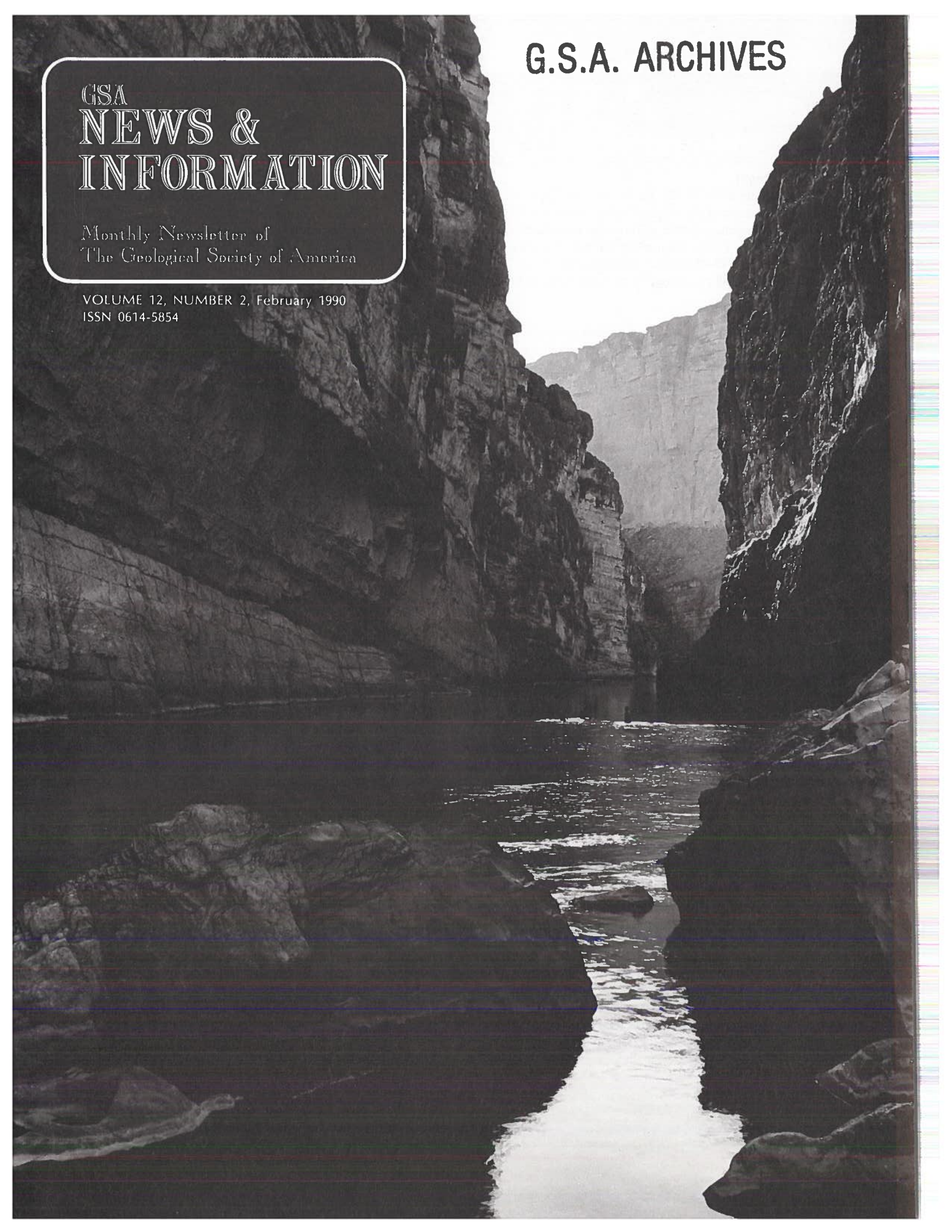


G.S.A. ARCHIVES

GSA
NEWS &
INFORMATION

Monthly Newsletter of
The Geological Society of America

VOLUME 12, NUMBER 2, February 1990
ISSN 0614-5854



GSA in Education

by Allison R. (Pete) Palmer

Food for Thought

At the symposium in St. Louis on the Crisis in Science Education, Ed Buchwald of Carleton College presented a thoughtful and thought-provoking talk that will soon be published in full in the *Journal of Geological Education* under the title "Differing Views of Science Education—Geologists and Science Educators." Perhaps the sampling below will encourage you to look more closely at what Ed has to say:

"Science educators prefer to build curriculum and instruction around major conceptual themes. . . . Conceptual themes which are appropriate to elementary school include such things as organization (orderliness), cause and effect, systems, scale, models, change, structure and function, discontinuous and continuous properties (variation), and diversity. . . . If we geologists are to be useful in educating the children of the world we must look at the fundamental concepts of science and how they are valuable to children and other nonscientists. We can be most helpful to teachers of science by describing the world in terms that fit fundamental conceptual themes and in terms that allow teachers to

see the commonalities of geology and other sciences. . . . [W]e need to emphasize those ideas in geology which have robust and far-reaching application in the rest of children's lives. . . . [W]hen we lobby for our favorite geological subject to be taught in school science, whether it is plate tectonics, dinosaurs, or environmental pollution, we need to keep in mind whether it will further conceptual knowledge and positive attitudes about science."

And for the academics among us, ". . . there is ample evidence that college science students do not develop conceptual reasoning skills when they are overwhelmed with unfamiliar terms, facts, and too many topics as is typical of college science courses. College science teachers need to rethink their role in educating the citizens who will eventually teach in elementary and secondary schools."

What should be our neighbor's level of effective understanding about the geosciences, and how can our neighbor appreciate and be supportive of the role of scientists of all persuasions in our complex society? Do our general courses reflect this concern, or do we focus on the 2% of our potential neighbors who might continue into science careers? Read Ed Buchwald's article and think about it.

Northeastern Section Announces 1990 Meeting Speakers

Wallace Broecker, Lamont-Doherty Geological Observatory, will give the keynote address at the 1990 Northeastern Section meeting in March in Syracuse, New York. He will speak on "Global Warming: What Does the Future Hold?" on Sunday, March 4, at 7 p.m. in the Schine Student Center at Syracuse University. The Welcoming Party for the Section's 1990 meeting will be held immediately after Broecker's address.

James Head, Brown University, will speak at the Section's banquet, Monday, March 5, on "Exploration of Venus: Implications for Early Earth."

If you plan to attend the Northeastern Section 1990 meeting, March 4-7, be sure to make lodging reservations by February 9. A Syracuse-Georgetown basketball game in Syracuse on Sunday, March 4, will place a heavy demand on accommodations in the area at the beginning of the Section meeting.

In Memoriam

Manual Alvarez, Jr.
Mexico City, Mexico
August 9, 1989

Ira H. Cram
Denver, Colorado
January 16, 1989

Frederic A. Bush
Greenwich, Connecticut

Harry F. Ferguson
North Huntingdon, Pennsylvania
November 4, 1989

Clifford C. Church
Bakersfield, California
April 1989

John H. McKeever, Jr.
Anchorage, Alaska
November 21, 1989

Front page: Santa Elena Canyon, Big Bend National Park, Texas. The Rio Grande incises Cretaceous Comanchean limestones of the Mesa de Anguila horst. This photo, by Dewey D. Sanderson, Marshall University, Huntington, West Virginia, won first place in the black and white category in the 1989 Photo Salon contest at the GSA Annual Meeting in St. Louis.

Vol. 12, no. 2 GSA News & Information February 1990

GSA NEWS & INFORMATION (ISSN 0164-5854) is published monthly by The Geological Society of America, Inc., with offices at 3300 Penrose Place, Boulder, Colorado. Mailing address is P.O. Box 9140, Boulder, CO 80301-9140, U.S.A. Second-class postage paid at Boulder, Colorado, and at additional mailing offices. **Postmaster:** Send address changes to GSA News, Membership Services, P.O. Box 9140, Boulder, CO 80301-9140.

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Prepared from contributions from the GSA staff and membership. Executive Director: F. Michael Wahl, Ph.D.; Managing Editor: Faith Rogers; Associate Editor: Lee Gladish; Production and Advertising Manager: James R. Clark; Advertising Coordinator: Ann H. Crawford; Production: Mona T. Gonzales and Joan E. Manly.

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Washington from the Inside

by Daniel R. Sarewitz

1989–1990 GSA Congressional Science Fellow

Several months after moving to Washington, D.C., to start my year as the fourth GSA Congressional Science Fellow, one thing is clear: I've learned a lot of new acronyms. It's a matter of survival. There was a time, early on, when I was greeted with withering sneers and unconcealed derision because of my ignorance of one acronym or another. In Washington, if you don't know the difference between OTA (Office of Technology Assessment), OMB (Office of Management and Budget), and OSTP (Office of Science and Technology Policy), you're finished. These days, I rarely utter a paragraph without including one or two good acronyms. I do this in small part to avoid the repetition of long, cumbersome names, but mostly I do it because it demonstrates that I am on the inside, that I walk the corridors of power.

Access to these corridors was provided by the American Association for the Advancement of Science (AAAS), which has orchestrated the Congressional Fellowship program for more than 15 years. Through their efforts, and the support of sponsoring societies such as GSA, about 25 scientists a year are placed in congressional offices. The fellowship program serves both the scientific and legislative communities. On the one hand, the fellows offer their expertise to Congress, and are thus a much needed technical resource. Conversely, the fellows gain insight into the legislative process, and especially into the manner in which scientific considerations influence (or don't influence) the formulation of public policy. Ideally, these dual roles help to facilitate communication and understanding between legislators and scientists.

Orientation

The fellowship program began with a grueling but enlightening two-week orientation period, organized by AAAS, which introduced us to a wide range of policy issues varying from foreign policy to AIDS to global environmental change to congressional ethics. We learned about the budget process, about how bills are passed, about the constitutional structure and history of the Congress, and even about the architecture of the Capitol Building itself. But most important, we learned about the currency that makes the government run, and that currency is *information*. The key to life here is knowing who to call to get the information you need. If you think it's tough keeping up with your own discipline in the technical literature, then imagine a city where the "literature" encompasses the entire spectrum of knowledge required to keep the country running. This is a humbling notion if one arrives from academia feeling a bit lofty about one's own arcane expertise.

Information does not exist in a vacuum. Although it may be the currency of policy formulation, it is useless without parallel mastery of two skills: compromise and networking. Both of these skills may be foreign to the scientific milieu, so they deserve brief comment. Compromise especially may have little or no place in the practice of science. We can imagine two colleagues engaging in a lifelong feud over the interpretation of slip direction on a fault or the taxonomy of some goniatite, but we cannot imagine these same two individuals agreeing that the slip on the fault was oblique just because one of them thinks it's transcurrent and the other thinks it's reverse. In Washington, however, it is exactly this type of agreement that allows the system to function. It is easy, from a distance, to moralize about such negotiation, but if you are a legislator and your home town has



just been flattened by a tornado, you don't want some colleague to vote against federal disaster assistance to your district just because you insisted on voting against an unnecessary dam project in his or her district.

Then there is networking, the ongoing process of expanding one's circle of contacts. This has nothing to do with social climbing, and everything to do with information. Networking is as important to life in Washington as breathing: the more people you know, the more access you have to information. You network on the phone, in the reception area of your office, at lunch, in a cab, at cocktail parties. Each of these venues requires a somewhat different technique. For example, networking at cocktail parties is actually called "schmoozing." Schmoozing may involve a higher percentage of inane chitchat than other forms of networking, but it also may provide a context for "off-the-record" exchanges of ideas or commitments. Schmoozing, as well as other face-to-face forms of networking, always terminates with an exchange of business cards.

A Place to Work

Armed with insights such as these, the science fellow embarks on the process of finding a suitable congressional office in which to work. The AAAS fellowship program has a tremendous reputation in Congress, and this year about 150 offices expressed interest in having a fellow on their staff. The reasons for this interest are varied, but two are paramount. First, the supply of well-informed scientific personnel working in Congress is limited, and as such we can provide a valuable service (information!). Second—and perhaps more important—we are free.

It is gratifying to feel wanted, for whatever reasons (compromise!), and most of us interviewed with 10 or 20 different offices, savoring our popularity and trying to come up with a perfect match. I sampled the personal offices of various Senators and Representatives, as well as several committee offices in both chambers. This interview process itself was extremely valuable because it offered the opportunity to talk to dozens of House and Senate staff members—the people who keep the Congress running—and to several members of Congress as well (networking!). Fairly early on I found myself drawn to the House personal offices, many of which seemed to be characterized by a frenetic pace of activity tempered

(continued on p. 40)

Report from Washington (continued from p. 39)

by a strong dose of good will and bad jokes. Senate personal offices, by comparison, seemed austere, and the committee offices positively academic.

In the end, I chose the office of Congressman George Brown, a Democrat who represents the California 36th district (Riverside-San Bernardino-Ontario area). My decision was based on personal chemistry as much as the interests and needs of Representative Brown himself, but as I will explain, this turned out to be a remarkably fortuitous choice.

