GSA
NEWS & INFORMATION

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Council Adopts Strategic Plan for GSA

by F. Michael Wahl
GSA Executive Director

One of the major goals of 1989 GSA President Bill Bromery was the adoption of a strategic plan for the Society. In March, he called a special meeting of the Executive Committee to discuss both strategic and long-range planning for GSA. In summarizing his concerns, he stated that proposals from the various standing committees of GSA are routinely brought to the Council for approval and funding. Most of these draw at least to some degree on the endowment of the Society, and it is possible that eventually the principal of the endowment will be invaded. To prevent this from happening, long-range planning and the setting of priorities are required.

The first step in such a process was to examine the purpose and mission of the Society. In addition, to fulfill that mission, certain broad objectives had to be identified and available resources mapped to these objectives. As part of the plan, it was suggested that a standing committee be established that would monitor all other Society committees to see that their actions and proposals were in compliance with the strategic plan.

After much discussion by the Executive Commttee and Council, the following mission and strategic plan were officially adopted in May.

Mission

The purpose of the Society is to promote the science of geology and thereby to enable its members, by working together, to advance their scientific growth and development.

"Geology" is used in the broad sense—the study of the solid earth and other planets and planetary objects using any and all available techniques; it includes geochemistry and geophysics.

Strategic objectives of the plan shall include

- publications
- scientific meetings
- research support
- enhancing the profession of geology
- education and public awareness
- fostering the development of new (research) perspectives in geology
- promoting integration among the geosciences
- awards and honors

Possible proposals for new program initiatives might include

- the identification of new initiatives with respect to
  a. earth-system science
  b. global change in the geosphere-biosphere system
- the fostering of integration of Quaternary geology and exploration geophysics
- the promotion of the role of geology in waste management
- encouragement of the quantification of geology through applications of GIS (Geoscience Information Systems) and other computer-based new technologies
- development of a GSA program of Dahlem-style conferences to address the challenges of the future

The plan also includes the assessment and/or recommendation of basic GSA policies on

- professional ethics in research and publications
- dues and publications
- investments and use of endowment income

  The long-range (strategic) objective for policies on investment and expenditures of endowment income (funds) is to maintain an average annual rate of growth that will preserve or increase the ratio of net value of endowment per member, discounted for inflation.
- AGI (American Geological Institute) and GSA participation in AGI

The plan includes the establishment of a Committee on Long-Range Planning to

- review annually the basic mission and the strategic objectives of the Society, with respect to changes in the science of geology and the environment in which it is done
- assess, with respect to the mission and strategic objectives of the Society:
  a. the current broad goals and plans of the Society in each of its major program areas, and
  b. proposals for new policies or program initiatives
- solicit and propose new policies and program initiatives for the Society that will advance the strategic objectives of the Society.

In summary, the basic idea is that each of the standing committees of the Council will look at the strategic plan of the

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Plan for GSA (*continued from p. 321*)

Society when making their proposals, and the plan will be the template against which they will measure their proposals. The plan states, however, that ultimate responsibility for all strategic objectives rests with the Council.

1990 Committee

Members of the 1990 Committee on Long-Range Planning were appointed by Council at the annual meeting in St. Louis. They are Raymond A. Price, Chairman, Doris M. Curtis, Randolph W. Bromery, Samuel S. Adams, James W.H. Monger, Don L. Anderson, R. Allan Freeze, and Philip E. LaMoreaux (chairman, GSA Foundation Board of Trustees, ex officio).

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DECADE OF NORTH AMERICAN GEOLOGY · DECADE OF NORTH AMERICAN GEOLOGY

DNAG NEWS

by Allison R. (Pete) Palmer

Books Recently Printed or In Press

As of this writing (early October) DNAG Volume N, *The Eastern Pacific Ocean and Hawaii*, is finished, and it should be in your hands (if you were an author, or were at the 1989 Annual Meeting in St. Louis), or be available for purchase. We'll be interested in comments on the innovative color scheme for the Pacific bathymetry and also the effectiveness of Tanya Atwater's tectonic plates.

The text, cover materials, etc. for Volume F-2, *Appalachian-Ouachita Orogen in the United States*, went to the printer on September 28. The schedule now calls for delivery by December 29, so it will be a 1989 publication. There may be a slight delay in delivery if any complications develop with the proofs for Phil Osberg's plate.

Books That Should Be at the Printer

Volume L, *The Arctic Ocean Region*, and Volume O-1, *Surface Water Hydrology*, are still hung on Art Grantz and Reds Wolman. Both volumes will now be published in early 1990. However, there has been some positive action. Grantz has now scheduled a visit in late October to look over the book galleys; Wolman's chapter, being wrapped up by his co-author, is "imminent," and the rest of his book is ready to go.

Volume H, *The Caribbean Region*, is in the wrap-up stage. The last details before printing can commence should be cleared up in November.

The last six chapters for the Centennial Special volume *Archaeological Geology of North America* are "in the mail." All final details before printing can commence should also be cleared up before the end of November.

Other Action

Production is under way for the Stress and Thermal Aspects maps. These should be mid-1990 products.

The two eastern sheets for the Geologic Map of North America are now fully compiled. Final details for the color scheme and legend are being worked out before color separation on these sheets begins. Compilation of the Canadian part of the northwestern sheet is also completed, and compilation of the U.S., Mexican, and central American parts of the western sheets is under way.

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Penrose Conference Scheduled on Dating of Geomorphic Surfaces

A GSA Penrose Conference, New Methods for Dating of Geomorphic Surfaces, will be held October 12-17, 1990, at the Sierra Nevada Inn at Mammoth Lakes, California. Conveners are Fred M. Phillips, Geoscience Department, New Mexico Tech, Socorro, NM 87801, (505) 835-5540; and Ronald I. Dorn, Department of Geography, Arizona State University, Tempe, AZ 85287, (602) 965-3520.

The past five years have seen major advances in the geological subdisciplines associated with surficial processes. Previously, these areas of geology had suffered in comparison to hard-rock and sedimentary geology because they lacked adequate geochronological control. For more than 100 years, biostratigraphy has enabled correlation and at least relative dating of sedimentary deposits. The past 40 years have seen the development of numerous radiometric methods for the dating of igneous and metamorphic rocks. However, geologic surfaces are generally not contemporaneous with the age of formation of their constituents, and thus these geochronologic methods are of limited value in determining surface ages (except in the relatively rare case where the surface happens to be an accurately datable lava flow). This lack of chronologic control has held back progress in geomorphology, Quaternary geology, paleoclimatology, pedology, archeology, and other related fields.

Amazingly, the past five years have seen the development of not just one but at least five different methods for the quantitative measurement of geologic surface ages. These methods include the accumulation of the cosmogenic radionuclides ^{36}Cl, ^{10}Be, and ^{26}Al, the cosmogenic stable nuclides ^{3}He and ^{21}Ne, the incorporation of organic ^{14}C into rock varnish, and the relative leaching rates of mobile and immobile cations in rock varnish. In addition to these relatively well established methods there are others in a more experimental stage. Already, applied studies are being conducted on a wide variety of problems, including dating of glacial moraines and Pleistocene lake shorelines, development of alluvial fans, ablation of polar ice, measurement of erosion rates, dating of meteorite impact craters, and dating of archeological artifacts. Within the geological fields dealing with surficial geology, these techniques promise to have an impact comparable to that which K-Ar dating had on the hard-rock areas of geology.

An unavoidable outcome of the burgeoning development of a multiplicity of techniques, by different investigators in separate laboratories, has been a lack of communication. There have been few attempts to cross-check or compare most of the techniques. Many of the techniques have been developed by individual investigators working in isolation, and their results have never been duplicated. Different investigators working on the same technique have developed differing methods that have never been compared. Major environmental variables of importance to most of the new surface-dating techniques have never been systematically investigated.

The objectives of the Penrose Conference on surface-exposure dating are to advance the state of the science by providing the opportunity for communication between investigators in different areas and by providing the ability to simultaneously collect samples for later comparison.

The conference will explore five subject areas: (1) cosmogenic nuclide methods, (2) rock varnish methods, (3) field sampling methodology, (4) laboratory methodology, and (5) application of multiple methods. The conference will emphasize group discussion; thus, oral presentations will be limited to keynote talks on topics within the subject areas. Informal poster sessions will allow participants to share recent research results. The subject areas will also be discussed during two field trips. The first will focus on previous applications of surface-exposure dating methods to glacial and volcanic deposits in the eastern Sierra region. The second will provide an opportunity to compare field sampling approaches and to actually collect a suite of samples for purposes of later comparison.

The conference will be limited to approximately 50 active researchers in surface-exposure dating. Interested participants should send a letter of application to either of the co-conveners and include a summary of their related research. The deadline for applications is **April 15, 1990**. The registration fee will be approximately $500, which will include food, lodging, and field trips. Limited support will be available for qualified graduate students and overseas participants.

Smithsonian Offers Research Fellowships in Science

The Smithsonian Institution announces its research fellowships for 1990-1991 in the fields of History of Science and Technology, Anthropology, Biological Sciences, and Earth Sciences.

Smithsonian Fellowships are awarded to support independent research in residence at the Smithsonian in association with the research staff and using the Institution's resources. Predoctoral and postdoctoral fellowship appointments for six to 12 months, and graduate student appointments for 10 weeks are awarded. Proposals for research in the following areas may be made.

- History of Science and Technology: History of computers, communication, and society; history of agriculture; air and space; electrical technology; engineering; industrial archaeology; mathematics; medicine and pharmacy; natural history; physical sciences; social dimensions of science and technology; and transportation.
- Anthropology: Archaeology; cultural anthropology; folklife; linguistics; and physical anthropology.
- Biological Sciences: Animal behavior and pathology; ecology; environmental studies; evolutionary biology; marine biology; natural history; paleobiology; systematics; and tropical biology.
- Earth Sciences: Meteoritics; mineralogy; paleobiology; petrology; planetary geology; sedimentology; and volcanology.

Applications are due *January 15, 1990*. Stipends supporting these awards are: $25,000 per year plus allowances for senior postdoctoral fellows; $20,000 per year plus allowances for postdoctoral fellows; $12,500 per year plus allowances for predoctoral fellows; and $3000 for graduate students for the 10-week tenure period. Predoctoral, postdoctoral, and senior postdoctoral stipends are prorated on a monthly basis for periods less than one year.

Awards are based on merit. Smithsonian fellowships are open to all qualified individuals without reference to race, color, religion, sex, national origin, age, or condition of handicap of any applicant. For more information and application forms, write to: Smithsonian Institution, Office of Fellowships and Grants, 7300 L'Enfant Plaza, Washington, D.C. 20560. Indicate the particular area in which you propose to conduct research and give the dates of degrees received or expected.

FOUNDATION NEWS

by Robert L. Fuchs

The Flow of Foundation Funds—How it Works

SOURCES	*FUND*	*APPLICATIONS*
Members' direct gifts	GEOSTAR unrestricted	GSA research grants
Dues statement designations	Century Challenge	Medlin scholarship
Public gifts	Allan V. Cox Student Research	Cox Research Award
Bequests	John T. Dillon Alaska Research	Dillon Award
Industry—DNAG	Antoinette Lierman Medlin Scholarship	Donath Medal
Industry—research	Research	Young Scientist Award
Industry—conferences	Memorial	DNAG publications
Foundations	Minority	Student travel grants
Gifts of stock and property	Penrose Conferences	Penrose Conferences
Endowment earnings	Publications	Meetings support
Deferred and contingent gifts	Women in Science	Foundation operations
Research grants recycle	DNAG	
Conference surplus	Young Scientist Award	
	W. Storrs Cole Memorial	

The GSA Foundation is a relatively simple financial organization. The Foundation itself is a bank, a temporary resting place for current monies and a permanent home for endowment funds. Gifts to the Foundation from the variety of sources shown above represent deposits to the bank. The various applications are the withdrawals.

Within the Foundation, money reposes in a number of compartments, some for special purposes, some unrestricted. Ideally, unrestricted funds allow the Foundation the maximum amount of flexibility—to fund a variety of activities and also to pay for Foundation operating costs (a necessary evil). However, the Foundation's Board of Trustees has encouraged the formation of special-purpose, restricted funds that function within certain guidelines set by the donors. Examples would be the DNAG Fund, a commitment of $3.3 million (largely from industry and now mostly spent) to underwrite the costs of the Decade of North American Geology, and the Young Scientist Award, established by Fred and Mavis Donath and comprising the Donath Medal and an annual stipend to an outstanding geoscientist. The policy in regard to the creation of a specially named, restricted fund requires an initial gift or gifts of a minimum of $5000 and subsequent growth of the corpus to at least $10,000.

Of greatest interest to members is the applications part of the funds flow. The Board of Trustees' current policy in regard to disbursements is to spend an annual amount equal to approximately 8% of the Foundation's total fund balance financing various of the applications listed above. Restricted funds have specific applications; unrestricted funds can have wide usage. Excluding the DNAG monies, which flow through directly to that program, at least $56,000 will be disbursed in 1989. At the present time Foundation monies are restricted to the support of GSA activities and programs.

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How To Go With the Flow

December is the most popular time for tax planning, because most of one's numbers for the year are known, and most options to minimize taxes disappear on January 1. This planning involves a review of the current year's results, a preliminary tax calculation, and an estimate of next year's situation.

Once the basic financial scenario has been developed, a tax strategy can be devised. Variations in aspects of the scenario year-to-year, principally in income, may suggest acceleration of deductions in order to minimize total tax over the two-year period. Charitable contributions are one of the few available devices that can be used to reduce personal tax liability on short notice.

Year-end contributions to the GSA Foundation can be an important way to minimize 1989 income tax. Gifts of cash are the most common gift form, but there are other means of accomplishing a donation as part of personal tax strategy—gifts of real and personal property, life insurance, and securities are examples. Appreciated securities are a popular method of making a year-end gift since the value of the securities at date of transfer is the value of the gift, not the original cost of the securities. Whatever the final form of your gift, it is important to remember that the funds will ultimately flow through the Foundation to one or more of its important applications in earth science.

Donors to the Foundation, September 1989

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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

Final Announcement

NORTHEASTERN SECTION, GSA, 25th Annual Meeting

Syracuse, New York
March 4–7, 1990

Syracuse University, together with Colgate University, Cornell University, Hamilton College, and Hobart and William Smith Colleges, will host the 25th Annual Geological Society of America Northeastern Section meeting at the Sheraton University Inn and Conference Center on the campus of Syracuse University. The Eastern Section of SEPM, the Northeastern section of the Paleontological Society (PS), the Eastern Section of the National Association of Geology Teachers (NAGT), and the Association for Women Geoscientists will be meeting with GSA's Northeastern Section. The meeting will run from 7 p.m. Sunday, March 4, through noon Wednesday, March 7, 1990.

REGISTRATION

Registration is required for everyone participating in any event connected with the meeting.

Preregistration. All participants are *strongly* urged to preregister as early as possible so that the local committee can plan more efficiently. Your preregistration form and payment must be *received* no later than **February 2, 1990**. Complete the preregistration form and return it with a check or money order in U.S. currency (made payable to Northeastern Section GSA) to Art Goldstein, Department of Geology, Colgate University, Hamilton, NY 13346 (315-824-1000, ext. 201). Refunds on canceled preregistration will be made in full until February 12, 1990. No refunds will be made after this date.

On-Site Registration. On-site registration, and pick-up of meeting materials for those who have preregistered, will be from noon to 10 p.m. on Sunday, March 4; 7 a.m. to 5 p.m. on Monday and Tuesday, March 5 and 6; and 7 a.m. to noon on Wednesday, March 7. *Registration on Sunday* will be in the lobby of the Heroy Geology Laboratory. All subsequent registration will be in the lobby of the Sheraton University Inn. *All participants are strongly urged to preregister as early as possible!*

TRANSPORTATION

Syracuse is centrally located in the GSA Northeastern Section and the State of New York.

Ground Transportation. Syracuse is at the crossroads of the New York State Thruway (I-90) and Interstate 81 (see map) and is thus reached easily by car or bus. Use the Thruway for east or west approaches and I-81 if coming from the north or south. Parking is available at conference hotels as well as the Sheraton University Inn parking garage and nearby public parking lots. Shuttle bus service will be provided between conference hotels and Syracuse University. Syracuse is also situated on the Amtrak rail system, which has a stop in East Syracuse, 10 minutes by taxi from downtown Syracuse and Syracuse University.

Air Travel. Syracuse's Hancock International Airport is located just north of the city, near the Thruway/I-81 intersection, and is serviced by several major airlines with connections throughout the northeast. Take a taxi ($12) for the 15-minute ride from the airport to the Sheraton University Inn, Holiday Inn, or Hotel Syracuse.

TECHNICAL PROGRAM

The meeting officially begins at 7 p.m. on *Sunday, March 4*, with a plenary keynote address to be held in the Goldstein Auditorium of the Schine Student Center. A general *welcoming party* will be held in the student lounge of the Schine Center immediately following the plenary session. All meeting participants are encouraged to use Sunday as a travel and registration day and to participate in the plenary session and welcoming party.

