploitation is declining in North America, one-third of the members of GSA are employed, one way or another, in finding and producing resources.

Population growth and rising living standards drive consumption. When the GSA was founded, the world's population was 1.7 billion. Today is it 5 billion; a century ahead, it is projected to be 12 billion. North America has slowly passed from a self-sufficient, exporting region to a dependent importing region. The century ahead will see North America increasing its dependence on other parts of the world. Fossil fuels will probably continue to be the dominant energy source for much of the next century, and the kinds of ore deposits mined today will probably still supply the world's needs in the year 2088. Material will be needed for new ceramics, new concretes, and other metal substitutes. Those supplies must be found and developed. Of necessity, geologists will continue to play a vital role.

The most important role for geologists of the 21st century however, will be helping society understand and manage the environment. Wastes from the resource feast of the 20th century have already disturbed every geochemical cycle. That imbalance will have to be redressed during the 21st century.

Brian Skinner was born in Wallaroo, South Australia, on December 15, 1928. He completed his undergraduate education at the University of Adelaide in 1949 and started working in mineral exploration as an assistant to the late H.J.C. Connolly. Following graduate studies at Harvard (Ph.D., 1955), he returned to Australia to teach at the University of Adelaide. From there he moved to the U.S. Geological Survey (1959–1966) in the Branch of Experimental Geochemistry and Mineralogy, and in 1966 to Yale University, where he is currently the Eugene Higgins Professor of Geology and Geophysics. Skinner's research activities have been directed toward problems concerning the genesis of mineral deposits and, recently, to methods of assessing undiscovered mineral resources. He has been Editor of Economic Geology since 1970, and he was President of the Geochemical Society in 1973 and President of the Geological Society of America in 1985. He currently serves as Chairman of the Board on Earth Sciences of the National Research Council.





DNAG NEWS

by Allison R. (Pete) Palmer

Progress continues slowly on several fronts. I wish I could predict with some degree of accuracy when the next volume will be totally in hand. As of mid-December, with holidays looming and not too many more productive days in the year, we still await the final key pieces, predominantly from volume editors, to have the Surface Water, Eastern Pacific, Arctic, Appalachian/Ouachita, and Caribbean volumes completely in production. The last two still have some tricky color plates to finish, but the others can go forward as soon as the last texts appear.

Rapid progress is being made in the North American overview volume: 11 of the 19 chapters are written, and 9 are already revised and in production. This volume is targeted to be available for the International Geological Congress this summer.

A major logjam in the Economic Geology volume broke in November, and that volume now seems to be moving. The first chapter in final form has been received for the Gulf of Mexico Basin, and others are promised to follow soon. The two Precambrian megachapters needed to complete that book are under new leadership, and the book is now back on track. Chapters are also beginning to come in for the Neotectonics and Transects volumes.

Two more neotectonic maps (heat flow and stress) are getting close to completion, as well as the special volume from the Engineering Geology division.

The last of the U.S. Cordilleran megachapters is now through review, and all Cordilleran authors have been asked by their editors to begin sending in their final revisions, as there are no more major delays foreseen in completing this volume. A couple of chapters that have been long promised but not yet received for review may drop by the wayside if they don't show up soon.

The Alaskan volume is being completely prepared by the USGS in Menlo Park. According to the editor, most of this is written, but finished chapters have not yet made it to production in Boulder. The same is true for the special volume by the Archaeology Geology Division.

It's hard to move 2000 or so volunteers even with the best of intentions. There are 443 synthesis chapters in the volumes of *The Geology of North America* that are being produced by GSA. Of these, 373 have been written and 302 were either in production or published as of early December. Of the 140+ chapters in special DNAG volumes, more than two-thirds have been written, and more than half are in production or published.

The whole DNAG Project can still be wrapped up in the decade of the 1980s as originally planned, and a good bit of it can be wrapped up in 1989. Those who have done their jobs should take pride in the quality of the work completed so far and keep encouraging their lagging colleagues to complete their commitments.

Editors Receive First GSA Distinguished Service Awards



Recipients of GSA's first Distinguished Service Awards are (left to right) Eldridge Moores, Robert Hatcher, William Thomas, and Campbell Craddock.

GSA Books Editor Campbell Craddock, *Geology* Editor Eldridge Moores, and *Bulletin* Editors Robert Hatcher and William Thomas received GSA's first Distinguished Service Awards at the 1988 Annual Meeting in Denver. The editors were honored for their work on the journals and books during 1981-1988. Terms of service for all four editors ended in 1988.

Craddock, University of Wisconsin in Madison, assumed the editorship for GSA books in 1982. He shepherded some 60 books through review to publication during his tenure.

Moores, University of California in Davis, helped *Geology* grow from 620 pages in 1981 to 1156 in 1988—necessary growth as manuscript submissions increased from 170 received in 1981 to 644 in 1988. He expanded the *Geology* Editorial Board, added new features to the journal, and encouraged geoscientists to submit papers, especially in underrepresented subject areas.

Hatcher and Thomas applied their expertise to the ailing *Bulletin* and handled manuscript submissions that increased from 170 in 1982 to 291 in 1988. They instituted an editors' comments page in the journal, solicited the geological review papers for the Centennial volume of the *Bulletin* in 1988, and reduced the time between acceptance and publication of papers from one year to an average of 6 months. The *Bulletin* grew from 1058 pages in 1982 to 2008 pages in 1988.

The GSA Council approved the Distinguished Service Award at its May 1988 meeting as a means of acknowledging exceptional service to the Society. Recipients can be GSA Members, Fellows, Student Associates, or, in exceptional circumstances, employees. Any GSA member or employee may make a nomination for the award; the Executive Committee selects the honoree(s), and the Council ratifies selections. Deadline for nominations for 1989 is March 1.

Friends of Mineralogy Plan Symposium

The Friends of Mineralogy, Pacific Northwest Chapter, have scheduled a symposium, Minerals of the Inland Northwest (Idaho, Montana, and western Canada). It will be held May 12-14, 1989 (immediately following the GSA meeting in Spokane, Washington), in Coeur d'Alene, Idaho (40 miles east of Spokane).

The symposium will feature speakers on minerals and mineral localities, mineral displays and special exhibits, mineral dealers, a micromount session, and more.

For information and registration, call or write Friends of Mineralogy, c/o Lanny R. Ream, P.O. Box 2043, Coeur d'Alene, ID 83814; (208) 667-0453.

Geological Society of America



CONGRESSIONAL SCIENCE FELLOWSHIP 1989-1990

The Geological Society of America invites applications for the 1989-1990 Congressional Science Fellowship. The Fellow selected will spend a year (September 1989-August 1990) in the office of an individual member of Congress or a congressional committee advising on a wide range of scientific issues as they pertain to public questions. Guided by the American Association for the Advancement of Science, the Fellow selects a congressional staff position in which he or she can work on major legislative issues.

CRITERIA

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

AWARD

The GSA Congressional Science Fellowship carries with it a \$28,000 stipend and a limited relocation and travel allowance. The fellowship is funded by GSA and by a grant from the U.S. Geological Survey. (Employees of the USGS are ineligible to apply for this fellowship.)

TO APPLY

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

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



Deadline for receipt of all application materials is March 15, 1989



Randolph Bromery



Raymond Price



Albert Bally



Robert Fuchs

GSA Officers and Councilors for 1989

PRESIDENT

Randolph W. Bromery

b. Cumberland, MD, 1-18-26; m. 47; c. 5. GEOLOGY, GEOPHYSICS. *Educ.*: Howard Univ., BS, 56; American Univ., MS, 62; Johns Hopkins Univ., PhD, 68. *Honorary degrees*: EdD, Western New England Coll.; DSc, Frostburg State Coll.; LHD, Univ. of Massachusetts; LLD, Hokkaido Univ. *Prof. exp.*: geophysicist, U.S. Geol. Surv., 48-67; assoc. prof. geophysics, 67-69, head dept. geol. & geog., 69-70, v. chancellor, 70-71, exec. vice-pres. & chancellor, 71-79, COMMONWEALTH PROF. OF GEOPHYSICS, UNIV. OF MASSACHUSETTS, 79-; PRES., GEOSCIENCE ENGINEERING CORP., 83-; INTERIM PRES., WESTFIELD STATE COLL., 88-; DIR.: EXXON CORP., 77-, SINGER CO., 76-, NYNEX CORP., 87-, JOHN HANCOCK INS. CO., 87-, CHEMICAL BANK, 88-. *Concurrent pos.*: professorial lect., Howard Univ., 61-65; consultant, USAID, U.S. Dept. of State, 64 & 68; sr. scientist, Conn. Geol. & Natural History Surv., 67-71; consultant, Kennecott Copper & Esso Eastern, 64-75; mem. bd. of dir.: New England Telephone Co., 73-81, and Northwestern Mutual Life Ins. Co., 77-79; pres., Weston Geophysical Internatl., 81-83; mem. bd. of trustees: Johns Hopkins Univ., Mount Holyoke Coll., and Talladega Coll.; incorporator, Woods Hole Oceanographic Inst. and Boston Museum of Sci.; v. chmn. and dir., New Coalition for Econ. and Social Change; mem. Advisory Comm. Sch. of Earth Sci., Stanford Univ., 84-87; mem. U.S. Dept. of Commerce, Sea Grant Review Panel, 77-80, chmn., 79-80; mem. bd. of overseers, visiting comm., Dept. of Geol. Sci., Harvard Univ., 76-81; mem. bd. of overseers, visiting comm., Dept. Earth and Planetary Sci., Massachusetts Inst. Tech., 82-85; mem. Advisory Comm., Sch. of Arts and Sci., Johns Hopkins Univ., 82-; mem. Advisory Comm., American Men and Women in Sci., 73-79; mem. special comm. to Republic of Zaire, educ. and geol., NAS, 70; mem. Advisory Comm. on Minorities in Engineering, Sloan Found., 74-77; mem. Special Advisory Panel, secy., Dept. of Interior, 76-77; mem. Grad. Record Exam. Comm., ETS, 81-87, chmn., 83-87; mem. Special Comm. on Governance in South Africa, World Peace Found. & South African Inst. for Internatl. Affairs, 79. *Honors & awards*: pres., Soodoo Womens Univ., Seoul, Korea; spec. award, Northeast Corridor Prog., U.S. Geol. Surv., 67; spec. commendation, Republic of Liberia, 66; cert. of appre., Republic of Liberia, 72; alumni award, Distinguished Postgrad. Achievement, Howard Univ., 85; Award for Excellence in Physical, Earth, and Atmos. Sci., Natl. Consort. for Black Professional Development, 77; official guest, pres. Republic of Malawi, 71; official guest, pres. Republic of Camerouns, 78. *Mem.*: fel. Geol. Soc. Amer. (counc., 77-79; v-pres., 88; pres. 89); Soc. Explor. Geophys.; fel. Am. Geophys. Union; fel. Am. Assoc. Adv. Sci.; New York Acad. of Sci.; NRC Bd. on Earth Sci.; OCS Scientific Advisory Comm.; Sigma Xi; Phi Kappa Phi; Phi Eta Sigma (hon.); Cosmos Club; Council on Foreign Relations. *Res.*: Gravity, magnetic, radioactivity, electrical and seismic surveying methods applied to geologic mapping programs and hydrological and civil engineering programs. *Mailing address*: Dept. of Geology and Geography, Morrill Science Center, Univ. of Massachusetts, Amherst, MA 01003. *Phone*: (413) 568-3311, ext. 200, at Westfield St. Coll., or (413) 545-2120, at Univ. of Massachusetts.

VICE-PRESIDENT

Raymond A. Price

b. Winnipeg, Manitoba, 3-25-33. STRUCTURAL GEOLOGY, TECTONICS. *Educ.*: Univ. of Manitoba, BSc, 55; Princeton Univ., AM, 57, PhD (geol.), 58. *Prof. exp.*: geol./res. scientist, Geol. Surv. Canada, 58-68; assoc. prof. geol., 68-70, head dept. geol. sci., 72-77, prof. geol., 70-81, visiting prof., 88-, Queen's Univ., Kingston, Ontario; dir. general, 81-87; asst. deputy minister, 87-88, Geol. Surv. Canada, Energy, Mines and Resources Canada; RES. SCIENTIST, GEOL. SURV. CANADA and VISITING PROF. GEOL. SCI., QUEEN'S UNIV., 88-. *Concurrent pos.*: mem. Canadian Geoscience Counc., 79-,

foreign secy., 79-82; mem. ed. bd., *Journal of Structural Geology*, 78-; mem. Canadian Geol. Found., 82-; mem. advisory comm., dept. of geol. geophys. sci., Princeton Univ., 84-; dir. Intl. Union Geol. Sci. (IUGS) Advisory Bd. on Research Development, 85-; chmn. Canadian Counc. for Ocean Drilling Prog., 85-; No. American ed. *Tectonics* (AGU), 85-88; ed. bd. Oxford Univ. Press *Monographs on Geol. and Geophys.*, 86-; mem. bd. of dir., Lithoprobe, 87-; pres. Inter-Union Comm. on the Lithosphere, Intl. Counc. of Scientific Unions (ICSU), 80-85; assoc. ed. *Canadian Bulletin of Petrol. Geol.*, 81-83; assoc. ed. *Canadian Journal of Earth Sci.*, 67-81; chmn. Canadian Natl. Subcom. for the Intl. Geodynamics Proj., 72-80; assoc. ed. *Geoscience Canada*, 73-75; assoc. ed. *GSA Bulletin*, 74-82; mem. Comm. for the Geol. Map of the World, 80-85; chmn. Advisory Counc., Queen's Univ. Ctr. for Resource Studies, 81-82; mem. bd. of electors, dept. earth sci., Cambridge Univ., 82-84; chmn. advisory comm., dept. earth sci., Memorial Univ. of Newfoundland, 85-87; mem. bd. of dir., Queen's Univ. Ctr. for Resource Studies, 81-82; chmn. AGU comm. on "Earth as a System," 86-88; chmn. working group on "Geol. Processes: Past and Present," ICSU Planning Group for "The Intl. Geosphere-Biosphere Programme: A Study of Global Change," 85-86. *Honors & awards*: distinguished lectr. Canadian Inst. Min. Metallurgy, 69; fel. Royal Soc. of Canada, 72; Killam Sr. Res. Fellowship, 78-80; distinguished lectr. Canadian Soc. Petrol. Geol., 80-81; Best Technical Paper, Rocky Mtn. Assoc. Geol., Denver, 81; R.J.W. Douglas Medal, Canadian Soc. Petrol. Geol., 84; Sir William Logan Medal, Geol. Assoc. Canada, 85; doctor of sci. (*honoris causa*), Carleton Univ., 87; officier dans l'Ordre des Palmes Academiques, France, 88; foreign assoc. USA Natl. Acad. Sci., 88; D.H. Foster lectr., Lehigh Univ., 88; Leopold von Buch Medal, Deutsche Geologische Gesellschaft, 88. *Mem.*: fel. Geol. Soc. Amer. (counc., 79-81; v-pres., 89); fel. Geol. Assoc. Canada; Am. Assoc. Petrol. Geol.; Canadian Soc. Petrol. Geol.; Am. Geophys. Union; Sigma Xi; Assoc. Professional Engineers of the Province of Ontario. *Res.*: Structural geology, tectonics, regional geology, science and public policy. *Mailing address*: Geological Survey of Canada, c/o Dept. of Geological Sciences, Queen's Univ., Kingston, Ontario, K7L 3N6, Canada. *Phone*: (613) 545-6542.

PAST PRESIDENT

Albert W. Bally

b. The Hague, Netherlands, 4-21-25; m. 50, c. 3; cit. Switzerland. GEOLOGY. *Educ.*: Univ. Zurich, PhD (geol.), 53. *Prof. exp.*: Gulf Oil, 53; post-doctoral Lamont-Doherty Geol. Observ., 53-54; explor., 54-62, chief geol., 62-66, Shell Canada; mgr. geol. res., Shell Dev. Co. (Houston), 66-68; chief geol. U.S.A., 68-75, consulting geol., 75-80, sr. explor. consultant, 80-81, Shell Oil; chmn. dept. geol., Rice Univ., 81-86; HARRY CAROTHERS WIESS PROFESSOR OF GEOLOGY, RICE UNIV., 81-. *Concurrent pos.*: mem. ad hoc comm. on the geol. sci., NRC, 68; Crosby visiting prof., Massachusetts Inst. Tech., Spring 77; mem. passive margin panel Internatl. Panel Ocean Drilling (IPOD), 75-78; mem. Interunion Comm. Geodynamics and section ed. final rept., 78-79; mem. U.S. Geodynamics Comm., 77-80; chmn. site selection comm., 74-80, exec. comm., 74-80, 82-, Consortium Continental Reflection Profiling; mem. oceanography advisory, exec. comm., Natl. Sci. Found., 78-79; chmn. panel res. and problems on continental margins, Natl. Acad. Sci., 76-78; mem. sci. comm., 78-80, chmn., 80-83, Internatl. Geol. Correlation Programme (IGCP); mem. IUGS task group post-geodynamics proj. planning, 78-79; mem. plate tectonics delegation, Natl. Acad. Sci. comm. scholarly communication with People's Republic of China, 79; mem. ocean sci. bd., Natl. Acad. Sci., 82; mem. Am. Assoc. Petrol. Geol. educ. comm., 82; mem. publications advisory comm., Am. Geol. Inst., 83-; sci. consultant, Institut Francais du Petrole, 82-; Trans Alaska Lithosphere Investigation, 83; Tectonics Panel, 84-85, Atlantic Regional Panel, 84-85, JOIDES

(continued on p. 39)

Ocean Drilling Proj.; ed. three vols. "Seismic expression of structural styles: A picture and work atlas," pub. AAPG, 84; mem. Lithoprobe Eval. Comm. for Sci. Engineering Res. Coun. Canada, 85-; chmn. Am. sedimentary basins delegation to the People's Republic of China, comm. on scholarly communication with People's Republic of China, Natl. Acad. Sci., 85-86. *Honors & awards:* Canadian Soc. Petrol. Geol. Merit Award Medal (together with P.L. Gordy, C. Steward), 66; Geol. Soc. London William Smith Medal, 82; mem. Assoc. Soc. Geol. de France, 84; Am. Assoc. Petrol. Geol. President's Award, Best Special Publication, 85; hon. mem., Am. Assoc. Petrol. Geol., 86; Geologische Vereinigung Gustav Steinmann Medal, 87; AAPG Robert H. Dott, Sr., Memorial Award, 89. *Mem.:* Am. Assoc. Petrol. Geol.; Am. Geophys. Union; fel. Geol. Soc. Amer., (counc., 75-77; v-pres., 87; pres., 88); fel. Am. Assoc. Adv. Sci.; Canadian Soc. Petrol. Geol.; Geologische Vereinigung; Schweizerische Geologische Gesellschaft; Vereinigung Schweiz Petroleum-Geologen und Ingenieure; Houston Geol. Soc.; Soc. Geologica Italiana; Assoc. Geoscientists for Internatl. Development. *Res.:* Petroleum geology, structural geology, tectonics, and regional geology. *Mailing address:* Dept. of Geology, Rice University, P.O. Box 1892, Houston, TX 77251. *Phone:* (713) 527-4880.