Getting Down to Business

I was assigned a desk, Rolodex, and telephone, and I was ready for action. After consultation with the office staff director, I decided to focus initially on several areas, including undergraduate science education policy, trends in federal research and development funding, and international scientific cooperation with Latin American nations. For exactly four days prior to October 17, I accumulated reams of information(!) on these subjects, filling all of my shelves with important documents, and absorbing very little of what I read. Discussions with my fellow fellows indicated that they were doing exactly the same thing.

At this point I need to backtrack for a moment. During orientation, we were all warned numerous times that we would probably not work on any subject that would draw substantially on our area of technical knowledge. The general message was that, as "scientists," we might be expected to work on a broad range of issues that were generally considered to be "scientific." I, for example, had an interest in earthquake hazard mitigation legislation, but when I expressed this interest during my interviews, I was told the same thing in each office: "Forget about it. That's a non-issue until the next San Francisco earthquake."

Well.

The morning after the Loma Prieta earthquake, our office was in chaos as we were flooded with calls from reporters and other congressional offices, and we began to ride a wave of public attention and anxiety that, even now, has not diminished. It turns out that George Brown is widely considered to be one of the most knowledgeable members of Congress in the area of earthquakes and earthquake legislation. He was an original author of the bill that created the NEHRP (National Earthquake Hazards Reduction Program), which is the source of most federal funds used to study earthquakes and their effects.

Earthquake policy now occupies about two-thirds of my time. My responsibilities range from writing speeches and op-ed pieces to evaluating numerous claims of earthquake predictions ("My roosters went plumb crazy!") to analyzing proposed legislation that would establish a federal earthquake insurance program. In a sense, this all happened before I was fully prepared to take advantage of it. On the day of the earthquake, I didn't even know how to pronounce "NEHRP." It looked like "nerp" to me. So I went around saying "nerp" as often as possible, the better to establish my fledgling legitimacy. Several days later I discovered the mortifying truth: the correct pronunciation is "knee-hurp."

I've still got a lot to learn.

Daniel R. Sarewitz, GSA Congressional Science Fellow for 1989-1990, is working in the office of Congressman George E. Brown, Jr., 36th District of California, 2188 Rayburn House Office Building, Washington, DC 20515; (202) 225-6161. The fellowship, which is for a one-year term, is jointly sponsored by funds from GSA and a grant from the U.S. Geological Survey.



DNAG NEWS

by Allison R. (Pete) Palmer

More Kudos

The last chapter for the Centennial Special Volume *Archaeological Geology of North America* arrived on November 21. By the time you receive this, Norm Lasca, the senior editor, will have been here to look over galleys for the entire book, and the book should be off to the printer this month. It should be available by late spring. Many thanks to the 71 authors, listed below, for their patience while this volume was being brought to completion. These bring the total of authors in all completed DNAG volumes to 1327, and there's more to come!

- | | | |
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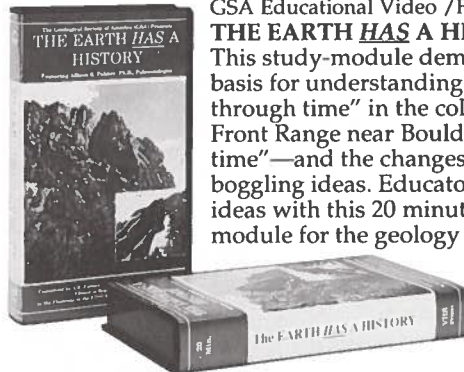
Progress Report

November was a slow month. There was a lot of internal production action (chapters to copy editing or typesetting, plates to color separation or printing, minor drafting, etc.), but the Caribbean, Surface Water, and Arctic volumes still lack the single key chapters to bring them completely under control. The last of the chapters for the volume on the Cordilleran orogen in the conterminous United States and one more megachapter for the Precambrian volume were received for peer review. As noted above, all chapters for the volume *Archaeological Geology of North America* are now to copy editing or beyond. This volume will be in the final paging process by the time you receive this.

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NEW!

GLACIAL LAKE WISCONSIN

by Lee Clayton and John W. Attig, 1989

For more than a century it has been known that part of the state of Wisconsin was once occupied by proglacial Lake Wisconsin, and many of its large-scale features have been known for 70 years or so. Still, it has received little detailed attention until recently, and this is the first comprehensive report on the lake. The authors report recent findings and relate these to our modern understanding of the late Pleistocene history of the western Great Lakes region. Some fine, old photographs are included; so are several excellent topographic maps covering the area, some of which is known to scientists and tourists alike as the Wisconsin Dells. An excellent companion for field trips.

MWR173, 88 p., ISBN 0-8137-1173-8, hardbound, **\$23.75**

Interaction of the Rocky Mountain Foreland and the Cordilleran Thrust Belt

edited by Christopher J. Schmidt and William J. Perry, Jr., 1988

Are the nature and degree of interaction of the thrust belt and foreland fairly well defined? The editors assumed so when they began this project, but soon found, from reviewer comments and from authors who described the same areas but arrived at completely different conclusions, that the style and degree of interaction in some areas (the Teton-Gros Ventre region, for example) were in considerable dispute. This new and massive work by leading scientists attempts to clarify some of the disputes and to focus new attention on the many problems yet to be resolved in the region where the Cordilleran thrust belt and the Rocky Mountain foreland merge or overlap. Here are thirty-two chapters presented in four sections, titled: Styles of Deformation in the Foreland; General or Comparative Structural Studies of Interaction and Overlap; Regional Structural and Geophysical Studies of Interaction and Overlap; and Sedimentologic and Stratigraphic Studies Related to Foreland/Thrust Belt Interaction. Included are three pocket-plates and a microfiche card.

MWR171, 596 p., 3 pocket plates, 1- 24X 98-frame microfiche, indexed, **\$78.00**

Geology and Paleontology of Seymour Island, Antarctic Peninsula

edited by R. M. Feldmann and M. O. Woodburne, 1988

This small, desolate island, located off the northeast tip of the Antarctic Peninsula, contains one of the most important records of Late Cretaceous and early Tertiary life in the Southern Hemisphere. The prophetic words of early explorer/scientist Otto Nordenskjöld about the importance of the deposits here have been borne out by spectacular paleontologic discoveries during the past ten years. The authors provide an enormous amount of information in 22 chapters.

MWR169, 574 p., indexed, list: \$85.00 **SALE \$63.75**

The Cretaceous System of Southern South America

by A. C. Riccardi, 1988

This synthesis of the existing knowledge of the Cretaceous System of southern South America gives a general account of the stratigraphy, magmatism, tectonism, paleontology, and paleogeography of Argentina, Bolivia, southern Brazil, Chile, Paraguay, and Uruguay. In the first part is a description of the Cretaceous rocks on the basis of generalized sections of the most important areas or basins; in the second part is a summary of patterns of plutonism, volcanism, tectonism, paleontology, transgressive-regressive history, and paleogeographic evolution.

MWR168, 168 p., 1 pocket-plate, indexed, list: \$32.00 **SALE \$24.00**

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

edited by Charles B. Hunt, 1988

Go back in time with this volume and experience the thrill of discovering brand new geologic concepts! Accompany one of America's greatest geologists, Grove Karl Gilbert, through these field notes of his trip into Utah's Henry Mountains in 1875-1876. Here is an exciting, first-hand record of this historic field trip during which Gilbert introduced the concept of laccoliths and demonstrated clearly that intrusive igneous masses can deform the rocks into which they intrude. Gilbert's notes became the guide for Charles Hunt's many seasons of work in the same area 60 years later. Now Hunt shares Gilbert's notes and maps with us, adding asides and clarifications of his own to create a fascinating combination of geologic history and frontier Americana. For young geologists, Gilbert's precise and elegant field sketches and descriptions provide a virtual course-book in field operations, techniques, and geologic sketching. An enjoyable book for all, and an essential companion for those exploring this scenic section of the great American West on their own.

MWR167, 234 p., list: \$36.00 **SALE \$22.50**

available soon ...

Geophysical Framework of the Continental United States

edited by L. C. Pakiser and W. D. Mooney, 1990

A comprehensive review and evaluation of our knowledge of the structure of the crust and upper mantle of the continental United States, exclusive of Alaska, as determined from geophysical observations. A valuable background source for information needed for research on the structure, composition, and geologic evolution of the continental crust and upper mantle. This volume, with 33 chapters, is a textbook approach presenting: the geophysical methods of studying the crust and upper mantle; a region-by-region review of crustal and upper-mantle structure; continental overviews based on the different geophysical methods; and geologic and petrologic syntheses based largely on the geophysical results.

MWR172, 840 p., 3 pocket plates, indexed, ISBN 0-8137-1172-X, hardbound, **\$92.50**

GSA *Bulletin* and *Geology* Contents

February 1990



The Geological Society of America

BULLETIN

Volume 102, Number 2, February 1990

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GEOLOGY

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Final Announcement

ROCKY MOUNTAIN SECTION, GSA, 43rd Annual Meeting

Jackson, Wyoming
May 21-23, 1990

The Rocky Mountain Sections of the Geological Society of America and the Paleontological Society will meet jointly at the Snow King Resort in Jackson, Wyoming. The meeting is sponsored by the University of Wyoming Department of Geology and Geophysics, assisted by the Geological Survey of Wyoming.

ENVIRONMENT

Lying amid magnificent scenery at the southern end of Jackson Hole, Wyoming, the town of Jackson is an extraordinary community and resort area. The traditional western atmosphere, abundant wildlife, and more than 30 art galleries and museums generate a vitality and an international flavor that attract visitors from all over the world. Jackson Lake and Yellowstone Park, to the north, are easily accessible by car from the meeting area. Geology of the area is varied and strikingly exposed. To the south and southeast are the Idaho-Wyoming thrust belt and classic foreland terranes of the Wind River Mountains and the Wind River and Green River basins. To the north and east are the Yellowstone and Absaroka volcanic areas, and to the west are the Teton Mountains and the Snake River plain.

Jackson in May can be winter or summer, with dramatic temperature changes daily. You should anticipate the possibility of snow, maybe even quite a bit of snow.

REGISTRATION

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

Preregistration: Participants are encouraged to preregister for the meeting to avoid delays and to assist the local committee in planning and making arrangements. Completed preregistration forms, with payment, must be postmarked no later than **April 15, 1990**. Payment is to be made in U.S. currency, checks, or money orders made payable to the University of Wyoming. Mail the completed forms and payment to:

Conferences and Institutes
University of Wyoming
Extended Studies Building
P.O. Box 3972
Laramie, WY 82071

Those planning to attend field trips and/or spouse/guest activities must preregister by April 15. Refunds for canceled preregistration will be made until April 15—less a \$15 clerical fee. After that date, no refunds will be made unless the event is canceled.

On-site Registration: Registration and pick-up of meeting materials will be from noon to 8 p.m. on Sunday, May 20, and from 8 a.m. to 5 p.m. May 21-23. Registration will be held in the lobby of the Snow King Resort, Jackson, Wyoming.

TRANSPORTATION

Flights into and out of Jackson. Meeting participants can make flight reservations with Snow King's in-house travel agency. Snow King is familiar with all airline schedules into and out of Jackson Hole and offers special discount group air fares. For more information, call them at (800) 522-5464, or if calling inside Wyoming, (800) 533-7669. Snow King and the University of Wyoming will

provide complimentary van service between the airport and the convention center.

Shuttle and Taxi Service. University of Wyoming vans will make regular trips between the Snow King Convention Center and other major hotels in Jackson. Vans will run every 15 minutes starting one hour before the meeting each morning, for two hours during lunch, and for one hour at the end of each day. Vans will run twice hourly during mid-morning and mid-afternoon. See the accompanying map for the shuttle van route. Additional information will be provided at the meeting. The taxi companies listed below are also available in the Jackson area.

A Caribou Cab—(307) 733-2888

A-1 Taxi Service—(307) 733-5089

Jackson Hole Transportation—(307) 733-3135

Car Rentals. The rental agencies listed below are available in the Jackson area. Budget Rent-A-Car has an office at Snow King, in addition to their airport office.

Avis Rent-A-Car (307) 733-3422

Budget Rent-A-Car (307) 733-2206

Dollar Saver Rent-A-Car (307) 733-2222

Freedom Rent-A-Car (307) 733-1656

Hertz (307) 733-2272

National Car Rental (307) 733-4132

Outdoor Rental Auto & Truck Rentals (307) 733-6449

Rent-A-Wreck (307) 733-5014

Student Drivers. Students will be needed to drive vans for premeeting field trips, during the meeting, and for postmeeting field trips. Meeting registration costs will be waived for students driving shuttle vans during the meeting. Depending on the field trip, drivers may be required to stay out overnight. Field trip registration, lodging, some meals, and a guidebook will be provided for field trip drivers. All interested persons must apply using the form on p. 46.