Symposia and general technical sessions will run from 8 a.m. Monday, March 5, through noon, Wednesday, March 7. Oral sessions will be held at the Sheraton University Conference Center and Newhouse Communications Center. All poster sessions and exhibits will be held in the Goldstein Auditorium of the Schine Student Center.

SYMPOSIA

1. **Evolution of Continents.** Doug Nelson, Cornell University, (607) 255-6329.
2. **Phanerozoic Paleogeography, Paleoclimatology, Biogeography, and Paleomagnetism.** Rob Van der Voo, University of Michigan, (313) 764-1435.
3. **Geology of Rocks That Aren't There: Reconstruction of Post-Devonian Events in the Northeast.** Dan Karig, Cornell University, (607) 255-5267.
4. **Ice Sheet Margins and Water: Deglaciation within Marine and Lacustrine Basins.** Terry Hughes, University of Maine, (207) 581-2152, and Eugene Domack, Hamilton College, (315) 859-4711.
5. **Recent Developments in the Southwestern Grenville Province—Sudbury to Vermont.** James McLelland, Colgate University, (315) 824-1000, and John Moore, Carleton University.
6. **Subglacial Meltwater: Landforms and Sediment.** John Shaw, Queens University, (613) 545-6033 or 6030.
7. **Sequence Stratigraphy in the Appalachian Basin: Theory, Scale, Applications, and Interpretations.** Teresa Jordan, Cornell University, (607) 255-3596.
8. **Crustal Signatures of Northern Appalachian-Caledonide Terranes.** Gary Boone, Syracuse University, (315) 443-3869 or 2672.
9. **Along-Strike Variations in the Nature of the Alleghanian Orogeny.** Art Goldstein, Colgate University, (315) 824-1000.
10. **Regional Ground-water Circulation Patterns: The Influences of Tectonism, Basin Development, and Glaciation.** Dorothy Tepper, U.S. Geological Survey, (607) 272-8722.
11. **Global Biological Events in Earth History.** George McGhee, Rutgers University, (201) 932-2044, and Peter Sheehan, Milwaukee Public Museum, (414) 278-2741. Sponsored by the Paleontological Society and IGCP 216.
12. **Ground-water Contamination: How Real Are the Hazards?** Don Siegel, Syracuse University, (315) 443-3607 (evening public forum).
13. **Clinton Ironstones.** Edward Cotter, Bucknell University, (717) 524-3026. Sponsored by the Eastern Section, SEPM.

(*continued on p. 328*)

Northeastern Section (*continued from p. 328*)

14. **High-Resolution Seismic and Sedimentary Facies Analysis.** Gail Ashley and Robert E. Sheridan, Rutgers University, (201) 932-2044. Sponsored by the Eastern Section, SEPM.

Special Poster Session

Classic Field Sites for Teaching Earth Science in the Northeast. Jim O'Connor, University of District of Columbia, (301) 593-7831. Sponsored by the Eastern and New England Sections of NAGT.

PROJECTION EQUIPMENT

All slides must fit in a standard 35 mm carousel tray. Two projectors and two screens will be provided in all technical and symposium sessions. If possible, bring your own loaded tray(s) to the meeting. Extra trays and projection equipment will be available in the Speaker Ready Room at the Sheraton. Please label trays with your name, session, left and/or right screen, and time of paper; give trays to the projectionist at least 20 minutes before the beginning of the session.

SHORT COURSES

Two short courses will be held in the Heroy Geology Laboratory on Sunday, March 4.

1. **Role of Critical Thinking in Geology Education.** Paul Pinet, Colgate University.
2. **Subsidence and Thermal History of Extensional Basins: Techniques and Examples.** Leigh Royden, MIT.

For further information on short courses, contact Short Course Coordinator Art Goldstein, Department of Geology, Colgate University, Hamilton, NY 13346, (315) 824-1000, ext. 201.

POLICY ON SMOKING, CAMERAS, AND SOUND EQUIPMENT

GSA Northeastern Section policy prohibits the use of cameras or sound-recording equipment at technical or poster sessions. A no-smoking policy has also been adopted by the local committee and will be followed in all meeting rooms and organized social events.

EXHIBITS

Exhibits of geological research equipment and educational material will be on display in the Goldstein auditorium at the Schine Student Center adjacent to poster sessions and the refreshment area. Booths will be framed with pipe and drape and contain tables and chairs. The cost is $300; a special half-price rate of $150 will apply for nonprofit and educational organizations. For additional information, contact Barbara Tewksbury, Department of Geology, Hamilton College, Clinton, NY 13323, (315) 859-4713.

SCIENCE THEATER

A wide variety of scientific films and videos of geological interest, including a "classic film festival," will be presented during off-hours (lunchtime and evenings). A schedule of show times will be included in the registration packet.

SPECIAL EVENTS

Sunday, March 4

Heroy Geology Lab Open House—noon to 5 p.m.

Plenary Session—Keynote Address—7 p.m.

Welcoming Party—immediately following the plenary session at the Schine Student Center.

Geology Photo Contest—in conjunction with welcoming party (contact Gary Boone for further information; 315-443-3869 or 2672).

Monday, March 5

GSA Northeastern Section Annual Banquet—Sheraton University Inn—7:30 to 10 p.m.

Tuesday, March 6

Public Forum—Ground-water Contamination: How Real Are the Hazards?—Sheraton University Inn—7-9 p.m.

(*continued on p. 330*)

Housing Form

Geological Society of America Northeastern Section, March 4–7, 1990

Arrival date _____ Departure date _____

Person requesting housing (type or print)

_____
Last name First

_____
Name of institution or firm

_____
Street address or P.O. box number

_____
City State ZIP code

Phone ( ) _____ ( ) _____
day evening

Send this form and remittance or credit card information to:
Sheraton University Inn
801 University Avenue
Syracuse, New York 13210

Telephone (315) 475-3000

Hotels	Rate per Room *per day* (single to quad)*	Indicate 1st and 2nd Choices
Sheraton University Inn	$75.00	_____
Holiday Inn	70.00	_____
Hotel Syracuse	65.00	_____

*Rates do not include 7% state or 3% occupancy tax.

Type of room (single, double, triple, quad): _____

Sharing room with: _____

To insure the conference rate, reservations must be made by February 9, 1990. To guarantee a room, remittance for one night must accompany this form. Make checks payable to: Sheraton University Inn.

If remittance by credit card, please provide the following information:

Type _____

Card number _____

Expiration date _____

Signature _____

Preregistration Form

Northeastern Section, GSA, 25th Annual Meeting
March 4–7, 1990, Syracuse, New York

IMPORTANT

1. Preregistration *must be received no later than* ***February 2, 1990.***
2. Full payment *must* accompany all preregistration requests. Unpaid purchase orders are *not* acceptable.
3. Cancellation deadline: February 12, 1990. No refunds after this date.
4. Register only *one* person per form.
5. Fill in *receipt* section at bottom. This will be in your packet at the registration desk.
6. Copy this preregistration form for your records.

PLEASE PRINT OR TYPE

Name _____
(Last) (First) (Initial)

Registered as (check one) ____ Professional ____ Student ____ Guest

Member affiliation ____ GSA ____ NAGT ____ SEPM ____ PS GSA Student Associate ____ Yes ____ No

Name for badge _____

Affiliation _____

Professional address _____ Phone:

_____ Work: ( ) _____

_____ Home: ( ) _____

PREREGISTRATION (*on or before February 2, 1990*)

Entire Meeting	
Professional—GSA member (or affiliate)	$50.00
Professional—Nonmember	$60.00
Student—Member (see verification requirement below)	$20.00
Student—Nonmember or Guest	$25.00
One Day Only	
Professional—Member	$25.00
Professional—Nonmember	$35.00
Student—Member	$15.00
Student—Nonmember	$20.00

REGISTRATION (*after February 2, 1990*)

Entire Meeting	
Professional—GSA Member (or affiliate)	$55.00
Professional—Nonmember	$65.00
Student—Member (see verification requirement below)	$25.00
Student—Nonmember or Guest	$30.00
One Day Only	
Professional—Member	$35.00
Professional—Nonmember	$40.00
Student—Member	$20.00
Student—Nonmember	$25.00

SPECIAL EVENTS

Short Course: Critical Thinking	
Professional	$50.00
Student (see verification requirement below)	$20.00
Short Course: Extensional Basins	
Professional	$50.00
Student (see verification requirement below)	$20.00
Association for Women Geoscientists Breakfast (March 5)	$10.00
Eastern Section—NAGT Luncheon (March 5)	$15.00
GSA Northeastern Section Banquet and Business Meeting (March 5)	
Professional or Guest	$20.00
Student	$10.00
Abstracts with Programs—reserved (on-site pick-up)	$10.00

Total fees ..... $_____

Enclose check or money order in U.S. funds payable to Northeastern Section GSA

STUDENT VERIFICATION _____
(Signature—department head or GSA Campus Representative)

Mail completed *form and full payment* to Art Goldstein, Department of Geology, Colgate University, Hamilton, NY 13346

RECEIPT
1990 Northeastern Section GSA Meeting

Please fill in.
Receipt will be in your packet at the registration desk

Name _____
(Last) (First) (Initial)

Affiliation _____ Paid $ _____ Date _____

Northeastern Section (*continued from p. 328*)

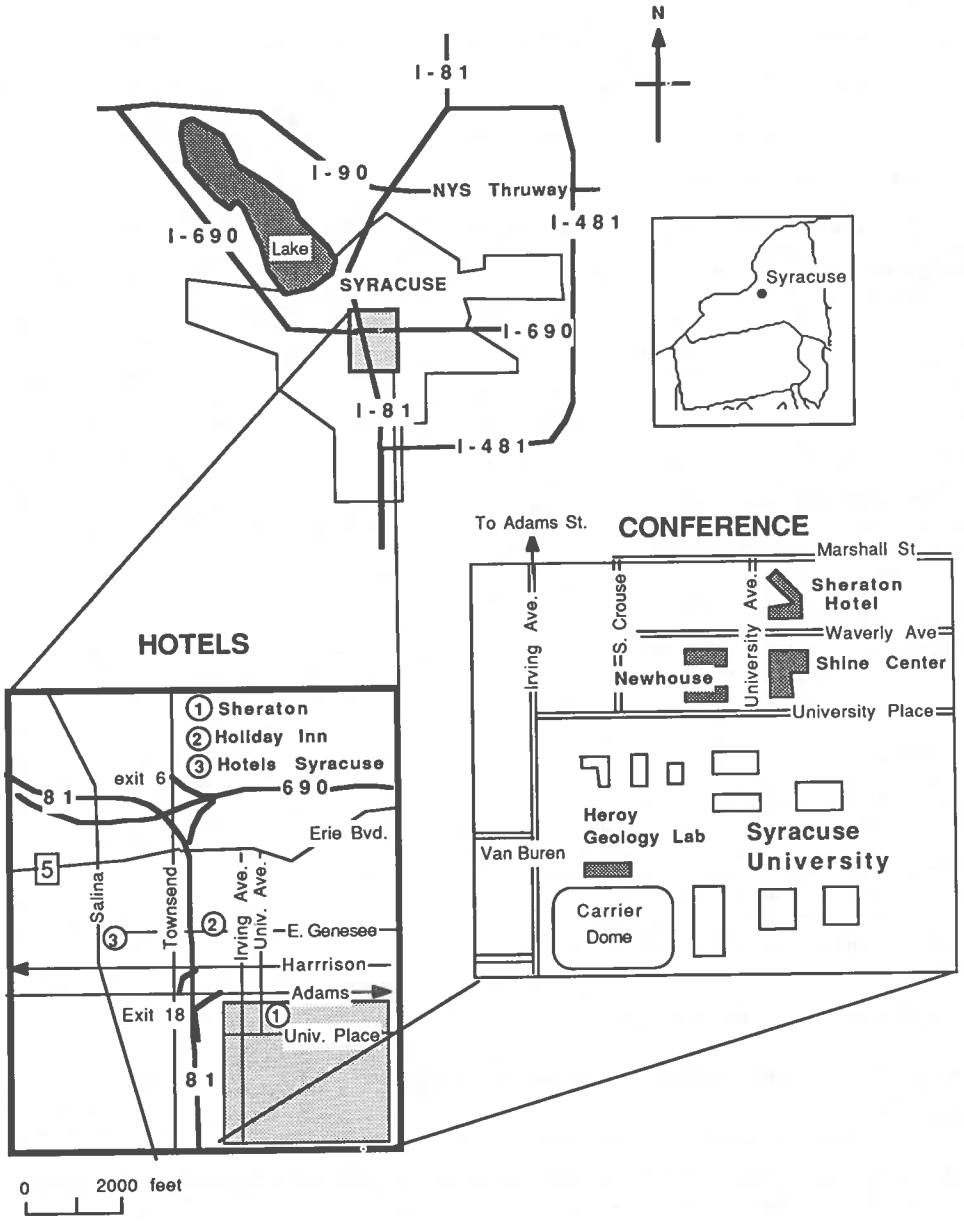
HOUSING

Blocks of rooms have been reserved at the Sheraton University Inn, Holiday Inn (Downtown) and the Hotel Syracuse (see map). The Sheraton, on the campus of Syracuse University, will be headquarters for the meeting. Meetings and special events will take place at the Sheraton as well as the Schine Student Center and the Newhouse Communications Center, both of which are immediately adjacent to the Sheraton. A shuttle bus will run between the Holiday Inn, the Hotel Syracuse, and the Sheraton University Inn and Convention Center. Guaranteed rates will be per room regardless of the number (maximum of 4) of occupants. All hotels have restaurants, and there is a large number of inexpensive restaurants on Marshall Street adjacent to the Sheraton as well as a cafeteria at the Schine Student Center. *Use the Housing Form to make your hotel reservations.* For conference planning it is critical that participants reserve hotel rooms well in advance. *A cut-off date of February 9, 1990, has been established for receipt of hotel accommodations. Reservations received after this date will be on a space available basis with no assurance of guaranteed rates.*

1. Sheraton University Inn & Conference Center—(315) 475-3000, 801 University Avenue, Syracuse, NY 13210.
2. Holiday Inn (Downtown)—(315) 474-7251, 701 East Genesee Street, Syracuse, NY 13210.
3. Hotel Syracuse—(315) 422-5121, 500 South Warren Street, Syracuse, NY 13202.

FURTHER INFORMATION

For further information, contact one of the general program co-chairmen: *Henry T. Mullins* (315-443-4706), or *Donald I. Siegel* (315-443-3607), at Syracuse University, Geology Department, Syracuse, NY 13244.



GSA Northeastern Section 1990 Meeting

Final Announcement

SOUTH-CENTRAL SECTION, GSA, 24th Annual Meeting

Stillwater, Oklahoma
March 4–6, 1990

The South-Central Section of the Geological Society of America will meet at the Noble Research Center on the Oklahoma State University Campus. The meeting is hosted by the School of Geology of Oklahoma State University, and will be held jointly with the Midcontinent Section of the National Association of Geology Teachers, the Pander Society, and the South-Central Section of the Paleontological Society.

REGISTRATION

Registration is required for all participants in any event, including technical sessions, symposia, exhibits, planned social events, and field trips.

Preregistration. In order to help the local committee make final plans, you are strongly urged to register in advance. *Preregistration forms with payment must be postmarked by* **FEBRUARY 9, 1990**.

Complete the registration form and return it with a check or money order in U.S. funds, payable to South-Central GSA. Individuals planning to go on field trips must also register by February 9, 1990. Participation in field trips is limited and will be filled on a first-come basis. Refunds for canceled registration will be made in full up until February 9, 1990. After that date no refunds will be issued except in the event of cancellation or oversubscription of a field trip.

On-Site Registration. Registration will take place on Sunday, March 4, 1990, from 3 to 8 p.m. in room 109 of the Noble Research Center on the Oklahoma State University campus and will continue there daily from 7:45 a.m. to 5 p.m. for the duration of the meeting. Please note the lower preregistration prices. No refunds will be made for on-site registration and ticket sales.

SYMPOSIA

The following symposia have been organized. Authors of papers to be considered for inclusion in a symposium should send abstracts directly to the convener. Individuals with questions about a specific symposium should contact the appropriate convener.

1. **Conodont Biofacies—Recent Advances.** Charles A. Sandberg, U.S. Geological Survey, Box 25046, M.S. 940, Federal Center, Denver, CO 80225; Scott M. Ritter, School of Geology, Oklahoma State University, Stillwater, OK 74078.

This symposium will provide an opportunity to discuss advances in conodont biofacies that have occurred during the past seven years, since the biofacies symposium in Madison, Wisconsin. Papers treating the current level of understanding of conodont biofacies within a system or series (or zone, etc.) as well as papers on practical applications, biofacies methods, or general conodont paleoecology, will be considered. A round-table workshop on biofacies techniques, led by Charles A. Sandberg and Ronald R. Charpentier (U.S. Geological Survey, Denver), with contributions by other Devonian conodont workers, will be held in conjunction with the symposium.

2. **Tectonic Habitat and Structural Styles in the Midcontinent and Southern Oklahoma: Implications for Hydrocarbon Accumulations.** Ibrahim Cemen and Zuhair Al-Shaieb, School of Geology, Oklahoma State University, Stillwater, OK 74078.