TREASURER

Robert L. Fuchs

b. Bay Shore, NY, 12-7-29; m. 86; c. 2. GEOLOGY. *Educ.:* Cornell Univ., BA, 51; Univ. Illinois, MS, 52. *Mil. serv.:* U.S. Navy. *Prof. exp.:* area explor. supervisor, analyst, staff geol., party chief, jr. geol., Mobil Oil, NY, Louisiana, Venezuela, Libya, 52-65; dir. prog. support Flow Labs, Inc., 65-66; pres., founder, dir. Con-Serv Corp. & Automation Inst., 66-69; sr. vice-pres., Intercontinental Energy Corp., 69-71; dir. Canyon Resources Corp., 80-; dir. Sheffield Explor. Co., Inc., 81-; dir. Sundance Oil Co., 82-84; pres., founder, dir. Geosystems Corp., 71-86 (name changed to Caland Petroleum Corp. in 84); MANAGING DIR., FIRST FAIRFIELD INVESTMENT CO., 87-. *Concurrent pos.:* trustee, v. chmn., 81-82, pres., Geol. Soc. Amer. Found., 87-. *Mem.:* Am. Assoc. Petrol. Geol., Energy Minerals Div. (pres., 81-82); Am. Inst. Prof. Geol.; Am. Inst. Min. Eng.; fel. Geol. Soc. Amer. (treas., 83-); Rocky Mtn. Assoc. Geol. *Res.:* Natural resource exploration, technical analytical exploration management, venture/asset management, economic geology of petroleum. *Mailing Address:* First Fairfield Investment Co., 1675 Larimer St., Suite 720, Denver, CO 80202. *Phone:* (303) 571-0885.

COUNCILOR 1987-1989

William W. Hay

b. Dallas, TX, 10-12-34. MICROPALAEONTOLOGY, MARINE GEOLOGY. *Educ.:* Southern Methodist Univ., BS, 55; Univ. of Illinois, MS, 58; Stanford Univ., PhD (geol.), 60. *Prof. exp.:* NSF fellowship in geol., Univ. of Basel, 59-60; from asst. prof. to prof. geol., Univ. of Illinois, Urbana-Champaign, 60-73; chmn. div. marine geol. geophysics, 74-80, dean, 77-80, prof. marine geol. geophysics, 68-80, Rosenstiel School of Marine and Atmospheric Sciences, Miami; pres., Joint Oceanographic Institutions Inc., 79-82; PROF., NATL. HISTORY AND GEOL., FEL., COOPERATIVE INST. FOR RESEARCH IN ENVIRONMENTAL SCI., UNIV. OF COLORADO, BOULDER, 82-. *Concurrent pos.:* adjunct prof., Marine and Atmospheric Sci., Univ. of Miami, 82-; honorary research fel., Univ. College, Univ. of London, 71-. *Mem.:* Am. Geophys. Union; fel. Geol. Soc. Amer. (counc., 87-89); Am. Assoc. Petrol. Geol.; Paleont. Soc.; Soc. Econ. Paleont. Mineral. *Res.:* Pelagic sedimentation; calcareous nannoplankton; probability in stratigraphy; sedimentary mass balance. *Mailing address:* University Museum, University of Colorado, Campus Box 218, Boulder, CO 80309-0218. *Phone:* (303) 492-7370.

COUNCILOR 1987-1989

Marcus E. Milling

b. Galveston, TX, 10-8-38; m. 59; c. 1. PETROLEUM GEOLOGY; SEISMIC STRATIGRAPHY. *Educ.:* Lamar Univ., BS, 61; Univ. Iowa, MS, 64, PhD (geol.), 68. *Prof. exp.:* res. specialist, sr. res. specialist, sr. res. geol., res. supervisor, EXXON Production Research Co., 68-77; sr. supervisory production geol., 77-79, dist. explor. geol., 79-80, Exxon Co., USA; mgr. geol. res., 80-86, mgr. geologic staff, 86-87, ARCO Oil & Gas Co.; ASSOCIATE DIRECTOR, TEXAS BUREAU OF ECONOMIC GEOLOGY, and DIRECTOR, GEOSCIENCE INSTITUTE FOR OIL AND GAS RECOVERY RESEARCH, THE UNIVERSITY OF TEXAS AT AUSTIN, 87-. *Mem.:* fel., Geol. Soc. Amer. (counc., 87-89); Am. Assoc. Petrol. Geol.; Soc. Econ. Paleont. Mineral.; Am. Geol. Inst. Found. Bd. of Trustees; Soc. Expl. Geophysicists; Soc. Petrol. Engineers; Offshore Technology Comm., vice-chmn. Bd. of Dir.; Dept. of Energy Solid Earth Science Panel. *Res.:* Environmental facies analysis clastic depositional systems; seismic stratigraphy deep-sea fans, oil and gas recovery research. *Mailing address:* Geoscience Institute, The University of Texas, P.O. Box X, Univ. Station, Austin, TX 78713. *Phone:* (512) 471-1534 or 471-0369.

COUNCILOR 1987-1989

John S. Scott

b. Hamilton, Ontario, 7-14-29; m. 56; c. 2. GEOLOGY. *Educ.:* McMaster Univ., BSc, 53; Univ. Illinois, Urbana, PhD (geol.), 60; Natl. Defence Coll., Kingston, 77. *Prof. exp.:* geol., Photographic Surv. Corp., Ltd., Canada, 53-57; geol., Geol. Surv. Canada, 60-67; consulting geol., H.G. Acres & Co., Ltd., Canada, 67-69; research scientist, 69-74, dir., Terrain Sciences Div., 74-87, DIR. GEN. GEOPHYSICAL SURVEY, HAZARDS TERRAIN SCIENCES BRANCH, GEOL. SURV. CANADA, 87-. *Concurrent pos.:*

mbr. assoc., Comm. on Geotechnical Research, Natl. Res. Council of Canada, 61-66, 78-. *Mem.:* fel., Geol. Soc. Amer. (counc., 87-89); fel., Geol. Assoc. Canada; mbr. Canadian Geotechnical Soc.; Internatl. Assoc. Engineering Geol. *Res.:* Engineering geology; hydrogeology as related to construction; stability of slopes in overconsolidated shales. *Mailing address:* Geological Survey of Canada, 580 Booth Street, Room 2048, Ottawa, Ontario, Canada K1A 0E9. *Phone:* (613) 995-0623.

COUNCILOR 1987-1989

Stephen H. Stow

b. Oklahoma City, OK, 9-18-40; m. 65; c. 2. GEOCHEMISTRY. *Educ.:* Vanderbilt Univ., BA, 62; Rice Univ., MA, 65, PhD (geochem.), 66. *Prof. exp.:* res. scientist, Plant Foods Res. Div., Continental Oil Co., 66-69; consultant, Geol. Surv. Alabama, 70-74; industry consultant, 70-80; part-time geol., U.S. Bureau of Mines, Tuscaloosa, 74-76; from asst. prof. to prof. geol., 69-80, adjunct prof., 82-84, Univ. Alabama, Tuscaloosa; Group leader geol. geochem., 80-88, SECTION HEAD, GEOSCIENCES, 88-, and MANAGER, GEOSCIENCE TECHNOLOGY SUPPORT PROGRAM, 86-, OAK RIDGE NATL. LABORATORY. *Concurrent pos.:* part-time prof. geol., Univ. Tennessee, Knoxville, 81-. *Mem.:* Am. Geophys. Union; fel., Geol. Soc. Amer. (counc., 87-89) (hydrogeol. div.); fel., Am. Assoc. Adv. Sci.; Soc. Econ. Geol.; Alabama Geol. Soc. (vice-pres., 72-73, 75-76, pres., 76-77); Georgia Geol. Soc., 74-80; The Universities Council on Water Resources, 72-79; Internatl. Assoc. Hydrogeol. (Comm. Hydrogeol. Hazardous Waste). *Honors & awards:* Sigma Xi Best Thesis Award, Rice Univ., 65; elected to Outstanding Young Men of Amer., 71; ed. bd. *Environ. Geol. and Water Sci.*; mem. NAS/NRC Panel on "Professional Community, Education and Manpower;" mem. Am. Geol. Inst. Educ. Advisory Comm.; mem. AAAS/NSF sponsored Comm. on Professionals in Sci. and Technology. *Res.:* Geology and geochemistry of phosphates; geochemistry of mafic rocks of southern Appalachians; sulfide ore deposits; subsurface injection of liquid wastes; nuclear waste repository siting. *Mailing address:* Environmental Sciences Div., Bldg. 1505, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831-6038. *Phone:* (615) 574-7830.

COUNCILOR 1988-1990

Zoltan de Cserna

b. Budapest, Hungary, 3-3-28; m.; cit. Mexico. GEOLOGY. *Educ.:* Univ. New Mexico, BA, 51, MS, 52; Columbia Univ. (PhD geol.), 55. *Prof. exp.:* explor. geol., Inst. Nat. Invest. Recursos Minerales (México), 51-55; res. assoc., 52-53, res. geol., 53-59, Inst. Geología, Univ. Nat. Autón. México; consult. geol., Cía. Minera del Rio Murga, S.A., 56-69; geological consultant, Comisión Federal de Electricidad, 77-87; SENIOR RESEARCH PROFESSOR, INSTITUTO DE GEOLOGÍA, UNIV. NAL. DE AUTÓNOMA MÉXICO, 59-. *Concurrent pos.:* mem., Comité de la Carta Geológica de México, 52-60; prof. structural geol., Facultad de Ciencias, Univ. Nat. Autón. México, 56-; chief geol., Inst. Geología, Univ. Nat. Autón. México, 66-69; mem., 66-82, chmn., 72-73, Am. Comm. Strat. Nomenclature; sci. co-editor, Inst. Geología, Univ. Nat. Autón. México, 83-; editor, Soc. Geol. Mexicana, 86-. *Honors & awards:* mem. Acad. Investigación Científica (México), 62-; Guggenheim Fellow, 73; Investigador Nacional, 85-; assoc. mem. Centro de Investigación Sísmica, Fundación J. Barros Sierra, 87-. *Mem.:* fel. Geol. Soc. Amer. (counc., 88-90); Am. Assoc. Petrol. Geol.; Sigma Xi; Geologische Vereinigung; Soc. Geol. Mexicana; Asoc. Mex. Geól. Petrol.; Asoc. Ings. Minas, Metalurgistas y Geólogos de México; Soc. Mex. Mineralogía. *Res.:* Structural geology, tectonics and regional geology. *Mailing address:* Apartado Postal 21-093, Coyoacán, 04000 México, D. F., México. *Phone:* (901) 548-4203.

COUNCILOR 1988-1990

Priscilla C. Grew

b. Glens Falls, NY, 10-26-40; m. 75. GEOLOGY, EARTH SCIENCES. *Educ.:* Bryn Mawr Coll., BA, 62; Univ. of California, Berkeley, PhD (geol.), 67. *Prof. exp.:* from instr. to asst. prof. geol., Boston Coll., 67-72; asst. research geol., Inst. of Geophysics, Univ. of California, Los Angeles, 72-77; dir., California Dept. of Conservation, 77-81; commissioner, California Public Utilities Commission, 81-86; DIR., MINNESOTA GEOL. SURV. and PROF. GEOL., UNIV. OF MINNESOTA, 86-. *Concurrent pos.:* exec. secretary, ed., Lake Powell Research Proj., 71-77; visiting staff mem., Los Alamos Scientific Lab., 72-77; mem., Comm. on Minority Participation in Earth Sci. & Mineral Engineering, U.S. Dept. of Interior, 72-75; visiting asst. prof. geol., Univ. of California, Davis, 73-74; adjunct asst. prof., environ. sci. and engineering, Univ. of California, Los Angeles, 75-76; chmn., California State Mining & Geol. Bd., 76-77; chmn., California Geothermal Resources Bd., 77-81; mem., U.S. Geol. Surv. Earthquake Studies Advisory Panel, 79-83; mem., Comm. on Gas, Exec. Comm., Natl. Assoc. Regulatory Utility Commissioners, 82-86; mem., Bd. Mineral and Energy Resources, Natl. Research Council, 82-88; mem., Advisory Council, Gas Research Inst., 82-86; mem., Comm. Advisory to U.S. Geol. Surv., 82-86; mem., Subcom. on Earthquake Research, Natl. Research Council, 85-; mem.-at-large, U.S. Natl. Comm. on Geol., 85-; mem., Comm. on Equal Opportunities in Sci. and Tech., 85-86, mem., Adv. Comm. Earth Sciences, 88-, mem. Adv. Comm. Sci. and Technology Centers, 88-, Natl. Sci. Found.; mem. Minnesota Minerals Coordinating Comm., 86-; mem., Research Coordination Council, Gas Research Inst., 87-. *Mem.:* fel. Geol. Soc. Amer. (counc., 88-90); Am. Geophys. Union (chmn. Comm. on Public Affairs, 86-); fel. Am. Assoc. Adv. Sci. (mem.-at-large, Sect. E,

(continued on p. 40)

Officers and Councilors for 1989 (continued from p. 39)

86-); Natl. Parks and Conservation Assoc. (trustee, 82-86). *Res.*: Geology and public affairs; environmental geology; natural resources management; science and regulatory policy studies. *Mailing address*: Minnesota Geological Survey, 2642 University Avenue, St. Paul, MN 55114. *Phone*: (612) 627-4780.

COUNCILOR 1988-1990**Donald C. Haney**

b. Ferguson, KY, 7-2-34; m. 56; c. 2. GEOLOGY, SOILS. *Educ.*: Univ. of Kentucky, BS, 59, MS, 60; Univ. of Tennessee, PhD (geol.), 66. *Mil. serv.*: U.S. Army, 53-56. *Prof. exp.*: instr. geol., Campbellsville Coll., 60-62; instr. geol., Eastern Kentucky Univ., 62-64, from assoc. prof. to prof. geol., 66-78, chmn. dept. geol., 68-78; STATE GEOLOGIST and DIR., KENTUCKY GEOLOGICAL SURVEY, 78-. *Concurrent pos.*: geol., U.S. Geol. Surv., 70-77; participant Am. Geol. Inst. Internatl. Field Conf., Spain, 71; consultant, Amoco Prod. Co., 76; consultant, Kerr-McGee, Inc., 77; consultant, Staggs and Assoc., 80; adjunct prof. geol., Univ. of Kentucky, 80-. *Mem.*: Assoc. Am. State Geol.; Am. Inst. Prof. Geologists; fel. Geol. Soc. Amer. (counc., 88-90); Geol. Soc. Kentucky (vice-pres., 67, pres., 71); Kentucky Acad. Sci. (sect. leader, 71); Lexington Geol. Soc. (vice-pres., 68); Natl. Assoc. Geol. Teachers. *Res.*: Structural geology of eastern Tennessee; study of Pennsylvanian rocks in eastern Kentucky, including structure, sedimentology, and coal resources. *Mailing address*: Kentucky Geological Survey, 311 Breckinridge Hall, Univ. of Kentucky, Lexington, KY 40506-0056. *Phone*: (606) 257-5863.

COUNCILOR 1988-1990**Richard W. Hutchinson**

b. London, Ontario, 11-17-28; m. 51; c. 4. GEOLOGY. *Educ.*: Univ. Western Ontario, BSc, 50; Univ. of Wisconsin, MS, 51, PhD (geol.), 54. *Prof. exp.*: geol., Am. Metal Climax, Inc., 54-64; assoc. prof., 64-69, prof. econ. geol., mineral deposits, Univ. Western Ontario, 69-83; CHARLES F. FOGARTY PROF. OF ECON. GEOL., COLORADO SCHOOL OF MINES, 83-. *Concurrent pos.*: Natl. Research Council Canada research grant, 64-; Geol. Surv. Canada research grant, 65-69; NATO Research Council research grant, 67-69; consulting geol.: Callahan Mining Corp., NY, 64-70, Chevron Resources Co., 72-83, UNDP-UNRF, 76-85, Utah Internatl., 85-. *Honors & awards*: Barlow Gold Medal, Canadian Inst. Mining & Metall., 72, 79; Derry Medal, Mineral Deposits Div. of Geol. Assoc. Canada, 83; SEG Medal, Soc. Econ. Geol., 85. *Mem.*: Soc. Econ. Geol.; Geol. Soc. Am. (counc., 88-90); Canadian Inst. Mining & Metall.; Geol. Assoc. Canada; Soc. Geol. Appliqué Gites Minéraux; Pros. Dev. Assoc. Canada; Colorado Sci. Soc. *Res.*: Descriptive geology on pegmatites and deposits of rare-element minerals in pegmatites; genesis and tectonic relationships of massive sulfide base metal ore deposits; metallogeny and origin gold deposits; tin deposits; origin of K-bearing marine evaporite deposits; metallogenic evolution of ore deposits. *Mailing address*: Dept. of Geology and Geological Engineering, Colorado School of Mines, Golden, CO 80401. *Phone*: (303) 273-3039, (303) 273-3800.

COUNCILOR 1989-1991**James F. Hays**

b. Little Rock, AR, 7-10-33; m. 56; c. 1. GEOLOGY. *Educ.*: Columbia Univ., AB, 54; California Inst. Tech., MS, 61; Harvard Univ., PhD (geol.), 66. *Prof. exp.*: geol. U.S. Geol. Surv., 61; guest investigator Carnegie Inst. Geophys. Lab., 65; jr. fel., 63-66, asst. prof., 66-69, assoc. prof., 69-72, prof. geol., 72-82, chmn. dept. of geol. sci., Harvard Univ., 81-82; dir. Div. of Earth Sci., 82-87, SENIOR SCIENCE ADVISOR, NATIONAL SCIENCE FOUNDATION, 87-. *Concurrent pos.*: consultant Astronaut Training Prog., 69-73, mem. Lunar Sample Analysis Planning Team, NASA, 73-76; visiting prof. chemistry and geol., Arizona State Univ., 78-79; chmn. Lunar & Planetary Review Panel, 78-81; mem. Advisory Comm. on Mining and Minerals Research, 83-85; Scientific Advisory Bd., Mount St. Helens Natl. Volcanic Monument, 83-87; assoc. ed. *Journal of Geophysical Research*, 78-80, 83-85. *Mem.*: fel. Geol. Soc. Amer. (counc., 89-91); fel. Mineral. Soc. Amer.; Am. Geophys. Union; Am. Assoc. Petrol. Geol.; Geochem. Soc.; Am. Assoc. Adv. Sci.; Meteoritical Soc. *Res.*: Experimental petrology; phase equilibria in silicates at high pressures and high temperatures; kinetics of crystallization; interior of the earth, moon, and planets; principal investigator of Apollo lunar samples. *Mailing address*: Office of the Director, National Science Foundation, Washington, DC 20550. *Phone*: (202) 357-9443.