WELCOMING PARTY

A welcoming party will be held from 7 to 9 p.m. in the Grand Ballroom of the Snow King Resort on Sunday, May 20. Hors d'oeuvres and a no-host bar will be available.

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 15, 1990**, accompanied by full payment. No trip refunds will be made after May 5, 1990. The registration form is in this announcement.

All trips begin and end in Jackson unless otherwise noted. The trips are technical, and some can be physically rigorous. Please check with the trip leader if you have any questions.

(continued on p. 46)

Rocky Mountain Section (continued from p. 45)

All field trip participants will receive a complete guidebook. Guidebooks may also be purchased at the Field Trip Desk during the meeting. After the meeting, contact the Geological Survey of Wyoming, P.O. Box 3008, University Station, Laramie, WY 82071, (307) 766-2286.

For more detailed information, contact the field trip leader or the field trips coordinator: James C. Case, Geological Survey of Wyoming, P.O. Box 3008, University Station, Laramie, WY 82071, (307) 766-2286.

For specific information on transportation, contact Richard Weiland, Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006, (307) 766-3386.

Premeeting

1. Late Tertiary and Quaternary Faulting North and South of the Eastern Snake River Plain. The Grand Valley-Star Valley and Beaverhead faults are two late Cenozoic basin-and-range normal faults in eastern Idaho and western Wyoming. Extension on these faults resulted in deep basins filled with horst-derived clastic sediment and volcanic ash, ash-flow tuff, and basalt derived primarily from the eastern Snake River Plain. We will spend two days examining Miocene to latest Quaternary movement along these normal faults. The first day will be spent south of the Snake River Plain, first looking at latest Quaternary fault scarps (and maybe trenches across the scarps) in Star Valley, then at the tilted basin-fill deposits that exhibit gross faulting along the Grand Valley fault. On the second day, we will drive north of the Snake River Plain to Birch Creek Valley, where participants will see evidence of late Neogene subsidence, faulting, and tilting, and then visit several magnificent scarps in Quaternary sediments along the Beaverhead

fault. The field trip will focus on different styles of faulting, space-time variations in extension, and the relation of extension to volcanism on the Snake River Plain. Leaders: Mark H. Anders, Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY 10964, (914) 359-2900, ext. 361; David W. Rodgers, Idaho State University; James P. McCaig, Utah State University. Two days, May 19-20. Leave Snow King Resort at 8 a.m. on May 19; return to Jackson at 7 p.m. on May 20.

Limit: 25; cost: \$160, including two lunches, beverages, one night's lodging (double occupancy), transportation, and guidebook.

2. Early Tertiary Paleontology and Environments of Wyoming—Jackson to Fossil Butte National Monument and Fossil Basin.

This is a one-day loop tour of some of the important early Tertiary formations and paleontological sites of westernmost Wyoming. The primary destination is Fossil Basin. On the way, important sites within the Hoback and Pass Peak Formations of the Hoback Basin will be discussed. At Fossil Basin, we will visit the new (1990) visitor center at Fossil Butte National Monument. Leading experts will discuss the depositional environments and faunas of the Eocene Green River Formation in this area. We will visit an active quarry site within the Fossil Butte Member of the Green River Formation that has yielded a significant fauna in recent years. The return trip to Jackson will travel along the western border of the scenic Bridger-Teton National Forest. Leader: Brent Breithaupt, Department of Geology and Geophysics, University of Wyoming, P. O. Box 3006, Laramie, WY 82071-3006, (307) 766-3386. Sponsored by the Rocky Mountain Section of the Paleontological Society. One day, Sunday, May 20. Leave Snow King Resort at 7 a.m.; return at approximately 6 p.m.

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

3. Investigations of Geothermal Connections, Mercury Anomaly Mapping, Northern Boundary of Yellowstone National Park.

Geothermal development on private lands just north of Yellowstone National Park might affect thermal systems in the park, such as Mammoth Hot Springs. National Park Service research is attempting to delineate mantle faults and other permeable structures in the north boundary area by identifying mercury haloes and anomalies at the surface. In collaboration with new mapping activity and a U.S. Geological Survey research program, this study is helping to identify possible routes of hydrothermal ground water in the area. The field trip will offer stops at the Mammoth Hot Springs terraces and nearby Hot River and LaDuke hot spring, as well as several traverse lines where mercury anomalies suggest open, hydrothermally active structures. While it will not be possible to draw firm conclusions by the time of the trip, preliminary data will be shown that suggest interconnection between hydrothermal systems in some areas. While snow still blankets higher elevations in the park in mid-May, the Mammoth area is expected to be relatively dry and suitable for hiking. Leader: Wayne Hamilton, Research Office, National Park Service, Box 168, Yellowstone National Park, WY 82190, (307) 344-7381, ext. 2248. One day, Sunday, May 20. Leave Snow King Resort at 8 a.m.; return early evening.

Limit: 30; cost: \$60, including lunch, beverages, transportation, and guidebook.

4. Quaternary Geology of Jackson Hole, Wyoming. In northern Jackson Hole, we will examine evidence for three ages of glacial moraines and associated outwash deposited during three phases of the last glaciation. These three phases relate to changes among three glacial lobes along the southern margin of the Yellowstone-Absaroka ice mass caused by a westward shift in the ice-cap source. We will also examine scour basins now filled by lake sediments,

(continued on p. 48)

Student Driver Application

1990 GSA Rocky Mountain Section Meeting
Jackson, Wyoming

Complete and return to: Richard Weiland, Transportation Coordinator, Department of Geology and Geophysics, P.O. Box 3006, Laramie, WY 82071-3006. Applications must be received by February 30, 1990.

Name on driver's license _____

Date of birth _____

Social Security number _____

Driver's license number _____

State issuing driver's license _____

Expiration date of license _____

Preferred field trip to drive on _____

Preferred day of meeting to drive on _____

Are you presenting an abstract or poster session? _____

Mailing address _____

Phone (_____) _____ day (_____) _____ night

PREREGISTRATION FORM

Rocky Mountain Section Meeting, GSA May 21-23, 1989 Jackson, Wyoming

Important!!!

1. Full payment must accompany registration.
2. Register one: professional, student, spouse/guest.
3. You will receive a receipt by mail. Copy this form for your records.
4. Preregistration deadline is **April 15, 1990**.

Please print

Name _____

Name for badge _____

Professional affiliation _____

Registered as Professional Student Spouse/Guest (check one)

Address: _____

Phone: business (_____) _____ residence (_____) _____

GSA/PS Member yes _____ no _____ Member # _____
GSA Student Associate yes _____ no _____
Rocky Mountain Section yes _____ no _____
Speaker yes _____ no _____
Field Trip Leader yes _____ no _____

Preregistration (postmarked by April 15, 1990)

GSA member \$ 50.00 \$ _____
PS member 50.00 \$ _____
Nonmember 75.00 \$ _____
Student 35.00 \$ _____
Spouse/Guest 30.00 \$ _____

Registration (after April 15, 1990)

Student 35.00 \$ _____
Spouse/Guest 30.00 \$ _____
All others 75.00 \$ _____

FIELD TRIPS

Premeeting

1. Late Tertiary and Quaternary Faulting North and South of Eastern Snake River Plain (May 19-20) 160.00 \$ _____
2. Early Tertiary Paleontology and Environments of Wyoming (May 20) 40.00 \$ _____
3. Investigations of Geothermal Connections, Mercury Anomaly Mapping, Yellowstone National Park (May 20) 60.00 \$ _____
4. Quaternary Geology of Jackson Hole, Wyoming (May 20) 40.00 \$ _____

Postmeeting

5. Recent Developments in Thrust Belt Interpretation (May 24-26) 210.00 \$ _____
6. Teton Fault Zone and Structural Evolution of Teton Range (May 24) 55.00 \$ _____
7. Laramide Structural Styles, Northwest Wyoming (May 23-26) 220.00 \$ _____
8. Economic and Archean Geology of South Pass Greenstone Belt, Wind River Mountains (May 23-24) 130.00 \$ _____

GSA Rocky Mountain Section Business Luncheon (May 22), noon 11.00 \$ _____
Paleontological Society Business Meeting (May 22), 5 p.m. (no charge); check if attending _____
GSA Rocky Mountain Section Education Committee Meeting (May 21), 5 p.m. (no charge); check if attending _____

ACTIVITIES (members, spouses/guests)

Chuckwagon Dinner 30.00 \$ _____
Ecology and Geothermal Features of Yellowstone Tour 30.00 \$ _____

Total Fees: Enclose check or money order payable to the University of Wyoming \$ _____

I would like to charge this to: VISA MasterCard

Credit Card Number _____

Expiration Date _____

Signature of Card Holder _____

Refunds on canceled preregistrations (less a \$15 clerical fee) will be made until April 15, 1990. After that date, no refunds will be made except for canceled functions.

For information, phone (800) 448-7801 or (307) 766-3386; fax 307-766-3914.

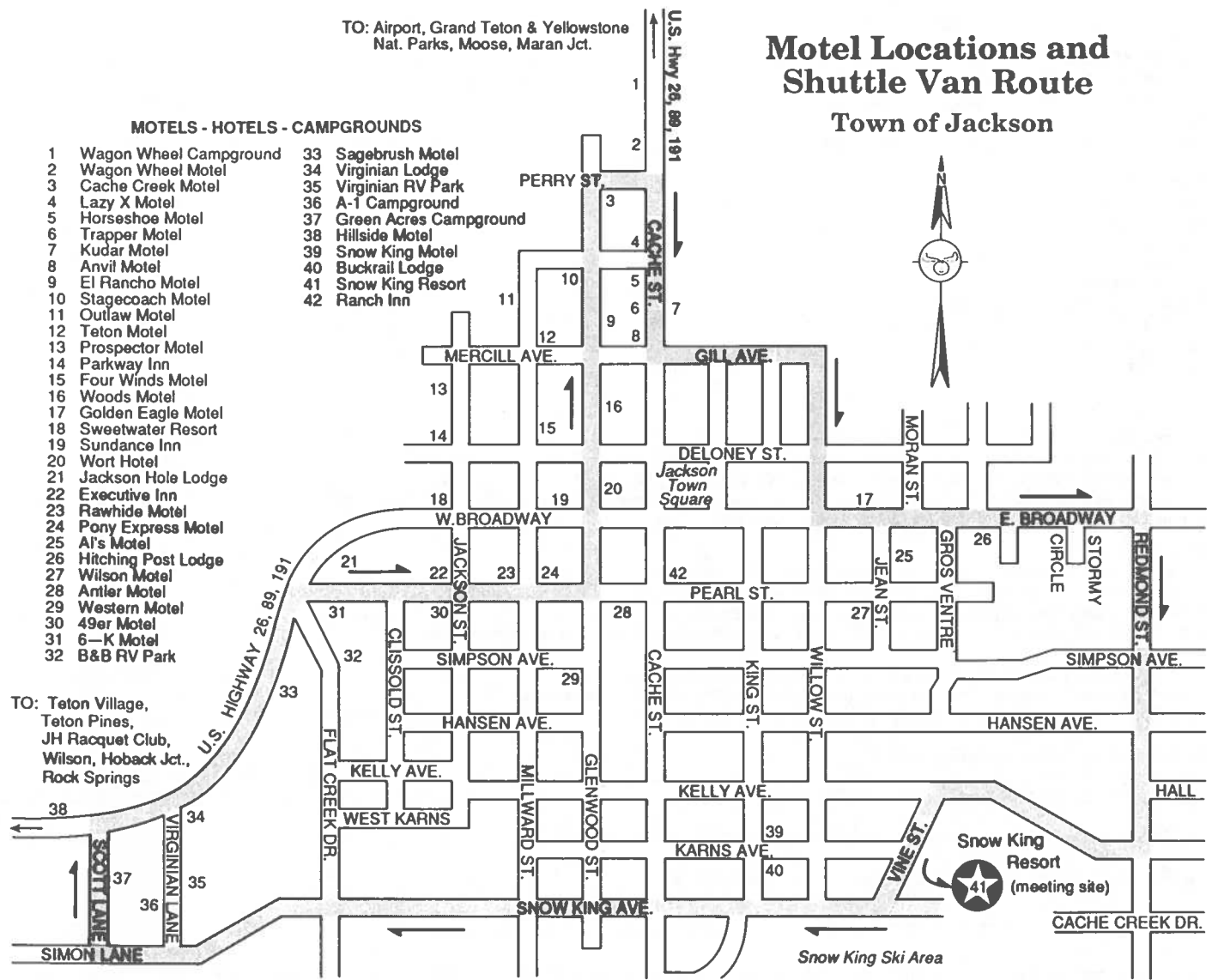
Mail completed registration forms and fees to:
Rocky Mountain GSA Meeting
Conferences and Institutes, P.O. Box 3972
University of Wyoming, Laramie, WY 82071

Rocky Mountain Section (continued from p. 46)
 evidence for glacial floods, relations between local Teton glaciers and those from the Yellowstone-Absaroka ice mass, moraines buried by outwash, and an early Wisconsin(?) outwash thickly mantled by loess. Relations between glacial deposits and movement on the Teton fault will be discussed, as will submerged paleo-shorelines downdropped by the Teton fault. In southern Jackson Hole we will examine deposits of the much more extensive Munger glaciation (Bull Lake?) which are mantled by loess containing a well-developed buried soil. Leaders: Kenneth L. Pierce, U.S. Geological Survey, Branch of Central Regional Geology, P.O. Box 25046, M.S. 913, Denver, CO 80225, (303) 236-1244; John M. Goode, National Park Service, retired. One day, Sunday, May 20. Leave Snow King Resort at 8 a.m.; return late afternoon. Limit: 40; cost: \$40, including lunch, beverages, transportation, and guidebook.