The symposium will focus on current structural and tectonics research in the southern midcontinent and southern Oklahoma regions and is intended to provide a well-organized discussion on the interactions of different structural styles. These two regions contain several diverse structural styles, ranging from rift tectonics in the Nemaha ridge area and wrench tectonics in the Wichita and Arbuckle Mountains to a well-developed fold and thrust belt in the Ouachita Mountains. The symposium will address persisting questions related to the structural and tectonic evolution of these regions. It will also include several presentations on the relation between the structural styles and hydrocarbon accumulations in these areas on the basis of research within the last decade.

3. **Paleontological Society Symposium: Recent Advances in Middle Carboniferous Biostratigraphy.** Patrick K. Sutherland, School of Geology and Geophysics, University of Oklahoma, Norman, OK 73019; Walter L. Manger, Dept. of Geology, University of Arkansas, Fayetteville, AR 72701.

The South-Central Section of the Paleontological Society will sponsor a one-day symposium devoted to recent advances in middle Carboniferous biostratigraphy. Presentations are invited on aspects of Chesterian, Morrowan, and Atokan faunal and floral sequences. Publication of a symposium volume is planned in the Circular Series of the Oklahoma Geological Survey.

4. **Petroleum Migration: From Organic Matter to the Reservoir.** Colin Barker, Dept. of Geosciences, University of Tulsa, Tulsa, OK 74104.

An improved understanding of petroleum migration has emerged in the past few years. Migration distances, driving mechanisms, compositional changes, and efficiencies of the various processes are being actively studied, and combinations of lab data, computer modeling, and geologic information promise further advances. This symposium will cover a broad cross section of current research on petroleum migration, including both expulsion from source rocks and migration through carrier systems.

5. **Applied Hydrogeology.** Wayne A. Pettyjohn, School of Geology, Oklahoma State University, Stillwater, OK 74078.

During the past few years, several fundamental concepts have been developed that allow a better understanding of ground-water recharge, flow, discharge, and mass transport. This symposium will consist of presentations that deal with these concepts and techniques, all of which can or have been applied to the evaluation of regional hydrogeology and the investigation of contaminated sites.

6. **National Association of Geology Teachers Symposium: Computer Applications in Geological Education.** Samuel Wells, Northeast Oklahoma A&M, Miami, OK 74354; Daniel F. Merriam, Wichita State University, Wichita, KS 67208.

7. **Southern Midcontinent–Texas Craton Transect, International Lithosphere Program.** Charles Gilbert, Dept. of Geology, Texas A&M University, College Station, TX 77843.

The Southern Midcontinent–Texas Craton Transect is part of the Global Geoscience Transects Project of the International Lithosphere Program. The goal of the project is the development of an interpretive cross section, to a depth of approximately 100 km from the Kansas-Oklahoma border to the Llano Uplift region of central Texas. This symposium will concentrate upon recent advances in various aspects of this project, including

(*continued on p. 332*)

South-Central Section (*continued from p. 331*)
surface bedrock geology, geophysical intrepretations, and seismic fabric diagrams.

FIELD TRIPS

1. **Middle Carboniferous Lithofacies and Biostratigraphy of the Southern Ozarks.** The South-Central Section of the Paleontological Society is sponsoring a two-day premeeting field trip to examine lithofacies changes and biostratigraphic relations within Chesterian and Morrowan rocks in northwestern Arkansas and northeastern Oklahoma. Planned in conjunction with Symposium 2. The trip will begin on the University of Arkansas campus at 8 a.m. on Saturday, March 3. Outcrops in the Fayetteville area will be examined on the first day; participants will return to Fayetteville on Saturday night. Travel on the first day will be by van. On the second day the group will travel toward Muskogee, Oklahoma, by van or by personal vehicle. The field trip cost includes transportation and lunch on Saturday and the guidebook. For further travel and lodging arrangements, contact the field trip leaders. To permit travel arrangements, the field trip leaders request that you let them know if you plan to attend by *January 20, 1990*. Leaders: Walter L. Manger, Dept. of Geology, University of Arkansas, Fayetteville, AR 72701; Patrick K. Sutherland, School of Geology and Geophysics, University of Oklahoma, Norman, OK 73019. Cost: $30.

2. **Paleozoic Stratigraphy and Conodont Biostratigraphy of the Arbuckle Mountains, Oklahoma.** This is a two-day trip to examine excellent exposures of Ordovician to middle Carboniferous strata of the Arbuckle Mountains in light of recent conodont studies. Planned in conjunction with Symposium 1. The trip will begin at the Noble Research Center on the Oklahoma State University campus at 8 a.m. on Saturday, March 3, 1990. Leaders: James E. Barrick, Dept. of Geosciences, Texas Tech University, Lubbock, TX 79409; Jeffrey A. Bauer, Shawnee State University, Portsmouth, OH 45662; Raymond L. Ethington, Dept. of Geology, University of Missouri, Columbia, MO 65211; Robert C. Grayson, Jr., Dept. of Geology, Baylor University, Waco, TX 76798. Limit: 45. Cost: $80, includes guidebook (newly published by the Oklahoma

(*continued on p. 334*)

Housing Form

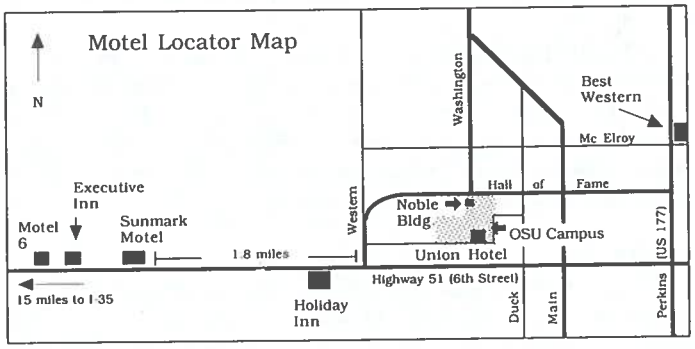
Request for Room Reservations
All rooms will be assigned on a first-come, first-served basis. If we are unable to honor your choice of hotel, we will select accommodations that are closest in rates to your choice.

Reservation requests must be received prior to *January 15, 1990.*

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

	Single	Double	Double double	Extra person
Best Western	$36.00	$42.00	——	$5.00
Holiday Inn	34.00	42.00	$42.00	——
Executive Inn	25.00	31.00	35.00	——
Sunmark Hotel	37.00	42.00	——	5.00
Motel 6	17.95	——	——	6.00
Student Union Hotel	The Union is charging a flat rate of $40			

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.



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 _____

Arrival: Date _____ Hour _____ a.m./p.m.
Departure: Date _____ Hour _____ a.m./p.m.
Hotel: (Select from list) See locator map.
First choice _____
Second choice _____
Third choice _____

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

Name _____
Address _____
City/State/ZIP _____
Telephone _____
Names of room occupants _____

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 (we) 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: _____

Mail this form to:
Tayla Henderson
School of Geology
Oklahoma State University
105 Noble Research Center
Stillwater, OK 74078-0451

Preregistration Form

South-Central Section, GSA, 24th Annual Meeting
Stillwater, Oklahoma • March 4–6, 1990

IMPORTANT

1. Full payment must accompany registration.
2. REGISTER ONE: professional, student, or spouse/guest.
3. You will receive a receipt in the mail. Copy this form for your records.
4. Preregistration deadline: *Must be postmarked no later than February 9, 1990.*

For Office Use Only
Ck or MO # _____
Amount _____
Issued by _____
_____

Name _____

Nickname for badge _____

Registered as _____ Professional _____ Student _____ Spouse/Guest

Spouse/Guest name for badge _____

Affiliation (abbreviate for badge) _____

Professional address _____

_____

Phone: Business ( ) _____ Residence ( ) _____

Check Affiliation: GSA Member: _____ yes _____ no Speaker: _____ yes _____ no GSA Student Associate: _____ yes _____ no

GSA Member # _____

Preregistration (*postmarked by February 9, 1990*)

Professional—Member	$40.00	_____
Professional—Nonmember	$45.00	_____
Science teacher	$10.00	_____
Student—Member	$12.00	_____
Student—Nonmember	$15.00	_____
Guest	$10.00	_____

Registration (*after February 9, 1990*)

Professional—Member	$46.00	_____
Professional—Nonmember	$52.00	_____
Science teacher	$12.00	_____
Student—Member	$15.00	_____
Student—Nonmember	$18.00	_____
Guest	$12.00	_____
NAGT Luncheon	$ 8.50	_____
Paleontological/Pander Society Luncheon	$ 8.50	_____
Banquet	$11.00	_____

FIELD TRIPS

Preregistration for field trips is due *February 9, 1990.* All field trip participants must also preregister for the meeting.

1. Middle Carboniferous Lithofacies and Biostratigraphy of the Southern Ozarks (March 3–4)	$30.00	_____
2. Early to Middle Paleozoic Conodont Biostratigraphy of the Arbuckle Mountains, Oklahoma (March 3–4)	$80.00	_____
TOTAL		$_____

PREREGISTRATION FORMS MUST BE POSTMARKED NO LATER THAN FEBRUARY 9, 1990.

Full refunds on canceled preregistrations will be made until February 9, 1990. After that date, no refunds will be made except for canceled field trips.

Mail completed registration forms and fee remittances to

Tayla Henderson
School of Geology
Oklahoma State University
105 Noble Research Center
Stillwater, OK 74078-0451

South-Central Section (*continued from p. 332*)
Geological Survey), one night lodging in Ardmore, Oklahoma, transportation, and two lunches.

PROJECTION EQUIPMENT

All slides must be 2" × 2" and fit in a standard carousel tray. Two projectors and two screens will be provided in each technical session. Please bring your own loaded carousel trays. A Speaker Ready Room equipped with projectors will be available for review and practice. Overhead projectors will not be available.

EXHIBITS

Exhibits will be located in the atrium of the Noble Research center adjacent to the technical session rooms. A single 8' × 10' booth will cost $250 for the duration of the meeting. The cost of booths for educational and nonprofit institutions will be $50. GSA and Oklahoma Geological Survey publications will be available for purchase. For further information, contact

Scott M. Ritter
School of Geology
Oklahoma State University
105 Noble Research Center
Stillwater, OK 74078-0451

SPECIAL EVENTS

A **welcoming party** will be held on Sunday evening, March 4, from 7 to 9 p.m. at the Holiday Inn—Holidome (see Motel Locator Map). Hors d'oeuvres and beverages will be provided.

The **GSA South-Central Section Annual Banquet** is scheduled for Monday evening, March 5, at 7 p.m. at the Best Western Motel. The after-dinner speaker will be Mike Helfert, from the Space Shuttle Earth Observation Office of NASA. Helfert, who is the science investigator for environmental change, will treat us to a spectacular slide show and discussion of global change from the vantage point of space. Cost: $11.

Free shuttle service will depart from the parking lot just east of the Noble Research Center between 6:20 and 6:50 p.m.

The joint **South-Central Section of the Paleontological Society–Pander Society Luncheon** will be held at 12 noon, March 6, at the OSU Student Union. Cost: $8.50.

The **National Association of Geology Teachers Luncheon** will be held at 12 noon, March 6, at the OSU Student Union. Cost: $8.50.

The **GSA South-Central Section Management Board Meeting** will be held Sunday, March 4, at 5:30 p.m. in room 102 of the Noble Research Center.

The **GSA South-Central Section Business Meeting** will be on Monday, March 5, at 5:30 p.m. in room 102 of the Noble Research Building.

PUBLICATIONS

Additional copies of the *Abstracts with Programs* for the meeting will be available at the registration desk. Preregistrants will be able to reserve copies for pickup on site. After the meeting, order through Publication Sales, GSA Headquarters.

Guidebooks for the field trips can be purchased from the Oklahoma Geological Survey booth during the meeting. After the meeting, additional copies of the guidebook will be available from the Oklahoma Geological Survey, 100 E. Boyd, Room N-131, Norman, OK 73109.

STUDENT AWARDS

To encourage student participation, cash awards for travel to the meeting and for outstanding papers will be presented. The South-Central Section will present three cash awards ($200, $100, $50) for the best student papers, and the first place winner is eligible to receive up to $300 for travel to the 1990 GSA Annual Meeting in Dallas. Judging for travel awards will be based upon evaluation of abstracts for quality of research and writing. Outstanding paper awards will be judged upon both quality of research and effectiveness of presentation. To be eligible, only students may be listed as authors on the paper, and it must be designated on the abstract form as a student paper. Special student accommodation rates have also been arranged at the Student Union Hotel ($40 for four people).

POLICY ON CAMERAS, SOUND EQUIPMENT, AND SMOKING

South-Central Section policy prohibits the use of cameras or sound-recording equipment at technical sessions and poster sessions. A no-smoking policy adopted by the Program Committee prohibits smoking in all technical sessions.

HOUSING

Rooms will be available at the following locations: OSU Student Union Hotel, Stillwater Best Western, Holiday Inn, Sunmark Motel, Executive Inn, and Motel 6. The location of these facilities and their proximity to campus can be seen on the Motel Locator Map. The Oklahoma State University School of Geology will be accepting all reservations (see Housing Form). If prepayment is required, the motel you are assigned will advise you of any deposit needed when you receive your room confirmation. For prices see the Housing Form.

PARKING

Free parking will be available for all participants in Lot 6, which is located immediately south of the football stadium (see campus map). This lot is also directly east and within easy walking distance of the Noble Research Center.

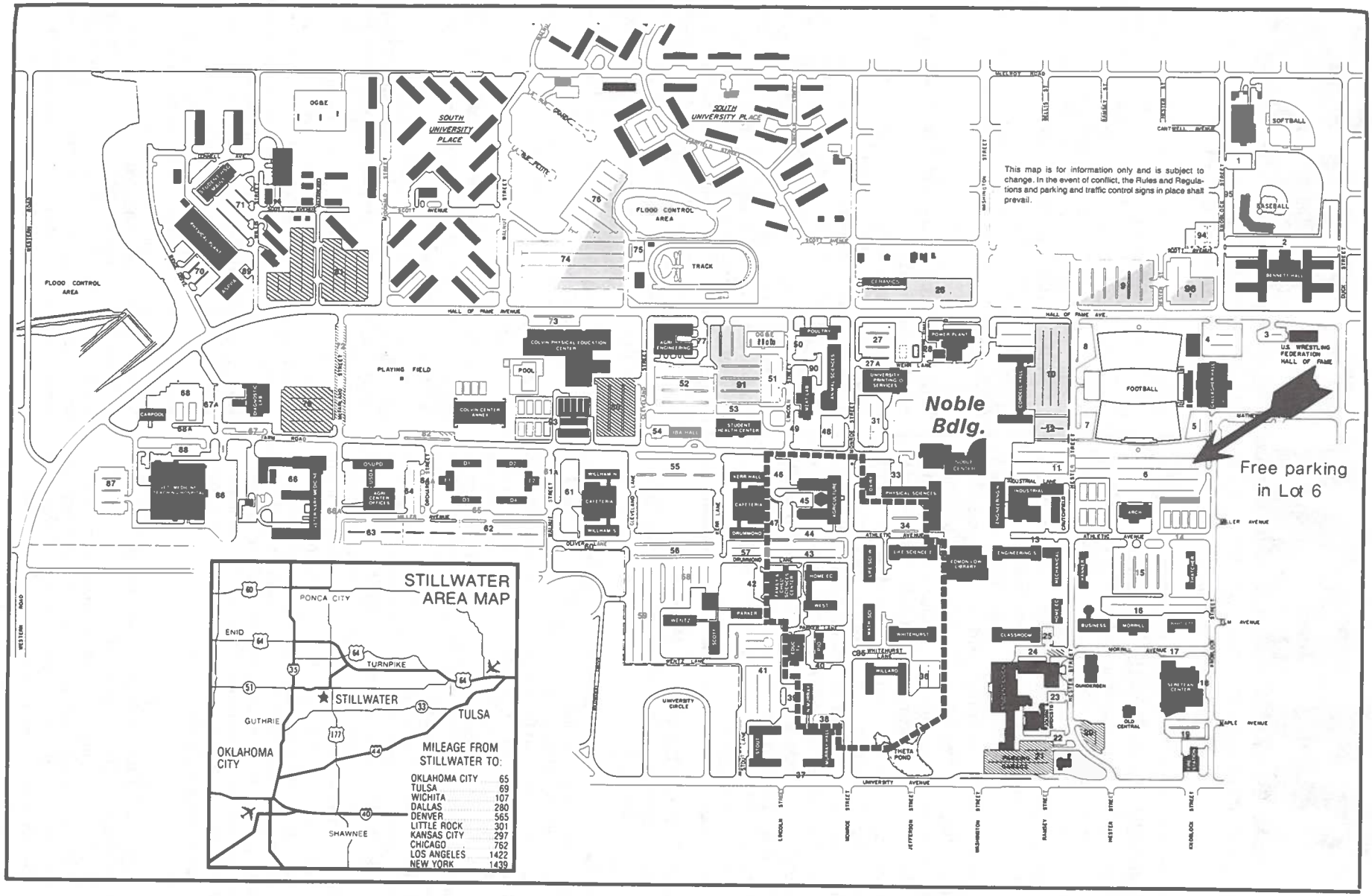
TRAVEL

Stillwater is located about 70 miles from both Tulsa and Oklahoma City. Car rentals may be arranged at either of the major airports. Shuttle vans will run hourly from both the Tulsa and Oklahoma City airports to Stillwater on Sunday, March 4, beginning at 9 a.m. and ending at 6 p.m. If you believe that you will need to take advantage of the shuttle service, please contact Scott Ritter so that adequate van space can be provided. A ride board will be posted during the meeting for coordination of return travel.