COUNCILOR 1989-1991**Eldridge M. Moores**

b. Phoenix, AZ, 10-13-38; m. 65; c. 3. TECTONICS, STRUCTURAL GEOLOGY. *Educ.*: California Inst. Tech., BS, 59; Princeton Univ., MA, 61, PhD (geol.), 63. *Prof. exp.*: teaching asst. geol., 62-63, NSF visiting res. fel., 63-65, res. assoc., Princeton Univ., 65-66; lectr., 66-67, from asst. prof. to assoc. prof., 67-75, chmn. dept., 71-72, 73-76, PROF. GEOL., UNIV. OF CALIFORNIA AT DAVIS, 75-. *Concurrent pos.*: NSF Panel on Grad. Fellowships in Earth Sciences, 77-79, chmn., 78-79; COCORP Site Selection and Sci. Advisory Panel, 81-. *Mem.*: Geol. Soc. Amer. (counc., 89-91); Mineral. Soc. of Amer.; Am. Geophys. Union. *Res.*: Ophiolites and plate tectonics; plate tectonics of deformed belts; history of plate interactions. *Mailing address*: Department of Geology, University of California at Davis, Davis, CA 95616. *Phone*: (916) 752-0352.

COUNCILOR 1989-1991**David A. Stephenson**

b. Moline, IL, 7-1-36; m. c. 4. HYDROGEOLOGY. *Educ.*: Augustana Coll., BA, 58; Washington State Univ., MS, 61; Univ. of Illinois, PhD, 65. *Prof. exp.*: res. assoc. Desert Res. Inst., 62-64; asst. geol. Illinois St. Geol. Surv., 61-62, 64-65; consultant Water Resources, 64-78; from asst. prof. to prof. geol., Univ. of Wisconsin, 65-79; chief Water Resources Section, Wisconsin Geol. and Natural History Surv., 77-79; chmn. Environ. Resources Unit, Univ. of Wisconsin Ext., 74-77; dir. Water Resources Mgmt. Grad. Degree Prog., Univ. of Wisconsin, 68-78; assoc., v-pres., dir., Water Resources Group, Woodward-Clyde Consultants, 79-83; exec. v-pres., Water Resources Assoc., Inc., 83-84; assoc. and dir., Ground-water Resources and Waste Mgmt. Svcs. Group, Dames & Moore Consultants, 84-87; PRINCIPAL, HARDING LAWSON ASSO., PHOENIX, 87-. *Concurrent pos.*: Natl. Res. Council (NRC) committees on Accessory Elements, 77-78, chmn. Ground-water Resources in Relation to Coal Mining, 80-81, Groundwater Quality Protection, 85-86; Res. Advisory Council, Wisconsin Dept. Natural Resources, 77-79; gen. chmn. Am. Water Resources Assoc. natl. conference, San Francisco, 82. *Mem.*: Am. Inst. Hydrology; Am. Inst. Prof. Geol.; Am. Water Resources Assoc.; Geol. Soc. Amer. (counc., 89-91); Intl. Assoc. Hydrogeol.; Intl. Water Resources Assoc. *Res.*: Hydrogeology, water resources mgmt. *Mailing address*: Harding Lawson Asso., 2800 North 44th St., Suite #450, Phoenix, AZ 85008. *Phone*: (602) 224-0844.

COUNCILOR 1989-1991**James F. Tull**

b. New York, NY, 5-26-47; m. 67; c. 2. STRUCTURAL GEOLOGY, GEOTECTONICS. *Educ.*: Univ. of North Carolina, BS, 69; Rice Univ., PhD (geol.), 73. *Prof. exp.*: asst. prof. geol., Univ. Alabama, 73-78, assoc. prof., 78-81; assoc. prof. geol., 81-84, PROF. GEOL. AND DEPT. CHMN., FLORIDA STATE UNIV., 84-. *Concurrent pos.*: consultant Geol. Surv. Alabama, 75-80; E. I. du Pont de Nemours & Co., Inc., 78; visiting res. prof. Univ. of Tromsø, Norway, 79-80; Amoco Petrol. Co., 81-84; Champlin Petrol. Co., 81; J. M. Huber Co., 84-86; Educational Testing Svc., 86-; Hecla Mining Co., 87-; Exxon Found., 88. *Mem.*: fel. Geol. Soc. Amer. (counc., 89-91); Geol. Soc. Norway; Geol. Soc. Alabama; Geol. Soc. Georgia; Soc. of Sigma Xi. *Res.*: Structural evolution of mountain systems, particularly the development of metamorphic and igneous terranes in the Scandinavian Caledonides and Southern Appalachians; studying metamorphism associated with orogenesis and relationships between structural and metamorphic events; successor basin evolution. *Mailing address*: Department of Geology, Florida State University, Tallahassee, FL 32306. *Phone*: (904) 644-1448.

18 Winners in GSA Bookstore Drawings in Denver

The GSA Bookstore at the Centennial Meeting in Denver attracted more scientists than any previous meeting. GSA publications and those of the Decade of North American Geology were available, and sales were brisk throughout the meeting.

Drawings were held twice daily at the bookstore; the winners are listed below in alphabetical order. Congratulations to all, and thanks to everyone for helping make GSA's Centennial Bookstore the most successful in our history!

Winners

L. David Carter, Anchorage, Alaska
 Laurel Collins, Port Republic, Maryland
 Dennis E. Dahms, Lawrence, Kansas
 Walter Dean, Lakewood, Colorado
 Judy Ehlen, Ft. Belvoir, Virginia
 Virginia Gulick, Tucson, Arizona
 Daphne A. Hall, Memphis, Tennessee
 Robert D. Hall, Indianapolis, Indiana
 Ernest Hauser, Ithaca, New York
 Joe Hazel, Flagstaff, Arizona
 T. Kohmen, Lakewood, Colorado
 Judy Ann Lowman, San Bernardino, California
 Merrick Mainster, Houston, Texas
 Barry Miller, Kent, Ohio
 Scott Minor, Boulder, Colorado
 Guy Reed, New York, New York
 Delfino Ruvalcaba, Fort Collins, Colorado
 Bennetta Schmidt, Lubbock, Texas

Geological Society of America



YOUNG SCIENTIST AWARD 1989

The Geological Society of America has established a Young Scientist Award. It consists of a gold medal and a cash prize. This award has been made possible through an endowment from Dr. and Mrs. Fred A. Donath.

The first award will be presented at the 1989 GSA Annual Meeting in St. Louis. The medal is to be called the Donath Medal, and the 1989 cash prize will be \$10,000. The awardee will also receive a complimentary lifetime membership in the GSA and complimentary lifetime affiliation in the GSA divisions of the medalist's choice.

The award will be given to a young scientist for outstanding achievement in contributing to geologic knowledge through original research that marks a major advance in the earth sciences. The recipient of the award must be 35 years or younger during the year in which the award is to be received.

Nominations for the 1989 award must include

- complete biographical information
- a summary of the candidate's scientific contributions to geology (200 words or less)
- a selected bibliography (no more than 10 titles)
- signed supporting letters from at least five GSA Fellows or Members

Nominees need not be GSA members. All nominations for the 1989 award must be received at GSA headquarters by **MARCH 15, 1989**. Send nominations and supporting materials to

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

Final Announcement

CORDILLERAN SECTION, GSA, 85th Annual Meeting ROCKY MOUNTAIN SECTION, GSA, 42nd Annual Meeting

Spokane, Washington
May 8-11, 1989

Spokane



The Cordilleran and Rocky Mountain Sections of the Geological Society of America will meet jointly at the Spokane Convention Center in Spokane, Washington, in conjunction with the Rocky Mountain and Pacific Coast Sections of the Paleontological Society, the Pacific Northwest Section of the National Association of Geology Teachers, and the Association for Women Geoscientists. The meeting is cosponsored by the Department of Geology, Eastern Washington University, Cheney, Washington, and the Department of Geology and Geological Engineering, University of Idaho, Moscow, Idaho. The meeting is also hosted by the Spokane office of the Geologic Division, U.S. Geological Survey; the Western Field Operations Center, U.S. Bureau of Mines; the Northwest Mining Association; the Washington State Department of Natural Resources, Division of Geology and Earth Resources; and the Idaho Geological Survey.

ENVIRONMENT

Spokane is a medium-sized city with many of the amenities of larger metropolitan areas, but with few of the hassles. It is considered to be the gateway to the "Inland Empire," a region characterized by spectacular scenery and the best in recreation. Twelve national parks and fifteen national forests are within a day's drive. In addition, because Spokane is situated between the Cascade Mountains, the Columbia Plateau, and the northern Rocky Mountains, it offers a diverse physiographic and geologic landscape.

REGISTRATION

All persons participating in any events of the meeting must be registered.

Preregistration. You are urged to preregister to aid the local committee in making final plans. Preregistration forms, with payment, must be postmarked no later than April 8, 1989. Payment must be made in U.S. currency, checks, or money orders made payable to Eastern Washington University. Complete the registration form and return it with a check or money order to GSA Cordilleran/Rocky Mountain Sections Meeting, Regional Conference Center, M.S. 11, Eastern Washington University, Cheney, WA 99004. Those planning to attend the field trips, short courses, or any of the spouse/guest activities *must* preregister by April 8, 1989. Refunds on canceled preregistration will be made until April 8, 1989, less a \$15 clerical fee. After that date, no refund will be made except for cancellation of a field trip, short course, or activity.

On-Site Registration. Registration, and pick-up of meeting materials by those who have preregistered, will be from 12 noon to 9 p.m. May 7 and from 8 a.m. to 5 p.m. on May 8-10. Those attending the meeting on May 11 only may pick up their registration materials between 8 a.m. and 12 noon. Registration will be held in the lobby of the Agricultural Trade Center in the Spokane Convention Center.

TRANSPORTATION

Cheney Travel, 113 Street, Cheney, WA 99004, (509) 235-8417, is the official travel agency for this meeting.

Air. Reservations must be made no later than April 1, 1989, to ensure sufficient airline seats and special fares. Cheney Travel will have the best rates on all flights to the meeting. United Airlines is the official air carrier, offering discounts of up to 40% off coach rates. Other airline rates can be lower than usual if flights are booked through Cheney Travel. **ATTENTION UTAH TRAVELERS!!** Call Cheney Travel to assist you with your flight plans. Group rates are

available for you with Delta Airlines. To make your flight reservations, call Cheney Travel **COLLECT**.

Reservation Procedures

1. Book early. Understand restrictions, if applicable.
2. Call Cheney Travel **COLLECT** for reservations Monday-Friday, 8 a.m. to 6 p.m. Pacific Time. Identify yourself as a GSA traveler.
3. Payment options: Check made payable to Cheney Travel or major credit card. Final payment must reach Cheney Travel no later than 14 days prior to departure to allow time for mailing.
4. Tickets will be sent via certified mail upon receipt of final payment.
5. Air fares are subject to change at any time. Once your ticket has been issued, your fare is guaranteed.

Ground. Transportation from the Spokane International Airport is available to all major hotels in Spokane. Students requiring ground transportation to the Eastern Washington University (EWU) campus in Cheney should indicate this on the Student Housing Form. Transportation will be provided from the Spokane International Airport, Spokane Amtrak, or the Spokane bus station to EWU at a cost of \$8 per person per trip. There will be no charge to those arriving by bus and terminating their trip in Cheney.

Car Rental. Cheney Travel will be able to arrange car or van rental either in Spokane or from other cities. Phone (509) 235-8417.

RED ALERT!!! If you plan on arriving early for fun and relaxation, the Bloomsday foot race, or a premeeting field trip, **BE SURE TO MAKE TRAVEL PLANS IMMEDIATELY!** Because of the popularity of the Bloomsday race, we have only a limited number of hotel accommodations reserved. If you find that there is "no room at the inn," contact Cheney Travel for assistance.

WELCOMING PARTY

A hosted welcoming party will be held from 7 to 9 p.m. at the Spokane Convention Center on Sunday, May 7. Entertainment is planned.

STUDENT SUPPORT

The GSA Cordilleran and Rocky Mountain Sections have funds available for grants to GSA Student Associates who are contributing to the meeting. *Students are strongly encouraged to apply for these grants.* We anticipate that most students who qualify will be funded to some degree. Application letters must be submitted to the respective section secretaries:

(continued on p. 43)

Cordilleran/Rocky Mountain Sections (continued from p. 42)

Cordilleran Section

Bruce A. Blackerby
Department of Geology
California State University
Fresno, CA 93740
(209) 294-2955 (direct)
(209) 294-3086 (department)

Rocky Mountain Section

Kenneth E. Kolm
Department of Geology
and Geological Engineering
Colorado School of Mines
Golden, CO 80401
(303) 273-3932 (direct)
(303) 273-3800 (department)

Applications should include certification that the student is a GSA Student Associate in the appropriate section and is presenting a paper or poster session at the Spokane meeting. Deadline for application is February 28, 1989, for Cordilleran Section students and April 15, 1989, for Rocky Mountain Section students.

STUDENT HOUSING

Eastern Washington University has reserved approximately 90 rooms for students during this meeting. *Student I.D. will be required.* Residential-style housing with centrally located restroom facilities will be made available in Louise Anderson Hall. Rates are \$7 per person per night for double occupancy, or \$11 per night for single occupancy. Please reserve your room on the Student Housing Form (not the regular Housing Form) and return it with the Preregistration Form. Indicate if you have a roommate preference, and if a smoking or nonsmoking room is desired.

For the convenience of our student participants, transit service is available from the Eastern Washington University campus in Cheney to Spokane for \$0.60 per person one way. Buses start running from Cheney to Spokane at 6 a.m. The last bus from Spokane to Cheney leaves Spokane at 10:15 p.m. The EWU campus in Cheney is 27 km (17 mi) southwest of Spokane off Interstate 90.

SHORT COURSE

A one-day short course, "Spreadsheets: The Geologist's All-Purpose Tool," will be held Friday, May 12, 1989. This course teaches participants how to solve many common geologic problems using Lotus 1-2-3 and compatible spreadsheet programs on a personal computer. This basic course is intended for beginners or those with minimal spreadsheet experience; prior computer experience is not necessary. This successful course has been given in the United States and internationally. Participants will learn the essentials of how to define their own professional-looking spreadsheets, perform geological calculations ranging from simple to complex, produce graphs of their data, use data-base capabilities to sort data, and automate work within the spreadsheet using macros. Exercises are geologically oriented and use real-world data from mining geology, hydrology, field geology, and petroleum geology.

Instructors: Carol Peterson and F. Jay Phillips, geologists and cofounders of the Computer Oriented Geological Society (COGS). Limit: 30; cost: \$100, including a notebook summarizing features, functions, and commands used in spreadsheet programs, plus floppy disks containing a Lotus 1-2-3-compatible shareware spreadsheet program and sample exercises used in the course.

FIELD TRIPS

Participants in all field trips must also preregister for the meeting. Field-trip registration is on a first-come, first-served basis. If a trip is oversubscribed or canceled, the field-trip fee will be refunded. Preregistration for field trips must be received by April 8, 1989, accompanied by full payment. Trips may be canceled if registration is insufficient. No trip refunds will be made after May 11, 1989.

Premeeting

1. The Priest River Complex and the Newport Fault Zone. Mylonites, granitics, and the high-grade core of the Spokane dome and the listric Newport fault will be examined to study kinematics and age relations of this metamorphic core complex. Brady P. Rhodes, Dept. of Geological Sciences, California State University, Fullerton, CA 92631, (714) 773-3882; Tekla A. Harms, Amherst College; Donald W. Hyndman, University of Montana. Two days, May 6-7. Leave Spokane Convention Center at 7 a.m. on May 6; return to Spokane late afternoon on May 7.

Limit: 35; cost: \$140, including one night lodging, one breakfast, two lunches, one dinner, beverages, transportation, and guidebook.

2. Volcanism, Plutonism, and Sedimentation Associated with Core Complex and Graben Development in the Central Okanogan Highlands, Washington. The temporal relation between igneous activity, sedimentation, and the development of the Republic graben and the core-complex structures will be investigated. Metamorphic rocks of the Kettle dome, four principal phases of the Colville batholith, and volcanic and sedimentary rocks in the Republic graben will be examined. R. Wade Holder, Grace A. McCarley-Holder, Dept. of Geology, Georgia Southern College, L.B. 8149, Statesboro, GA 30460, (912) 681-5757; David R. Gaylord, Washington State University; Kenneth F. Fox, Jr., U.S. Geological Survey. Three days, May 5-7. Leave Spokane Convention Center at 7 a.m. on May 5; return to Spokane late afternoon on May 7.

Limit: 20; cost: \$195, including two nights lodging, three lunches, beverages, transportation, and guidebook.

3. Paleogene Strike-Slip Sedimentary Basins of Central Washington. The sedimentary and tectonic history of the fluvial and lacustrine Swauk and Chumstick basins will be examined. Emphasis will be on recognition of distinctive sedimentologic characteristics of each facies, development of a basin model, and integration of the basin evolution model into the regional tectonic framework. James E. Evans, Dept. of Geology, Bowling Green State University, Bowling Green, OH 43403, (419) 372-2886; Samuel Y. Johnson, U.S. Geological Survey. Two days, May 6-7. Leave Spokane Convention Center at 7 a.m. on May 6; return to Spokane late afternoon on May 7.

Limit: 37; cost: \$150, including one night lodging, two lunches, beverages, transportation, and guidebook.

4. Structure of the Yakima Fold Belt, Central Washington. This trip examines the influence of pre-Miocene structures on the Yakima folds, the nature of the folds at the margin of the Columbia Plateau, and the style of folding and faulting of the Columbia River Basalt Group in the fold belt. Stephen Reidel, 620 W. Bonneville, Pasco, WA 99301, (509) 545-8886; Newell P. Campbell, Yakima Valley College. Two days, May 6-7. Trip starts in Yakima at 8 a.m. on May 6 (transportation will be provided from Spokane Convention Center to Yakima at 5 p.m. on May 5); return to Spokane late afternoon of May 7.

Limit: 40; cost: \$170, including two nights lodging, two lunches, beverages, transportation, and guidebook.

5. Cambrian of Northern Idaho and Northwestern Montana. Twelve stops in Middle and Upper Cambrian units in northern Idaho and northwestern Montana will be made. Upward-shallowing depositional cycles, regional correlations, and grand cycles will be emphasized at stops ranging from outer ramp below wave base to middle carbonate belt peritidal sequences. John Bush, Dept. of Geology and Geological Engineering, University of Idaho, Moscow, ID 83843, (208) 885-6192. Sponsored by the Paleontological Society. Two days, May 6-7. Leave Spokane Convention Center at 8 a.m. on May 6; return late afternoon of May 7.

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Limit: 28; cost: \$140, including one night lodging, two lunches, beverages, transportation, and guidebook.