Postmeeting
5. Overview of Recent Developments in Thrust Belt Interpretation. This is a three-day field trip beginning in Jackson, Wyoming, and ending in Salt Lake City, Utah. The first two days will emphasize some insights into the geometry and kinematics of the northern and western thrust belt that have accompanied 15 years of

oil and gas exploration and recent field studies. Day one provides a transect through the eastern thrust belt that begins with the classic Snake River section across the Prospect, Darby, and Absaroka thrust sheets. We will spend the afternoon on a transect of the Crawford and Sheep Creek thrust plates, with stops at a salt decollement on Salt River Pass, the Crawford ramp anticline at Raymond Canyon, and decollement folds in the Jurassic Twin Creek Limestone above the Sheep Creek blind thrust. The second day will be spent viewing three of the western thrusts of the belt. We will visit the Meade thrust and its frontal imbricates at Montpelier and Georgetown canyons, Idaho; the Paris thrust at Paris Canyon, Idaho; the Laketown thrust at Laketown, Utah, and its footwall imbricates and folds at South Eden Canyon, Utah. The interpretation of linking geometries between these western thrusts will be discussed on the basis of recent mapping and deep-well data in Bear Lake Valley. The final day of the trip will begin in Kemmerer, Wyoming, with stops on the eastern edge of Fossil Basin to view the toe of the Absaroka thrust; at Evanston, Wyoming, to discuss the petroleum geology of the Absaroka thrust plate and to view the Acocks and Almy normal faults; at Echo, Utah, to view the tectogenic Echo Canyon Conglomerate; and two stops in Weber Canyon, Utah, to discuss basement involvement in thrusting and

(continued on p. 50)



Request for Room Reservations

Geological Society of America, Rocky Mountain Section May 20-23, 1990 Jackson, Wyoming

IMPORTANT! PLEASE READ.

Rooms have been reserved at each of four motels listed below for the meeting. Complete and return this form to the motel or hotel of your choice. Do *not* send this form to GSA!

All rooms will be assigned on a first-come first-served basis. Reservation requests must be received prior to *April 10, 1990*.

Please reserve the following hotel accommodations:

Single (1 bed/1 person) _____ # of rooms

Double (1 bed/2 persons) _____ # of rooms

Double/Double (2 beds/2 persons) _____ # of rooms

Extra persons _____ Suite _____

Special Requests: _____

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

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

Hotel (select from list, also see locator map): _____

Send acknowledgment to (enter name of person reserving room):

Name _____

Address _____

City/State/ZIP _____

Telephone _____

Names of room occupants _____

Hotel	No. of rooms	Single	Double	Double	Extra person	Suite
		1B/1P	1B/2P	Double 2B/2P		
1. Snow King Resort	190	\$45	\$55	\$55	\$10	\$100
2. Antler Motel	55 (newer)	45	55	55	4	
	15 (older)	36	42	42		
3. 49er Motel	80	45	55	55	4	
4. Motel 6	100	33		39	6	

(Children under 18 free with 2 adults at Motel 6)

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 p.m. If you will arrive later than 6 p.m., you must complete the late-arrival information below to have your room held until a later hour.

_____ I may arrive after 6 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 night's lodging. If prepayment is required, the hotel or motel will advise of deposit amount necessary when you receive your room confirmation.

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

Mail this form to the hotel or motel of your choice (see addresses). Or you may call for reservations, but you must indicate your affiliation with GSA to obtain the rates listed.

Accommodations with Reserved Space for Rocky Mountain Section Meeting, Jackson, WY 83001

Snow King Resort	Box SKI	(307) 733-5200	(800) 522-KING
		Wyoming residents call (800) 533-SNOW	
Antler Motel	Box 575	(307) 733-2535	(800) 453-4511
49er Motel	Box 1948	(307) 733-7550	(800) 453-4511

Other Accommodations in Jackson Area

Al's Motel	Box 575	(307) 733-2082
Anvil Motel	Box 486	(307) 733-3668
Best Western Parkway	Box 494	(307) 733-3143
Buckrail Lodge	Box 23	(307) 733-2079
The Bunkhouse (Hostel)	Box 486	(307) 733-3668
Cache Creek Motel	Box 918	(307) 733-7781 (800) 843-4788
El Rancho Motel	Box 1071	(307) 733-3668
Executive Inn Best Western	Box 1101	(307) 733-4340 (800) 528-1234
Four Winds Motel	Box 66	(307) 733-2474
Golden Eagle Motor Inn	Box 1107	(307) 733-2042
Hitching Post Lodge	Box 521	(307) 733-2606
Horseshoe Motel	Box 917	(307) 733-2287 (800) 541-5256
Jackson Hole Lodge	Box 1805-VC	(307) 733-2992 (800) 642-4567
Lazy X Motel	Box 604	(307) 733-3673

Outlaw Motel	Box 1247	(307) 733-3682
Pony Express Motel	Box 972	(307) 733-2658 or 3835
Prospector Motel	Box 494	(307) 733-4858
Ranch Inn	Box 596	(307) 733-6363
Rawhide Motel	Box 3289	(307) 733-1216
6-K Motel, Inc.	Box 955	(307) 733-2364
Snow King Lodge Motel	Box 1053	(307) 733-3480
Sundance Inn—B & B	Box I	(307) 733-3444
Teton Motel	Box 1135	(307) 733-3883
Trapper Motel	Box 1712	(307) 733-2648 (800) 341-8000
Virginian Lodge	Box 1052	(307) 733-2792 (800) 262-4999
Wagon Wheel Village Motel	Box 525	(307) 733-2357 (800) 323-9279
Western Motel	Box 1684	(307) 733-3291
Woods Motel	Box 1235	(307) 733-2953
Wort Hotel	Box 69	(307) 733-2190 (800) 322-2727

Campgrounds in Jackson

B & B Village	Box 1747	(307) 733-3121
Green Acres		
RV Park & Campground	Box 968	(307) 733-7178
Jackson Hole Campground	Box 2802	(307) 733-2927
Virginian Lodge RV Park	Box 1052	(307) 733-7189 (800) 262-4999
Wagon Wheel		
RV Park & Campground	Box 1463	(307) 733-4588

Rocky Mountain Section (continued from p. 48)

the resultant tectogenic sediments preserved in the Evanston Formation. Leaders: James Coogan, Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006, (307) 766-3386; Frank Royse, Jr., 6984 Urban Street, Arvada, CO 80004. Three days, May 24-26. Leave Snow King Resort at 7:30 a.m. on May 24; trip terminates at Salt Lake City airport at approximately 4 p.m. on May 26. Transportation will be provided back to Jackson on May 26 if needed.

Limit: 30; cost: \$210, including three lunches, beverages, two nights' lodging (double occupancy), transportation, and guidebook.

6. The Teton Fault Zone and Structural Evolution of the Teton Range.

A full-day field trip along the Teton normal fault will emphasize the Quaternary history and morphology of this youthful structure, neotectonic deformation of Jackson Hole, related earthquake hazards, and associated structural evolution of the Teton range and surrounding region. Stops will be made to demonstrate (1) the tectonic setting of the Teton fault within the framework of the Yellowstone-Snake River Plain volcanic system and older structures, (2) extent of faulting, segmentation, structural style, and geometry of the Teton fault exposed in Quaternary scarps, (3) examination of fault offsets in alluvial fans and moraines along the Teton range front, (4) neotectonic deformation of the valley floor, (5) earthquake hazards and hypothetical ground deformation associated with large earthquakes on the Teton fault, and (6) examination of the Teton fault at the 1989 trenching site. Participants should be prepared to hike at some of the stops on the trip. Some hiking areas may have somewhat steep, rocky slopes. Leaders: Robert B. Smith, Department of Geology and Geophysics, University of Utah, Salt Lake City, UT 84112-1183, (801) 581-7129; John O.D. Byrd, University of Utah; David Sussong, U.S. Geological Survey, Cheyenne, Wyoming. One day, Thursday, May 24. Leave Snow King Resort at 7:30 a.m.; return late afternoon.

Limit: 35; cost: \$55, including lunch, beverages, transportation, and guidebook.

7. Laramide Structural Styles, Northwest Wyoming. Participants on this trip will examine the structural style and kinematics of three Laramide uplifts: Rattlesnake Mountain near Cody, the Owl Creek Mountains near Thermopolis, and the Wind River Range. Exposures in Shoshone Canyon west of Cody provide an excellent profile through the corner of Rattlesnake Mountain where participants will examine the heterogeneity of basement and cover response to thrusting. In the Owl Creek Mountains we will examine evidence for a strike-slip duplex which may connect the Big Horn and Wind River thrust systems. At the south end of the Wind River Range, participants will observe spectacular exposures of the Mesozoic section at Red Grade. A fold over the toe of the Wind River thrust and tectogenic sediments along the south and west side of the Wind River Range document the timing of Laramide and post-Laramide uplift. Leaders: James Steidtmann, Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006, (307) 766-3386; Eric Erslev, Colorado State University; Earnest Paylor, Jet Propulsion Laboratory. Three and one-half days, May 23-26. Leave Snow King Resort late afternoon, May 23; return to Jackson evening of May 26. Late afternoon tour through Yellowstone National Park on May 23.

Limit: 35; cost: \$220, including one breakfast, three lunches, beverages, three nights' lodging (double occupancy), transportation, and guidebook.

8. Economic and Archean Geology of the South Pass Greenstone Belt, Southern Wind River Mountains. The South Pass greenstone belt, historically, has been Wyoming's most important source of gold and iron ore. The belt is a tripartite succession of

greenschist to amphibolite grade metamorphosed volcanic, plutonic, and sedimentary rock intruded by granite and granodiorite. Participants will examine outcrops of ultramafic and mafic schists, banded iron formation, and metagraywacke, the main emphasis being on gold deposits. Thus, on this excursion we will also examine auriferous shear zones and ore shoots and will take a brief historical tour of a ghost town reconstructed from the early gold rush era. Leaders: W. Dan Hausel, Geological Survey of Wyoming, Box 3008, University Station, Laramie, WY 82071, (307) 766-2286; Joseph Hull, Uppsala University, Sweden. One and one-half days, May 23-24. Leave Snow King Resort at 4 p.m. on May 23; return to Jackson late evening on May 24.

Limit: 20; cost: \$130, including one breakfast, one lunch, one steak dinner, beverages, one night's lodging (double occupancy), and guidebook.

SYMPOSIA

1. Geology of Wyoming. This is a special full-day symposium in honor of David Love and D. L. Blackstone. Conveners are Arthur W. Snoke and James R. Steidtmann, Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006.

2. Rocky Mountain Foreland Structure. Christopher Schmidt, Department of Geology, Western Michigan University, Kalamazoo, MI 49008-5150; Eric Erslev; Ron Chase.

3. Early Tertiary Paleontology and Environments of Wyoming. Sponsored by the Rocky Mountain Section of the Paleontological Society. Brent Breithaupt, Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006; Tom Bown.

4. Late Pleistocene Climate Changes in the Rocky Mountain Region. Eric Leonard, Department of Geology, Colorado College, Colorado Springs, CO 80903.

5. Alpine Hydrology and Hydrochemistry. James Drever, Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071.

6. Mathematical Geology. Leon Borgman, Department of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006.

TECHNICAL SESSIONS AND POSTERS

Technical sessions are scheduled as oral and poster sessions from Monday, May 21, 8 a.m., through Wednesday, May 23. For additional information, contact B. Ronald Frost, Department of Geology and Geophysics, P.O. Box 3006, Laramie, WY 82071-3006, (307) 766-4290.

PROJECTION EQUIPMENT

Projection equipment will be provided for 2" x 2" slides and a standard 35 mm carousel tray. Please bring your own carousel tray if possible. Two projectors and two screens will be provided for each session. Overhead projectors will *not* be available.