DETAILED INFORMATION

For other information concerning technical sessions, field trips, registration, accommodations, and activities, please contact

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


This map is for information only and is subject to change. In the event of conflict, the Rules and Regulations and parking and traffic control signs in place shall prevail.
Noble Bdlg.
Free parking in Lot 6
STILLWATER AREA MAP
PONCA CITY
ENID
TURNPIKE
STILLWATER
TULSA
GUTHRIE
OKLAHOMA CITY
SHAWNEE
MILEAGE FROM STILLWATER TO:
OKLAHOMA CITY 65
TULSA 69
WICHITA 107
DALLAS 280
DENVER 565
LITTLE ROCK 301
KANSAS CITY 297
CHICAGO 762
LOS ANGELES 1422
NEW YORK 1439
FLOOD CONTROL AREA
SOUTH UNIVERSITY PLACE
TRACK
PLAYING FIELD
POOL
FOOTBALL
SOFTBALL
BASEBALL
U.S. WRESTLING FEDERATION HALL OF FAME
UNIVERSITY CIRCLE
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NEW!

GLACIAL LAKE WISCONSIN

edited 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, ISBN 0-8137-1171-1, hardbound, **$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 Nordenskjold about the importance of the deposits here have been borne out by spectacular paleontologic discoveries during the past ten years — discoveries that have provided new insights into the geologic history of Antarctica and answers to old questions about life in the Southern Hemisphere that have puzzled naturalists since Darwin's voyage on HMS *Beagle*. The authors provide an enormous amount of information in 22 chapters. A complete table of contents may be requested from GSA's Marketing Department.

MWR169, 574 p., indexed, ISBN 0-8137-1169-X, hardbound, 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. Includes more than 1,100 bibliographic references a general correlation chart for the entire area, and 16 tables listing the stratigraphic and geographic distribution of all described and figured fossils. Tithonian to Maastrichtian ammonites are figured in 18 plates.

MWR168, 168 p., 1 pocket-plate, indexed, ISBN 0-8137-1168-1, hardbound, 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., ISBN 0-8137-1167-3, hardbound, list: $36.00 **SALE $22.50**

THE GEOLOGICAL SOCIETY OF AMERICA

Annual research awards program 1990

The Geological Society of America will continue its annual research awards program in 1990. Eligibility is not restricted to GSA members. New application forms for the current year and detailed requirements are available each fall in the geology departments of colleges and universities offering graduate degrees in earth sciences. Forms are mailed annually to GSA Campus Representatives and department secretaries and chairmen in the United States and Canada. They are also available upon request from the Research Grants Administrator, Geological Society of America, P.O. Box 9140, Boulder, Colorado 80301. PLEASE USE ONLY THE 1990 APPLICATION AND APPRAISAL FORMS.

The primary role of the research grant program is to provide partial support of master's and doctoral thesis research for graduate students at universities in the United States, Canada, Mexico, and Central America.

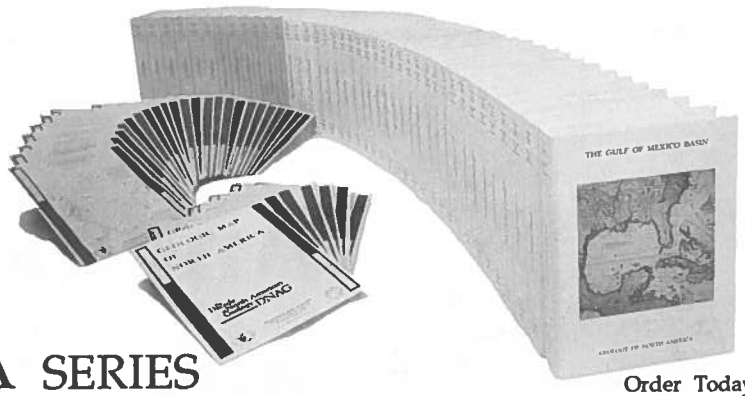
The Geological Society of America awarded $180,000 in grants in 1989. The awards went to 210 students doing research for advanced degrees. The average amount awarded was $859. The largest award was $1,700, but there is no predetermined maximum amount.

Confidential evaluations from two faculty members are required from master's and doctoral candidates and must accompany applications submitted. PLEASE USE THE "APPRAISAL OF APPLICANT" FORMS, WHICH ACCOMPANY THE 1990 APPLICATION FORMS.

The Committee on Research Grants will meet in April to evaluate applications and award grants. In April, all applicants for grants will be informed of the committee's actions by the Executive Director of the Geological Society of America.

ALL APPLICATIONS MUST BE SUBMITTED ON THE 1990 FORMS AND POSTMARKED BY FEBRUARY 15, 1990

The Decade of North American Geology DNAG



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Volume A
GEOLOGY OF NORTH AMERICA — AN OVERVIEW
edited by A. W. Bally and A. R. Palmer, 1988
The overview volume for the 27 other volumes of the Geology of North America (U.S., Canada, and Mexico). Summarizes the major geologic features of North America and the adjacent oceanic regions, and complements the more detailed treatments presented in the other volumes, sometimes providing additional perspectives. Twenty chapters include concise reviews of current thinking about Precambrian basement, Phanerozoic orogens, cratonic basins, passive-margin geology of the Atlantic and Gulf Coast regions, marine and terrestrial geology of the Caribbean region, marine geology of the North Atlantic and northeast Pacific oceans, Quaternary geology, hydrogeology, and economic geology. An excellent text for a graduate course or upper-level undergraduate course in regional geology. Includes tables of contents for the other 27 volumes. Accompanying reference lists lead the reader more deeply into the major publications on North American geology. Extended selected references are on two microfiche cards.
GNA-A, 629 p., 2 microfiche cards in pocket, 12 plates in slipcase, indexed, ISBN 0-8137-5207-8 hardbound, **$60.00**

Volume D2
SEDIMENTARY COVER — NORTH AMERICAN CRATON: U.S.
edited by L.L. Sloss, 1988
The "sedimentary cover" refers to the stratified rocks of youngest Proterozoic and Phanerozoic age that rest upon the largely crystalline basement rocks of the continental interior. The early chapters of the volume present data and interpretations of the geophysics of the craton and summarize, with sequential maps, the tectonic evolution of the craton. The main body of the text and accompanying plates and figures present the stratigraphy, structural history, and economic geology of specific sedimentary basins (e.g., Appalachian basin) and regions (e.g. Rocky Mountains). The volume concludes with a summary chapter in which the currently popular theories of cratonal tectonics are discussed and the unresolved questions are identified.
GNA-D2, 520 p., 8 plates in slipcase, indexed, ISBN 0-8137-5205-1, hardbound, **$49.50**

Volume I2
THE ATLANTIC CONTINENTAL MARGIN: U.S.
edited by R.E. Sheridan and J.A. Grow, 1988
This synthesis covers stratigraphy, depositional processes, and geophysical interpretation of the major onshore and offshore marginal basins from Maine to the Bahamas, and includes an up-to-date review of thinking on regional tectonic history. Additional chapters discuss the theoretical aspects of thermal evolution, subsidence, and seismic stratigraphy as applied to this region. Geological resources including petroleum, water, sand and gravel, hard minerals, and heat flow are reviewed, and environmental hazards such as seismicity, coastal erosion, waste disposal and submarine instability as it relates to site of drilling platforms and mining are evaluated. A summary chapter reviews areas of controversy and suggests key topics for research.
GNA-I2, 620 p., 16 plates on 8 sheets in slipcase, indexed, ISBN 0-8137-5204-3, hardbound, **$49.50**

Volume K3
NORTH AMERICA AND ADJACENT OCEANS DURING THE LAST DEGLACIATION
edited by W.F. Ruddiman and H.E. Wright, Jr., 1987
Most Quaternary sediments in North America north of 45°N post-date the last deglaciation. This volume looks at those extensive deposits from the standpoints of timing, cause, and mechanism of the wastage of North American ice during the last deglaciation and the accompanying environmental changes in the nonglaciated and deglaciated areas. It particularly examines the mechanisms by which a mass of ice equivalent to 100 m of global sea-level was returned to the ocean within about 8,000 years. A truly comprehensive synthesis of marine and terrestrial information in 22 chapters grouped into five sections: Chronology of Disintegration of the North American Ice Sheets, Ice Core and Other Glaciological Data, the Nonglacial Physical Record on the Continent, Biological Record on the Continent, and Analysis and Summary. Includes two oversized pocket plates in color showing time-series maps of pollen densities and vegetation changes since 18 ka.
GNA-K3, 509 p., 2 pocket plates, indexed, ISBN 0-8137-5203-5, hardbound, **$43.50**

Volume M
THE WESTERN NORTH ATLANTIC REGION
edited by P.R. Vogt and B.E. Tucholke, 1986
Complete coverage of the geology and geophysics of the western North Atlantic Ocean basin in 41 chapters, organized into 8 sections: Introduction; Present Accretion Axis; Regional Geology and Geophysics; Plate Tectonic Evolution; Surficial Sedimentation; Biofacies; Paleoceanography; and Resources and Law of the Sea.
GNA-M, 720 p., 11 plates in slipcase, indexed, ISBN 0-8137-5202-7, hardbound, **$47.50**

Volume N
THE EASTERN PACIFIC OCEAN AND HAWAII
edited by E.L. Winterer, D.M. Hussong, and R.W. Decker, 1989
This new synthesis includes a section on plate kinematics, documenting the basis for a new interpretation of the magnetic anomaly patterns. It also includes six chapters on various aspects of tectonics, petrologic characteristics, and hydrothermal processes of active ridges from the Galapagos Rift to the Juan de Fuca Ridge; a section on mid-plate volcanism, including the Hawaii-Emperor chain; five chapters on various aspects of northestern Pacific sedimentary regimes; and nine chapters on the geology of the Pacific continental margin from the Aleutians to Guatemala as, seen from the perspective of marine geology. Three separate oversize plates illustrate the bathymetry of the northeast Pacific; distribution of sediment samples and types and magnetic anomaly data and tectonic interpretations; and synthesis of geology and bathymetry of Hawaiian Islands; parts of East Pacific Rise; and major seismic profile across the Pacific margin of Guatemala are also included.
GNA-N, 577 p., 12 plates in slip case, indexed, ISBN 0-8137-5208-6, hardbound, **$54.50**

Volume O2
HYDROGEOLOGY
edited by W. Back, P.R. Seaber, and J.S. Rosenshein, 1988
Discusses hydrogeology from the geological perspective. After describing the major features of 28 hydrogeologic regions of North America, the volume devotes eight chapters to discussion of the comparative hydrogeology of kinds of different bedrock regimes and surficial deposits; seven chapters to geologic processes including karstification, diagenesis, tectonics, ore deposits, and hydrocarbon migration intimately involved with ground water; and two concluding chapters to a look at future scientific and societal problems related to ground water. An excellent addition to the series!
GNA-O2, 534 p., 3 pocket plates, indexed, ISBN 0-8137-5206-X, hardbound, **$49.50**

1989 ANNUAL MEETING QUESTIONNAIRE

FOR GSA MEMBERS WHO DID *NOT* ATTEND THE ST. LOUIS ANNUAL MEETING

Please take a few minutes to provide us with your views on several topics. This questionnaire was used during the St. Louis Annual Meeting. Even though you were unable to attend, we would like to hear from you.

Your response is important to us—and as always, your vote *does* count. To show our appreciation, everyone who returns a completed questionnaire by January 15, 1990, will qualify for a drawing for one of the following:

1. A round-trip airfare anywhere in the Continental United States.*
2. A round-trip airfare to the 1990 Dallas Annual Meeting.
3. Professional registration for the 1990 Dallas Annual Meeting.

The drawing will take place at GSA headquarters on January 22, 1990. Winners will be notified by both mail and telephone.

YOUR RESPONSE IS COMPLETELY CONFIDENTIAL. You may send the form and coupon in two separate envelopes, OR if you prefer, we will separate the two and place your coupon in the drawing.

Thank you for your response.

*Air travel will be on either United or Delta Airlines from departure points within the Continental U.S. (Hawaii excluded), tickets are nontransferable, and some restrictions may apply. Airline tickets must be used by December 31, 1990.

Fold and Tear

Full Name (please print)

Company or Organization

Street Address

City, State, ZIP Code

Telephone: (work)

Telephone: (home)

1989 QUESTIONNAIRE

FOR GSA MEMBERS WHO DID *NOT* ATTEND THE 1989 ANNUAL MEETING

Mail by January 15, 1990, to: GSA Headquarters, P.O. Box 9140, Boulder, CO 80301

1. Please check your member status:

(1)____ Professional (2)____ Student Associate

2. Please check your age bracket:

(1)____ Under 25 years
(2)____ 25-35 years
(3)____ 36-45 years
(4)____ 46-60 years
(5)____ Over 60 years

3. Regarding your primary daily responsibilities, please check all that apply:

(1)____ Professor (at any level)
(2)____ Department Chair
(3)____ Dean, Vice-President, Provost
(4)____ Student
(5)____ Owner/Partner/Officer
(6)____ Manager
(7)____ Chief/Sr. Geologist
(8)____ Geologist
(9)____ Geophysicist
(10)____ Other _____

4. What is the location of your primary address? (Check one section from the map.)

Section from map ____1 ____2 ____3
____4 ____5 ____6 ____7 (Other)

5. How important is the meeting site as a factor in your decision to attend the Annual Meeting?

(1)____ Very important
(2)____ Somewhat important
(3)____ Of little importance
(4)____ Not a factor

6. GSA has chosen the following future annual meeting sites. Please check all the ones you are likely to attend.

(1)____ 1990 Dallas
(2)____ 1991 San Diego
(3)____ 1992 Cincinnati
(4)____ 1993 Boston
(5)____ 1994 Seattle
(6)____ All of the above
(7)____ None of the above

7. GSA is considering sites for 1995. Please identify the three host cities in which you would most likely attend the Annual Meeting. Rate them 1, 2, 3, with 1 as your first choice.

(1)____ Atlanta
(2)____ Montreal
(3)____ New Orleans
(4)____ Orlando
(5)____ Toronto
(6)____ None of the above

☐ **Yes, I completed the evaluation. Enter my name in the drawing!**

Fold and Tear

Geological Society of America
Meetings Department
3300 Penrose Place
P.O. Box 9140
Boulder, CO 80301
USA

8. GSA is considering holding meetings in one city on a frequent, regular cycle, with alternative cities for the years in between. Which cycle do you prefer? (Please check one):

(1)____ Every other year
(2)____ Every third year
(3)____ Every fourth year
(4)____ Do not repeat the same city more frequently than every fifth year.

Comment _____

_____

_____

_____

9. GSA is considering naming Denver as the city to be repeated on a regular cycle. Do you agree or disagree with this idea?

(1)____ Agree (2)____ Disagree

If you disagree, please name one other city you would prefer

_____

10. Currently, the official meeting days are Monday through Thursday. In order that registrants may take better advantage of Saturday discounted airfares, GSA is considering starting the Annual Meeting earlier. Assuming a four-day meeting, do you favor starting the meeting with volunteered papers beginning on:
Check one

(1)____ Saturday
(2)____ Sunday
(3)____ Neither; keep the Monday start.

Comment _____

_____

_____

_____

_____

11. Regardless of the starting day, are you in favor of volunteered papers being presented for a five-day period?

(1)____ Yes (2)____ No

12. Do you prefer theme sessions (volunteered papers organized by scientific topic) to discipline sessions (volunteered papers organized by scientific classification)?

(1)____ Yes (2)____ No
(3)____ No preference

Comment _____

_____

_____

_____

_____

_____

_____

13. This year the abstracts deadline was on July 19 (five weeks closer to the start of the meeting than any previous year). Do you like this change?

(1)____ Yes (2)____ No
(3)____ Don't care

Comment _____

_____

_____

_____

_____

14. The July abstracts deadline meant that speakers were not selected until August 19. As a result, speaker notification cards became available the third week in August, and the 1989 program schedule first appeared in the September issue of *GSA News & Information*. Did the later release of information affect your decision to attend the meeting or your ability to obtain travel funds?

(1)____ Yes (2)____ No

Comment _____

_____

_____

_____

_____

15. What is your primary use of the abstracts volume? (Check one)

(1)____ On-site during the meeting
(2)____ Post-meeting library reference for research
(3)____ Other _____

16. Over what period of time are you most likely to use the abstracts volume for research purposes? (Check one)

(1)____ Between 1 month and 1 year
(2)____ More than 1 year, but less than 4 years
(3)____ More than 4 years

17. How often do you use the abstracts volume as an independent reference work citable in your publications?

(1)____ Very frequently
(2)____ Frequently
(3)____ Rarely
(4)____ Never

18. Considering your overall use of the abstracts volume, do you prefer having it organized by: (Check one)

(1)____ Session, using the author index for locating an abstract by a particular individual.
(2)____ Alphabetically, using the program to locate abstracts on a particular topic.
(3)____ Either way is acceptable.