6. Geology, Alteration, and Mineralization of the Alkaline Gem Stocks, Northern Idaho. The Gem stocks are a highly differentiated group of alkaline intrusions emplaced into Precambrian Belt Supergroup rocks in the Coeur d'Alene mining district in northern Idaho. This trip will examine the phases and internal features of the stocks, their alteration and mineralization, and their contact relations with the country rocks. This trip is designed for geologists with little or no experience in alkaline rocks as well as for igneous petrologists. Economic geologists who wish to increase their knowledge of alkaline systems may find this trip appealing. D. Kate Schalck, Dept. of Geology, Washington State University, Pullman, WA 99163, (509) 335-3009. One day, May 7. Leave Cavanaugh's Inn at the Park at 8 a.m.; return to Spokane late afternoon.

Limit: 10; cost: \$50, including one lunch, beverages, transportation, and guidebook.

7. The Miocene Clarkia Fossil Beds of Northern Idaho. Miocene Clarkia Lake was apparently formed by the abrupt lava damming of a preexisting drainage system. Nine metres of lacustrine deposits appear to represent a nearly complete lacustrine cycle of rapid deposition at the prime Clarkia fossil site (P-33). This one-day field trip will provide an opportunity to observe the fossil and sedimentologic record that serves as a basis for paleoecologic and paleolimnologic interpretations; the distribution of Miocene basalts in relation to Neogene topographic and ecologic systems; and the Precambrian basement rocks, locally intruded by granites of Mesozoic-Cenozoic ages. Jack Smiley, Dept. of Geology and Geological Engineering, University of Idaho, Moscow, ID 83843, (208) 885-7950/6192. Sponsored by the Paleontological Society. One day, May 7. Leave Cavanaugh's Inn at the Park at 8 a.m.; return to Spokane late afternoon.

Limit: 50; cost: \$50, including one lunch, beverages, transportation, and guidebook.

8. Transect Through the Baker-Wallowa-Seven Devils Terranes: A Forearc to Island-Arc Transition in Northeastern Oregon? This trip will traverse the Baker terrane southeast of Baker, Oregon, along the Burnt River; examine Triassic volcanic rocks of apparent arc affinity near Huntington, Oregon, as well as exposures of the largely gabbroic Sparta igneous complex; visit outcrops of Jurassic flysch, Triassic volcanics, Permian(?) Burnt River Schist, and the apparently equivalent Elkhorn Ridge Argillite along the Snake River; and spend a day studying exposures of the Wallowa batholith and nearby Triassic volcanic and sedimentary units in the southern Wallowa Mountains. M. Allan Kays, Dept. of Geology, University of Oregon, Eugene, OR 97403, (503) 686-4578; Ellen M. Bishop, Oregon State University. Three days, May 5-7. Leave Spokane Convention Center at 8 a.m. on May 5; return to Spokane late afternoon of May 7.

Limit: 30; cost: \$190, including two lunches, two nights lodging, beverages, transportation, and guidebook.

Concurrent with Meeting

Several half-day (3-5-hour) field trips are scheduled in conjunction with specific symposia during the meeting.

1. The Northern Columbia Plateau from the Air. This two-hour air flight will view unique and spectacular geomorphic features resulting from the cataclysmic outburst floods from Pleistocene Lake Missoula, including the Channeled Scablands and the Grand Coulee. Dale F. Stradling, Dept. of Geography, Eastern Washington

University, Cheney, WA 99004, (509) 359-7904; Eugene P. Kiver, Eastern Washington University. One (or two) afternoons, May 9 (and 10). Departure and return schedule to be announced.

Limit: 48; cost: \$85, including transportation to and from airport, two-hour air flight, and guidebook.

2. Geologic Factors Influencing Residential Radon. Local geology that contributes to areas of high residential radon levels in the Spokane Valley will be examined. The basement of a home with anomalously high radon levels that has been mitigated to EPA standards will be visited. Raymond Tekverk, Jan E. Fay, Faytek Incorporated, 1115 Lambert Lane, Coeur d'Alene, ID 83814, (208) 667-3263. One afternoon, Wednesday, May 10. Leave Spokane Convention Center at 12 noon; return at 5 p.m.

Limit: 20; cost: \$32, including lunch, beverages, transportation, and guidebook.

3. Geologic Controls of Ground-Water Movement in the Spokane Aquifer. Geomorphic and physiographic features related to the Spokane Valley-Rathdrum Prairie aquifer, the sole source of water for the Spokane area, will be examined. The geology of this extraordinarily prolific aquifer will be examined through visits to gravel pits in the Spokane Valley. Sources of ground-water contamination will also be visited. George E. Maddox, George Maddox and Associates, Inc., E. 223 Augusta, Spokane, WA 99207, (509) 326-4335. One afternoon, Tuesday, May 9. Leave Sheraton at 12 noon; return at 5 p.m.

Limit: 30; cost: \$23, including one lunch, beverages, and transportation.

Postmeeting

1. Precambrian Belt Supergroup: Is the Deer Trail Group Belt? Come and decide for yourself. New mapping and stratigraphic and sedimentologic analyses of the Deer Trail Group have resulted in new correlations and new insight into the stratigraphy of the western margin of the Belt Supergroup. Fred K. Miller, James W. Whipple, U.S. Geological Survey, Federal Building, W. 920 Riverside, Spokane, WA 99201, (509) 456-4677. Sponsored by the Belt Association. Two days, May 12-13. Leave Spokane Convention Center at 8 a.m. on May 12; return late afternoon of May 13.

Limit: 20; cost: \$130, including one night lodging, one breakfast, two lunches, one dinner, beverages, transportation, and guidebook.

2. Paleozoic Biostratigraphy and Paleogeography of Northeastern Washington. Fossil localities in both eugeosynclinal and miogeosynclinal rocks on the edge of the Paleozoic North American Cordillera will be examined. The trip provides an opportunity to view all stratigraphic units in northeastern Washington from the Lower Cambrian Addy Quartzite to the Lower Triassic eugeosynclinal graywackes and argillites. J. Thomas Dutro, Jr., U.S. Geological Survey, Museum of Natural History, Room E 311, Washington, DC 20560, (202) 343-3222; Ernest H. Gilmour, Eastern Washington University. Sponsored by the Paleontological Society. Two and one-half days, May 11-13. Leave Spokane Convention Center at 5 p.m. on May 11; return to Spokane late afternoon of May 13.

Limit: 34; cost: \$140, including two nights lodging, two lunches, beverages, transportation, and guidebook.

3. Mineralization and Tectonics in the Southern Kootenay Arc and Purcell Anticline. The tectonics, stratigraphy, and mineralization of the spectacular Kootenay arc, a Jurassic island-arc complex of the Rossland Group and Purcell anticlinorium, will be examined. Includes underground tour of the Sullivan Pb-Zn mine. Richard Lambert, Dept. of Geology, University of Alberta,

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Edmonton, Alberta T6G 2E3, Canada, (403) 432-2942. Trygve Hoy, British Columbia Ministry of Energy, Mines and Petroleum Resources. Three and one-half days, May 11-14. Leave Spokane Convention Center at 5 p.m. on May 11; return to Spokane late afternoon of May 14. Participants will be crossing the international border into Canada and then back to the United States.

Limit: 25; cost: \$220, including three nights lodging, transportation, and guidebook.

4. Elements of the Cascades "Collisional" Orogen: A Transect from the Methow Basin to the San Juan Islands, Washington.

This trip will examine the geologic relations within the "collision zone" between the Intermontane and Insular superterrane along Highway 20 in the north Cascades. The trip will start in the Mesozoic Methow basin, traverse the high-grade rocks of the Cascades crystalline core, cross the Straight Creek fault, and examine structural relations in the western Cascades-San Juan Islands thrust system. Michael F. McGroder, Dept. of Geological Sciences, AJ-20, University of Washington, Seattle, WA 98115, (713) 591-5777; Robert B. Miller, San Jose State University; Mark T. Brandon, Yale University; Ralph Haugerud, U.S. Geological Survey. Four and one-half days, May 11-15. Leave Spokane Convention Center at 4 p.m. on May 11; trip ends at the Seattle airport in late afternoon of Monday, May 15.

Limit: 32; cost: \$470, including four nights lodging, four breakfasts, two lunches, four dinners, beverages, transportation, ferry tolls, and guidebook.

5. Geology of Eocene Mineral Deposits, Ferry County, Washington.

The Republic graben is one of the most active areas of recent gold exploration in the western United States. This trip will examine surface exposures of epithermal precious-metal vein and disseminated deposits, gold replacement deposits, and disseminated gold in alkalic rocks in the Republic graben. The trip includes stops at the Republic Unit, Overlook, and Kettle River deposits and the Gold Dike mine. Richard Tschauder, Hecla Mining Company, Box 467, Republic, WA 99166, (509) 775-3022. Two days, May 12-13. Leave Spokane Convention Center at 7 a.m. on May 12; return to Spokane late afternoon of May 13.

Limit: 30; cost: \$115, including one night lodging, one breakfast, two lunches, one dinner, beverages, transportation, and guidebook. Participants must provide their own hard hats.

6. Sources for the Columbia River Basalt Group.

This trip will examine the dikes and vents that fed the Columbia River Basalt Group in northeastern Oregon and southeastern Washington. The geographic restriction of the dikes, the nature of the pre-Columbia River Basalt Group crust, dike orientation, tectonic setting, and petrogenetic models will be discussed. P. R. Hooper, Dept. of Geology, Washington State University, Pullman, WA 99164, (509) 335-6746; Stephen Reidel, Pasco, Washington. Two and one-half days, May 11-13. Leave Spokane Convention Center at 5 p.m. on May 11; return to Spokane late afternoon of May 13. The trip will stop at the Lewiston, Idaho, airport at 5 p.m. on Saturday, and participants can depart from there if they choose.

Limit: 14; cost: \$240, including two nights lodging, two lunches, beverages, transportation, and guidebook.

7A. Lake Missoula Floods and Channeled Scablands: Evidence for the Late Wisconsin Ice Dam and Floods in the Purcell Trench.

Evidence for the occurrence of Pleistocene Lake Missoula and the ice sheet that dammed the lake near Sandpoint, Idaho, will be examined. Roy M. Breckenridge, Idaho Geological Survey, Morrill Hall, Room 332, University of Idaho, Moscow, ID 83843, (208) 885-7991. One day, May 12. Leave Spokane Convention Center at 8 a.m.; return in late afternoon.

Limit: 32; cost: \$40, including one lunch, beverages, transportation, and guidebook.

7B. Lake Missoula Floods and Channeled Scablands: Glacial and Multiple Flood History of the Northern Borderlands.

New mapping has reconstructed the position of the Pleistocene glaciers and the glacial and flood history of the upper Columbia River. Interaction of the Columbia River lobe, catastrophic floods, and glacial lakes will be explored. Eugene P. Kiver, Dept. of Geology, MS-70, Eastern Washington University, Cheney, WA 99004, (509) 359-7959; Dale F. Stradling, Eastern Washington University. One day, May 13. Leave Spokane Convention Center at 8 a.m.; return in late afternoon.

Limit: 32; cost: \$40, including one lunch, beverages, transportation, and guidebook.

7C. Lake Missoula Floods and Channeled Scablands: Record of Pre-Late Wisconsin Floods and Late Wisconsin Flood Features.

New evidence from flood deposits interstratified with loess in the Cheney-Palouse Scabland tract indicates that there were at least six flood episodes during the Pleistocene, the oldest occurring prior to 790 ka. The thick loess deposits and evidence for the multiple floods will be examined. Alan J. Busacca, Eric McDonald, Dept. of Agronomy and Soils, Washington State University, Pullman, WA 99164, (509) 335-1859. One day, May 14. Leave Spokane Convention Center at 7 a.m.; return in late afternoon.

Limit: 32; cost: \$45, including one lunch, beverages, transportation, and guidebook.

8. Geologic Engineering and Landslide Mitigation at Grand Coulee Dam.

The geologic investigations and engineering solutions for unstable slopes near the Grand Coulee Dam will be investigated. Includes field examination of the Riverbank Stabilization Program and automated monitoring system. Greg W. Behrens, Phil J. Hansen, U.S. Bureau of Reclamation, P.O. Box 620, Grand Coulee, WA 99133, (509) 633-1360, ext. 513. One day, May 12. Leave Spokane Convention Center at 8 a.m.; return in late afternoon.

Limit: 40; cost: \$40, including one lunch, beverages, transportation, and guidebook.

9. Formation of the Idaho Batholith by Intrusion of Voluminous Synplutonic Mafic Dikes; Related Mylonite of the Western Idaho Suture Zone.

This field trip will examine a well-exposed cross section of the northern Idaho batholith and its high-grade regional metamorphic country rocks. Special emphasis will be given to well-preserved examples of magma mingling with the synplutonic mafic dikes, and the role of the mafic magmas in providing heat for metamorphism and melting to form the batholith. The trip will also examine the quartz diorite/tonalite of the Kamiah complex and its deformation by the spectacular mylonites of the western Idaho suture zone, including sense of movement and possible amount of movement in the mylonite. Donald W. Hyndman, Dept. of Geology, University of Montana, Missoula, MT 59812, (406) 243-2244/2341. Two and one-half days, May 11-13. Leave Spokane Convention Center at 4 p.m. on May 11; return to Spokane at 6 p.m. on May 13.

Limit: 35; cost: \$220, including two breakfasts, two lunches, two dinners, two nights lodging, beverages, transportation, and guidebook.

10. Subaqueous Basalt Eruptions into Pliocene Lake Idaho, Snake River Plain, Idaho.

The central and western parts of the Snake River Plain provide classic exposures for studying the effects of water on the products of basaltic eruptions. Significant variations in water depth, from a large deep lake to an elevated water table, together with eruptions that ranged from small dike-fed flows to

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large, multiphase volcanoes, produced exposures with a wide range of characteristics. These include flows that ran into the lake, pillowed basalt flows, pyroclastic tuffaceous units, and hydrovolcanic constructions, including tuff cones and maars. One day will be spent in the lower Bruneau River area and the other in the Sinker Creek area near Murphy, Idaho. Margaret D. Jenks, Bill Bonnicksen, Idaho Geological Survey, University of Idaho, Moscow, ID 83843, (208) 885-7991. Three days, May 12–14. Leave Spokane Convention Center at 8 a.m. on May 12; return to Boise airport at 6 p.m. on May 14, or return to Spokane at 2 a.m. on May 15.

Limit: 30; cost: \$195, including three lunches, two nights lodging, beverages, transportation, and guidebook.

11. Hydrogeology of Mine Tailings, Coeur d'Alene Mining District, Northern Idaho. This trip will provide an overview of water-resource impacts from a century of mining and milling within the Coeur d'Alene mining district. There will be an opportunity to view a range of mill wastes in the Coeur d'Alene River drainage. Stops will include both constructed tailings impoundments and stream-deposited jib and flotation tailings. Dale Ralston, Dept. of Geology and Geological Engineering, University of Idaho, Moscow, ID 83843, (208) 885-7977; John Riley, U.S. Bureau of Mines. One day, May 12. Leave Spokane Convention Center at 8 a.m.; return to Spokane by 6 p.m.

Limit: 40; cost: \$25, including transportation only.

12. Geology of Hells Canyon from a Raft. This will be a float trip through Hells Canyon of the Snake River on white-water raft(s) to observe the hydrology and geology, including Columbia River Basalt and pre-Tertiary accreted terranes. Rolland Reid, Roy E. Williams, Dept. of Geology and Geological Engineering, University of Idaho, Moscow, ID 83843, (208) 885-7977/6259. Six days, May 12–17. Leave Spokane Convention Center at 7:30 a.m. on May 12; return at 1 a.m. on May 17.

Limit: 25; cost: \$500, including all rentals, transportation to and from Spokane, and all meals except breakfast on May 12. Participants need bring rafting clothes only.

13. A Structural Section Through a 25-km-thick Thrust System in West-Central Montana: Paradise to Garrison. This trip follows plunging folds on the southwestern limb of the Purcell anticlinorium from Paradise to Garrison, Montana. Consistent southeasterly plunge reveals the internal structure of a very thick thrust plate. The trip begins in the deep end, in the biotite zone of regional metamorphism, and concludes at the shallow end, in a foreland basin. Between is a complete transition from the ductile interior to the brittle carapace of the thrust plate. Jim Sears, Dept. of Geology, University of Montana, Missoula, MT 59812, (406) 243-5251/2341; Christopher P. Weiss, Adrian, Michigan. Two days, May 12–13. Leave Spokane Convention Center at 7 a.m. on May 12; return to Spokane by 10 p.m. on May 13. Participants may depart the Missoula, Montana, airport at 6 p.m. May 13.

Limit: 30; cost: \$140, including one lunch, one night lodging, beverages, transportation, and guidebook.

14. History and Geology of the Famous Coeur d'Alene Mining District, Northern Idaho. This trip will introduce professionals and laypersons to the geology and history of the Coeur d'Alene mining district, which claims the greatest recorded silver production in the world. It also contains both the largest and the deepest hard-rock underground mines in the United States. The district's cultural history is important to the nation's labor movement and the state's history. Theories concerning the origin of the deposits and the geology of the district are controversial. The trip will include an underground tour of a producing mine and a historical and geologic surface tour, as well as overviews of the

history and geology of the area. Peter L. Siems, James Constantinopoulos, Dept. of Geology and Geological Engineering, University of Idaho, Moscow, ID 83843, (208) 885-7948/7991; Earl H. Bennett, Idaho Geological Survey. One and one-half days, May 11–12. Leave Spokane Convention Center at 4 p.m. on May 11; return to Spokane by 6 p.m. on May 12.

Limit: 30; cost: \$100, including one night lodging, transportation, and guidebook.

For more detailed information, contact the field-trip leader or the field-trip coordinators: Nancy Joseph, Washington Department of Natural Resources, Division of Geology and Earth Resources, Spokane County Agricultural Center, N. 222 Havana, Spokane, WA 99202, (509) 456-3255; or Valerie Chamberlain, Department of Geology and Geological Engineering, University of Idaho, Moscow, ID 83843, (208) 885-6192.

TECHNICAL PROGRAM

Technical sessions are scheduled as oral presentations and poster sessions on Monday through Thursday, May 8–11. Oral presentations will be held in the Convention Center and the adjoining Agricultural Trade Center. Poster sessions will be held in the Convention Center. Poster booths will consist of three panels, each 4 feet high and 8 feet wide.

Contact John P. Buchanan, Program Chairman, Department of Geology, MS-70, Eastern Washington University, Cheney, WA 99004, (509) 359-7493, if you have questions regarding the technical program.

SYMPOSIA

The following symposia have been organized around a theme primarily of the geologic evolution of western North America. Symposia will be held in the Convention Center and the adjoining Agricultural Trade Center.

1. Geophysical Overview of the Cordillera. Christopher J. Potter, Dept. of Geology, Lafayette College, Easton, PA 18042, (215) 250-5196; Walter D. Mooney, U.S. Geological Survey.

2. Evolution of the Proterozoic Rocks of the Northern Cordillera. Sponsored by the Belt Association. **Session I: Sedimentation and Tectonics.** James W. Whipple, U.S. Geological Survey, Federal Building, Room 656, W. 920 Riverside, Spokane, WA 99201, (509) 456-4677. **Session II: Economic Geology.** John C. Balla, ASARCO, N. 2900 Nevada, Spokane, WA 99207, (509) 489-7870.