STUDENT SUPPORT

The GSA Rocky Mountain Section has funds available for grants to GSA Student Associates who are contributing to the meeting. Students are encouraged to apply for these grants. Most students who qualify will be funded to some degree. Send applications to Rocky Mountain Section Secretary

Kenneth E. Kolm

Department of Geology and Geological Sciences
Colorado School of Mines
Golden, CO 80401.

Application letters must be sent by *April 15, 1990*. Letters should include certification that the student is a GSA Student Associate in

(continued on p. 51)

Rocky Mountain Section (continued from p. 50)

the Rocky Mountain Section and is giving a paper or poster presentation at the Jackson meeting.

Students may also volunteer to operate projectors during the meeting. These student assistants will be provided room and registration. Contact Buff Moore, Department of Geology and Geophysics, University of Wyoming, (307) 766-2443, to volunteer.

PRIZE FOR BEST STUDENT PAPER IN PALEONTOLOGY

The Paleontological Society will award the current volume of *Paleobiology* as a prize to the presenter of the best student paper on a paleontological topic. The paper can be co-written with a nonstudent, but the student must be both the presenter and the senior (primary) author. To be eligible, the speaker must either be currently enrolled in a graduate or undergraduate program or have completed such a program no longer than one month prior to the meeting.

EXHIBITS

Exhibits will be adjacent to poster sessions and meeting rooms at the Snow King Resort. The cost for exhibit booths will be \$100 for nonprofit institutions and \$250 for commercial exhibitors. Space should be reserved before *April 15, 1990*. For further information and space reservations, prospective exhibitors should contact:

Henry Heasler
Department of Geology and Geophysics
University of Wyoming
P.O. Box 3006
Laramie, WY 82071

PUBLICATIONS

Additional copies of the Rocky Mountain Section *Abstracts with Programs* and the field trip guidebooks, published by the Geological Survey of Wyoming, may be purchased at the registration desk. Field trip guidebooks will be provided to participants in each field trip. After the meeting, field trip guidebooks may be purchased from the Geological Survey of Wyoming, P. O. Box 3008, Laramie, WY 82071-3008.

ACTIVITIES

Jackson is a lively western resort town located in one of the most scenic parts of the world. In town, you can play tennis and golf or enjoy the swimming pool, jacuzzi, and scenic chairlift ride located at Snow King Resort. Trail rides, hiking, and float trips are all available within a few minutes of Jackson. A variety of shops, restaurants, galleries, and museums are located within walking distance of the Snow King Resort.

Welcoming Party. A welcoming party will be held from 7 to 9 p.m. in the Grand Ballroom of the Snow King Resort on Sunday, May 20. Hors d'oeuvres and a no-host bar will be available.

Chuckwagon Dinner. Get ready for a cowboy-style chuckwagon dinner at 6 p.m. on Tuesday, May 22, at the Spring Creek Resort. The resort is located on a butte just north of Jackson and has a wonderful view of the Teton range. Dinner, served outside if the weather is good, will include barbecued chicken, pork ribs, and sausage, four different salads, corn on the cob, western baked beans, corn bread, and a choice of desserts and beverages. A no-host bar will supply alcoholic beverages. A western band will provide music for dancing. Limit: 70. Cost: \$30, including transportation to the Spring Creek Resort from Snow King and back.

Flyover of the Teton Area. See the greater Jackson area, Teton range, and southern Yellowstone Park by airplane (up to four flights per day, Sunday through Wednesday). The flights are in a

Cesna Turbo 206, which is a good mountain plane with excellent visibility (high wing configuration). The flight will last up to 1½ hours and will emphasize structural geology. Please check the appropriate box on the registration form to reserve a seat. Flights will be filled on a first-come, first-served basis. Leader and pilot: David Lageson, Montana State University. Limit: 4 passengers per flight. Cost: \$75 per person (to be paid at the plane), including transportation to and from the Jackson Hole airport and a field trip guide.

Ecology and Geothermal Features of Yellowstone National Park. An all-day guided tour of the flora, fauna, and geologic wonders in our country's first national park. This is a great chance to see how Yellowstone is recovering from the 1988 fires and to learn something about its ecosystem and unique geothermal characteristics. Specific stops within the park will be determined by the weather and accessibility. Set for Wednesday, May 23. Leaders: Don DeSpain (park biologist) and Rick Hutchinson (park geologist), Yellowstone National Park. Limit: 40. Cost: \$30, including transportation and a box lunch.

CHILD CARE

Day care for infants to older children will be available at professionally staffed local day-care centers. Several Jackson day-care centers allow drop-ins with advance reservations. Night Owls, a licensed agency child care service, will come to your hotel or motel; phone (307) 733-6136.

DETAILED INFORMATION

Requests for additional information or suggestions should be addressed to the General Chair:

Ronald W. Marrs
Department of Geology and Geophysics
University of Wyoming
P.O. Box 3006
Laramie, WY 82071-3006
(307) 766-2330

Reminder

Call for Nominations for 1990

Nominations for service as officers and councilors of GSA are due at headquarters by **FEBRUARY 15, 1990**.

Nominations for the Distinguished Service Award are due at headquarters by **MARCH 1, 1990**.

For procedures and additional information, please refer to the October 1989 issue of *GSA News & Information*, or call headquarters at (303) 447-2020.

Send your nominations and required backup and supporting materials **TODAY** to

Administrative Department
Geological Society of America
P.O. Box 9140
Boulder, CO 80301

Former GSA President Honored



Robert F. Legget, GSA Senior Fellow and 1966 President, has received the 1989 Royal Bank Award for Canadian Achievement. The award, honoring a Canadian "whose outstanding accomplishment makes an important contribution to human welfare and the common good," went to Legget in recognition of his contributions in earth sciences, engineering, and history and for his publications on transportation systems, especially railways and canals. Legget received the award, consisting of a substantial cash prize and a gold medal, at a banquet held in his honor in Ottawa in September 1989.

**GSA Foundation and Sections
Fund Student Travel Grants**

GSA Sections offer grants to students for travel to Section meetings, assisted by matching grants from the GSA Foundation. Travel grants are awarded and administered by the Sections. For information on travel grants for the 1990 Section meetings, contact the following.

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

North-Central: John S. Klasner, Department of Geology, Western Illinois University, Macomb, IL 61455, (309) 298-1275.

Northeastern: Kenneth N. Weaver, Maryland Geological Survey, 2300 St. Paul St., Baltimore, MD 21218, (301) 554-5503 or 554-5500.

Rocky Mountain: Kenneth E. Kolm, Department of Geology and Geological Sciences, Colorado School of Mines, Golden, CO 80401, (303) 273-3932 or 273-3800.

South-Central: Scott M. Ritter, School of Geology, Oklahoma State University, 105 Noble Research Center, Stillwater, OK 74078-0451, (405) 744-6358.

Southeastern: Michael J. Neilson, Department of Geology, University of Alabama, Birmingham, AL 35294, (205) 934-5102.



GSA HAT

The GSA hat comes in both a light blue cotton twill, embroidered with the GSA logo, and in dark blue corduroy, embroidered with the Society's name.

✂ **Clip and Mail to**
GSA Meetings Dept., P.O. Box 9140, Boulder, CO 80301

Name _____
 Address _____
 Address _____
 City _____
 State/ZIP _____
 Phone _____

Here is my order for the GSA HAT: \$9.50 ea.
 One size fits all
 Light blue cotton twill with GSA logo Quantity ____
 Dark blue corduroy with Society's name Quantity ____
 Total hats @ \$9.50 ea. \$ ____
 Add shipping & handling \$ 1.50
 TOTAL AMOUNT DUE: \$ ____

Make checks payable to: Geological Society of America

Remit in U.S. funds only NO PHONE ORDERS
 Allow three weeks for delivery ACCEPTED

Geological Society of America



CONGRESSIONAL SCIENCE FELLOWSHIP 1990-1991

The Geological Society of America invites applications for the 1990-1991 Congressional Science Fellowship. The Fellow selected will spend a year (September 1990-August 1991) in the office of an individual member of Congress or a congressional committee advising on a wide range of scientific issues as they pertain to public questions. Guided by the American Association for the Advancement of Science, the Fellow selects a congressional staff position in which he or she can work on major legislative issues.

CRITERIA

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

AWARD

The GSA Congressional Science Fellowship carries with it a \$35,000 stipend and 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, 1990

FOUNDATION NEWS

by Robert L. Fuchs

Trustees Meet in St. Louis

The annual meeting of the Foundation and its Board of Trustees was held on Tuesday afternoon, November 7, during the GSA Annual Meeting in St. Louis. At this meeting the terms of Michel T. Halbouty and John C. Maxwell expired. Both had served two consecutive terms, beginning with the formation of the Foundation in 1980. Board Chairman Phil LaMoreaux and the other Trustees expressed their thanks for this long period of service to the Foundation and to GSA. Peter T. Flawn and William B. Heroy, Jr. have been appointed to fill the vacant positions on the board created by the departures of Mike Halbouty and John Maxwell.

In addition to the change of Trustees, the Board elected officers for the coming year, as follows: P. E. LaMoreaux—Chairman, F. Beach Leighton—Vice Chairman, Robert L. Fuchs—President, F. Michael Wahl—Vice President, and Donna L. Russell—Secretary/Treasurer.

Discussions of finances, funds on hand, disbursements, and projected income occupied the major part of the meeting. The Foundation's current investment balance is \$653,000. The month of October was a high point in terms of number of contributions—371. Several large gifts are pending, including a bequest from a deceased member which is currently in the estate settlement process. An active major gift campaign is underway. A number of companies and foundations have been contacted for the purpose of supporting, through the Foundation, existing and new GSA programs in research, meetings, education, and publications.

The Foundation's 1990 administrative budget was set at \$110,000, of which 75% will be paid by GSA, and the balance will be derived from Foundation funds. The Trustees reviewed the financial situation of the Decade of North American Geology. Current sales and expense projections indicate that the DNAG program will still be in a deficit position by the end of 1991. However, with continued sales in 1992 and subsequent years, DNAG cumulative sales should exceed total expenses, including the original start-up advance of \$200,000 made by GSA to the Foundation. By the end of 1992, DNAG is projected to be in the black, barring unforeseen departures from the projections.

The Trustees then turned their attention to the small funds that are part of the Foundation's financial structure. The recent emphasis by the Foundation on these smaller accounts has resulted in increased gifts from the membership. The Women in Science Fund, for example, quintupled, from \$100 to over \$500 in November. Some of the Division funds remain extremely small, however, and present an administrative problem to the Foundation. The Trustees reaffirmed their policy in regard to creating a new, named fund. Such a special restricted fund shall be created only for an initial gift of at least \$5000, with the prospect that the fund will increase to \$10,000 within two years, or the money will revert to the Unrestricted Fund. In addition, earnings on a named fund are to be compounded and no disbursements made until the annual earnings level attains \$1000.

Meetings Manager Sue Beggs reported on Geotrips, Geohostels, and programs that the Society has initiated to provide a continuing scientific learning experience for members. GSA's very successful Grand Canyon excursion is an example of a Geotrip. Geohostels are planned to take place at selected college facilities across the country and will include both classroom and field sessions.

GSA President Ray Price briefed the Trustees on the Society's strategic planning function that has been put into place at the

beginning of GSA's second century. The formation of strategic objectives, creation of new program initiatives, and assessment of basic GSA policies will be carried out by a newly formed Committee on Long-Range Planning. Because of the financial implications of this activity, the Chairman of the Foundation or designee will be an ex-officio member of this committee. In order to be able to implement future plans and programs, Executive Director Mike Wahl pointed out that consideration must be given to an expansion of the headquarters facility. The task of financing this expansion will fall upon the Foundation.

The Foundation has recently been offered gifts of real estate, and the Trustees discussed a policy to be followed with respect to such gifts. Each gift of real property must be reviewed on a case-by-case basis, and while the Foundation welcomes such gifts, it must be cognizant of the special costs in title transfer and property maintenance and the potential environmental liability that might attach to a particular property.

The backbone of the Foundation is its Trustees, and the qualifications for the position of Trustee were discussed. It is important that persons qualified and desirous of becoming Trustees recognize fully the responsibilities and time requirements placed upon the individual. The Trustees reviewed the list of Trustee candidates from which future selections are made, and submitted this list to the GSA Council for its final approval. The Trustee candidates are reviewed at each meeting of the Board.

The Trustees agreed to hold the next board meeting in early April 1990, at GSA headquarters in Boulder.

1989 Antoinette Lierman Medlin Scholarship Awards

Eric J. Daniels of the University of Illinois has won the 1989 Medlin Scholarship Award. The award of \$1000 was made for Daniels's proposal "Coal Mineralogy of Pennsylvanian Anthracite Region." The selection was tops among ten very good proposals, according to the reviewers, who commented on the overall high quality of this year's applications. Last year's winner, Ken Ridgeway, was given an additional award of \$250 this year to help defray the cost of attending the GSA Annual Meeting to present his paper. Proposals for the 1990 award will be requested in the spring of 1990 and will be considered from any full-time graduate student conducting research in coal geology. The Medlin Award is handled by GSA's Coal Geology Division.