Comment _____

_____

_____

19. How frequently do you attend GSA section meetings?

(1)____ 1989 was the first year
(2)____ Every year
(3)____ Every other year
(4)____ Every three to five years
(5)____ Very rarely or never

20. If you attend a section meeting, how likely is it that you will attend a GSA Annual Meeting in the same year?

(1)____ Very likely to attend
(2)____ Likely to attend
(3)____ Unlikely to attend
(4)____ Never

Please feel free to comment on any of these questions or on any of GSA's activities. As always, we are glad to hear from you.

_____

_____

_____

GET YOUR 1989 ST. LOUIS T-SHIRT AND THE NEW GSA HAT

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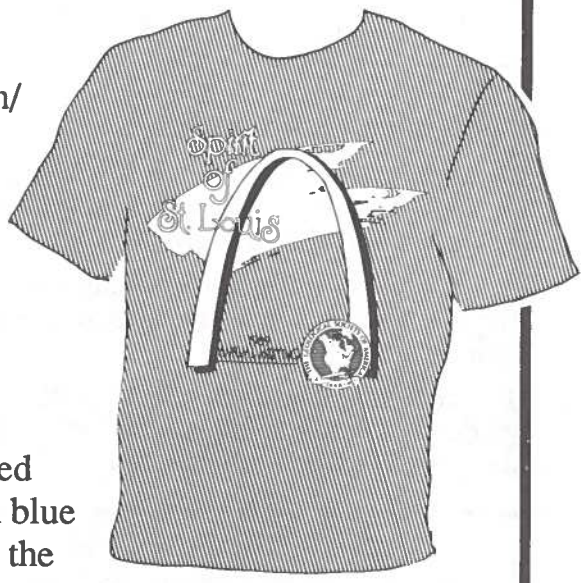
The St. Louis T-Shirt is jade green, 50% cotton/ 50% polyester. The design includes "Spirit of St. Louis" and the famous St. Louis Arch.



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Information Explosion Is 1990 Theme

In the past decade computers have been woven into the fabric of our daily lives. The processing power of microcomputers has grown rapidly and now exceeds that of room-sized mainframes of a generation ago. Increasingly, from data collection to manuscript preparation, geosciences research resides in electronic files.

The theme for the 1990 GSA Annual Meeting in Dallas recognizes the role that computers are playing in geology today and are certain to play in the future. Special sessions will focus on the importance of computers in geosciences research, and local field trips will provide outstanding examples.

The 1990 Annual Meeting program will be built around symposia and theme and discipline sessions.

- Symposia are organized only by GSA divisions and associated societies.
- Theme sessions serve to focus volunteered presentations, frequently from a variety of disciplines, on a topic of broad interest.
- Discipline sessions consist of volunteered papers submitted to scientific (rather than topical) classifications.

Theme topics may be proposed by any individual or group. Proposed topic titles and a short explanatory paragraph should be submitted to either co-chairman. Submission of theme topics is due by *January 2, 1990.*

Organizations or groups of individuals submitting theme topics should designate one person as official theme advocate. The theme advocate participates in the review process and may solicit contributions, although no abstract is guaranteed acceptance. Abstracts contributed to theme sessions are entirely volunteered and are reviewed by three independent reviewers appointed by the Joint Technical Program Committee (JTPC). The advocate may serve as a fourth reviewer.

Abstracts submitted to a theme session but not deemed relevant to the topic by the official advocate will be reviewed and considered for presentation in a discipline session.

The following ideas have been compiled by the 1990 Annual Meeting Local Committee. They are not intended to be comprehensive nor exclusive. Neither are they necessarily the ones that will emerge as the final titles of theme sessions to which abstracts will be submitted.

1990 Candidate Themes

1. Computers in Geology—modeling geologic processes; 3-D seismology; instructional uses
2. Plate Margins and Tectonic Evolution—Proterozoic crustal evolution of North and South America; tectonic setting and magma genesis at extensional centers; transpression
3. Geochemical Cycles and Global Stratigraphy—biotic, chemical, and isotopic changes at boundary intervals; rhythmic bedding and paleoclimatology; sequence stratigraphy
4. Environmental Problems—water supplies, hazardous wastes; neotectonics
5. Paleobiology—extinctions and recoveries; taphonomy; cladistics
6. Mapping and Technology—in situ stress maps; Global Positioning System; crustal imaging; deep crustal drilling

Preliminary List of Theme Topics

T1. Application of Sr isotopes in sedimentary geology
T2. Mesozoic tectonic evolution of Mexico and the Gulf of Mexico
T3. Case studies in environmental hydrogeology
T4. K/T boundary intervals in the southern United States
T5. Hydrogeology of arid regions

Future GSA Annual Meetings

Dallas	Oct. 29–Nov. 1, 1990
San Diego	Oct. 21–Oct. 24, 1991
Cincinnati	Oct. 26–Oct. 29, 1992
Boston	Oct. 25–Oct. 28, 1993
Seattle	Oct. 24–Oct. 27, 1994

Final Announcement

CORDILLERAN SECTION, GSA, 86th Annual Meeting

Tucson, Arizona
March 14–16, 1990

The Cordilleran Section of the Geological Society of America will meet in conjunction with the Pacific Coast Section of the Paleontological Society on the campus of the University of Arizona in Tucson during spring break (technical sessions on March 14–16, 1990, and both premeeting and postmeeting field trips). The meeting is sponsored by the Department of Geosciences at the University of Arizona with the cooperation of the Arizona Geological Survey and the Tucson Field Office of the U.S. Geological Survey.

LOCALE

Tucson is a metropolitan area of approximately 600,000 people located in the Sonoran Desert of southern Arizona only an hour by road from Nogales on the international border with Mexico. Varied rock assemblages in complexly faulted nearby ranges include Proterozoic basement, Paleozoic platform cover, diverse Mesozoic sedimentary sequences, Mesozoic and Tertiary plutons and volcanic rocks, strongly deformed mid-Tertiary strata, and Neogene basin fill. Temperatures in mid-March range from minima of 40°–55° F to maxima of 65°–85° F at the elevation of Tucson (temperatures in surrounding mountains are lower). March days may be windy but are seldom wet. The slate of field trips for the 1990 Cordilleran Section meeting in Tucson is all new; there are no repeats from the 1987 GSA Annual Meeting in Phoenix. In recognition of the proximity of the meeting site to the Republic of Mexico, papers in technical sessions may be presented in either English or Spanish [presentaciones de los trabajos pueden ser en inglés o español].

REGISTRATION

The PREregistration deadline is *February 9, 1990.*

Everyone participating in meeting events must be an official registrant. To encourage attendance by geoscientists from Mexico and Central America, registration fees (but not fees for events or field trips) will be waived for participants (attendees) resident in those regions. Admission to the technical sessions will also be free for precollege earth science teachers.

CURRENT student ID is required to obtain special student rates at both the on-site and preregistration counters. Students not carrying a current student ID when they arrive to pick up registration materials will be required to pay the professional fee.

Registration and pick-up of meeting materials will be held during the Bienvenidos Bash for PREregistrants on Tuesday evening, March 13. After this date all registration will be held in the Gould-Simpson Building Foyer on the campus of the University of Arizona.

A message board and general information center will also be available in the registration area for your convenience.

Cancellation requests must be made in writing and received by February 16, 1990, to qualify for refund. If you cancel, and paid your registration by credit card, you will be issued credit according to the card number you provided on the registration form.

On-Site Registration Schedule

Ramada Downtown	
Tuesday, March 13 (preregistrants only)	6:30 p.m.– 9:00 p.m.
Gould-Simpson Building, University of Arizona	
Wednesday, March 14	7:30 a.m.– 4:30 p.m.
Thursday, March 15	7:30 a.m.– 4:30 p.m.
Friday, March 16	7:30 a.m.–10:30 a.m.

STUDENT SUPPORT

The GSA Cordilleran Section has funds available for grants to support students who are contributing to the meeting. Students are strongly encouraged to apply for these grants, and we anticipate that most students who qualify will be funded to some degree. Application letters must be received by *January 31, 1990,* by Section Secretary Bruce A. Blackerby, Department of Geology, California State University, Fresno, CA 93740, (209) 294-2955 (direct) or 294-3086 (department). Applications should include certification that the student is a GSA Student Associate of the Cordilleran Section and is presenting a paper or poster session at the Tucson meeting (students from Mexico and Central America need not be GSA Student Associates to be eligible for student grants).

TRANSPORTATION

Air. Hyways and Byways Travel Service in Tucson has been designated as the official travel agent for the meeting. For information and reservations, please call Edith Staton (1-800-326-4373 toll-free), 9:00 a.m. to 4:30 p.m. MST, Monday through Friday and identify yourself as a GSA meeting participant. Delta Airlines is offering 5% off supersaver first-class fares and 40% off fares with no restrictions or advance purchase requirements. It is advisable to make reservations as early as possible to take advantage of the lowest fares. If ten or more persons travel together, attractive group rates may apply, provided flight times and routes are the same for all members of the group (please note also that names of all members of a group must be available when group reservations are made). To expedite reservations, have your mailing address, telephone number, and credit card number (with expiration date) ready when you call. Hyways and Byways will find the lowest possible fares for you (to either Tucson or Phoenix). For the convenience of those planning to attend premeeting and postmeeting field trips, special meeting fares will be available March 9 through 23 inclusive; your tickets will be mailed to you no later than March 2.

Ground. Special car rental rates will be available through Hyways and Byways Travel Service and can be arranged when airline reservations are made (see above). All four convention hotels offer complimentary transportation to and from the Tucson airport (but round trips are 30–45 minutes and limited passenger capacity may cause delays). Arizona Stagecoach limousines (departure stand just outside Tucson terminal) will offer 20% discounts off published fares to convention hotels with presentation of either a coupon that Hyways and Byways will mail with your airline tickets, or evidence of GSA preregistration or membership. Those engaging regular taxicabs (pick up station just outside Tucson terminal) should take care to prenegotiate fares (which are not prescribed in Tucson). Arizona Shuttle Service offers ground transportation from the Phoenix airport (100 miles away) directly to your Tucson hotel at special rates (call 1-800-888-2749 toll-free and identify yourself as a GSA meeting participant).

(*continued on p. 346*)

Cordilleran Section (*continued from p. 345*)

Special Drawing. The names of all persons who make airline reservations for the 1990 GSA Cordilleran Section Meeting through Hyways and Byways Travel Service will be placed in a drawing for two (2) free round-trip tickets to anywhere Delta Airlines flies in the conterminous United States. The winner will be announced at the meeting.

HOUSING

Rooms have been blocked at special convention rates in four hotels from which daily shuttle service will be provided to the meeting site (see accompanying map for locations and housing form for rates):

A. Ramada Downtown (HQ)
B. Days Inn Downtown
C. Plaza Hotel and Conference Center
D. Quality Inn University

To obtain convention rates, reservations must be made through the *GSA Cordilleran Housing Bureau in Tucson* at the address given on the accompanying housing form.

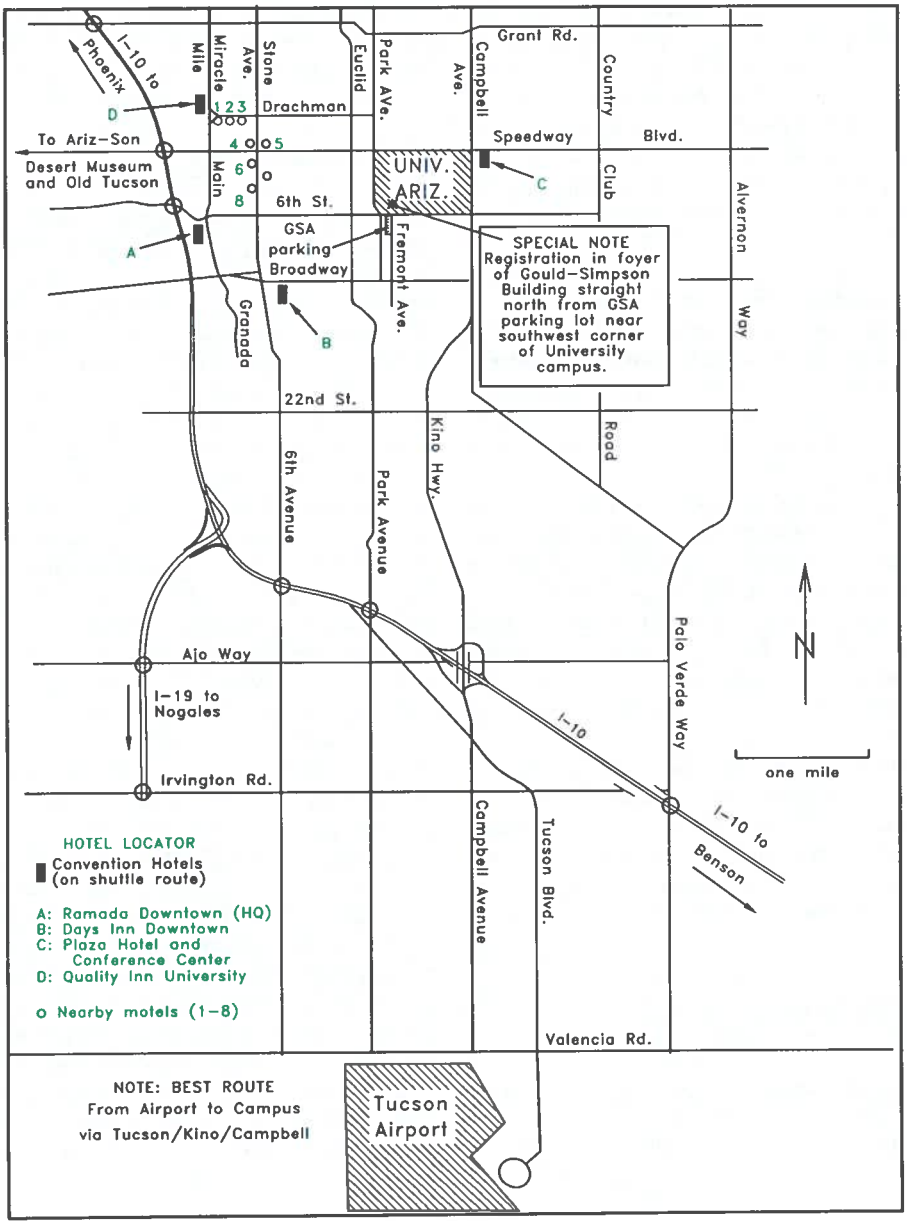
For the convenience of those driving to Tucson and wishing to stay in a local motel, the following telephone numbers are provided for nearby motels (see accompanying map for locations):

1. Best Western Executive Inn: (602) 791-7551
2. Frontier Motel: (602) 798-3005
3. Copper Cactus Inn: (602) 622-7411
4. Franciscan Inn: (602) 622-7763
5. Tucson Travelodge: (602) 622-6714
6. Best Western Royal Sun: (602) 622-8871
7. Rodeway Inn: (602) 791-7503
8. Sahara Motor Inn: (602) 882-5526

Please note that shuttle service will not be provided to motels 1–8 (i.e., only to hotels A–D), and that individuals are fully responsible for any reservations at motels 1–8 (i.e., GSA Cordilleran Housing Bureau handles reservations for and guarantees negotiated rates at hotels A–D only).

SHUTTLE SERVICE

To keep shuttle travel times from convention hotels to the meeting site to a minimum, shuttle buses will run on two routes



(each serving two of the four convention hotels). To travel by shuttle from one hotel to a second hotel on the other shuttle route, simply ride the shuttle bus to the meeting site and board a second shuttle bus serving the other shuttle route.

PARKING

Free parking for those attending the GSA Cordilleran Section Meeting will be provided at a designated University of Arizona parking lot. The lot is located just west of Fremont Street, just south of 6th Street (a main thoroughfare), and two blocks due south of the registration area in the Gould-Simpson Building (see accompanying map for location). Please note that left turns off 6th Street are prohibited from 7 to 9 a.m. and from 4 to 6 p.m. on weekdays; to turn off 6th Street onto Fremont Street during those hours, your vehicle must be headed east on 6th Street.

TECHNICAL PROGRAM

Technical sessions are scheduled as oral presentations and poster sessions on Wednesday through Friday, March 14 through 16, on the campus of the University of Arizona. Poster sessions and exhibits will be in the Park Student Center, located one block west of the registration site in the Gould-Simpson Building. Oral presentations will be given in several buildings within a 250 m radius surrounding the Gould-Simpson Building. The Program Coordinator is Roy A. Johnson, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4890 (direct) or 621-6024 (department). The Symposium Coordinator is Judith Totman Parrish, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4595 (direct) or 621-6024 (department).

Poster Displays. Poster booths will each have three 4′ × 8′ tack boards of neutral tone oriented horizontally.