3. Synoptic Paleozoic Biogeography of Selected Tectonic Fragments, Western North America. Sponsored by the Paleontological Society. J. Thomas Dutro, Jr., U.S. Geological Survey, Museum of Natural History, Room E. 311, Washington, DC 20560, (202) 343-3222.

4. Upper Paleozoic Biostratigraphy and Stratigraphy of the Northern Rocky Mountains. Sponsored by the Paleontological Society. Bruce R. Wardlaw, U.S. Geological Survey, National Center, M.S. 970, Reston, VA 22092, (703) 648-6916; Ernest H. Gilmour, Eastern Washington University.

5. Upper Paleozoic Orogenies of Western North America. Linda B. McCollum, Dept. of Geology, MS-70, Eastern Washington University, Cheney, WA 99004, (509) 359-7473; Nancy L. Joseph, Washington Department of Natural Resources.

6. Western Edge of the North American Continent: Mesozoic Tectonic Evolution. Mel A. Kuntz, Karen Lund, U.S. Geological

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Survey, Box 25046, M.S. 913, Federal Center, Denver, CO 80225, (303) 236-1293.

7. Deformational History of the Coast Mountains and North Cascades, Washington, British Columbia, and Southeast Alaska. Session I: North Cascades to Southern Coast Mountains. Darrel S. Cowan, Dept. of Geological Sciences, University of Washington, AJ-20, Seattle, WA 98195, (206) 543-4033; Robert B. Miller, San Jose State University; Paul J. Umhoefer, University of Washington. **Session II: The Coast Mountains.** Margaret Rasmussen, Dept. of Geology, Occidental College, 1600 Campus Road, Los Angeles, CA 90041, (213) 259-2823; George E. Gehrels, University of Arizona; Glenn J. Woodsworth, Geological Survey of Canada.

8. Paleogene Sedimentation, Volcanism, and Tectonics of the Western United States. Thomas D. Fouch, U.S. Geological Survey, Box 25046, M.S. 939, Federal Center, Denver, CO 80225, (303) 236-7064; Alan R. Niem, Oregon State University.

9. Paleocene-Eocene Crustal Extension and Associated Deformation, Volcanism, Plutonism, and Dome Formation in Northeast Washington and Idaho. Kenneth F. Fox, Jr., U.S. Geological Survey, Box 25046, M.S. 913, Federal Center, Denver, CO 80225, (303) 236-0213; John A. Watkinson, Washington State University.

10. Tectonic Setting of Volcanic-Hosted Ore Deposits in the Pacific Northwest. Byron R. Berger, U.S. Geological Survey, Box 25046, M.S. 973, Federal Center, Denver, CO 80225, (303) 236-1185.

11. Neogene Volcanism in the Western United States. Session I: Magmatism and Tectonism in and Adjacent to the Cascade Province. Donald A. Swanson, U.S. Geological Survey, Cascades Volcano Observatory, 5400 MacArthur Blvd., Vancouver, WA 98661, (206) 696-7806; Rick M. Conrey, Washington State University. **Session II: Magmatism and Tectonism in the Cordilleran Continental Interior.** William P. Leeman, National Science Foundation, Earth Sciences Division, Washington, DC 20550, (202) 357-7911; William K. Hart, Miami University.

12. Use of Soils for Correlation and Interpretation of Quaternary Geologic Events. Eric V. McDonald, Alan J. Busacca, Dept. of Agronomy and Soils, Washington State University, Pullman, WA 99164, (509) 335-0933.

13. Earthquake-Induced Landslides. Robert L. Schuster, U.S. Geological Survey, Box 25046, M.S. 966, Federal Center, Denver, CO 80225, (303) 236-1633; Gerald W. Thorsen, Washington Department of Natural Resources.

14. Radon in the Natural Environment. Raymond Tekverk, Jan E. Fay, Faytek, Inc., 1115 Lambert Lane, Coeur d'Alene, ID 83814, (208) 667-3263.

15. Geoarcheological Research in the Pacific Northwest. Jerry R. Galm, Dept. of Archeological and Historical Services, Eastern Washington University, MS-168, Cheney, WA 99004, (509) 359-2239.

16. Hydrogeologic and Hydrogeochemical Investigations for Waste Management. Barbara C. Williams, U.S. Bureau of Mines, Spokane Research Center, E. 315 Montgomery Avenue, Spokane, WA 99207, (509) 484-1610.

17. Earth Science Education. Kurt L. Othberg, Idaho Geological Survey, Morrill Hall, Room 332, University of Idaho, Moscow, ID 83843, (208) 885-7991.

For details, contact the first-listed symposium convener or the symposia cochairpersons: Keith Stoffel, Washington Department of Natural Resources, Spokane County Agricultural Center, N. 222 Havana, Spokane, WA 99202, (509) 456-3255; or Peter Isaacson, Department of Geology and Geological Engineering, University of Idaho, Moscow, ID 83843, (208) 885-6192.

THEME SESSIONS

Theme sessions are similar to symposia in that they are focused on a special geological topic; however, theme sessions are open forums where papers are entirely volunteered. The following theme sessions have been proposed.

1. Paleozoic and Early Mesozoic Paleogeographic Relations Between the Klamath Mountains, Northern Sierra Nevada, and North America. M. Meghan Miller, California Institute of Technology, Div. of Geological and Planetary Sciences, Pasadena, CA 91125, (818) 356-6465.

2. Neotectonics of the Cascadia Subduction Zone. Robert S. Yeats, Dept. of Geology, Oregon State University, Corvallis, OR 97331, (503) 754-2484; Brian F. Atwater, U.S. Geological Survey.

3. Quaternary Catastrophic Floods Generated by the Failure of Natural Dams in the Western United States. Keith L. Stoffel, Washington Department of Natural Resources, Div. of Geology and Earth Resources, N. 222 Havana, Spokane, WA 99202, (509) 456-3255; John P. Buchanan, Eastern Washington University.

4. Tectonic Evolution of the Brooks Range, Alaska. Wes Wallace, Dept. of Geology and Geophysics, Fairbanks, AK 99775-0760, (907) 474-7565.

PROJECTION EQUIPMENT

All slides must be 2" x 2" and fit a standard 35-mm carousel tray. Two projectors will be available for all symposia and theme sessions, whereas technical sessions will have only one projector available. Please bring your own loaded carousel tray, if possible. Overhead projectors will not be available.

PUBLICATIONS

Additional copies of the *Abstracts with Programs* volume and of the field-trip guidebooks published by the Idaho Geological Survey and the Washington State Department of Natural Resources may be purchased at the registration desk. After the meeting, field-trip guidebooks may be purchased from either the Idaho Geological Survey, 322 Morrill Hall, University of Idaho, Moscow, ID 83843, or from the Washington Department of Natural Resources, Division of Geology and Earth Resources, Mail Stop PY-12, Olympia, WA 98504.

EXHIBITS

Exhibits will be adjacent to the poster session and meeting rooms in the Convention Center. The cost of booths for educational and nonprofit institutions will be \$100, and for commercial exhibitors, \$250. For further information and space reservations, contact the exhibits coordinator: Russell Boggs, Department of Geology, MS-70, Eastern Washington University, Cheney, WA 99004, (509) 359-7497. Please reserve exhibit space before April 7, 1989.

SPECIAL EVENTS

Lilac-Bloomsday 12-km Run. If running or walking is your style, don't miss Bloomsday! Bloomsday's 12-km (7.46-mi) course provides the field for the largest timed race in America—more than 59,000 participants. Everyone who officially enters the race and crosses the finish line is awarded a T-shirt. Special prizes will be awarded by age categories for GSA meeting participants who enter the Bloomsday race. The race will be run Sunday, May 7, beginning at 9 a.m. It is very important that you preregister for the meeting immediately and check the box on the registration form if you are interested in running in the race, so that entry forms can be mailed to you. Please note the **RED ALERT!!!** warning regarding transportation and housing. Contact Peter Gabby, U. S. Bureau of Mines, E. 360 3rd Avenue, Spokane, WA 99202, (509) 456-7753 for more information.

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Cordilleran/Rocky Mountain Sections (continued from p. 47)

Alumni Functions. No-host alumni receptions will be held Monday, May 8, from 5:30 to 7:30 p.m. Geology departments wishing to have a special banner or arrange to have a separate room should contact the registrar, Margie Wallace, Regional Conference Center, MS-11, Eastern Washington University, Cheney, WA 99004, (509) 359-2406.

Dinner Cruise. A spectacular dinner cruise on Lake Coeur d'Alene will be held the evening of Tuesday, May 9. Located about 53 km (33 mi) from Spokane, Lake Coeur d'Alene is often referred to as one of the five most beautiful lakes in the world—it is surrounded by mountains and national forests with abundant fir, pine, and larch trees. Enjoy the famous Coeur d'Alene Hotel's cuisine while listening to your favorite dance music. Upper decks will be open for dancing or enjoying the fresh air of the Great Northwest; the lower cabin, enclosed with glass, will be heated in case of inclement weather. A no-host bar will be available. Departure from Spokane hotels will be at 5:30 p.m. The cruise is scheduled to begin at 7 p.m. Limit: 300; cost: \$30 per person, including transportation to and from the boat and a complete dinner.

Western Party. Brace yourselves for an old-fashioned western hoe down the evening of Thursday, May 10. Located in the pine woods a short distance from Spokane, Worden's Winery will be the setting for an old-fashioned western BBQ, complete with BBQ ribs and chicken, baked beans, Indian bread, coleslaw, dessert and beverage, a cowboy hat, western band, and square dancing. Two glasses of Worden's award-winning wine, a winery tour, and a tasting complete this evening of fun and festivity. Limit: 200; cost: \$22 per person, including transportation to and from the hotels.

Paleontological Society Meeting and Dinner. The Pacific Coast and Rocky Mountain Sections of the Paleontological Society will each meet separately immediately following the technical

sessions on Monday, May 8, at 5 p.m. for short business meetings. These will be followed by a social event from 5:30 to 7:30 p.m. at the Convention Center, then conclude with dinner (location to be announced). Note that the national Paleontological Society Council will be holding its midyear meeting in conjunction with the Pacific Coast-Rocky Mountain Section meeting.

National Association of Geology Teachers Luncheon. The Pacific Northwest and Alaska sections of the National Association of Geology Teachers will meet on Monday, May 8, at 12 noon. Larry E. Davis, Department of Geology, Washington State University, will give a presentation after lunch on "Reducing Stress for Learning-Disabled Students in Beginning Geology." Cost: \$9.50.

Association for Women Geoscientists Luncheon. This will be held at Moreland's Restaurant, Tuesday, May 9, at 12 noon. Cost: \$6.

GSA Cordilleran Section Business Luncheon. The annual business luncheon will be held on Tuesday, May 9, at 12 noon. Cost: \$10.

GSA Rocky Mountain Section Business Meeting. The annual business meeting will be held Wednesday, May 10, at 12 noon. Cost: \$8.50.

SPOUSE AND GUEST ACTIVITIES

A full and exciting program of spouse and guest activities is planned to help make your stay in Spokane fun and memorable. Costs of tours include bus transportation.

Sierra Silver Mine Tour. This full-day tour includes a drive along the north shore of Lake Coeur d'Alene to the Cataldo Mission; lunch and a walking tour of the picturesque silver mining town of Wallace, Idaho; and a tour of the Sierra Silver Mine. May 8, all day. Cost: \$24.

(continued on p. 49)

Cordilleran/Rocky Mountain GSA Meeting

STUDENT Housing Form

Mail to

Louise Anderson, EWU Regional Conference Center, MS-11, Cheney, WA 99004
(509) 359-2406

Student I.D. will be required

May 7-11, 1989

Single occupancy: \$11 per person per night

Double occupancy: \$7 per person per night

Roommate preference: _____

Smoking Nonsmoking

Name _____

Address _____

City

State

ZIP

Arrival date _____ Departure date _____

Do you need transportation from the airport? Yes No

Arrival date and time _____ Airline _____

Departure date and time _____ Airline _____

Airport transportation: \$8 per person each way

Amount enclosed _____ Make checks payable to Eastern Washington University

PLEASE MAIL THIS FORM WITH YOUR REGISTRATION FORM

Cordilleran/Rocky Mountain Sections (continued from p. 48)

Spokane City Tour. This tour features Spokane attractions including museums, parks, gardens, and historic buildings. An enjoyable way to learn a little of the history of the Lilac City. May 8, 2½ hours. Cost: \$7.50.

Museum of Native American Cultures. One of the most comprehensive collections of native Indian art and artifacts in existence. Morning of May 9 or 11, 2 hours. Cost: \$6.

Cheney-Cowels Museum. Exhibits depict the history of the Spokane area. The adjacent Grace Campbell House portrays the lifestyle of an elite mining tycoon during Spokane's "Age of Elegance." Morning of May 9 or 11, 2 hours. Cost: \$5.50.

Silverwood. Idaho's newest tourist attraction is a reconstructed turn-of-the-century mining town. Tour the facility on a narrow-gauge steam railroad and view antique aircraft, automobiles, locomotives, museums, and shops. Afternoon of May 10, 5 hours. Cost: \$15.

Wine Tours and Tastings. Enjoy the fruits of the region and experience three different local wineries. Arbor Crest is situated on a scenic hilltop outside Spokane in the historic Riblet Mansion and offers pleasant surroundings for wine tasting and relaxation. Latah Creek and Worden's wineries are slightly smaller operations and will be toured together. Afternoons of May 8-10, 3 hours. Cost: \$5.50 for Arbor Crest or Worden's-Latah Creek.

Luncheon. A selection of Spokane's most memorable restaurants are eager to host you for a leisurely lunch on your final day in Spokane. May 11, 2 hours. Cost: \$13.

Shopping. Spokane's Skywalk system connects 15 city blocks for indoor access to retail department stores, specialty shops, and restaurants. The second largest such system in the world, it

provides an ideal year-round shopping climate and an assortment of retail shops.

Workshops and Minicourses. A selection of general-interest workshops is arranged for the mornings of May 8-11. Photography, flower arranging, gardening, aerobics, and Brazilian embroidery will be offered for a small fee. Pay at registration.

HOUSING

Rooms have been made available for you in the following locations: Sheraton, Cavanaugh's Inn at the Park, Cavanaugh's River Inn, West Coast Ridpath, Holiday Inn Downtown, Shilo Inn, Suntime 8 Inn, Suntime Inn Division, Downtowner Motel, Tradewinds Downtown, Thunderbird Lodge, Lincoln Center, National 9 Towne Center, Holiday Inn West, and Quality Inn Spokane House. See the accompanying map for hotel or motel locations. The Spokane Convention and Visitors Bureau will be accepting all reservations. Do not enclose checks to cover first night's lodging. If prepayment is required, the hotel or motel you are assigned will advise you of any deposit when you receive your room confirmation. A 72-hour cancellation notice prior to the date of arrival is required by the hotels to stop billing or to refund your deposit.

DAY CARE

Professional child-care is available throughout the week of the meeting. Local day-care agencies are accepting infants to older children. Please check the box on the registration form if you wish to have care for your child at any time during the meeting. To serve participants of the meeting professionally and expediently, we must know before you arrive that these services are needed.

DETAILED INFORMATION

Requests for detailed information concerning registration, accommodations, and activities should be addressed to

General Chairman

Ernest H. Gilmour
Department of Geology, MS-70
Eastern Washington University
Cheney, WA 99004
(509) 359-2201

Registrar

Margie Wallace
Conference Coordinator
Regional University Conferences, MS-11
Eastern Washington University
Cheney, WA 99004
(509) 359-2406

(continued on p. 50)

**GSA Annual Meeting 1989, St. Louis, Missouri
November 6–November 9**

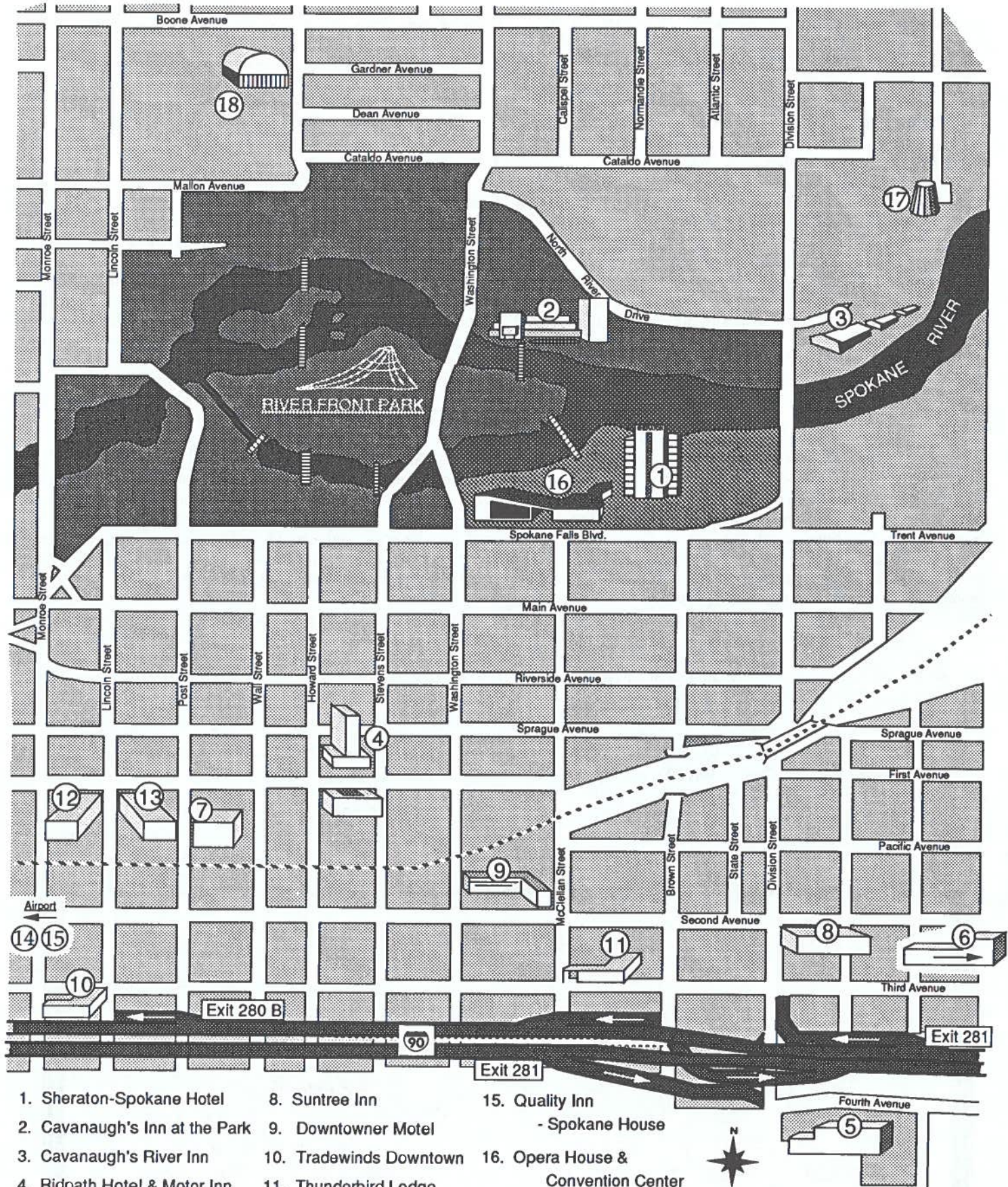
**Call for Papers
April 1**

**Abstracts Due
July 19**

**Program, Housing,
and Registration Information
August 1**

**Preregistration Due
October 13**

**For Information
GSA Meetings Department
P.O. Box 9140
Boulder, CO 80301
(303) 447-2020**



- | | | |
|--------------------------------|-------------------------|---|
| 1. Sheraton-Spokane Hotel | 8. Suntree Inn | 15. Quality Inn
- Spokane House |
| 2. Cavanaugh's Inn at the Park | 9. Downtowner Motel | 16. Opera House &
Convention Center |
| 3. Cavanaugh's River Inn | 10. Tradewinds Downtown | 17. Museum Of Native
American Cultures |
| 4. Ridpath Hotel & Motor Inn | 11. Thunderbird Lodge | 18. Coliseum |
| 5. Holiday Inn Downtown | 12. Lincoln Center | |
| 6. Shilo Inn | 13. Towne Center | |
| 7. Suntree 8 Inn | 14. Holiday Inn West | |

**Spokane Hotel
Locator Map**



Spokane

#89-862

PID	_____
BID	_____
PMT	_____
METH	_____
POST	_____
INFO	_____
MISC	_____

PREREGISTRATION FORM

Cordilleran and Rocky Mountain Sections Meeting, GSA, May 8-11, 1989, Spokane, Washington

IMPORTANT

1. Full payment must accompany registration.
2. REGISTER ONE: professional, student, or spouse/guest.
3. You will receive a receipt in the mail. Copy this form for your records.
4. Preregistration deadline: Must be postmarked no later than April 8, 1989.