Donors to the Foundation, November 1989

Archeological Geology Division

Arthur Mirsky

Century Challenge

H. Richard Blank
Elwood R. Brooks
Allen J. Dennis
Michael C. Dix
Prodip Kumar Dutta
Louis A. Fernandez
Helen L. Foster
Gerald M. Friedman
Richard F. Hadley
Gaylord C. Hinshaw
Richard E. Kimmel

Allen Lowrie
Frances W. Pierce
Loughlon C. Quinn
James C. Ratté
Michael Raub
Robert H. Rutford
Charles B. Sclar
Charles Eric Seedorff
Irving H. Tesmer
Linda S. Trapasso

(continued on p. 55)



Donors to the Foundation, November 1989 (continued)

Decade of North American Geology

Amoco Foundation, Inc.
Glenn P. Biasi
Alton A. Brown
Richard Goldsmith
Eric M. Luttrell
H. A. Sellin

History of Geology Award

Arthur Mirsky

Hydrogeology Division Student Research

John M. Sharp

GEOSTAR Funds

Antoinette Lierman Medlin Scholarship

Aureal T. Cross
Alan Davis
Perry R. Donald
Lucy McCartan
Parker-Hannifin Foundation
Frances W. Pierce

Allen V. Cox Student Research

Clement G. Chase
Robert Glenn Johnson
Gordon A. Thrupp
L. Kenneth Wilson

GEOSTAR

John Eliot Allen
Albert W. Bally
Arthur P. Butler, Jr.
Lawrence R. Cann
Joan R. Clark
Norma Del Giudice
Roger L. Duba
Priscilla Crowell Grew
David G. Hardy
Richard A. Hoppin
Keith M. Hussey
Yngvar Isachsen
Ross L. Kinnaman
Ronald J. Lipp
Mark J. Logsdon
Joseph F. Machamer
Edward McFarlan, Jr.
William R. Muehlberger
Edmond G. Otton
Jonathan Rice
Jack A. Simon
Stephen H. Stow
Jerry J. Sweeney
Robert G. Wiese, Jr.
Peter Yuan

John T. Dillon Alaska Research Award

Wendell A. Koonitz
James P. McCalpin
Andrew Meigs
Sandra Phillips

Minority

J. David Bukry
Margaret Cooper
Robert A. Matthews
Lucy McCartan
Daniel P. Spangler

Publications

Kenneth J. Fulton

Research

Charles F. Berkstresser, Jr.
James A. Brown, Jr.
Thomas J. Carrington
Klaus-Werner Damm
Russell C. Evarts
John L. Fauth
Cyrus W. Field
Michael Fleischner
Gerald Friedman
Fraser E. Goff
Robert L. Gordon
William B. Hall
Vance T. Holliday
James C. Ingle, Jr.
Ted Keffer
Robert Metz
Eldridge Moores
Theodore M. Oberlander
Bruce James O'Connor
Richard K. Olsson
David A. Seeland
Larry N. Smith
Daniel P. Spangler
Robert C. Stephenson
Edward F. Stoddard
Bennie W. Troxel
Volker C. Vahrenkamp
Kenneth Russell Walker
Donald E. White

Unrestricted

David B. Bannan
Leon Baskin
Paul C. Bateman
Charles Noble Beard
Thomas H. Bedwell
Jean M. Berdan
Robert E. Bergstrom
Charles F. Berkstresser, Jr.
Nicholas L. Bogen
Glen F. Brown
Brian F. Butler
Dabney W. Caldwell
John R. Castano
Frederick W. Cater, Jr.
Walter M. Chappell
Doak C. Cox
John P. Crawford
Richard Crook, Jr.
Edward C. Dapples
Dan A. Davis
Joseph A. Dixon
Gordon P. Eaton
Rollin Eckis
Joseph L. Graf, Jr.
Jene D. Hendrickson
Claude Hillaire-Marcel
Alan D. Howard
Ralph H. Howe
Samir G. Khoury
James E. Kline
Paul A. Lindberg
Mark J. Logsdon
Robert W. MacLay
Steven E. Mains
Robin L. A. Marymont

John C. Maxwell
Neal E. McClymonds
Robert L. Melvin
E. Allan Merewether
Carl W. Myers
James T. Neal
Rodney D. Norby
William A. Oliver, Jr.
Elaine R. Padovani
Harriet E. Powell
Walter C. Pusey III
Charles B. Reynolds
Coleman R. Robison
Jean T. Shannon
C.F. Stewart Sharpe
Eugene S. Simpson
John A. Stokley
Thompson M. Stout
Desiree E. Stuart-Alexander
Koike Toshio
Adam R. Wasem
Virgil D. Winkler
James C. Witcher
Peter B. Yuan

Women in Science

Rachel Cowan
Lucy McCartan
Betty Ann Lindberg Skipp
Daniel P. Spangler

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

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Supporting The Advancement of Research

Enclosed please find my contribution in the amount of _____ to the GSA Foundation.

Please print:

Name _____

Address _____

City/State/ZIP _____

Phone _____

GSA Employment Service

Searching for a New Geoscientist?

When was the last time you hired a new employee? Did you waste time and effort in your search for a qualified geoscientist? Let the GSA computerized search file make your job easier.

How does it work? Complete the Employer's Request for Earth Science Applicants form on the following page. Remember to specify educational and professional experience requirements as well as the specialty area or areas of expertise your applicant should have. The GSA computer will take it from there.

You will receive a printout that includes the applicants' names, addresses, phone numbers, areas of specialty, type of employment desired, degrees held, years of professional experience, and current employment status. Resumés for each applicant are sent with each printout at no additional charge. In 1990, the cost of a printout of one or two specialty codes is \$150. (For example, in a recent job search

for an analyst of inorganic materials, the employer requested the specialty codes of geochemistry and petrology.) Each additional specialty is \$50. A printout of the entire applicant listing in *all* specialties is available for \$350. (Specialty codes printed in boldface type are considered major headings. If you select a specialty code printed in boldface type, your listing will contain applicants within the related subspecialties as well. If you request a listing of one of the subspecialties, applicants coded under the major category will be included but not those coded under the other related subspecialties.) If you have any questions about your personalized computerized search, GSA Membership Services will assist you.

The GSA Employment Service is available year long. However, GSA also conducts the Employment Interview Service each fall in conjunction with the Society's Annual Meeting (this year in Dallas, Texas, Oct. 29–Nov. 1). You may rent interview space in half-day increments from GSA. Our staff will schedule all interviews with applicants for you, the recruiter. In addition, GSA offers a message service, complete listing of applicants, copies of resumés at no additional charge, and a posting of all job openings.

South-Central Section Gives Awards to Students

James E. Anderson's paper "Diagenesis of the Lansing and Kansas City Groups, Upper Pennsylvanian, Northwestern Kansas and Southwestern Nebraska" won the GSA South-Central Section's Best Student Paper award for 1989. Anderson received a check for \$300 from the Section to defray his expenses in attending the 1989 GSA Annual Meeting in St. Louis and to pay for his GSA membership.

Other winners at the 1989 South-Central Section meeting were Dennis Schucker and Michael D. Blum.

The Section awarded undergraduate research grants to Debra C. Wheeler, Leslie L. Baker, and Jonathan D. Price.



South-Central Section Past Chairman Anthony Walton presents a check to James Anderson, first-place winner of the Section's 1989 Best Student Paper Award.

Looking for a New Job?

Are you looking for a new position in the field of geology? The GSA Employment Service offers an economical way to find one. Potential employers use the service to find the qualified individuals they need.

You may register any time throughout the year. Your name will be provided to all participating employers who seek individuals with your qualifications. If possible, take advantage of GSA's Employment Interview Service, which is conducted each fall in conjunction with the Society's Annual Meeting. The service brings potential employers and employees together for face-to-face interviews. Mark your calendar for Oct. 29–Nov. 1 for the 1990 GSA Annual Meeting in Dallas, Texas.

To register, complete the application form on the following page, prepare a one- to two-page resumé, and mail it with your payment to the address given below. One-year listing for GSA Members and Student Associates in good standing: \$30, non-members: \$60.

NOTE: If you plan to interview at the GSA Annual Meeting, GSA *must* receive your material **no later than August 15, 1990**. If we receive your materials by August 15, your record will be included in the information the *employers* receive prior to the meeting. Submit your forms early to receive maximum exposure! Don't forget to indicate on your application form that you would like to interview in November. Good luck with your job search!

**APPLICANT AND EMPLOYER FORMS ARE
BACK-TO-BACK ON THE FOLLOWING PAGES**

For additional information and submission of forms, please contact

T. Michael Moreland
Manager, Membership Services
Geological Society of America
P.O. Box 9140
Boulder, CO 80301
(303) 447-2020



The Geological Society of America

3300 Penrose Place • P.O. Box 9140 • Boulder, Colorado 80301

EMPLOYER'S REQUEST FOR EARTH SCIENCE APPLICANTS

(Please type or print legibly)

Name _____ Date _____

Organization _____

Mailing address _____

City _____ State _____ Zip code _____ Telephone number _____ (Area code) _____ Number _____

SPECIALTY CODES (see list below)

List the specialty code numbers that you wish to order, or check here if you want entire file of applicants in ALL specialties.

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

POSITION DATA: What position(s) do you expect to fill? _____

In what area(s)? _____

Degree requirements _____ Number of positions available _____

SPECIALTY CODES

100. Economic Geology	224. stable isotopes	352. statistical geology	501. exploration	630. Science Editing
101. coal geology	225. geochronology	400. Mineralogy	502. subsurface stratigraphy	650. Sedimentology
102. geothermal, etc.	250. Geomorphology	401. crystallography	520. Petrology	651. sedimentary processes
103. metallic deposits	300. Geophysics	402. clay mineralogy	521. igneous	652. sedimentary environments
104. nonmetallic deposits	301. seismic	410. Museum (curator)	522. metamorphic	720. Stratigraphy
105. mining geology	302. gravity/magnetics	420. Oceanography	523. sedimentary (clastic)	750. Structural Geology
120. Engineering Geology	303. seismicity	421. marine geology	524. sedimentary (carbonate)	751. tectonics
150. Environmental Geology	304. paleomagnetism	422. coastal geology	525. experimental	752. tectonophysics
160. Public Education & Communication	320. Hydrogeology	450. Paleontology	550. Planetology	753. rock mechanics
200. General Geology	321. hydrochemistry	451. invertebrate	575. Quaternary Geology	800. Volcanology
220. Geochemistry	322. ground water	452. vertebrate	600. Regional Geology	
221. organic	323. surface water	453. micropaleontology	620. Remote Sensing	
222. high temperature	330. Library	454. paleobotany	621. photogeology	
223. low temperature	350. Mathematical Geology	455. paleoecology	622. photogrammetry	
	351. computer science	500. Petroleum Geology		

Applicants seeking employment in:

- Academic
 Government
 Industry
 Other _____

Minimum degree required

- None
 B.A. or B.S.
 M.A. or M.S.
 Ph.D.

Minimum professional experience

- None
 1-5 yrs.
 6-plus

Experience desired (yrs.)

	None	1-5	6-plus
Administrative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exploration/Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Employment in: U.S. only U.S. with foreign assignments Either

Foreign Languages: French German Russian Other _____ Not required

I am interested in interviewing applicants through the GSA Employment Service at the 19____ Annual Meeting in _____

See attached sheet for current fee schedule.

1. I agree to use this service for valid recruiting purposes.
 2. I agree that no placement charges will be assessed to any applicant participating in the GSA Employment Matching Service.

Total fee enclosed\$ _____
or invoice requested\$ _____

Signature (required) _____



The Geological Society of America

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N&I 0290
FOR ACCTG. USE ONLY
Rec. \$30 \$60
Ck # _____
Ltr. _____
GSA _____
Add. _____

APPLICATION FOR EMPLOYMENT MATCHING SERVICE (Please type or print legibly with black ink)

NAME (Mr. (Miss
(Mrs. (Ms.
(Dr. (last name first) _____ Date _____

Mailing Address _____
City _____ State _____ Zip Code _____

Date Available _____ Telephone (_____) _____
area code Business Home Visa _____
If not U.S. citizen, list visa _____

Members of GSA ONLY: Check here if you DO NOT WISH to have this number included in the Membership Directory

EXPERIENCE

Must use specialty codes listed below. Choose three that best describe your expertise in order of importance.