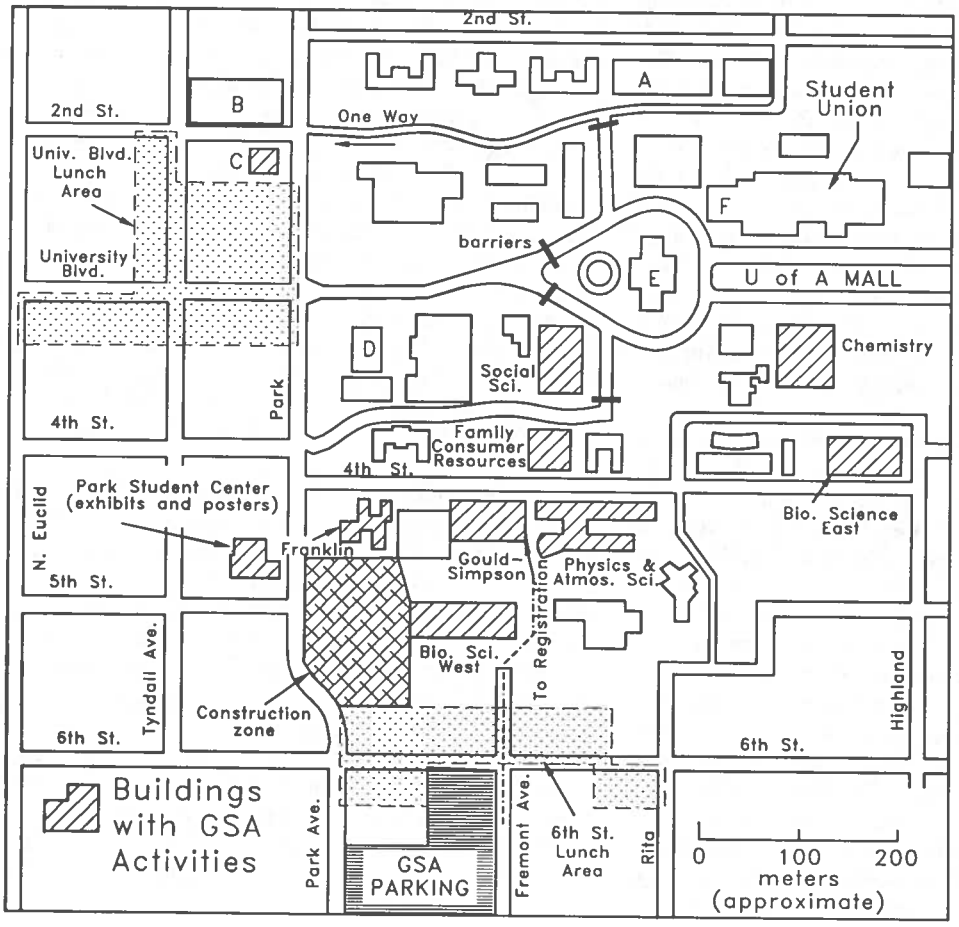
Projection Equipment. All slides must be 2″ × 2″ and fit standard 35 mm carousels (please bring your own loaded carousel trays if possible). Two slide projectors and two screens will be provided for all oral sessions, but overhead projectors will not be available. Speakers will advance their own slides by remote control.

Symposia

Scheduled symposia and their conveners are:

1. *Paul E. Damon Symposium:* **Magmatism and Orogeny in the Colorado Plateau and Basin and Range Provinces.** Richard L. Armstrong.
2. *Paleontological Society Symposium:* **Quaternary Paleoecology of Southwestern North America.** Stephen M. Rowland and Andrew S. Cohen.
3. **Geochemical and Geophysical Characteristics of the Lower Crust in the Southwest.** Joaquin Ruiz and L. David Nealey.
4. **Paleozoic Stratigraphy and Tectonics of the Southern Cordillera.** Joseph F. Schreiber, Jr.
5. **Southern Continuation of the Cordilleran Miogeocline and the Paleozoic Continental Margin of Northern Mexico.** John H. Stewart.
6. **Mesozoic Evolution of Southwestern North America.** Stephen J. Reynolds.
7. **Mid-Tertiary Cordilleran Volcanism: Relations to Plate Convergence versus Intraplate Processes.** Peter W. Lipman.
8. **Environmental History of the American Southwest During the Last Glacial Termination: The Black Mat.** Owen K. Davis.
9. **Geologic Maps of Metamorphic Core Complexes and Highly Extended Areas** [poster symposium]. Jon E. Spencer.

(*continued on p. 348*)



SITES OF INTEREST

A: Mineral Museum (under "Geology" archway)

B: Arizona Historical Society Museum

C: Arizona Geological Survey

D: Arizona State Museum (Anthropology, Archaeology)

E: "Old Main" (original UA)

F: ASUA Bookstore

N

MEETING SITE MAP (SW corner of Campus)

Cordilleran Section (*continued from p. 347*)

Theme Sessions

Proposed theme sessions and their conveners are:

A. **Transition Between the Basin and Range Province and the Colorado Plateau.** Robert B. Scott.

B. **Cordilleran Lithospheric Seismic Investigations.** Roy A. Johnson.

C. **Gold in Cordilleran Settings.** Spencer R. Titley.

D. **Topography and Orogeny: The Evolution of Elevation in the Cordillera.** Clement G. Chase.

FIELD TRIPS

Participants in all field trips must also be registrants for the meeting (for one day at least). Field-trip registration will be on a first-come, first-served basis. Preregistration by *February 9, 1990,* is mandatory for all premeeting trips. Registration during the meeting may be possible for postmeeting trips (if trip logistics and space permit), but trips may be canceled if preregistration is insufficient (in which case field-trip fees will be refunded). All field trips originate and terminate in Tucson unless otherwise noted. To obtain convention rates, participants should use the official housing form to make reservations needed at convention hotels for nights preceding, during, or following field trips (as participants will find it most convenient to stay at departure hotels, housing forms should be sent promptly to guarantee desired reservations). The Field Trip Coordinator is George E. Gehrels, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-6026 (direct) or 621-6024 (department).

Premeeting Trips

1. **Cenozoic Stratigraphy and Tectonics of the Safford, Tonto, and Payson Basins, Southeastern and Central Arizona** (March 12–13). Dale Nations, Department of Geology, P.O. Box 6030, Northern Arizona University, Flagstaff, AZ 86011-6030, (602) 523-7180; Brenda Houser, USGS—Tucson; David Brumbaugh, Northern Arizona University; Larry Anderson, Bureau of Reclamation—Denver; Joe Kruger, Roy Johnson, University of Arizona. This 2-day trip will focus on the Cenozoic stratigraphy, structure, and tectonic history of three extensional basins that form a linear pattern across the Transition Zone and into the Basin and Range province. Geologic highlights will be observed at roadside stops and on short hikes over relatively rough terrain. Dry, cool weather expected; light jacket and hiking boots recommended. Departure from Howard Johnson Motel (1025 East Benson Highway, Tucson, AZ 85726-7115, (602) 623-7792; participants from outside Tucson should make their own reservations there for evening of March 11) at 7 a.m. on March 12 and return to Tucson at 11 p.m. on March 13. Overnight in Globe, Arizona, motel. Limit: 28. Cost: $112 (includes transportation, lodging for March 12, and guidebook).

2. **Geomorphology and Quaternary Geology of the Pitaycachi Fault, Northeastern Sonora, Mexico** (March 11–13). William B. Bull, Department of Geosciences, University of Arizona, Tucson, AZ 87521, (602) 621-2219; Philip Pearthree, Arizona Geological Survey. This is a 2½-day trip to the 75-km-long scarp of the 1887 Sonoran earthquake, the only historical surface-rupturing event in the southern Basin and Range province, to examine the 1887 and older fault scarps in diverse lithologic materials, and to consider evidence for the great antiquity of the prior surface-rupture event provided by soils, hillslopes, and streams. The Pitaycachi fault has an earthquake recurrence interval of more than 100,000 years, which seems to be characteristic of faulting behavior in the region. Bring sleeping bag, tent, and other personal effects for camping; cooking utensils and food will be provided for cooperative simple meals. Expect cool early morning temperatures and warm sunny afternoons, but come prepared for the infrequent late-winter rainstorm. Passport or proof of citizenship (birth certificate) required to enter Mexico. Departure (noon on March 11) and return (8 p.m. on March 13): Plaza Hotel and Convention Center (a convention hotel). Limit: 17. Cost: $145 (includes transportation, meals, and guidebook).

3. **Juxtaposition of Proterozoic Crustal Blocks: 1.65 Ga Mazatzal Orogeny** (March 11–13). Karl E. Karlstrom, Department of Geology, P.O. Box 6030, Northern Arizona University, Flagstaff, AZ 86011-6030, (602) 523-7171; Sam A. Bowring, Washington University; Michael L. Williams, University of Massachusetts. Contrasting tectonic histories and structural levels in two Early Proterozoic blocks will provide a forum for discussion of assembly of Proterozoic lithosphere. In a middle crustal block (Sunflower block) we will examine high-grade (3.75 kbar) quartzite and rhyolite and ductile thrust nappes of the Mazatzal hinterland. In an upper crustal block (Mazatzal block) we will examine (1) a Proterozoic ophiolite (layered gabbro, sheeted dikes, pillow basalt, turbidites); (2) the overlying Tonto Basin Supergroup (synorogenic sediments?); and (3) foreland thrust and fold belt deformation. The Slate Creek shear zone, which juxtaposes crustal levels, will also be examined. The second day involves moderately strenuous hiking. Departure from Motel 6 in Phoenix (2330 West Bell Road) at 7 a.m. on March 12; participants should arrive at the motel on the evening of March 11. Arrival in Tucson at 7 p.m. on March 13. Limit: 27. Cost: $116 (includes transportation, lodging for March 11 and 12, lunches, and guidebook).

4. **Altar/Caborca Geology: Mid-Cretaceous Sedimentation/Compression and Tertiary Extension** (March 10–13). Cesar Jacques-Ayala, Juan Carlos García y Barragan, Instituto de Geología, Universidad Nacional Autónoma de México; Kees A. DeJong, Department of Geology, University of Cincinnati, Cincinnati, OH 45221, (513) 556-6696. The Caborca-Altar area straddles part of the hypothetical Mojave-Sonora megashear. This 3½-day trip will visit both northern and southern blocks, and we will examine Proterozoic and Cretaceous rocks, including the Lower Cretaceous Bisbee Group, the El Chanate Group (= Fort Crittenden Formation?) with arc volcanism, and the overlying syntectonic(?) Altar Formation with reverse metamorphism. We will also see a Sevier overthrust, a Laramide fold, and a Tertiary detachment. We will devote two days to stratigraphy with some structure, and one day to structure with some stratigraphy. Moderate climbing. Passport or proof of citizenship (birth certificate) required to enter Mexico. Departure (3 p.m. on March 10) and return (6 p.m. on March 13): Ramada Downtown (headquarters hotel). Limit: 19. Cost: $216 (includes transportation, lodging for March 10, 11, and 12, meals, and guidebook).

5. **Late Cretaceous and Tertiary Deformation of the Santa Catalina Metamorphic Core Complex** (March 12–13). Stephen J. Naruk, Shell Western E & P, Inc., P.O. Box 576, Houston, TX 77001, (713) 870-4414; Ann Bykerk-Kauffman, University of Arizona. Spectacular, archetypal structures of the mylonite zone and lower plate of the Santa Catalina core complex are featured on this trip. The mylonitic structures include S- and C-surfaces indicative of conjugate-like extensional shear zones, and strain markers that permit quantification of the strain within the mylonites. The lower plate structures include a variety of Cretaceous through middle Tertiary compressional, extensional, and intrusive features, which demonstrate that development of the core complex involved both shortening and extension. Daily departure (7 a.m.) and return (6 p.m.): Plaza Hotel and Conference Center (a convention hotel).

(*continued on p. 350*)

PREREGISTRATION FORM

GSA Cordilleran Section, 86th Annual Meeting, March 14-16, 1990, Tucson, Arizona
held jointly with Pacific Coast Section of Paleontological Society

Preregistration must be received no later than February 9, 1990. Full payment and form must accompany all preregistration requests. Unpaid purchase orders are not accepted as valid registration. One form per preregistrant. All field trip registrants must register for at least one day of the meeting. A confirmation card will be your receipt. The cancellation deadline for refunds is February 16, 1990.

REGISTRATION INFORMATION: GSA HEADQUARTERS (303) 447-2020

Type or print—Copy for your records. Shaded areas are for badge information.

Name (Last) _____ (First) _____

Institution/Employer _____ Nickname For Badge _____

Mailing Address _____

City _____ State _____ Zip Code _____

Country _____ Business Phone _____ Home Phone _____

Guest/Spouse Name (Last) _____ (First) _____

City _____ State/Country _____

Check Member Affiliation: (1) GSA _____ (2) PS _____

PREREGISTRATION FEES*

		Fee	Qty	Amount	Registration (on-site fees)
Professional Member (member affiliation checked above)	(1)	$ 40	1	$_____	$ 50
Member, one day (circle day: W T F)	(2)	$ 25	1	$_____	$ 25
Professional Nonmember	(3)	$ 50	1	$_____	$ 60
Nonmember, one day (circle day: W T F)	(4)	$ 30	1	$_____	$ 30
Student Member (member affiliation checked above)	(5)	$ 15	1	$_____	$ 20
Member, one day (circle day: W T F)	(6)	$ 10	1	$_____	$ 10
Student Nonmember	(7)	$ 20	1	$_____	$ 25
Nonmember, one day (circle day: W T F)	(8)	$ 15	1	$_____	$ 15
Guest (fill in name above for badge)	(9)	$ 0	__	n/c	$ 0
***Abstracts with Programs*—reserved (on-site pick-up)**	(10)	$ 9	__	$_____	$ 9

(for information only)

*Fees waived for professional geoscientists and students resident in Mexico or Central America and for precollege earth science teachers.

GUEST EXCURSIONS

Tour #1: Arizona-Sonora Desert Museum and Flandrau Planetarium	(11)	$ 36	1	$_____	March 14
Tour #2: Tubac Shops and Tumacacori Mission	(12)	$ 28	1	$_____	March 15

SPECIAL EVENTS

Cowboy Ribs at Old Tucson					
(a) including transport by shuttle bus	(16)	$ 24	1	$_____	March 14
(b) without transport (private vehicle)	(17)	$ 18	1	$_____	March 14
Business and Pleasure Buffet, Ramada Inn	(18)	$ 15	1	$_____	March 15

FIELD TRIPS (meeting registration required)

Premeeting					
1. Safford, Tonto and Payson basins	(34)	$112	1	$_____	March 12-13
2. Geomorphology of the Pitaycachi fault	(35)	$145	1	$_____	March 11-13
3. Proterozoic crustal blocks: Mazatzal orogeny	(36)	$116	1	$_____	March 12-13
4. Altar/Caborca Cretaceous-Tertiary geology	(37)	$216	1	$_____	March 10-13
5. Santa Catalina metamorphic core complex	(38)	$ 47	1	$_____	March 12-13
6. Upper Paleozoic stratigraphy of the Whetstone Mountains	(39)	$135	1	$_____	March 12-13
7. Early Jurassic magmatic arc in southern Arizona	(40)	$217	1	$_____	March 11-13
8. Styles of the Cordilleran orogeny	(41)	$104	1	$_____	March 11-13
9. Cretaceous calderas of the Tucson and Sierrita Mountains	(42)	$ 53	1	$_____	March 12-13
10. Quaternary geology of the Northeast Gulf of California	(43)	$225	1	$_____	March 10-13
Postmeeting					
11. Quaternary geology near Cañada del Oro	(44)	$ 25	1	$_____	March 17
12. Magdalena metamorphic core complex, Sonora	(45)	$193	1	$_____	March 16-18
13. Jurassic to mid-Tertiary tectonics, south-central Arizona	(46)	$118	1	$_____	March 16-18
14. Geology and geoarcheology of the San Pedro Valley	(47)	$ 85	1	$_____	March 17-18
15. Chiricahua calderas	(48)	$153	1	$_____	March 16-18
16. Southern margin of North America, Sonora	(49)	$229	1	$_____	March 17-20
17. Harcuvar complex of west-central Arizona	(50)	$154	1	$_____	March 16-18
18. Silver Bell porphyry copper system	(51)	$ 27	1	$_____	March 17

Total Remittance $_____
(full payment must be enclosed)

Remit in U.S. funds, payable to: 1990 CORDILLERAN MEETING

or charge: ☐ American Express ☐ VISA ☐ MasterCard ☐ Diners Club/Carte Blanche

Card expires: ___/___ _____
mo. yr.

Signature _____

Mail to: 1990 GSA CORDILLERAN MEETING, GSA HEADQUARTERS, P.O. BOX 9140, BOULDER, CO 80301

FOR OFFICE USE ONLY

Deposit Date _____ Comment _____

Balance Due $ _____

Refund $ _____

Refund Ck # _____

Refund Date _____

Cordilleran Section (*continued from p. 348*)

Limit: 33. Cost: $47 (includes transportation, lunches, and guidebook).