Name _____
Last First Middle initial

Nickname for badge _____
(up to 9 characters)

Registered as: _____ Professional _____ Student _____ Spouse/Guest

Spouse/guest name for badge _____

Affiliation (abbreviate for badge) _____

Professional address _____
Street

City State ZIP

Phone: Business () _____ Residence () _____

CHECK AFFILIATION

- GSA Member: Yes No Speaker: Yes No GSA Student Associate: Yes No
- Rocky Mountain Section Yes Cordilleran Section Yes

GSA Member # _____

Preregistration (postmarked by April 8, 1989)

GSA member	\$ 40.00	\$ _____
Nonmember	\$ 50.00	\$ _____

Registration (after April 8, 1989)

GSA member	\$ 50.00	\$ _____
Nonmember	\$ 50.00	\$ _____

Student registration	\$ 20.00	\$ _____
Spouse/guest registration	\$ 20.00	\$ _____

FIELD TRIPS

Preregistration deadline for field trips is April 8, 1989. All field trip preregistrants must also preregister for the meeting.

Premeeting

1. Priest River Complex and Newport Fault Zone (May 6-7)	\$140.00	\$ _____
2. Volcanism, Plutonism, and Sedimentation Associated with Core Complex and Graben Development, Central Okanogan Highlands (May 5-7)	\$195.00	\$ _____
3. Paleogene Strike-Slip Sedimentary Basins, Central Washington (May 6-7)	\$150.00	\$ _____
4. Structure of Yakima Fold Belt, Central Washington (May 6-7)	\$170.00	\$ _____
5. Cambrian of Northern Idaho and Northwestern Montana (May 6-7)	\$140.00	\$ _____
6. Geology, Alteration, and Mineralization of Alkaline Gem Stocks, Northern Idaho (May 7)	\$ 50.00	\$ _____
7. Miocene Clarkia Fossil Beds, Northern Idaho (May 7)	\$ 50.00	\$ _____
8. Transect Through Baker-Wallowa-Seven Devils Terranes (May 5-7)	\$190.00	\$ _____

During Meeting

1. Northern Columbia Plateau from the Air (circle one: May 9 or 10)	\$ 85.00	\$ _____
2. Geologic Factors Influencing Residential Radon (May 10)	\$ 32.00	\$ _____
3. Geologic Controls of Ground-Water Movement, Spokane Aquifer (May 9)	\$ 23.00	\$ _____

(over)

(continued on p. 52)

Cordilleran/Rocky Mountain Sections Pre-registration Form (continued from p. 51)

Postmeeting

1. Precambrian Belt Supergroup: Is the Deer Trail Group Belt? (May 12-13)	\$130.00	\$ _____
2. Paleozoic Biostratigraphy and Paleogeography of Northeastern Washington (May 11-13)	\$140.00	\$ _____
3. Mineralization and Tectonics, Southern Kootenay Arc and Purcell Anticline (May 11-14)	\$220.00	\$ _____
4. Elements of Cascades "Collisional" Orogen, Methow Basin to San Juan Islands (May 11-15)	\$470.00	\$ _____
5. Geology of Eocene Mineral Deposits, Ferry County, Washington (May 12-13)	\$115.00	\$ _____
6. Sources for Columbia River Basalt Group (May 11-13)	\$240.00	\$ _____
7. Lake Missoula Floods and Channeled Scablands		
A. Evidence for Late Wisconsin Ice Dam and Floods, Purcell Trench (May 12)	\$ 40.00	\$ _____
B. Glacial and Multiple Flood History, Northern Borderlands (May 13)	\$ 40.00	\$ _____
C. Record of Pre-Late Wisconsin Floods and Late Wisconsin Flood Features (May 14)	\$ 45.00	\$ _____
8. Geologic Engineering and Landslide Mitigation, Grand Coulee Dam (May 12)	\$ 40.00	\$ _____
9. Formation of Idaho Batholith by Intrusion of Mafic Dikes; Mylonite of Western Idaho Suture Zone (May 11-13)	\$220.00	\$ _____
10. Subaqueous Basalt Eruptions into Pliocene Lake Idaho, Snake River Plain (May 12-14)	\$195.00	\$ _____
11. Hydrogeology of Mine Tailings, Coeur d'Alene Mining District (May 12)	\$ 25.00	\$ _____
12. Geology of Hells Canyon from a Raft (river float trip) (May 12-17)	\$500.00	\$ _____
13. Structural Section Through 25-km-thick Thrust System, West-Central Montana (May 12-13)	\$140.00	\$ _____
14. History and Geology of Coeur d'Alene Mining District (May 11-12)	\$100.00	\$ _____

SPECIAL EVENTS

1. NAGT Pacific Northwest and Alaska Sections Luncheon (May 8)	\$ 9.50	\$ _____
2. GSA Cordilleran Section Business Luncheon (May 9)	\$ 10.00	\$ _____
3. Association for Women Geoscientists Luncheon (May 9)	\$ 6.00	\$ _____
4. GSA Rocky Mountain Section Business Meeting Luncheon (May 10)	\$ 8.50	\$ _____
5. Short Course: Spread Sheets (May 12)	\$100.00	\$ _____
Dinner Cruise (May 9)	\$ 30.00	\$ _____
Western Party (May 10)	\$ 22.00	\$ _____

SPOUSE/GUEST ACTIVITIES

1. Sierra Silver Mine Tour (May 8, all day)	\$ 24.00	\$ _____
2. Spokane City Tour (May 8)	\$ 7.50	\$ _____
3. Museum of Native American Cultures (circle one: May 9 or 11)	\$ 6.00	\$ _____
4. Cheney-Cowels Museum (circle one: May 9 or 11)	\$ 5.50	\$ _____
5. Silverwood (May 10)	\$ 15.00	\$ _____
6. Wine Tours and Tasting (circle one: May 8, 9, or 10)	\$ 5.50	\$ _____
7. Luncheon (May 11)	\$ 13.00	\$ _____

Yes, I am interested in child care

BLOOMSDAY

I plan to participate in Bloomsday

TOTAL FEES

Enclose check or money order, U.S. funds only, payable to Eastern Washington University TOTAL \$ _____

PREREGISTRATION FORMS MUST BE POSTMARKED NO LATER THAN APRIL 8, 1989

Full refunds on canceled preregistrations (less a \$15 clerical fee) will be made until April 8, 1989. After that date, no refunds will be made except for canceled field trips and spouse/guest activities.

Mail completed registration forms and fee remittances to:

Margie Wallace
Cordilleran & Rocky Mountain GSA Meeting
Regional Conference Center
Eastern Washington University
MS-11
Cheney, WA 99004

For information, call (509) 359-2406.



REQUEST FOR ROOM RESERVATIONS

GEOLOGICAL SOCIETY OF AMERICA/CORDILLERAN & ROCKY MOUNTAIN CONFERENCES, MAY 7-12, 1989, SPOKANE, WA

IMPORTANT! PLEASE READ.

The Spokane Convention and Visitors Bureau will make hotel accommodations upon completion of this official housing request form. Fill out this form completely and mail to the SRCVB (address given below.) Do NOT send this form to The Geological Society of America. Only reservations received on this form will be accepted. Hotels will not accept reservations over the telephone.

All rooms will be assigned on a first-come, first-served basis. If the Bureau is unable to honor your choice of hotel, it will select accommodations that are closest in rates to your choice.

Applications must be received prior to April 7, 1989.

Do not send checks or money orders with this form. The hotel will inform you if they need a room guarantee.

PLEASE RESERVE THE FOLLOWING HOTEL ACCOMMODATIONS IN SPOKANE:

Singles _____ # of rooms _____ Double/Double _____ # of rooms _____
 1 bed/1 person _____ 2 beds/2 persons _____
 Doubles _____ # of rooms _____ Extra Persons _____
 1 bed/2 persons _____

SPECIAL REQUESTS: _____

Arrival: Date _____ Hour _____ a.m. _____ p.m. _____

Departure: Date _____ Hour _____ a.m. _____ p.m. _____

HOTEL: (SELECT FROM LIST) LOCATOR MAP ON REVERSE SIDE

First choice _____

Second choice _____

Third choice _____

SEND ACKNOWLEDGEMENT TO: (Enter name of person reserving room.)

Name _____

Address _____

City/State/Zip _____

Telephone _____

NAME OF ROOM OCCUPANTS _____

HOTEL	SINGLE		DOUBLE	DOUBLE	EXTRA
	1B/1P	1B/2P	1B/2P	2B/2P	PERSON
1. Sheraton	62.00	70.00	70.00	70.00	9.00
2. Cavanaugh's Inn @ Park	62.00	71.00	71.00	71.00	---
Executive Wing	77.00	77.00	77.00	77.00	---
3. Cavanaugh's River Inn	52.00	61.00	61.00	61.00	---
4. West Coast Ridpath	50.00	56.00	56.00	56.00	5.00
Motor Inn/East Wing	60.00	66.00	66.00	66.00	5.00
5. Holiday Inn Downtown	46.00	50.00	55.00	55.00	9.00
6. Shilo Inn	50.00	55.00	58.00	58.00	6.00
7. Surtree 8 Inn	34.90	39.90	39.90	39.90	5.00
8. Surtree Inn Division	39.90	44.90	44.90	44.90	5.00
9. Downtowner	28.00	30.00	40.00	40.00	5.00
10. Tradewinds Downtown	45.00	45.00	50.00	50.00	5.00
11. Thunderbird Lodge	42.00	51.00	58.00	58.00	8.00
12. Lincoln Center	35.00	40.00	45.00	45.00	5.00
13. National/Towne Center	33.00	40.00	43.00	43.00	3.00
14. Holiday Inn West	53.00	53.00	47.00	47.00	5.00
15. Quality Inn Spokane House	40.00	45.00	45.00	50.00	5.00

*Rates listed are intended as a general guide and may vary slightly depending on the type of room requested. Rates do not include applicable sales tax.

**All reservations are held until 6:00 p.m. If you will arrive later than 6:00 p.m., you must complete the late arrival information below to have your room held until a later hour.

_____ I may arrive after 6:00 p.m. Please hold my room on a "guaranteed payment" basis chargeable to my credit card.

Credit Card Company _____

Credit Card Number _____

Expiration Date _____

Signature of Card Holder _____

Do not enclose checks to cover first nights lodging. If pre-payment is required, the hotel/motel you are assigned will advise of any deposit when you receive your room confirmation.

CONFIRMATION = Confirmation of accommodations will be mailed by the hotels/motels. Contact your hotel/motel directly with any questions, changes, or cancellations.

Mail this form to: Spokane Housing Bureau, W. 926 Sprague, Suite 180, Spokane, WA 99204. (509)624-1341

FOUNDATION NEWS

by Robert L. Fuchs

Alaska Research Award Fund Established

Family, friends, and scientific associates of John T. Dillon have created the John T. Dillon Alaska Research Award Fund. The fund was established with a total gift of \$8000, which consisted of 78 separate contributions. Income from it will provide grants for students to carry out research on earth science problems in Alaska.

The Dillon Fund is part of the Foundation's GEOSTAR program, Supporting The Advancement of Research. The research grants will be administered by the Society's Research Grants Committee, which normally meets in the spring of each year.

The benefactors of the Dillon Fund have provided guidelines for the selection of projects and grant recipients:

- field-based studies dealing with the structural and tectonic development of Alaska, or
- studies that include some aspect of geochronology, either paleontologic or radiometric, that will lead to new age control for significant rock units in Alaska, or
- other Alaskan earth science research projects, at the discretion of the committee, should neither of the first two criteria be met.

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

GEO STAR
Supporting The Advancement of Research

Enclosed is my contribution in the amount of _____
to the following fund:

_____ Antoinette Lierman Medlin Scholarship Award Fund

_____ Allan V. Cox Student Research Award Fund

_____ John T. Dillon Alaska Research Award Fund

Please send me information about the _____
Fund.

Please print:

Name _____

Address _____

City/State _____

Phone _____

It is anticipated that one candidate would be chosen each year. However, as the Dillon Fund grows, increasing income from the endowment will permit additional awards.

John Dillon was a graduate of California State University, Los Angeles, and he subsequently obtained his Ph.D. in 1975 from the University of California, Santa Barbara. His thesis dealt with the geology of the Chocolate Mountains of southeastern California, the work being carried out under John C. Crowell, professor at UCSB. John Crowell has been one of the prime movers in the establishment of the fund, along with John Decker of Arco Alaska and Mary A. Moorman, John Dillon's widow.

After a brief period of employment with the USGS in southern California, John Dillon went to work for the Alaska Department of Natural Resources in 1977. His eleven-year employment with the Alaska Survey concentrated on the tectonics of northern Alaska. John Dillon was particularly noted for his radiometric age-dating work in the Brooks Range, the results of which have had a major impact on the geologic understanding of this mountain range.

A dynamic, outspoken, and indefatigable field geologist, John Dillon died doing the work that occupied his life. Having finished the 1987 season's work in the Arctic National Wildlife Refuge, his plane crashed in bad weather while returning from the field. Also killed in the crash was John's father, Stephen P. Dillon, who had worked with his son that summer as a field assistant.

John Dillon is survived by three children and his wife Mary, a geohydrologist in Fairbanks, Alaska. Contributions to the John T. Dillon Alaska Research Award Fund, enabling others to carry on the work of this dedicated field geologist, may be sent to the Foundation at GSA Headquarters in Boulder.

Dedicated Funds within GEOSTAR

Since the GEOSTAR program was begun in October 1987, four new dedicated or special-purpose funds have been established. In addition to the John T. Dillon Alaska Research Award Fund, GSA's Young Scientist Award was created in late 1988 (see *GSA News & Information*, January 1989). This annual prize brings with it an honorarium of \$10,000, a sum most welcome to any young research scientist.

Earlier in 1988, two other research funds were announced. The Geophysics Division set up the Allan V. Cox Student Research Award to support studies in geophysics. Jack Medlin and the Medlin and Lierman families and friends created the Antoinette Lierman Medlin Scholarship Award Fund, under the auspices of the Coal Geology Division.

Please use the attached coupon if you wish to make contributions to the Dillon, Cox, or Medlin Funds, or to request further information about the research support they provide.

Trustees Meet the Challenge

In December, total contributions by GSA members to the Century Challenge neared the \$100,000 mark. This triggered a \$10,000 gift to the Century Challenge from the Foundation's Board of Trustees. The Trustees had contributed a kickoff gift of \$10,000 at the start of the campaign as well.



Donors to the Foundation, November 1988

Centennial

Dabney W. Caldwell
Chris T. Higgins
Herbert C. Mills
Robert Ramsdell
Patrick M. Walker

Century Challenge

John B. Anderson
Elwood R. Brooks
Catherine C. Campbell
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Phyllis J. Snow
Lawrence Taylor
Irving H. Tesmer
James F. Tull
Robert J. Weimer
David A. White
Willis H. White
Kenzo Yagi
Lynn A. Yehle

GEOSTAR Funds

A. L. Medlin
Jack H. Medlin
Anonymous
Anonymous

GEOSTAR

William K. Barry
Charles F. Bisbee

Research

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John L. Berkley
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David D. Pollard

FROM GSA'S BOOKSHELF...

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WITH SPECIAL REFERENCE TO THE APPALACHIANS**
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Westerman (SPE223, \$22.50)

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GEOLOGIC EVENTS**

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New GSA Fellows

The following candidates were elected to Fellowship by Council action at the November 1988 meeting.