* 1. _____ 2. _____ 3. _____

TYPE OF POSITION DESIRED

Interested in
 Academic
 Government
 Industry
 Other

Specific interest
 Administration
 Exploration/Production
 Field
 Research
 Teaching

Will accept employment in
 U.S. only
 U.S. with foreign assignments
 Either

* PRESENT SPECIALTY

Choose one from codes listed below _____ YEARS EXPERIENCE IN THIS SPECIALTY _____

PRESENT EMPLOYER _____

Give number of years experience for any of the following that are applicable:

Administrative _____ Exploration/Production _____ Field _____ Research _____ Teaching _____ Total geological working experience _____

KNOWLEDGE OF FOREIGN LANGUAGES: French _____ ; German _____ ; Russian _____ ; Spanish _____ ; Other _____

ACADEMIC TRAINING

College or University	Degree (rec'd or expected)	Year	Major	Minor

Postgraduate work beyond highest degree in (field) _____ Number of years _____

SPECIALTY CODES

Select those that best describe your ability. Use codes in bold face only when other breakdowns are inadequate.

- 100. Economic Geology
- 101. coal geology
- 102. geothermal, etc.
- 103. metallic deposits
- 104. nonmetallic deposits
- 105. mining geology
- 120. Engineering Geology
- 150. Environmental Geology
- 160. Public Education & Communication
- 200. General Geology
- 220. Geochemistry
- 221. organic
- 222. high temperature
- 223. low temperature
- 224. stable isotopes
- 225. geochronology
- 250. Geomorphology
- 300. Geophysics
- 301. seismic
- 302. gravity/magnetics
- 303. seismicity
- 304. paleomagnetism
- 320. Hydrogeology
- 321. hydrochemistry
- 322. ground water
- 323. surface water
- 330. Library
- 350. Mathematical Geology
- 351. computer science
- 400. Mineralogy
- 401. crystallography
- 402. clay mineralogy
- 410. Museum (curator)
- 420. Oceanography
- 421. marine geology
- 422. coastal geology
- 450. Paleontology
- 451. invertebrate
- 452. vertebrate
- 453. micropaleontology
- 454. paleobotany
- 455. paleoecology
- 500. Petroleum Geology
- 501. exploration
- 502. subsurface stratigraphy
- 520. Petrology
- 521. igneous
- 522. metamorphic
- 523. sedimentary (clastic)
- 524. sedimentary (carbonate)
- 525. experimental
- 550. Planetology
- 575. Quaternary Geology
- 600. Regional Geology
- 620. Remote Sensing
- 621. photogeology
- 622. photogrammetry
- 630. Science Editing
- 650. Sedimentology
- 651. sedimentary processes
- 652. sedimentary environments
- 720. Stratigraphy
- 750. Structural Geology
- 751. tectonics
- 752. tectonophysics
- 753. rock mechanics
- 800. Volcanology

* Résumé must be attached, LIMITED TO TWO PAGES, typewritten on one side only, to be acceptable for reproduction to employers. Include your name, address, and phone number; concise details of work experience; and majors/minors on degrees.
* Fee: \$30 if you are a Member or Student Associate of GSA in good standing (Member # _____) \$60 if you are not a member of GSA. Payment in U.S. funds (check, money order, or charge information MUST ACCOMPANY FORM). MAKE CHECK PAYABLE TO THE GEOLOGICAL SOCIETY OF AMERICA.

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GSA Goes Kiwi

New Zealand: North and South Islands

Dates (tentative): February 15 to March 8, 1991; 21 days

Itinerary: Our trip starts on February 15 in Auckland, from which we will travel south, through Rotoroa toward Wellington. The primary geological focus will be volcanological and geothermal features, including the Wairakei geothermal area, Lake Taupo, and the mighty volcanic trio of Mounts Tongariro, Ngauruhoe, and Ruapehu. The insight of interpretive specialists will help us to explore the unique cultural and biological story of New Zealand.

We will cross to South Island to visit the spectacular Banks Peninsula volcanics, Fiordland National Park, Milford Sound, Fox Glacier, Te Anau, Mount Cook, and the "English" city of Dunedin. In addition to glacial areas, the trip focuses on metamorphic facies, gold mineralization, alpine faulting, and the features of the mountain high country. This fascinating trip will end in Christchurch on March 8 for the return trip home.

Leader: Douglas S. Coombs, University of Otago, Dunedin, South Island, will coordinate the scientific leaders. He is a GSA Honorary Fellow and was elected Foreign and Commonwealth Member of the Geological Society of London "in recognition of . . . outstanding contributions in the fields of mineralogy, and igneous and metamorphic petrology." He has led an impressive number of field trips in New Zealand, and has been known to play a mean game of cricket.

Lodging: A range of accommodations, including hotels, inns, bed and breakfast establishments, and occasionally field stations.

Transportation: Bus and van; ferry between North and South Islands.

Land cost: \$2525 for 21 days; \$125 special discount for GSA members. There is also an advance registration discount. Airfare to and from New Zealand is additional.

Included: Island transportation by bus, van, and ferry; lodging (double occupancy); most meals (except those enjoyed during free time); entrance fees and applicable taxes; transfers and tours; luggage handling; and educational materials. There will be a small additional charge for those wanting single accommodations. If they wish, solo travelers may be paired to share accommodations.

Not included: Airfare to and from New Zealand; meals during free time; optional activities such as overflights of glaciers or to White Island, raft trips, or visits to sheep farms (to name a few of the possibilities); personal items such as laundry, liquor, gifts, excess baggage fees, or other items not specifically listed in the final brochure; side trips to places such as Tahiti, Samoa, or Australia.

Limit: 36 persons plus leaders. The trip will fill quickly, so register as soon as you can. Your \$200 deposit will be refunded through November 14, 1990 (less \$25), so you can secure a place on the trip early with almost no risk.

Registration: Registration is open to everyone, but GSA members will be given preference during the advance registration period up to June 30, 1990. Registrants should be in good health. Although there will be no mountaineering or first ascents, this trip will include moderate activity, especially because tramping (hiking) is a national pastime in New Zealand.

Airfares: The current 1990 roundtrip airfare on United Airlines from Los Angeles is \$1101 (plus tax). Air reservations are not included in the GSA trip price. We are making arrangements for a group fare, and we will keep Kiwi-trippers posted. A GSA travel agent will be designated to help with questions and concerns about travel to New Zealand and to other areas of the South Pacific.

Interested? Call today: 1-800-472-1988 for the complete 1991 New Zealand brochure, or send the coupon below.

If you would like to discuss the trip, call Sue Beggs, GSA Meetings Manager, or Delores Jones, Registration Coordinator.

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3 Week Geological Vacation Trip

Guests welcome

GSA members will receive a special discount

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1989 GSA Short Course Notes For Sale

A limited supply of short course notes is available from some of the courses presented at the St. Louis Annual Meeting. For information, please call:

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Meetings Department
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GSA NEW ZEALAND 1991

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GSA Annual Meetings

1989

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FUTURE

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Cincinnati	October 26–29	1992
Boston	October 25–28	1993
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1990

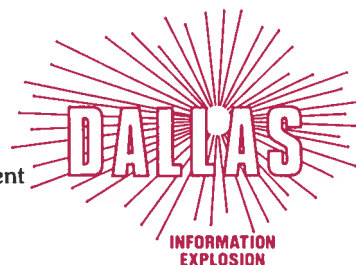
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October 29–November 1, 1990

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 April 1

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 July 11

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 August

For information
 GSA Meetings Department
 P. O. Box 9140
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Joint Technical Program Committee
 August 10–11

Preregistration due
 September 28

1991

GSA Annual Meeting • San Diego, California
October 21–24, 1991

Call for field trip proposals

The deadline for submitting a field trip proposal is *June 15, 1990*. Selection of trips will be made shortly thereafter, leaving 16 months for preparing guidebooks and making arrange-

ments. To submit your proposal or for further information, contact the 1991 Field Trip Chairman:

Michael J. Walawender
 Dept. of Geological Sciences
 San Diego State University
 San Diego, CA 92182
 (619) 594-5586

GSA Section Meetings

1990

<i>Section, Location, Dates</i>	<i>Contact</i>
Cordilleran Tucson, Arizona March 14–16	William Dickinson Department of Geosciences University of Arizona Tucson, AZ 85721 (602) 621-6024 or -4051
North-Central Macomb, Illinois April 26–27	John S. Klasner Department of Geology Western Illinois University Macomb, IL 61455 (309) 298-1151
Northeastern Syracuse, New York March 4–7	Henry T. Mullins Heroy Geology Laboratory Syracuse University Syracuse, NY 13244-1070 (315) 443-2672 (dept.) 4706 (direct) Donald I. Siegel Heroy Geology Laboratory (315) 443-3607 (direct)

<i>Section, Location, Dates</i>	<i>Contact</i>
Rocky Mountain Jackson, Wyoming May 21–23	Ronald W. Marrs University of Wyoming Dept. of Geology & Geophysics P. O. Box 3006 Univ. Station Laramie, WY 82071 (307) 766-3386
South-Central Stillwater, Oklahoma March 5–6	Scott M. Ritter Oklahoma State University School of Geology 105 Noble Research Center Stillwater, OK 74078-0451 (405) 744-6358
Southeastern Tuscaloosa, Alabama April 5–6	William A. Thomas Department of Geology University of Alabama P. O. Box 1945 Tuscaloosa, AL 35487-1945 (205) 348-5095

MEETINGS

(Asterisk indicates new or changed information)

1990

2nd International Brachiopod Congress, February 5-9, 1990, Dunedin, New Zealand. Information: J. D. Campbell and D. E. Lee, 2nd International Brachiopod Congress, Geology Dept., University of Otago, P.O. Box 56, Dunedin, New Zealand; phone 64-024-791-100, ext. 7526; fax 64-024-741-607.

Source Rocks, Generation, and Migration of Hydrocarbons and Other Fluids in the Southern Midcontinent—Symposium/Workshop, February 6-7, 1990, Norman, Oklahoma. Information: Kenneth S. Johnson, Oklahoma Geological Survey, 100 E. Boyd, Room N-131, Norman, OK 73019; (405) 325-3031.

Workshop on Tertiary Stratigraphy of Highly Extended Terranes, Southern Basin and Range Province, February 9-12, 1990, Zzyzx Springs, California. Information: Rick Hazlett, Dept. of Geology, Pomona College, 609 N. College Ave., Claremont, CA 91711-6339; (714) 621-8000, ext. 2952.

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

American Association for the Advancement of Science Annual Meeting, February 15-20, 1990, New Orleans, Louisiana. Information: AAAS Meetings Office, 1333 H St., N.W., Washington, DC 20005; (202) 326-6448.

National Water Well Association/Association of Ground Water Scientists and Engineers Cluster of Conferences, "Agricultural Impacts on Ground Water Quality," "Ground Water Geochemistry," "Ground Water Management and Wellhead Protection," and "Environmental Site Assessments: Case Studies and Strategies," February 20-22, 1990, Kansas City, Missouri. Information: NWWA/AGWSE, P.O. Box 182039, Dept. #017, Columbus, OH 43218; (614) 761-1711.

Workshop on a Deep Borehole in the Taconics, February 22-23, 1990, Troy, New York. Information: G. Friedman, Northeast Science Foundation, Inc., Box 746, Troy, NY 12181-0746, (518) 273-3247; or C. Skokan, Dept. of Geophysics, Colorado School of Mines, Golden, CO 80401, (303) 273-3474.

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

GSA South-Central Section, March 5-6, 1990, Stillwater, Oklahoma. Information: Scott M. Ritter, School of Geology, Oklahoma State University, 105 Noble Research Center, Stillwater, OK 74078-0451; (405) 744-6358.

GSA Northeastern Section, March 5-7, 1990, Syracuse, New York. Information: Henry T. Mullins or Donald I. Siegel, Dept. of Geology, Heroy Geology Lab., Syracuse University, Syracuse, NY 13244; (315) 443-4706 or 2672.

SIAM Conference on Applied Probability in Science and Engineering, March 5-7, 1990, New Orleans, Louisiana. Information: SIAM Conference Coordinator, 3600 University City Science Center, Philadelphia, PA 19104-2688; (215) 382-9800; fax 215-386-7999.

Subsurface Science Program Annual Meeting, March 5-7, 1990, Germantown, Maryland. Information: Judith Wright, P.O. Box 999, MS K6-84, Richland, WA 99352; (509) 376-7915, fax 509-376-7915.

AAPG Southwest Section Convention, March 11-13, 1990, Wichita Falls, Texas. Information: Will Tucker, Technical Program Co-Chairman, 825 MBank Building, Wichita Falls, TX 76301.

Prospectors and Developers Association of Canada 58th Annual Convention, March 11-14, 1990, Toronto, Ontario. Information: Cary McLeod, Prospectors and Developers Association of Canada, Suite 1002, 74 Victoria St., Toronto, Ontario M5C 2A5, Canada; (416) 362-1969; fax 416-362-0101.

Symposium on the Application of Geophysics to Engineering and Environmental Problems, March 12-15, 1990, Golden, Colorado. Information: SAGEEP '90, 133 S. Van Gordon, Suite 200, Lakewood, CO 80228; (303) 980-1648.