6. **Upper Paleozoic Stratigraphy of the Whetstone Mountains, Cochise and Pima Counties, Arizona** (March 12–13). Joseph F. Schreiber, Jr., Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-2153; Richard A. Armin, Unocal Corporation; W. Marc Connolly, Robert J. Stanton, Jr., Texas A&M University; Augustus K. Armstrong, New Mexico Bureau of Mines and Mineral Resources; Chester T. Wrucke, U.S. Geological Survey; Timothy W. Lyons, Yale University. The Whetstone Mountains of southeastern Arizona contain an unusually complete section of unmetamorphosed Paleozoic sedimentary rocks. This trip will focus on the upper Paleozoic section in the Dry Canyon area (hiking distances of 3 to 4 miles at elevations of 4800 to 5400 feet). Stops will emphasize the newly described cyclic sedimentation and *Chaetetes* biostromes in the Pennsylvanian Horquilla Limestone, the tectonic setting and sedimentology of the fluvial chert-clast conglomerate interval in the otherwise marine Earp Formation, the Colina Limestone environment of deposition and diagenesis, and the enigmatic Epitaph Dolomite. Sections of the Permian Scherrer Formation and Concha Limestone will also be traversed. Departure (7 a.m. on March 12) and return (6 p.m. on March 13): Quality Inn University (a convention hotel). Limit: 20. Cost: $135 (includes transportation, lodging for March 12, lunches, one dinner, and guidebook).

7. **The Early Jurassic Cordilleran Magmatic Arc in Southern Arizona: Plutons to Sand Dunes** (March 11–13). Nancy Riggs, Department of Geology, University of California, Santa Barbara, CA 93106, (805) 961-2782; Gordon Haxel, USGS—Flagstaff; Cathy Busby-Spera, University of California—Santa Barbara. This 2½-day trip will examine exposures of Early Jurassic plutonic, volcanic, and sedimentary rocks in southern Arizona: two diverse volcanic settings (a probable caldera in the Arivaca area, and an intermediate to silicic multivent volcanic complex in the Santa Rita Mountains), and eolian deposits that have been considered correlative with the Navajo Sandstone on the Colorado Plateau (the validity of this correlation in light of new U-Pb zircon data will be discussed). We will consider the implications of preservation of thick volcanic and eolian sequences for the tectonic setting of the magmatic arc. Plan for moderately strenuous traverses, some through thick brush. Departure (noon on March 11) and return (6 p.m. on March 13): Quality Inn University (a convention hotel). Limit: 24. Cost: $217 (includes transportation, lodging for March 11 and 12, breakfasts, lunches, and guidebook).

8. **Styles of Deformation of the Cordilleran Orogeny** (March 11–13). Harald Drewes, U.S. Geological Survey, Box 25046, M.S. 905, Federal Center, Denver, CO 80225, (303) 236-5647. This 3-day trip offers a review of key areas illustrating the complexities of Cordilleran (Late Cretaceous–early Tertiary in this area) orogenic features, the influence of older structure on them, and the overprinting of younger tectonic events. We will see evidence of large-scale, polyphase, compressive deformation, the basis for some tight dating of deformation, and the influence of structural features on base metals and gold mineralization. Evidence for both Cordilleran and Basin and Range chapters in the development of a gneiss-cored dome (core complex) should help resolve some uncertainties about such domes, while raising new questions about genetic ties between earlier compressional and later extensional events. Each day will require 3–5 hours of easy walking, most on ranch roads but some cross-country. Daily departure (7:30 a.m.) from and return (6 p.m.) to Howard Johnson Motel (1025 East Benson Highway, Tucson, AZ 85726-7115, (602) 623-7792; participants from outside the Tucson area should make their own lodging reservations). Limit: 33. Cost: $104 (includes transportation, one dinner, and field guide; participants should arrange for their own lunches).

9. **Cretaceous Caldera Systems: Tucson and Sierrita Mountains** (March 12–13). Peter W. Lipman, U.S. Geological Survey, Box 25046, M.S. 903, Federal Center, Denver, CO 80225, (303) 236-1020; Christopher J. Fridrich, Department of Energy; David A. Sawyer, USGS—Denver. Laramide igneous rocks in southeastern Arizona constitute the least metamorphosed sector of the Mesozoic Cordilleran volcanic arc of North America and are economically important for the porphyry copper deposits they host. Several Laramide volcanic systems in this area have recently been reinterpreted as silicic ash-flow calderas, challenging some previous ideas about the environment of the porphyry-type deposits of the region. On the first day we will examine evidence that the Tucson Mountains contain a trap-door caldera filled with 3–4 km of intracaldera Cat Mountain Tuff and associated caldera-collapse breccias formerly referred to as the Tucson Mountains Chaos. The second day we will make comparisons with the Sierrita caldera and its associated tuffs, where mid-Tertiary tilting provides an oblique section through an upper crustal magmatic system and associated porphyry copper deposits. Daily departure (7:30 a.m.) and return (6 p.m.): Quality Inn University (a convention hotel). Limit: 30. Cost: $53 (includes transportation, lunches, and guidebook).

10. **Quaternary and Environmental Geology of the Northeastern Gulf of California** (March 10–13). Owen K. Davis, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-7953; Alan Cutler, Keith Meldahl, University of Arizona; Nick Lancaster, Arizona State University; Brian Lock, University of Southwestern Louisiana; Joseph F. Schreiber, Jr., Manuel Palacios-Fest, University of Arizona; Chris Shaw, George C. Page Museum. The northwestern shore of the Gulf of California holds a remarkable assortment of marine and desert sediments. On this 4-day trip we will visit the dunes of the Gran Desierto, examine evaporite deposits in coastal and inland sabkhas, see uplifted marine and lagoonal deposits, explore the modern delta of the Colorado River, and visit the coastal strip at Puerto Peñasco. Temperature should be 70°–80° F; precipitation is unlikely. Participants should bring camping gear (including sleeping bag), and passport or proof of citizenship (birth certificate) for entering Mexico. Departure (8 a.m. on March 10) and return (10 p.m. on March 13): Quality Inn University (a convention hotel). Limit: 25. Cost: $225 (includes transportation, meals, and guidebook).

Postmeeting Trips

11. **Quaternary Geology and Geologic Hazards near Cañada del Oro, Tucson, Arizona** (March 17). William B. Bull, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-2219; Edgar J. McCullough, Jr., Peter Kresan, Clement G. Chase, Julie Woodward, University of Arizona. On this trip we will discuss criteria for dam-site selection and flood risk and other hazards in the context of late Cenozoic landscape evolution of the Santa Catalina Mountains and the adjacent Tucson basin. Multiple levels of pediments and alluvial fans reflect tectonic, lithologic, and climatic controls on the ancestral streams of a rugged mountain front. Characteristics of alluvial rivers and their implications for land-use planning are dramatically illustrated. A failed attempt to dam the Cañada del Oro provides an excellent case study on the importance of sound geologic study prior to dam building. Expect cool early morning temperatures, and a warm, sunny afternoon, but

(*continued on p. 352*)

REQUEST FOR ROOM RESERVATIONS

GEOLOGICAL SOCIETY OF AMERICA/CORDILLERAN SECTION MEETING, MARCH 14-16, 1990, TUCSON, AZ

IMPORTANT: PLEASE READ.

The GSA Cordilleran Housing Bureau will make hotel accommodations upon completion of this official housing request form. Fill out this form completely and mail to the Bureau (address given below). Do NOT send this form to The Geological Society of America. Only reservations received on this form will be accepted.

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

Applications must be received prior to February 1, 1990. To ensure reservation of the space you want, please submit this form as soon as possible!

PLEASE RESERVE THE FOLLOWING HOTEL ACCOMMODATIONS IN TUCSON:

Single _____ # of rooms
1 bed/1 person

Double _____ # or rooms
1 bed/2 persons

Double Double _____ # of rooms
2 beds/2 persons

Extra Persons _____

SPECIAL REQUESTS: _____

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

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

HOTEL: SELECT FROM LIST. SEE MAP FOR LOCATION.

First Choice ☐ Second Choice ☐ Third Choice ☐

PLEASE ENTER LETTERS OF HOTELS FROM LIST BELOW.

HOTELS WHERE SPACE IS BLOCKED AT SPECIAL RATES AND SHUTTLE SERVICE WILL BE PROVIDED:

HOTEL	SINGLE	DOUBLE	DOUBLE DOUBLE	EXTRA PERSON	SUITE
A. Ramada Downtown (Hq)	52.00	52.00	52.00	10.00	125.00
B. Day's Inn Tucson Downtown	42.00	42.00	42.00	7.00	——
C. Plaza Hotel and Conference Center	55.00	65.00	75.00	——	85.00 Quad
D. Quality Inn University	34.00	34.00	34.00	——	75.00 Suite

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

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

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

FIRST AND LAST NAME

UNIVERSITY/COMPANY

STREET ADDRESS/P.O. BOX

CITY STATE ZIP

AREA CODE PHONE NUMBER – COUNTRY

NAMES OF ROOM OCCUPANTS _____

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

Credit Card Company

Credit Card Number Expiration Date

Signature of Card Holder

Do not enclose checks to cover first night's lodging. After confirmation of your reservation is received from the GSA Cordilleran Housing Bureau, prepayment to guarantee late arrival may be sent directly to your hotel.

CONFIRMATION ** Confirmation of accommodations will be mailed by the GSA Cordilleran Housing Bureau. Contact your hotel directly with any questions, changes, or cancellations after February 10, 1990.

Mail this form to: GSA Cordilleran Housing Bureau, 130 South Scott Avenue, Tucson, AZ 85701.

Cordilleran Section (*continued from p. 350*)

come prepared for the infrequent late-winter rainstorm. Departure (7 a.m.) and return (5 p.m.): Quality Inn University (a convention hotel). Limit: 60. Cost: $25 (includes transportation, lunch and guidebook).

12. **Tectonostratigraphic Development and Strain History of the Magdalena Metamorphic Core Complex, North-Central Sonora, Mexico** (March 16–18). Jonathan Nourse, Department of Geological Sciences, California State Polytechnic University, 3801 West Temple Avenue, Pomona, CA 91768, (818) 869-3458. On this 2-day trip we will examine evidence for two superimposed strain events in a recently mapped, easily accessible core complex exposed 50–100 km south of the international border. Mid-Mesozoic supracrustal strata (Jurassic arc–Glance Conglomerate–Bisbee Group equivalents) preserve a history of Late Cretaceous–early Tertiary shortening with multiple granitic intrusion, followed by mid-Tertiary extension along ductile-brittle normal-slip shear zones. Stretched pebbles, syntectonic plutons, and S-C fabrics gauge relative intensities of the two deformations. Passport or proof of citizenship (birth certificate) required for entering Mexico. Departure (6 p.m. on March 16) and return (7 p.m. on March 18): Ramada Downtown (headquarters hotel). Limit: 21. Cost: $193 (includes transportation, lodging for March 16 and 17, meals, and guidebook).

13. **Highlights of Jurassic, Late Cretaceous to Early Tertiary, and Middle Tertiary Tectonics, South-Central Arizona** (March 16–18). Dick Tosdal, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, CA 94025, (415) 329-5423; Gordon Haxel, USGS—Flagstaff; Tom Anderson, University of Pittsburgh. Arc magmatism, intra-arc extension, strike-slip faulting, thrust faulting, and regional metamorphism are aspects of the diverse Jurassic, Late Cretaceous to early Tertiary, and middle Tertiary tectonics in south-central Arizona and adjoining parts of Sonora, Mexico. On this 2-day trip we will examine these environments between Organ Pipe National Monument and the Baboquivari Mountains in south-central Arizona, with particular attention to Late Cretactous to early Tertiary thrust faults, regional metamorphism, and peraluminous granites. The trip includes two hikes; appropriate walking shoes are necessary, a canteen would be useful, and a jacket may be required while on Kitt Peak (elevation 6900 ft). Departure (7 p.m. on March 16) and return (6 p.m. on March 18): Ramada Downtown (headquarters hotel). Limit: 30. Cost: $118 (includes transportation, lodging for March 16 and 17, lunches, and guidebook).

14. **Late Cenozoic Depositional History and Geoarcheology, San Pedro Valley, Arizona** (March 17–18). Everett H. Lindsay, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-6022; C. V. Haynes, University of Arizona; G. Smith, University of New Mexico. Participants will examine sediments of the St. David Formation, where chronology is framed by magnetostratigraphy and biostratigraphy, and of overlying alluvial deposits that have produced a record of Paleoindians and extinct mammals. The focus of the 2-day trip will be on the depositional history of the San Pedro Valley, as reflected in tectonic and climatic factors interpreted from sediments and fossils. The San Pedro Valley has a remarkable history that has been studied intensively for almost 90 years; knowledge of that history is continuously being enriched by application of new methods and techniques. Participants will need sturdy shoes, head cover, and light clothing for several short walks that will involve some climbing (nothing strenuous). Departure (8 a.m. on March 17) and return (6 p.m. on March 18): Ramada Downtown (headquarters hotel). Limit: 34. Cost: $85 (includes transportation, lodging for March 17, lunches, and guidebook).

15. **Calderas in 3-D, Chiricahua Mountains, Arizona** (March 16–18). John S. Pallister, U.S. Geological Survey, Box 25046, M.S. 903, Federal Center, Denver, CO 80225, (303) 236-1023, Edward A. du Bray, Joseph Rosenbaum, Lawrence Snee, Douglas Yager, USGS—Denver. Deep erosion and the rugged topography (5000–10,000 feet elevation) of the Chiricahua Mountains allow one to see inside the upper to middle levels of the 20-km-diameter mid-Tertiary Turkey Creek caldera. Comagmatic ash-flow tuffs, rhyolite lavas, feeder dikes, ring intrusion, and the underlying resurgent intrusion will be investigated. This single magmatic system spans the compositional range from the high-silica rhyolite (>75% SiO_2) to dacite and monzonite porphyry (<65% SiO_2). Field evidence to be seen on this 2-day trip suggests sequential eruption of high-silica ash flows and dacite lavas from the same vents, brecciation and metamorphism of just-erupted intracaldera tuff at the roof of the resurgent intrusion, and possible magmatic recycling of intracaldera tuff to form most lavas by anatexis. Departure (7:30 p.m. on March 16, after dinner) and return (8 p.m. on March 18): Plaza Hotel and Convention Center (a convention hotel). Limit: 25. Cost: $153 (includes transportation, lodging for March 16 and 17, lunches, one dinner, one breakfast, and guidebook).

16. **Tectonics and Stratigraphy of the Paleozoic and Triassic Southern Margin of North America, Sonora, Mexico** (March 17–20). John H. Stewart, U.S. Geological Survey, M.S. 901, 345 Middlefield Road, Menlo Park, CA 94025, (415) 329-5412; Forrest G. Poole, Keith B. Ketner, USGS—Denver; Raul J. Madrid, Conquistador Gold Ltd.; Jaime Roldán-Quintana, Instituto de Geología, Universidad Nacional Autónoma de México; Ricardo Amaya-Martínez, Universidad de Sonora. On this 4-day trip we will visit outcrops of Paleozoic carbonate-shelf and siliceous-offshelf facies and structures and Triassic overlap facies that are critical to understanding the geologic history of the Cordilleran continental margin in central Sonora. We will examine Permian deep-marine detrital deposits, Ordovician-Pennsylvanian deep-marine off-shelf siliceous strata including submarine-fan and stratiform barite deposits, Lower Permian shallow-subtidal and intertidal carbonate strata, Upper Triassic rift-basin continental deposits overlapping Paleozoic deep-marine offshelf siliceous strata, and Cambrian and Ordovician shallow-marine shelf strata. Some Paleozoic continental-shelf deposits in Sonora are similar to correlative Cordilleran miogeoclinal strata in the western United States. Evidence for medial Mississippian deformation and mid-Permian to mid-Triassic deformation will be demonstrated. Arguments for and against the hypothetical Jurassic Mojave-Sonora megashear will be discussed. Passport or proof of citizenship (birth certificate) required to enter Mexico. Bring a sleeping bag for an overnight stay in Mazatán (weather permitting). Expect warm weather and several short walks in moderately difficult terrain. Departure (7 a.m. on March 17) and return (8 p.m. on March 20): Ramada Downtown (headquarters hotel). Limit: 29. Cost: $229 (includes transportation, lodging for two or three nights, lunches, one dinner, and guidebook).

17. **Mesozoic Thrusting, Synplutonic Deformation, and Miocene Overprinting, Harcuvar Complex: A Section Through the Pre-Tertiary Crust of West-Central Arizona** (March 16–18). Stephen M. Richard, Institute for Crustal Studies, University of California, Santa Barbara, CA 93106, (805) 961-8426; Stephen Laubach, University of Texas, Austin; Stephen J. Reynolds, Jon E. Spencer, Arizona Geological Survey. The Harquahala Mountains and adjacent ranges provide nearly complete outcrop along a transect from southwest to northeast across the southeastern end of the Whipple extended terrane. Several lines of evidence suggest that the Harquahala Mountains are a tilted block exposing a section

(*continued on p. 353*)

Cordilleran Section (*continued from p. 352*)
on the order of 10 km thick through the pre-Tertiary crust of west-central Arizona. This 2-day trip will visit areas in the Granite Wash and western Harquahala Mountains to study the complexly interleaved Proterozoic, Paleozoic, and Mesozoic rocks that record several phases of crustal shortening characteristic of the upper part of the exposed crustal section. Stops in the central and northeastern Harquahala Mountains will focus on penetrative deformation under upper greenschist to lower amphibolite facies conditions associated with thrusts, overprinting by Late Cretaceous synplutonic fabrics, and brittle and ductile deformation associated with early Miocene crustal extension responsible for unroofing the range. We will discuss the relation of Mesozoic crustal thickening to Tertiary extension, the geometry of the southeastern termination of the Whipple fault system, regional correlation of Mesozoic supracrustal rocks and their tectonic setting, and the relation of structures in the Harquahala Mountains to similar structures in southern Arizona and southeastern California. Departure from Quality Inn University (a convention hotel) at 5:30 p.m. on March 16; return on March 18 to either Phoenix (Sky Harbor Airport at 8 p.m.) or Tucson (Quality Inn University at 10 p.m.). Limit: 24. Cost: $154 (includes transportation, lodging for March 16 and 17, lunches, and guidebook).