William D. Carlson
Marco T. Einaudi
Robert B. Finkelman
Kim D. Klitgord
Fred F. Meissner

H. Jay Melosh
Shlomo P. Neuman
John Proffett, Jr.
John M. Sharp, Jr.

New GSA Members

Cole D. Abel
Michael Abrams
Charles P. Acker II
Terrie P. Adams
Michael S. Adkins
Carlos L.V. Aiken
Gregory R. Albright
Robert H. Alexander
Dean E. Alford
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Jo Beth Allen
Richard J. Allinger
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Jose Oswaldo Araujo Filho
Toby E. Archuleta
Gregory W. Axten
Arthur P. Baclawski
Jeffrey W. Bader
Mark G. Bagel
R. Mark Bailey
Paul E. Baldauf
Otha D. Baldwin
John P. Ballegeer
Nancy L. Barber
James M. Barish
Jamie R. Barnes
Barbara A. Barreiro
Ramsay A. Barrett
Peter S. Barrows
Gretchen M. Bartley
Lawrence E. Bean
Susan M. Berger
G. S. Bhatnagar
David M. Bice
George H. Billingsley
Jill Marie Bird
Jeanette L. Black
Robert B. Black
Diane Bloomberg
Mark J. Bousek
Laura B. Brachfeld
James F. Brake
Thomas F. Bray, Jr.
Stephen G. Brezinski
William E. Britton, Jr.
Fred Brown
Mike C. Brown
Walter A. Brown
Karl F. Bruder
J. Gregory Bryan
Reid A. Bryson
Steven P. Buck
Kevin J. Burns
William C. Burton
J. Philip Butler
David J. Byrne
Paula A. Cammarata

Keith B. Campbell
Cynthia D. Campisano
Michael R. Canich, Jr.
James A. Carpenter
Brian J. Carter
Ian Cartwright
Lorraine M. Cavanaugh
Anne P. Cavazos
Oliver A. Chadwick
Jefferson K. Chambers
Troy J. Charlton
Leslie L. Chau
Christopher C. Clark
Christian Clode
Greg C. Coffin
Gregory L. Cole
H. William Cole
Edward P. Conti
Lisa Bailey Corbitt
Cynthia R. Coron
Thomas E. Covington
Thomas B. Craftie
Real Daigneault
Roberta L. Daley
M. Susanne Daniel
Lynn T. Daniello
Mark W. Darrington
Alice S. Davis
James D. De Cinque
Stephen T. Defibaugh
Leland R. Dexter
Stephen K. Dickey
Patrick F. Dobson
Carlo Doglioni
John Joseph Donohue IV
Ann S. Downing
Gregory J. Dozer
Francis O. Dudas
Phillip W. Dunn
Victor A. Early
Jeffrey G. Eaton
Donald D. Edds
R. Lawrence Edwards
Marc R. Egli
Mostafa M. El Sehamy
Ann M. Fair
Gregory L. Fasiano
Gerald L. Feder
Roger E. Feenstra
Ann M. Fenner
Ray E. Ferrell, Jr.
Faith Fiene
Patrick F. Fischer
Michael R. Fisher
Larry A. Flora
James S. Fout
Timothy C. Fox
Larry D. Galbiati
Ah S. Gan

Bruce Garbaccio
Susan Garcia
David K. Gay
Pamela A. Gemery
Robert E. Georgens
Carol N. Gerlitz
Carol C. Gilchrist
Kathryn M. Gillis
Jane A. Gilotti
Richard E. Giraud
Victor C. Goethals
Adolfo C. Gonzales
Danielle L. Green
Scott P. Greubel
Bjorn Gunnarsson
Gary H. Haag
Tom W. Hahne
Terry W. Hale
Charles M. Hammond
Jacquelyn E. Hams
James T. Harden
David J. Harding
Rosemary Haroian
Ann M. Harris
Charles W. Harris
Myra L. Hart
Mirza T. Hasan
Joseph E. Hazel
Gary D. Henderson
James V. Hengesh
Carole S. Hickman
Lindsay R. Hill
Robert A. Hines
Barbara A. Hippe
William F. Holden
Jeannette Husain Holly
James J. Holmes III
Rebecca Holmes
Ken Hon
Willard N. Hopkins
Christopher J. Horan
Kenneth B. Horrall
J. Hatten Howard III
Paul F. Huddlestun
Mark Hughes
Philip Hughes
Denise P. Hume
Vernon F. Hunter
Bruce W. Hurley
Moujated I. Hussein
William C. Hutchings
Bruce D. Idleman
Patrick M. Imbrogno
Michael R. Jansen
Mark D. Jasumback
David A. Jerose
David G. Jewett
Christopher S. Johnson
Larry M. Johnson

Michael D. Johnson
Steve G. Joki
David A. Jones
Hiroki Kamata
Douglas L. Kasefang
Gerard P. Kashatus
William P. Kegley
William Kelly
Robert L. Kendall
Lawrence P. Kennedy
Kamal S. Khair
Cecil H. Kindle, Jr.
Amelia S. Kinn
Christopher J. Kittredge
George F. Klemmick
Marcia E. Knadle
Julie S. Knapp
Rex A. Knepp
Robin B. Koeberle
Wendell A. Koontz
Richard S. Kopp
Robert W. Kosiba
Thomas S. Kraus
Ronald B. Krauth
Teh-Lung Ku
John H. Ladd
Alan P. Laferriere
Joseph G. La Fleur
Christopher M. Lapallo
Hugh D. Larkin II
Steven P. Larkin
Richard D. Law
Lyn R. Lawlor III
Gary F. Lawyer
Kenneth W. Leach
Paula J. Leier-Engelhardt
Catherine L. Lewis
Wei-Hsiung Lin
Michael A. Linden
Yuly M. Lipsits
Hugo A. Loaiciga
Theodore N. Loukides
William R. Lund
Erik R. Lundin
Roy W. Lynch
Ken C. Macdonald
Carlos E. Macellari
Patricia J. MacMillan
Ahmed Mahmood
Anthony Mariano
Charles A. Masella
Renee S. Mauche
Jeffrey R. Maxwell
Brian E. McAninch
Craig A. McCammack
Laura L. McCammack
Steven R. McCollum
Gerald A. McLane
James M. Mehegan

Mohamed A. Mersal
Thomas A. Metarko
Kimberlee W. Millberry-Horan
Jeffrey K. Miller
Frank R. Minnolera, Jr.
Christopher B. Mitchell
H. Lee Mitchell
Loretta L. Molitor
Patrick A. Monahan
Gerald T. Moore
Stephen G. Moran
Charles A. Mortensen
Martin W. Mosier
Thomas F. Mullen
John S. Myers
Rhonda R. Nations
Clive R. Neal
David T. Needham
Carl O. Nelson
Karen Ruth Newcomb
Ogden W. Nine, Jr.
Kimberly D. Noake
Marc D. Norman
Suzanne B. O'Connell
Douglas R. Oliver
Fred S. Olsen
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Margery D. Osborne
A. A. Ownby
Marvin L. Oxley
Jeffrey G. Paine
Michael D. Palleschi
Stavros S. Papadopoulos
Michael W. Parsons
Brian E. Patrick
Randy R. Patrick
Caroline A. Paul
John R. Pesch
Lisa Peters
Giampaolo Piali
Keith E. Pilgrim
Keith A. Pine
Walter E. Pittman, Jr.
Lee E. Plansky
H. D. Pouncey
Charles A. Price
David S. Princehouse
David L. Pry
Aaron S. Rachlin
Oscar Ramirez
Peter J. Randazzo
Robert G.H. Reynolds
Erupaka Y. Reddy
Michael A. Rendina
Michael E. Renz
David L. Reusswig
Jeffrey W. Reynolds
William R. Reynolds
(continued on p. 57)

New Members (continued from p. 56)

Julianne Rhodes
Linda K. Riddle
Anneliese A. Ripley
Elizabeth M. Robinson
Katherine Robinson
Dietrich H. Roeder
Gregory D. Roesch
Daniel T. Rogers
Donna M. Rohaus
Hagai Ron
Kevin G. Root
Michael L. Ross
Gwendolyn F. Russell
Theron D. Sage
Peter A. Salpas
Matti Saverikko
Kathryn M. Scanlon
Heidi K. Schatmeier
Johannes H. Schellekens
Birger Schmitz

James W. Schmoker
Michelle J. Schneider
Carl D. Schrenk
John T. Schulenberg
Bernard B. Schumak
Christopher M. Scott
David M. Sears
Joseph A. Senita
Erik A. Shamberger
Colin J. Shellum
John W. Shervais
William R. Short, Jr.
K. Lee Shropshire
Ernest S. Siraki
Mark H. Slatten
Alan D. Smith
Amos L. Smith
J. Bailey Smith
Joseph P. Sontchi
Jack S. Sowers

Victor P. Sparks, Jr.
Darwin R. Spearing
Frank H. Spearman IV
Robert A. Spicer
Thomas M. Stanley
Steven V. Stemle
Nicholas R. Stephens
David M. Stercho
David M. Stewart
Scott W. Stine
Byron D. Stone
Rick Stransky
Richard K. Stucky
Philip J. Stuecheli
Keith R. Stultz
Paula M. Sumpter
James B. Swinehart
Carl C. Swisher III
Lori T. Tagawa
Anthony J. Tankard
Steven R. Tarnoff

Dorothy H. Tepper
James K. Theye
J. Robert Thompson
Richard H. Thompson
Thomas J. Timmermans
Ralph B. Tolson
Cameron D. Toyne
Richard A. Trapp
Paul L. Travis
Scott J. Treherne
Robert C. Trentham
Joseph W. Troester
Robert E. Troutman
Robert D. Tucker
Michael J. Tuttle
David M. Van Horsen
Cees R. Van Staal
Steven L. Veal
Paul Wadeson
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Randy R. Walters

Jim B. Warner
James E. Wedekind
Amy L. Weinheimer
Bryan L. Whitcomb
Hal White
John D. Whiting
Jennifer L. Wilcox
R. Matthew Wilkening
Burke C. Williams
Thomas M. Williams
Wendell E. Wilson
Martin W. Winberry
Stefan Wohnlich
Donald L. Wolberg
Arnold M. Woods
Mary C. Woods
Christopher S. Wright
Clifford L. Wright
Markel R. Wyatt
Kenneth M. Yoder

New GSA Student Associates

Kenneth D. Adams
Susan E. Alderman
Mark W. Allen
Joachim E. Amthor
Michael E. Anderson
Scott A. Anderson
Abraham Araya
Peter J. Armato
Kevin G. Armstrong
Lee Ann Arrington
Felipe Audemard
James M. Bachmeier
Christopher M. Bailey
Gregory W. Bartow
Penny Mann Baxter
Richard J. Behl
William R. Belcher
Stephen C. Bell
Stephen C. Bennett
Samuel J. Bentley
Kristen Lynn Bentz
David A. Bero
Ronald P. Bertasi
Giovanni Bertotti
Martha C. Berwick
Diane E. Bettess
Aimee E. Beveridge
Jeffrey L. Binder
Brent G. Bingham
Barbara A. Birdwell
Jonathan D. Blundy
Venetia Bodycomb
Craig T. Boeckman
Robert Brinkmann
Gregory H. Browne
John T. Bruskwitz
Guido Busch
James W. Byrd II
William R. Callender
Paula Coppock Carnes
Louis J. Caruso
Silvio Casadio
Rosanne M. Cebelenski
Vincent M. Ceci
Vicki A. Childers
Lisa Chisholm
Sarah B. Christian
Julie M. Churchill
James G. Clay
Jane M. Cleland
Kathryn T. Clemens
Karen K. Clickener
Jean S. Cline

Jerry B. Coleman
Timothy A. Comrie
Christopher D. Connors
Richard M. Conrey
Myron J. Cook
Leo M. Coombs
Clay A. Cooper
Marta C. Corbin
Scott F. Coslett
Robert J. Creed
Charles R. Cullom
Raymond C. Culotta
William D. Cunningham
Monica J. Dailey
John A. Daniel
Joanne Danielson
Carleton W. Degges
Dave Deming
Lawrence F. Dempsey
Jill N. Densmore
Sarmistha Dey
Stephen R. Dines
Megan J. Donahue
Lisa A. Durham
Gary S. Dwyer
Eric J. Ekstrand
Jessica M. Elzea
Johan P. Erikson
Richard D. Ernst
Daniel W. Erskine
Luis Estrada
Kurt H. Etter
Wade M. Ewing
Daniel L. Farber
Leonard C. Farr, Jr.
Earl R. Faust
Jeremy B. Fein
Michael S. Fenster
Paul A. Ferguson
Todd D. Fickel
James D. Fielder
Fred Fischer
Joel F. Fogarty
Frederick D. Ford
Tammy L. Fountain
Sarah J. Fowell
Andrew N. Fox
Peter A. Fraley
Calvin J. Frye
Jeffrey W. Gadt
Christopher W. Galagan
Athanasios Ganas
Gerardo Garibay

Robert A. Gecy
Peter G. George
Cynthia Germain
Peter C. Gibson
Michael H. Gilmer
Karen S. Glaser
Gregory S. Glewwe
Kurt A. Goebel
Jonathan C. Goodmacher
Katherine L. Gordon
James B. Grace
Scot M. Graves
Sarah C. Gray
Andrew A. Gremos
Hans Gsellmann
Gwenael G. Guerin
George D. Guthrie
Sara M. Haines
Sheila W. Hainlin
William L. Halligan
Linda A. Hansen
Sarah L. Hanson
Joel T. Harper
Stephen T. Hasiotis
Marc Haworth
Karl P. Hayden
Christopher A. Hedlund
Mary Jo Hedrick
Diana C. Heft
Gudrun Heinzler
P. Mark Held
Charles J. Hero
Thomas A. Hickson
Rick E. Holasek
Ronald E. Holcomb
Ann E. Holmes
Ira F. Holston
David W. Holt
Kenneth C. Hood
John R. Hopper
Barbara D. Houghton
Charles E. Houser
Katherine J. Howard
Terry P. Huemer
Kathleen M. Hughes
Munir Humayun
Edward F. Jamison
Kate E. Japy
Steven D. Jensvold
Robert M. Joeckel
Beverly J. Johnson
Christopher A. Johnson
Peter W. Johnson

Sherri L. Johnson
Jay S. Johnston
Jeffrey W. Johnston
Michael D. Jones
Ron S. Jong
Diane L. Kamola
Hyohyun S. Kang
Philip Keavey
Sharon E. Keefe
William D. Keefe
Michael W. Kelley
Douglas C. Kellogg
Michael M. Kelly
Miles D. Kenney
Peter D. Ketcham
Christine V. Kimball
Nicholas J. Kiusalaas
Mark E. Kleszczewski
Ralph E. Klinger
Michael W. Knappertsbusch
Amy E. Kneeder
Douglas R. Knight
Eleanor M. Krukowski
Andrea P. Krumhardt
Jeffrey J. Kuglitsch
Julie A. Kupecz
Richard A. Kurlich III
Robert H. Lander
Charles R. Landis
Neal Langford
Nadine L. Langley
John P. Langton
Randall G. Larkin
John D. Lasko
James Lawrence
Calvin F. Lee
Vivian W. Lee
Henry A. Legarre
Alan H. Levine
Norman S. Levine
Daniel R. Levish
Robert L. Lewis
Rosanne M. Lindholm
Elliott W. Lips
David M. Lis
Eckhard Loebel
Bradley A. Loewen
Marc R. Lombardi
Dina Larios Lopez
David A. Love
Muhammad Gabr A. Luqman
Paula B. Maat
Robert A. Mahin

Michael O. Maler
Melissa A. Malone
William F. Manley
Matthew L. Manson
David D. Marks
Richard K. Marvin
Carla M. Matherne
Nancy L. Matsumoto
Mark A. McCaffrey
Kris K. McCandless
Reed F. McEwan
Sally F. McGill
Tracey K. McGrath
Susan A. McGuire
Dennis R. McMahan
Kay C. McQueen
Kirti Mehta
Jeffrey T. Melby
Felipe A. Melchor Perez
Marco Menichetti
Heidi J. Mertig
Jan J. Miller
Patricia Miller
Robert P. Miller
Ronald W. Miller
Stephen J. Miller
Clifton E. Mitchell
Jeremy N. Mitchell
Janet E. Moore
Toby B. Moore
B. Janine Morison
Mark R. Morseth-Mayer
Tom J. Mulder
Donald R. Murray
Matthew J. Nation
Clifton R. Naylor, Jr.
Kevin C. Nelson
Mark Nettles
Paul R. Nettles
Nancy Nevins
Mohamed A. Noweir
Hugh E. O'Brien
Jim E. O'Connor
Peter A. Osmolovsky
Tom E. Osterkamp, Jr.
Eric O. Owens
Daniel L. Oyler
James C. Parker
Richard P. Patton
Robert T. Pavlowsky
Rick Z. Pawlowski
Russell R. Perry

(continued on p. 58)

Dean M. Peterson
 Randy S. Phillips
 Suzanne M. Phlippeau
 James C. Pickens
 Dave Pivnik
 Stephen A. Prevec
 Maribeth H. Price
 Steven A. Procyk
 James A. Prosser
 J. Guy Reed
 Laura R. Reich
 Sarah E. Rieke
 H. Sonny Robb
 Correen L. Robinson
 Robert C. Rohwer, Jr.
 Edwin A. Romanowicz
 Timothy P. Rose
 John M. Roy
 Peter D. Rude
 Lowell T. Rundle
 Derek W. Ryter
 Luis F. Saenz Renteria
 Golam Sarwar
 Dorothy A. Satterfield
 Peter E. Sauer
 Nils R. Saverstam
 Thomas L. Sawyer
 Donna L. Schartung
 Daniel D. Schelling
 Reed P. Scherer
 Steven H. Schimmrich
 Shawn P. Schottler
 Albrecht J. Schwalm
 Michele A. Seidl
 Eric A. Semsak
 Brian D. Shea
 Im C. Shin
 Cheryl A. Shipp
 Andrew A. Sicree
 Claus Siebe
 David S. Singleton
 Catherine F. Slater
 Mitzi L. Slater
 Robert F. Sloan
 Harold A. Smith
 Philip M. Smith
 Dane R. Spearing

Robert N. Spieler
 James D. Standish
 Lynn A. Stevens
 David M. Street
 Frederick Stumm
 Michael L. Sweet
 Marc W. Sydow
 Gregory H. Symmes
 Zbigniew A. Szybinski
 L. Bradshaw Tate
 Steven D. Textoris
 Jennifer A. Thomson
 Alan L. Titus
 Nancy L. Tonso
 Christopher J. Travis
 Mary Ellen Tuccillo
 Lance D. Tuckruskye
 Wolfgang Unzog
 Jeroen A. Van Gool
 Stephen R. Van Horn
 De Wayne C. Varnam
 Nikki Vaughan
 Margaret E. Venable
 Scott K. Vetter
 Julie K. Vry
 Laureen J. Wagoner
 Tonya P. Wann
 Richard M. Watt
 Andrea Wech
 Steven P. Welter
 Rolf S. Wernicke
 Dietrich H. Whitesides
 Brian M. Whiting
 Todd H. Wiedemeier
 Daniel W. Wiesneth
 Thomas I. Wilch
 M. Scott Wilkerson
 Colin F. Williams
 William K. Witte
 Julie A. Woodward
 Gregory L. Wortman
 Susan A. Yelton
 Myung S. Yi
 Jeanne M. Yost
 Margaret R. Youngman
 James C. Zachos
 Carolyn Keith Zimmerman

In Memoriam

Claude C. Albritton, Jr.
 Dallas, Texas

Dana R. Kelley
 Pittsburgh, Pennsylvania
 November 24, 1987

Thomas L. Bailey
 Santa Barbara, California

Vincent C. Kelley
 Albuquerque, New Mexico
 December 5, 1988

Neil A. Benfer
 Charlottesville, Virginia
 June 26, 1988

Truman H. Kuhn
 Casselberry, Florida
 November 14, 1988

William M. Bethke
 Covington, Louisiana
 April 12, 1988

Valmore C. Lamarche, Jr.
 Tucson, Arizona
 March 24, 1988

Charles D. Campbell
 Carmel Valley, California
 December 10, 1988

Charles A. Lee
 Pacific Palisades, California
 October 25, 1986

J. Ben Carsey
 Houston, Texas
 October 1988

Ernest R. Lilley
 Tenafly, New Jersey

Wayne M. Felts
 Boulder City, Nevada
 October 27, 1988

Ronald W. Mearns
 San Jose, California

Rousseau H. Flower
 Socorro, New Mexico
 February 27, 1988

John B. Patton
 Bloomington, Indiana
 September 16, 1988

John F. Hall
 Chesterland, Ohio
 July 12, 1988

Caswell Silver
 Denver, Colorado
 October 18, 1988

A. John Haworth
 Humble, Texas

James W. Smith
 Montclair, New Jersey
 October 25, 1988

Charles Leo Hendricks
 Abilene, Texas

William H. Smith
 Champaign, Illinois
 July 2, 1988

John M. Hills
 El Paso, Texas
 November 20, 1988

Henryk B. Stenzel
 Houston, Texas

Jurij A. Jeletzky
 Ottawa, Ontario
 December 4, 1988

H. Edgar Summerford
 Casper, Wyoming
 August 28, 1988

Noye M. Johnson
 Hanover, New Hampshire
 December 27, 1987

Alice Dowse Weeks
 Wynnewood, Pennsylvania
 August 27, 1988

Alfred W. Jolliffe
 Kingston, Ontario

**American Ground Water Trust
 Invites Scholarship Applicants**

Undergraduate students pursuing academic studies beneficial to America's ground-water resources are invited to apply for scholarship support from The American Ground Water Trust of Dublin, Ohio.