American Institute of Hydrology: Minimizing Risk to the Hydrologic Environment, March 12-16, 1990, Las Vegas, Nevada. Information: AIH, 3416 University Ave. S.E., Minneapolis, MN 55414; (612) 379-1030.

21st Annual Lunar and Planetary Science Conference, March 12-16, 1990, Houston, Texas. Information: Pamela Jones, Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058; (713) 486-2150.

GSA Cordilleran Section, March 14-16, 1990, Tucson, Arizona. Information: William R. Dickinson, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721; (602) 621-4051.

***Second Asia/Pacific Mining Conference**, March 14-17, 1990, Jakarta, Indonesia. Information: Irene Low, Cahners Exposition Group (S) Pte Ltd, 1 Maritime Square, #12-01 World Trade Centre, Singapore 0409; phone 65-2711013; fax 65-274 4666; Telex RS 39200 CEG SP.

9th Industrial Minerals International Congress, March 24-28, 1990, Sydney, Australia. Information: Diana Little, Industrial Minerals, Park House, Park Terrace, Worcester Park, Surrey KT4 7HY, England; phone (01) 330-4311; fax 01-337-8943.

***Colorado School of Mines SEG Student Chapter Symposium on Megastructures and Associated Ore Deposits**, March 28, 1990, Golden, Colorado. Information: Craig Ford, Dept. of Geology, Colorado School of Mines, Golden, CO 80401; (303) 273-3800.

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

Engineering Geology and Geotechnical Engineering 26th Symposium, April 4-6, 1990, Pocatello, Idaho. Information: Lee Robinson, Engineering Geology Symposium, Box 8371, Idaho State University, Pocatello, ID 83209; (208) 236-3273.

GSA Southeastern Section, April 5-6, Tuscaloosa, Alabama. Information: William A. Thomas or C. Michael Leshner, SE-GSA, Dept. of Geology, University of Alabama, Tuscaloosa, AL 35487.

Ninth Symposium on Coastal Sedimentology, April 5-6, 1990, Tuscaloosa, Alabama. Information: Richard Hummel, Energy and Coastal Geology Division, P.O. Box 0, Tuscaloosa, AL 35486.

(continued on p. 64)

MEETINGS (continued from p. 63)

Conference on Subsurface Contamination by Immiscible Fluids, April 18-20, 1990, Calgary, Alberta. Information: K. Udo Weyer, Weyer Corp., Inc., 4827 Vienna Dr. N.W., Calgary, Alberta T3A 0W7, Canada; (403) 286-3777; fax 403-247-6074.

International Conference on High-Level Radioactive Waste Management, April 8-12, 1990, Las Vegas, Nevada. Information: American Society of Civil Engineers, 345 East 47th St., New York, NY 10017; (212) 705-7543; fax 212-421-1826; telex 422847 ASCE UI.

8th Petroleum Congress of Turkey, April 16-20, 1990, Ankara, Turkey. Information: Aytac Eren, Mudafaa Cad. 22, 06420 Bakanliklar, Ankara, Turkey; phone 90-4-117-91-60/288-285; telex 42-426 TPAO-TR.

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

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

European Geophysical Society XV General Assembly, April 23-27, 1990, Copenhagen, Denmark. Information: EGS Office, Postfach 49, D-3411 Katlenburg-Lindau, Federal Republic of Germany; phone 49-5556-1140; fax 49-5556-4709; telex 965564 zil d.

GSA North-Central Section, April 26-27, 1990, Macomb, Illinois. Information: John Klasner, Dept. of Geology, Western Illinois University, Macomb, IL 61455.

V. M. Goldschmidt Conference (international conference for the advancement of geochemistry), May 2-4, 1990, Baltimore, Maryland. Information: Donna Ricketts, 409 Keller Conference Center, Pennsylvania State University, University Park, PA 16802.

Pacific Rim Congress, May 6-12, 1990, Gold Coast, Queensland, Australia. Information: AusIMM PACRIM 90, P.O. Box 731, Toowoong, Queensland 4066, Australia; 61-7-371-7900.

SIAM Conference on Applications of Dynamical Systems, May 7-10, 1990, Orlando, Florida. Information: SIAM Conference Coordinator, 3600 University City Science Center, Philadelphia, PA 19104-2688; (215) 382-9800; fax 215-386-7999.

West Texas Geological Society and Permian Basin Section of SEPM Field Seminar to the Marathon Area, Brewster County, Texas, May 10-12, 1990. Information: WTGS/PBS-SEPM, P.O. Box 1595, Midland, TX 79702; (915) 683-1573.

***Midwest Friends of the Pleistocene Field Trip**, May 11-13, 1990, Council Bluffs, Iowa. Information: Art Bettis, Iowa Dept. of Natural Resources-Geological Survey Bureau, 123 N. Capitol St., Iowa City, IA 52242; (319) 335-1578.

13th Annual Spring Systematics Symposium: Evolutionary Ethics, May 12, 1990, Chicago, Illinois. Information: Symposium Coordinator, Dept. of Geology, Field Museum of Natural History, Roosevelt Rd. at Lakeshore Dr., Chicago, IL 60605-2496; (312) 922-9410, ext. 298.

Andean Geodynamics Symposium, May 15-17, 1990, Grenoble, France. Information: R. A. Oliver, Inst. Laue-Langevin, 156X, Centre de Tri, 38042 Grenoble Cedex, France.

Geological Association of Canada-Mineralogical Association of Canada Joint Annual Meeting, May 16-18, 1990, Vancouver, British Columbia. Information: R. I. Thompson, c/o GAC-MAC '90

Secretariat, 801 - 750 Jervis St., Vancouver, B.C. V6E 2A9, Canada; (604) 681-5226; fax 604-681-2503; telex 04-352848 VCR.

GSA Rocky Mountain Section, May 21-23, 1990, Jackson, Wyoming. Information: Ronald W. Marrs, Dept. of Geology & Geophysics, University of Wyoming, Laramie, WY 82071; (307) 766-3386.

Geological Association of Canada Nuna-SEG Field Research Conference on Greenstone Gold and Crustal Evolution, May 24-27, 1990, Val d'Or, Quebec. Information: Francois Robert, Geological Survey of Canada, 601 Booth St., Ottawa, Ontario K1A 0E8, Canada; fax 613-996-9990.

Symposium on Naturally Occurring Radionuclides in Agricultural Products, May 29-June 1, 1990, Orlando, Florida. Information: IFAS Office of Conferences, University of Florida, 551 IFAS, Gainesville, FL 32611; (904) 392-5930.

American Association of Petroleum Geologists Annual Convention, June 3-6, 1990, San Francisco, California. Information: Jim Baroffio, Chevron Canada Resources Ltd., 500 5th Ave., SW, Calgary, Alberta T2P 0L7, Canada.

1st Joint Meeting of the Canadian Quaternary Association and American Quaternary Association, June 4-6, 1990, Waterloo, Ontario, Canada. Information: Alan V. Morgan, Quaternary Sciences Institute, Dept. of Earth Sciences, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada.

5th Symposium on the Geology of the Bahamas, June 15-19, 1990. Information: R. J. Bain, Dept. of Geology, University of Akron, Akron, OH 44325-4101; (216) 375-7659.

USA/USSR Joint Conference on Global Environmental Hydrology and Hydrogeology, June 18-21, 1990, Leningrad, USSR. Information: Helen Klose, American Institute of Hydrology, 3416 University Ave., S.E., Minneapolis, MN 55414; (612) 379-1030.

4th International Conference on Geoscience Information (GeoInfo IV), June 24-29, 1990, Ottawa, Ontario. Information: David Reade, Conference Secretary-Treasurer, GEOSCAN Centre, Geological Survey of Canada, 601 Booth St., Ottawa, Ontario K1A 0E8, Canada; (613) 992-9550; fax 613-996-9990; telex 0533117 EMAR-OTT.

9th International Conference on Basement Tectonics, July 2-6, 1990, Canberra, Australia. Information: IBT9 ACTS, GPO Box 2200, Canberra, A.C.T. 2601, Australia; phone 062-49-8015; fax 062-573256.

1990 Watershed Management Symposium, July 9-11, 1990, Durango, Colorado. Information: Robert Riggins, USACERL, P.O. Box 4005, Champaign, IL 61824-4005.

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

International Sedimentological Congress, August 26-31, 1990, Nottingham, England. Information: C. P. Summerhayes, Institute of Oceanographic Sciences Deacon Lab., Brook Rd., Wormley, Godalming, Surrey GU8 5UB, England.

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

(continued on p. 65)

MEETINGS (continued from p. 64)

AEG General Meeting and 14th International Geochemical Exploration Symposium, August 29-31, 1990, Prague, Czechoslovakia. Information: Frantisek Mrna, Geological Survey of Prague, 118 21 Praha 1, Malostranske nam. 19, Czechoslovakia.

Conference on Evolution of Upwelling Systems since the Early Miocene, September 3-4, 1990, London, England. Information: C. P. Summerhayes, IOS Deacon Lab., Wormley, Godalming, Surrey GU8 5UB, England; 042-879-4141; fax 042-879-3066. (Abstracts deadline: February 1, 1990.)

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

GOLDTech 4, September 10-12, 1990, Reno, Nevada. Information: Meetings Department, Society for Mining, Metallurgy, and Exploration, P.O. Box 625002, Littleton, CO 80162-5002; (303) 973-9550; fax 303-973-3845; telex 881988.

AAPG-SEPM-EMD Rocky Mountain Section Meeting, September 16-19, 1990, Denver, Colorado. Information: Matt Silverman, Gustavson Associates, Inc., 5757 Central Ave., Suite D, Boulder, CO 80301. (Abstracts deadline: February 1, 1990.)

3rd International Archaean Symposium, September 17-21, 1990, Perth, Western Australia. Information: Susan E. Ho, P.O. Box 435, Nedlands, Western Australia 6009, Australia.

***7th International Conference on Geochronology, Cosmochronology and Isotope Geology**, September 24-29, 1990, Canberra, Australia. Information: Organizing Committee, ICOG 7, Research School of Earth Sciences, Australian National University, G.P.O. Box 4, Canberra, A.C.T. 2601, Australia; phone 062-49-3406; fax 61-62-490 738; telex 62693.

European Geological Societies, September 29-October 7, 1990, Lisbon, Portugal. Information: MEGS 6, Sociedade Geológica de Portugal, Apto. 2361, P1109 Lisboa Codex, Portugal. (Abstracts deadline: March 31, 1990.)

International Earth Sciences Congress on Aegean Regions, October 1-7, 1990, Izmir, Turkey. Information: IESCA-1990, D.E. University Dept. of Geology, P.K.74 (E.U.-PTT) Bornova, Izmir, Turkey; phone 51-182919 or 180680 or 181088; telex 52407 dbte tr; fax 51-220978.

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

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

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

(continued on p. 66)



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MEETINGS (continued from p. 65)

American Institute of Professional Geologists Annual Meeting, October 9-12, 1990, Long Beach, California. Information: Stephen M. Testa, 6695 E. Pacific Coast Highway, Long Beach, CA 90803; (213) 430-6500.

Geodynamics of the Arabian Plate, October 20-25, 1990, Kuwait. Information: Waris E.K. Warsi, Dept. of Geology, University of Kuwait, P.O. Box 5969, Safat 13060, Kuwait; or Muawia Barazangi, INSTOC, Snee Hall, Cornell University, Ithaca, NY 14853-1504. (Abstracts deadline: April 1, 1990.)

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

Penrose Conferences 1990

Correlation of Nonmarine Cretaceous Strata, May 9-14, 1990, Breckenridge, Colorado. Information: Niall J. Mateer, Nonmarine Cretaceous Correlations, 1467 N. 17th, Laramie, WY 82070; (307) 721-4946; or Norman O. Frederiksen, USGS, 970 National Center, Reston, VA 22092; (703) 648-5277.

***Transpressional Tectonics of Convergent Plate Margins**, August 25-30, 1990, Bellingham, Washington. Information: Vicki L. Hansen, Dept. of Geological Sciences, Southern Methodist University, Dallas, TX 75275-0395; (214) 692-4179.

Large Lakes and Their Stratigraphic Record, September 9-13, 1990, Lake Tahoe, California. Information: Andrew S. Cohen, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721; (602) 621-4691 (direct), (602) 621-6024 (dept.).

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

1991

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

SEPM Midyear Meeting—Continental Margins, Tectonics, Eustasy and Climate Change, August 15-18, 1991, Portland, Oregon. Information: Susan Green, SEPM, P.O. Box 4756, Tulsa, OK 74159-0756; (918) 743-9765.

***International Symposium on Fossil Cnidaria including Archaeocyatha and Porifera**, September 9-14, 1991, Münster, Federal Republic of Germany. Information: Fossil VI. Cnidaria, Pferdegasse 3, D-4400 Münster, Federal Republic of Germany.

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

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GSA News & Information
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