18. **Silver Bell Porphyry Copper System** (March 17). Spencer R. Titley, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-6018. Participants in this 1-day trip will visit and examine sites of mineralization in the Silver Bell Mountains. Isolated and separate centers of intrusion are cores to porphyry copper mineralization in a variety of host rocks that include intrusions, volcanic strata, and the Paleozoic succession. Included are visits to the El Tiro and Oxide pits as well as a visit to surface features above the North Silver Bell porphyry system. Departure (8 a.m.) and return (5 p.m.): Ramada Downtown (headquarters hotel). Limit: 20. Cost: $27 (includes transportation, lunch, and field guide).

FIELD TRIP GUIDEBOOK

Each field trip registrant (except for trips 8 and 18, which will use 1989 International Geological Congress guides) will receive a copy of an Arizona Geological Survey Special Paper containing guides for all other field trips in one volume. The book will also be on sale at a special convention price for other meeting registrants at the Arizona Geological Survey booth in the exhibit hall, and it will subsequently be available for purchase by the general public through the Arizona Geological Survey, 845 North Park Avenue, Tucson, AZ 85719.

GUEST PROGRAM

Special excursions for guest (or other) registrants to key historic, scientific, and cultural features in the vicinity of Tucson have been arranged as follows for Wednesday, March 14, and Thursday, March 15 (these trips will be superb ways to visit outstanding attractions at low cost with no hassle, but they are subject to cancellation with refunds if preregistration by February 20, 1990, is insufficient):

Tour #1: Arizona-Sonora Desert Museum and Flandrau Planetarium. The morning will be devoted to a tour of the world-famous Arizona-Sonora Desert Museum, a unique institution located on the saguaro-studded western flank of the Tucson Mountains and dedicated to entertaining and educational displays of the fascinating flora, fauna, and geology of the Sonoran Desert in a natural, outdoor setting. Lunch will be at the festive La Fuente Restaurant, featuring authentic Arizonan-Sonoran cuisine (taco and tostada buffet with all the trimmings). Afternoon will feature a visit to the Flandrau Planetarium on the campus of the University of Arizona for a special and dramatic show in the domed planetarium theater. Limit: 30 to 45. Cost: $36, including transportation, buffet lunch, and all entrance fees. Time: 9:15 a.m. to 3:30 p.m. on Wednesday, March 14. Departure and return: Ramada Downtown (headquarters hotel).

Tour #2: Tubac Shops and Tumacacori Mission. The lovely community of Tubac, established originally as a Spanish presidio in 1752 but now a haven of art galleries and unique shops in the heritage of the Great Southwest, lies a pleasurable journey south from Tucson up the broad valley of the Santa Cruz River. Lunch will be at Sargeant Grijalva's, a charming and unique Tubac eatery. The day includes a sojourn at nearby Tumacacori National Monument, featuring the historic and well-preserved Tumacacori Mission built in 1751, and also a visit to the Santa Cruz Chili and Spice Factory, where varied gourmet Southwestern food items are for sale. Limit: 30 to 45. Cost: $28, including transportation, lunch, and all entrance fees. Time: 9:15 a.m. to 4:30 p.m. on Thursday, March 15. Departure and return: Ramada Downtown (headquarters hotel).

EVENING EVENTS

Tuesday: Bienvenidos Bash. A no-host welcoming party will be held from 7:30 to 10:30 p.m. at the Ramada Downtown (headquarters hotel). A special shuttle loop will run to and from the other three convention hotels (frequent service 7–8 p.m. and 10–11 p.m. with intermittent service 8–10 p.m. also). Complimentary munchies will be available, and preregistrants will find it most convenient to pick up registration materials (prior to 9 p.m.) at the same function.

Wednesday: Cowboy Ribs at Old Tucson. Barbeque and a hot old time at Old Tucson, wild and woolly western movie set just beyond the Tucson Mountains. Ticket price includes admission to Old Tucson (Frontier Shops on Front Street, Red Dog Palace Saloon, High Chaparral Ranch), access to no-host watering holes with chips and dips at the Mexican Plaza and Cantina, and a full meal of Gunsmoked Beef Ribs and chicken with salad, corn cobbettes, Judge Roy Beans, fresh tortillas, and apple pie served on a movie sound set following a mock street gunfight complete with roof fall. Time: 7–9:45 p.m. (shuttle buses leave convention hotels at 6:15 p.m. and return at 10:30 p.m.) on Wednesday, March 14. Ticket costs: (a) $18 without transport (private vehicles to Old Tucson parking lot); (b) $24 with transport (shuttle buses from convention hotels). Preregistration is strongly advised to guarantee your attendance (i.e., advance crowd estimate will be required).

Thursday: Business and Pleasure Buffet. A wrap-up mixer at the headquarters hotel featuring no-host refreshments al fresco, a sumptuous buffet of authentic Arizonan-Sonoran food, the GSA Cordilleran Section business meeting (mercifully brief), and miscellaneous geoscientific diversions. Placards identifying tables for seating alumni from specific institutions will be provided upon request to the general chairman (see address and phone number below). Time: 6:15–9:45 p.m. (buffet at 7 p.m., más o menos) on Thursday, March 15. Place: Ramada Downtown (headquarters hotel), to and from which shuttle buses will run 6–7 and 9:30–10 p.m. from the other three convention hotels. Ticket price: $15, all-inclusive.

EXHIBITS

Exhibits will be located adjacent to poster sessions in the Park Student Center one block from the registration area in the foyer of the Gould-Simpson Building. Snacks and refreshments will be continuously available for purchase at the entrance to the exhibit hall. Rental fees for standard booths are $250 for commercial exhibitors and $125 for educational or nonprofit institutions.

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Cordilleran Section (*continued from p. 353*)
Arrangements for exhibit space should be made by *February 15, 1990*, with Exhibits Coordinator Joseph F. Schreiber, Jr., Department of Geosciences, University of Arizona, Tucson, AZ 87521, (602) 621-2153 (direct) or 621-4051 (department).

PALEONTOLOGICAL SOCIETY FUNCTION

An informal luncheon and short business meeting of the Pacific Coast Section of the Paleontological Society will be held on Thursday, March 15, at a venue to be announced during the Paleontological Society Symposium on Thursday morning.

GENERAL INFORMATION

Requests for additional information concerning the meeting should be addressed to General Chairman William R. Dickinson, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4051.

A GSA GEOTRIP

GSA Goes Kiwi

New Zealand: 1991

2½ to 3 Week Geological Vacation Trip

emphasis on South Island

Exact dates to be announced;
will be between mid-February and mid-March

Geologic leadership and other trip information to be announced March 1, 1990

Check the March issue of *GSA News & Information*

Approximate cost: $2000–$2400 plus airfare

Guests welcome

GSA members will receive a special discount

Call Sue Beggs, GSA Meetings Manager, (303) 447-2020

—Clip and return to—

GSA Meetings Dept.
P.O. Box 9140, Boulder, CO 80301

GSA NEW ZEALAND 1991

____ YES, I'm interested. Send more information.

Name _____

Address _____

Address _____

City _____ State _____ ZIP code _____

( ) Business phone _____ ( ) Home phone _____

1990 Annual Meeting—Dallas, Texas

October 29–November 1
Dallas Convention Center

DALLAS
INFORMATION EXPLOSION

General Chairman:
David E. Dunn
Geosciences, MS FN 3.2
University of Texas at Dallas
P.O. Box 830688
Richardson, TX 75083-0688

Short Course Proposals Due ..... **December 15, 1989**

Proposals are encouraged from GSA members and nonmembers. Proposals will be in review by GSA's Short Course Committee through January 31, 1990.

To request short course proposal guidelines or to submit proposals contact:
Short Course Coordinator
Edna Collis, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020

Theme Session and
Symposia Proposals Due ..... **January 2, 1990**

For 1990 program specifics contact:
Technical Program Chairmen
Richard M. Mitterer
Program in Geosciences
University of Texas at Dallas
Richardson, TX 75083-6088
(214) 690-2401 (dept.), (214) 690-2462 (direct)

or temporarily at:
Division of Engineering and Geosciences
Basic Energy Sciences, ER-15, GTN
Office of Energy Research
U.S. Dept. of Energy (D.O.E.)
Washington, DC 20545
(301) 353-5822

Roger E. (Tim) Denison
Mobil Research & Development Corp.
P.O. Box 819047
Dallas, TX 75381
(214) 851-8172

For general information on program participation (1990 and future years) contact:
GSA Meetings Manager
Sue Beggs, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020

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:
Edna A. Collis
Meetings Department
1-800-472-1988.

GSA *in* Education

by Allison R. (Pete) Palmer

Several important activities in the education arena are on hold as of this writing (early October) until the GSA Council takes action in early November in St. Louis on the recommendations that emanated from the July meeting of GSA's Education Committee. The chairpersons for the Section committees, who met with us, have made significant contributions to these recommendations. In the meantime, the following excerpts from a letter in the GSA archives, written in 1921 by Herman Fairchild (GSA president in 1912) to Professor H. F. Cleland, when both were serving on a GSA committee on Teaching of Geology, indicate that effective educational changes move at geologic rates.

> "The main difficulty in the teaching of geology in America lies deeper than the teacher and his laboratory equipment. Behind these is the ignorance, superstition and bigotry of great numbers of people, which parade under the name of religion.
>
> "The great intellectual value of Geology is the view point it gives—the outlook on the Universe and life. Earth-Science is the mortal foe of the old conception of things, and trustees and parents fear it.
>
> ". . . there is another work which the society should undertake—the education of the public, outside the schools. This is a proper and practicable function.
>
> "I suggest that our Committee direct its attention toward public or popular education rather than scholastic, or, perhaps what is better, that another committee be created, of men [and women] who are in touch with journalistic or general education mediums."

'Nuff said.

International Conference on High-level Radioactive Waste Management

The first in what is planned as an annual series of international conferences and exhibitions on high-level radioactive waste management is set for April 8–12, 1990, at Caesars Palace in Las Vegas, Nevada. The conference is hosted by the Howard R. Hughes College of Engineering, University of Nevada, Las Vegas, sponsored by the American Society of Civil Engineers and the American Nuclear Society, and co-sponsored by 11 other organizations, including the Geological Society of America.

The conference and exhibition will involve leading nuclear and non-nuclear engineers; nuclear scientists; and geophysical, hydrological, environmental, and other sciences concerned with identifying, measuring, and dealing effectively with the health and safety issues of major international programs.

Attendees will also have the opportunity to visit the Department of Energy's Yucca Mountain Project, the University of Nevada at Las Vegas campus, and many attractions in the Las Vegas area.

For program or exhibit information, write to American Society of Civil Engineers, 345 East 47th Street, New York NY 10017; (212) 705-7543, fax 212-421-1826, telex 422847 ASCE UI.

Report on Fibrous Minerals, Mining, and Disease Published

GSA has published a report by its Committee on Geology and Public Policy, "Fibrous Minerals, Mining, and Disease." The 11-page publication summarizes a forum sponsored by the committee and held at the 1988 Centennial Celebration in Denver, Colorado. Co-conveners for the forum were H. Catherine W. Skinner, Yale University, and Malcolm Ross, U.S. Geological Survey. Panelists were Graham W. Gibbs, Occupational Health Services, Canada; Michael M. Stahl, Toxic Substances Control Act Assistance Office, U.S. Environmental Protection Agency; Hans Weill, Tulane Medical Center; and Ann G. Wylie, Department of Geology, University of Maryland.

Copies of the report are available on request from Geological Society of America, Membership Services, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020.

In Memoriam

John W. Daly
Conifer, Colorado

Edwin B. Eckel
Lakewood, Colorado
September 28, 1989

Harry H. Emmerich
Dallas, Texas
August 28, 1989

Frank W. Johnson
Buck Hill Falls, Pennsylvania

K. Y. Lee
Arlington, Virginia
August 1, 1989

Robert E. Radabaugh
Tucson, Arizona
August 4, 1989

Victor T. Stringfield
Washington, D.C.
June 19, 1989

Jerry E. Upp
Tulsa, Oklahoma

Reminder

Call for Nominations for 1990

Nominations for GSA's most prestigious awards, the Penrose and Day Medals, for Honorary Fellowships of the Society, and for the Donath Medal (Young Scientist Award) are due at headquarters by *FEBRUARY 1, 1990.*

Nominations for service as officers and councilors of the Society 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

MEETINGS

(Asterisk indicates new or changed information)

1989

American Geophysical Union Fall Meeting, December 4-8, San Francisco, California. Information: AGU Meetings, 2000 Florida Ave., N.W., Washington, DC 20009; (202) 462-6903.

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

4th SIAM Conference on Parallel Processing for Scientific Computing, December 11-13, 1989, Chicago, Illinois. Information: SIAM Conference Coordinator, 3600 University City Science Center, Philadelphia, PA 19104-2688; (215) 382-9800; fax 215-386-7999.

1990

ACM/SIAM Symposium on Discrete Algorithms, January 22-24, 1990, San Francisco, California. Information: SIAM Conference Coordinator, 3600 University City Science Center, Philadelphia, PA 19104-2688; (215) 382-9800; fax 215-386-7999.

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, Zyzzyx 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 Northeastern Section, March 4-7, 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.

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.

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.

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. (*Abstracts deadline: January 17, 1990.*)

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.

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.

***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. (*Abstracts deadline: December 31, 1989.*)

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

GSA Southeastern Section, April 5-6, Tuscaloosa, Alabama.

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MEETINGS (*continued from p. 356*)

Information: William A. Thomas or C. Michael Lesher, SEGSA, Dept. of Geology, University of Alabama, Tuscaloosa, AL 35487. (*Abstracts deadline: December 15, 1989.*)

***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.

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.

International Conference on Mechanics of Jointed and Faulted Rock, April 18–20, 1990, Vienna University of Technology, Vienna, Austria. Information: H. P. Rossmanith, Wiedner, Jauptstrasse 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.

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.

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

GSA North-Central Section, April 26–27, 1990, Macomb, Illinois. Information: John Klasner, Dept. of Geology, Western Illinois University, Macomb, IL 61455. (*Abstracts deadline: January 5, 1990.*)

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.

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.

***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. (*Abstracts deadline: January 31, 1990.*)

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.

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.

USA/USSR Joint Conference on Global Environmental Hydrology and Hydrogeology, Leningrad, USSR, June 18–21, 1990. 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. (*Abstracts deadline: January 1, 1990.*)

International Sedimentological Congress, August 26–30, 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.

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.

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.

(*continued on p. 358*)

MEETINGS (*continued from p. 357*)

***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.

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

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

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.

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.

***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.*)

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.

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.).

Memorial Preprints

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

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Applications are invited for a tenure-track, junior level faculty position for September, 1990. We are particularly interested in candidates in the fields of tectonics and sedimentology-stratigraphy.

Letters of application accompanied by a curriculum vitae, including a research plan, the names of at least four references and pertinent publications should be sent to Robert Speed, Department of Geological Sciences, Northwestern University, Evanston, IL 60208. Applications will be accepted up to the closing date of December 15, 1989, and subsequently until the position is filled.

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The position will be filled at the assistant professor level. All requirements for the Ph.D. must be fulfilled by the time of appointment. Applicants should submit a complete resume, including a statement of teaching and research interests and transcripts and arrange for three letters of recommendation to be sent to Leslie D. McFadden, Search Committee Chairman, Department of Geology, University of New Mexico, Albuquerque, New Mexico 87131. The closing date for application is December 31, 1989.

The University of New Mexico is an equal opportunity, affirmative-action employer. Women and minority applicants are encouraged to apply for this position.

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Department of Geology

Applications are invited for a two-year sabbatical replacement position to begin September, 1990. Candidates should have ability and desire to teach in undergraduate geology program including courses in introductory geology, earth history, mineralogy, optical mineralogy and igneous and metamorphic petrology.

A Ph.D. is highly desirable. Please send letter of interest, resume, transcripts and three letters of recommendation to: Dr. Donald H. Zenger, Chairman, Department of Geology, Pomona College, 609 North College Ave., Claremont, CA 91711-6339.

Deadline for completed applications is January 15, 1990. Pomona College is an affirmative action, equal opportunity employer and especially invites applications from women and minorities.

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The deadline for applications is December 15, 1989. Later applications will be considered until the position is filled.

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