The Trust, a nonprofit public foundation serving as a ground-water education advocate, has awarded 26 scholarships since the program began in 1975. In recent years, the Trust has awarded scholarships of \$2000 each. However, the number and amount of the scholarships awarded are reviewed annually by the Board of Trustees of the American Ground Water Trust.

Applicants must complete and submit an American Ground Water Trust Scholarship Application by April 1, 1989, to be eligible for funds that could be awarded for the 1989-1990 academic year.

To receive an application, candidates should send a stamped, self-addressed envelope to The American Ground Water Trust, Scholarship Program, 6375 Riverside Drive, Dublin, OH 43017.

Please send notices of deaths of GSA members to Geological Society of America, Membership Services, P.O. Box 9140, Boulder, CO 80301.

Coal Scholarship Offered

To further interest and research into coal within the Rocky Mountain and Northern Great Plains coal provinces, the Coal Geology Division of GSA and the Ad Hoc Committee for the Symposium on the Geology of Rocky Mountain Coal are again offering a scholarship award in 1989. As this scholarship is derived from the Ad Hoc Committee's funds invested in the GSA Foundation, only applicants whose research pertains to coal in the states or provinces of Arizona, Alberta, British Columbia, Colorado, Idaho, Montana, New Mexico, North Dakota, Utah, Saskatchewan, South Dakota, and Wyoming will be considered.

Qualifications

Applicants must meet the following criteria to qualify for consideration of this scholarship.

A. Applicants must be currently enrolled in a graduate program (M.S. or Ph.D.) at a private or state college or university.

B. The main theme of an applicant's research must be an aspect of coal research, and the research must pertain to coals in the states or provinces listed above. (The institution where the

research is being conducted need not be in the states or provinces listed above.)

C. Although the applicant must be involved in coal research, he or she does not have to be a geology major but can be majoring in another field.

APPLICATIONS AND DEADLINE

Interested students can obtain scholarship applications from the Chairman of the Scholarship Committee, Gary B. Glass, Geological Survey of Wyoming, Box 3008, University Station, Laramie, WY 82071. Completed applications should be sent to this same address.

Scholarship applications should be submitted no later than February 28, 1989.

Selection Committee: A committee made up of at least two ad hoc members of the Symposium on the Geology of Rocky Mountain Coal and two GSA Coal Geology Division members will screen applications and select the most appropriate proposal before May 1 and announce the winner(s).

YOUR VOTE COUNTS: ABSTRACTS BY SESSION OR BY AUTHOR?

For 1988, the abstracts section of GSA 1988 Annual Meeting *Abstracts with Programs* is organized differently from previous years. The abstracts appear in *session order*. Previously the abstracts appeared in alphabetical order by senior author's last name.

Many found that this change made use of the abstracts book during the Denver meeting more convenient. For referencing a particular author, however, you must first turn to the author index to locate the page.

We are interested in how members feel about this change. We are now planning the 1989 abstracts volume and would like to hear from you as soon as possible. How about today?

Clip and send to: ABSTRACTS
 GSA Meetings Department
 P.O. Box 9140
 Boulder, CO 80301

_____ I like the change. Please keep the abstracts in session order for all future meetings.

_____ I am mildly opposed to abstracts being listed in session order. I prefer the alphabetical listing, but am willing to use the new system.

_____ I am strongly opposed to abstracts being listed in session order. I want GSA to return to the alphabetical listing.

Comments _____

Name and Institution (optional) _____

MEETINGS

(Asterisk indicates new or changed information)

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.

Crustal Dynamics: Chaotic Behavior and Fractal Structures, February 12-15, 1989, Monterey, California. Information: Donald L. Turcotte, Snee Hall, Cornell University, Ithaca, NY 14853; (607) 255-7282.

Geophysics of the Rocky Mountains, Front Range, and High Plains, February 13-14, 1989, Golden, Colorado. Information: Front Range AGU Service Center, P.O. Box 18-P, Denver, CO 80218; 1-800-525-6338 (303-831-6338 in Colorado).

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 80162-5002; (303) 973-9550; Telex 881988; Fax (303) 973-3845.

International Symposium on Natural Catastrophes and Their Impact, March 1989, Ankara, Turkey. Information: Tevfik Erkal, Türkiye Jeomorfoloğlar Dernəgi, P.K. 652 Kizilay, 06425 Ankara, Turkey.

Prospectors and Developers Association of Canada 57th Annual Convention, March 5-8, 1989, Toronto, Ontario, Canada. Information: Cary McLeod, PDAC, 74 Victoria St., Suite 1002, Toronto, Ontario M5C 2A5, Canada; (416) 362-1969.

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.

Hydrogeology Division News

At the 1988 GSA Annual Meeting in Denver, the Hydrogeology Division voted to establish a Hydrogeology Graduate Research Grant. The management board is working out the details. The Division will use the GSA review process for initial screening of proposals.

A full-day symposium, "Site Characterization for Conditions of Non-Darcian Flow," will be sponsored by the Hydrogeology Division and the Engineering Division at the 1989 GSA Annual Meeting in St. Louis. Co-conveners are John Harsh and Jeff Keaton. Persons interested in contributing a paper should contact John Harsh at (215) 344-3606.

A half-day symposium (Challenges in the next Millennium) will be convened by Dave Stephenson and a yet to be named co-convenor. The symposium will address hydrogeology and changes such as global climate change, increase of population, and deep mining. Persons interested in this symposium should contact Dave Stephenson at (602) 224-0844.

These symposia are being offered following the theme of the 1989 Annual Meeting, *Frontiers in Geosciences*. General contributed papers addressing frontiers in hydrogeology such as groundwater contamination, groundwater and geologic processes, and surface water-groundwater interactions are sought for this meeting.

Nominations are due for the Meinzer Award and the Distinguished Service Award and may be sent to any Division officer or to members of the award committee.

Symposium on the Afro-Arabian Rift System, March 6-8, 1989, Karlsruhe, Federal Republic of Germany. Information: U. Achauer, Geophysical Institute, Karlsruhe University, Herzstr. 16, 7500 Karlsruhe 21, Federal Republic of Germany; phone 0049-721-6084545; Telex 7825740 GEOK D; Fax 0049/721/71173.

Workshop on Drilling the Oceanic Lower Crust and Upper Mantle, March 7-9, 1989, Woods Hole, Massachusetts. Information: Janet Johnson, Dept. Geology and Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA 02543; (508) 548-1400, ext. 2623.

Geological Society of America South-Central Section Annual Meeting, March 12-14, 1989, Arlington, Texas. Information: Charles I. Smith, Dept. of Geology, University of Texas, Box 19049, Arlington, TX 76019; (817) 273-2987.

Second Symposium on the Application of Geophysics to Engineering and Environmental Problems, March 13-16, 1989, Golden, Colorado. Information: Ron Bell, SEMEG, c/o BellWest Geoservices, P.O. Box 10845, Edgemont Branch, Golden, CO 80401.

European Geophysical Society XIV General Assembly, March 13-17, 1989, Barcelona, Spain. Information: EGS Office, Max-Planck-Str. 1, Postfach 49, D-3411 Katlenburg-Lindau, Federal Republic of Germany; phone (49)-5556-1440; Telex 965564 zil d; Fax (49)-5556-4709.

***American Institute of Professional Geologists Nevada Section Field Trip**—Nevada Test Site and Mines, March 19-21, 1989, central-southern Nevada. Information: Ellen Hodos, P.O. Box 665, Carson City, NV 89702; (702) 885-1717. (*Application deadline: February 16, 1989.*)

Engineering Geology and Geotechnical Engineering 25th Anniversary Symposium, March 20-23, 1989, Reno, Nevada. Information: Engineering Symposium, Division of Continuing Education, University of Nevada, Reno, NV 89557-0024; (702) 784-4046.

Geological Society of America Northeastern Section Annual Meeting, March 23-25, 1989, New Brunswick, New Jersey. Information: Gail M. Ashley, Dept. of Geological Sciences, Rutgers University, New Brunswick, NJ 08903; (201) 932-2221.

International Symposium on the Silurian System (Murchison Symposium), March 28-April 9, 1989, Keele, England. Information: M. G. Bassett, Dept. of Geology, National Museum of Wales, Cardiff CF1 3NP, Wales; phone 02222-397951.

Economic Geology and Geotechnics of Active Tectonic Regions, April 3-7, 1989, London, England. Information: Conference Manager, Economic Geology and Geotechnics Conference, Dept. of Geological Sciences, University College, Gower St., London WC1E 6BT, England.

Geological Society of America Southeastern Section Annual Meeting, April 6-7, Atlanta, Georgia. Information: Earl A. Shapiro, Georgia Geologic Survey, 19 MLK Jr. Dr., SW, Atlanta, GA 30334; (404) 656-3214.

South-Central Friends of the Pleistocene, April 7-9, 1989, Central Texas. Information: Stephen A. Hall, Dept. of Geography, University of Texas, Austin, Texas 78712; (512) 471-5116.

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MEETINGS (continued from p. 60)

Shallow Gas and Leaky Reservoirs, April 10-11, 1989, Stavanger, Norway. Information: Norwegian Petroleum Society, P.O. Box 1897 - Vika, 0124 Oslo 1, Norway; phone 47-2-207025; Telex 77 322 nopet n.

National Fossil Exposition XI, April 14-16, 1989, Macomb, Illinois. Information: Karl A. Stuekerjuergen, Rte. 1, Box 28A, West Point, IA 52656; (319) 837-6690.

Geological Society of America North-Central Section Annual Meeting, April 20-21, 1989, Notre Dame, Indiana. Information: Michael J. Murphy, Dept. of Earth Sciences, University of Notre Dame, Notre Dame, IN 46556; (219) 239-7205.

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.

Third Annual Conference on Undergraduate Research, April 27-29, 1989, Trinity University, San Antonio, Texas. Information: Ann Knoebel, EUREKA, Trinity University, Holt Center, 106 Oakmont, San Antonio, TX 78212.

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

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

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

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

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

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

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

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

Engineering Geology in Tropical Terrains, June 26-29, 1989, Selangor Darul Ehsan, Malaysia. Information: Organising Secretary,

Conference on Engineering Geology in Tropical Terrains, Dept. of Geology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor Darul Ehsan, Malaysia.

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

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

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

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

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

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

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

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

(continued on p. 62)

1989-1990 Fulbright Grants in Geology Still Available

The Council for International Exchange of Scholars (CIES) has announced that some 1989-1990 Fulbright Grants remain available to U.S. faculty in the field of geology.

There are specific openings in Egypt, German Democratic Republic, Hungary, Iceland, Iraq, Kuwait, Morocco, Mozambique, Oman, Poland, Sudan, Syria, Tanzania, Turkey, U.S.S.R., West Bank, Yemen, and Zimbabwe. In addition, other countries are open to applications in any discipline, and geology is among their preferred fields.

Scholars in all academic ranks, including emeritus, are eligible to apply. It is expected that applicants will have a Ph.D., college or university teaching experience, and evidence of scholarly productivity. U.S. citizenship is required. In a few countries (of Central and South America and Francophone Africa), knowledge of the host-country language is required.

Interested scholars are urged to inquire as soon as possible. For information, call or write CIES, Eleven Dupont Circle NW, Suite 300, Washington, DC 20036; (202) 939-5401. When inquiring, indicate countries of interest.

MEETINGS (continued from p. 61)

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

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

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

Focus '89, Nuclear Waste Isolation in the Unsaturated Zone, September 18-21, 1989, Las Vegas, Nevada. Information: D. Burton Slemmons, School of Mines, Center for Neotectonic Studies, University of Nevada, LME 400 Reno, NV 89557-0047. (Abstracts deadline: February 15, 1989.)

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

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

***3rd Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst**, October 1-4, 1989, St. Petersburg, Florida. Information: 3rd Multidisciplinary Conference, Florida Sinkhole Research Institute, University of Central Florida, Orlando, FL 32816. (Abstracts deadline: April 17, 1989.)

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

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

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

***American Institute of Professional Geologists 26th Annual Meeting**, October 4-7, 1989, Arlington, Virginia. Information: Stan Johnson, Virginia Division of Mineral Resources, Box 3667, Charlottesville, VA 22903; (804) 293-5121.

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

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

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

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

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

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

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

Penrose Conferences

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

***The Eocene Tectonic Transition: Oregon to Alaska**, September 18-25, 1989, Penticton, British Columbia. Information: Ralph A. Haugerud, U.S. Geological Survey, 959 National Center, Reston, VA 22092; (415) 329-4910.



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STRUCTURAL GEOLOGY PHYSICAL MODELING

The Bureau of Economic Geology, The University of Texas at Austin, invites applications for a Research Associate position in its newly established Applied Geodynamics Laboratory. Required qualifications include a Doctoral degree in geology with specialization in structural geology, one year of post-Doctoral work experience in research or teaching, and the demonstrated ability to write effectively for publication. Candidates with a background in strain analysis, fluid or fracture mechanics, and the application of physical modeling techniques to analyzing the origin of geologic structures are preferred. Salary is commensurate with training and experience.

The successful candidate will participate in the design and construction of physical models, supervise the testing of physical properties, analyze model results and apply data to hypotheses of the origin of natural geologic structures. The principal deformation apparatus to be employed in this program is a 7000-G centrifuge designed for tectonic modeling. Send resume and names of three references to Edward C. Bingle, Bureau of Economic Geology, The University of Texas at Austin, University Station Box X, Austin, TX 78713-7508.

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GRADUATE ASSISTANTSHIPS AVAILABLE UNIVERSITY OF NEVADA, LAS VEGAS

The Department of Geoscience in conjunction with the Desert Research Institute is pleased to announce the availability of teaching and research assistantships for qualified students pursuing a Masters of Science degree in geology. Four primary areas of funded research are (1) Cambrian limestones in Antarctica, (2) Tertiary to recent volcanism and tectonism in the southern Basin and Range, (3) hydrogeology with emphasis in groundwater flow and contaminant transport in arid regions, and (4) Precambrian metamorphic rocks of southern Nevada. Other fields of research include Quaternary geology, tectonics and sedimentation, and structural geology.

Interested students should send a letter of inquiry to the Graduate Coordinator, Department of Geoscience; University of Nevada, Las Vegas; Las Vegas, Nevada 89154 or telephone (702) 739-3262.

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SURFICIAL PROCESSES UNIVERSITY OF WYOMING

The Department of Geology and Geophysics invites applications for a tenure-track position in the broad field of surficial processes. We are seeking a creative scientist who uses quantitative methods to study fundamental processes and demonstrates the potential for developing new research directions. Specific research interests are open and might include climate evolution, landscape development, sediment transport, hydrologic processes, neotectonics, or other relevant topics. The department has 21 faculty, 90 to 100 graduate students and a strong undergraduate program. We have active research programs in sedimentary basin analysis, environmental geochemistry, remote sensing, hydrology, and crustal evolution. In addition, the University has a strong emphasis on interdepartmental multidisciplinary projects. The successful candidate is expected to teach undergraduate and graduate courses, supervise graduate students, and establish a vigorous research program. PhD is required. The position will probably be filled at the assistant professor level, however higher rank is possible for an exceptional candidate. Interested persons should send a resume, a statement of research interests, and the names and addresses of at least 3 references to Dr. James I. Drever, Search Committee Chair, Dept. of Geology & Geophysics, University of Wyoming, Laramie, WY 82071. Closing date for applications is March 1. The University of Wyoming is an affirmative-action/equal-opportunity employer. We encourage applications from women and minorities.

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Tenure track, assistant professor, Geoscience appointment in the Dept. of Physics/Geoscience, beginning September, 1989 for an enthusiastic colleague having expertise in soil science and stratigraphy with computer familiarity preferred. A strong commitment to excellence in both teaching and research in support of BS and MS degrees offered in Geoscience is required. Candidates should have the doctorate by the time of appointment.

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The Department of Geological Sciences, McGill University, invites applications for two tenure-track positions in one or more of the following fields starting September '89: Groundwater Geology, Environmental Geology, Geochemistry (crustal/mantle, as well as surficial). We seek scientists with demonstrated research abilities. Successful applicants must have completed all the requirements for the Ph.D. before final appointment. In accordance with the requirements of Immigration Canada this ad is directed primarily to Canadian citizens and landed immigrants, but applications from qualified non-Canadians are also encouraged. Send curriculum vitae and the names of three professional referees to: Dr. Andrew Hynes, Geological Sciences, McGill University, 3450 University, Montreal, PQ H3A 2A7, Canada. Telephone: (514) 398-6768, FAX: (514) 398-4680. DEADLINE: March 31st, 1989.

FLUVIAL GEOMORPHOLOGIST COLORADO STATE UNIVERSITY

The Department of Earth Resources in the College of Forestry and Natural Resources at Colorado State University invites applications for a full-time faculty position in Fluvial Geomorphology beginning August 20, 1989, contingent upon available funds. Salary and rank are dependent on experience and accomplishments. Candidates should have a Ph.D. degree in Geology or a related field by the hire date and research and teaching experience. The appointee is expected to teach at the graduate and undergraduate levels, supervise M.S. and Ph.D. students, and develop an active research program emphasizing quantitative approaches which complement current programs in Geomorphology and Sedimentology.

The Department presently has 16 full-time faculty members covering the areas of geology, geography, and watershed science. Interdisciplinary research is conducted with other departments including Civil Engineering and Atmospheric Sciences. Research facilities include the Rainfall Erosion Facility and flumes located at the Engineering Research Center on the Foothills Campus. Applicants should send a vita, citation of publications, a statement of research and teaching interests, and names and addresses of four references to Frank G. Ethridge, Department of Earth Resources, Colorado State University, Ft. Collins, CO 80523. Deadline for applications is March 1, 1989. Colorado State University is an EO/AA employer.

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