

GSA TODAY

A Publication of the Geological Society of America



1997 ANNUAL MEETING

Salt Lake City, Utah
October 20–23

Salt Palace Convention Center
Little America Hotel

World Wide Web

Visit the GSA Web site to view more details and to get the latest information

on short course and field trip status.

www.geosociety.org

Deadlines

- ◆ Abstracts due July 8
- ◆ Preregistration & Housing due September 19 (*forms enclosed*)

For More Information

Call: (303) 447-2020
1-800-472-1988

Fax: (303) 447-0648

E-mail: meetings@geosociety.org

Web: www.geosociety.org



Global Connections

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Because the Rocky Mountains, Great Basin, and Colorado Plateau all come together at Salt Lake City, it is a geologist's paradise. Field trips will introduce you to some of the most spectacular and classic geology in the world. From your hotel window alone, you will see Bingham Canyon, the world's largest open pit copper mine; Pleistocene beaches from the highstand of ancient Lake Bonneville; the Precambrian spine of Antelope Island in the Great Salt Lake with its herds of wild buffalo; the infamous Wasatch Fault, capable of generating a magnitude 7.5 earthquake at any time; and the magnificent Wasatch Mountains, where the 2002 Winter Olympics will be played out.

In keeping with the growing international prominence of Salt Lake City, the 1997

How To Submit Your Abstract — Abstract Deadline: July 8

Submit Abstracts via the WWWeb (www.geosociety.org)

Abstracts for this year's Annual Meeting in Salt Lake City can be sent to GSA via the World Wide Web. (Over 40% of the abstracts were submitted electronically in 1996.) Note that you can send abstracts to GSA only via the Web. They may not be sent by ordinary e-mail.

For the present, this system will accept only abstracts containing pure ASCII content; no graphics, tables, symbols, Greek, superscripts, etc. may be included. If you must use any of that in your abstract, use the paper form for now. We hope to be able to include non-ASCII material in the future, but for most users the technology for that is not yet in place. However, if your entire content—title, addresses, and abstract body—is pure ASCII and you have access to the Web, the new system will make life much easier by eliminating the more onerous tasks usually connected with preparation of paper forms.

The best part is that it takes only a few seconds to send an abstract and even less to get feedback from GSA. There will be no more mystery about whether we received your submission. You'll receive an immediate confirmation of receipt from GSA, with an abstract number assigned, while you're still on the Web. There have been problems with some Web client servers cutting off

It's Easy To Submit Electronically

1. *Compose your abstract in your favorite word processor.* Do NOT compose your abstract online since *your server* may disconnect during the time lag.
2. *"Save" it as "text."* This will convert your data into pure ASCII.
3. *Copy and paste* this into the appropriate fields of the GSA Web form.
4. *Complete the personal information on the form, including credit card information for abstracts fee payment (required for both paper and electronic forms).*
5. *Hit the "SEND" button.* You're done! We've included instructions, pull-down lists, and helpful hints on the Web form to save you time and confusion. There's even an error checker to make certain you include all the information we must have.

their customers prematurely. The Web page has advice about this and suggestions for use of appropriate browser options.

Paper Still Works Well

The electronic system has not yet replaced the familiar paper version of GSA's abstract form. Rather, the two systems operate in parallel.

Paper abstract forms are available from:

- ◆ Abstracts Coordinator at GSA headquarters, ncarlson@geosociety.org or call (303) 447-2020, ext. 161.
- ◆ Conveners of symposia
- ◆ Advocates of theme sessions
- ◆ Geoscience departments of most colleges and universities
- ◆ Main federal and state survey offices

Please submit only one copy of your abstract—either electronic or paper.

Abstracts Fee Initiated

Costs for implementing an electronic abstract submission system, as well as increasing costs for producing the printed *Abstracts with Programs* books, have led to establishment of a \$15 abstract fee for the GSA Annual Meeting, beginning with the 1997 meeting in Salt Lake City.

Implementation of the fee follows the standard set by many other scientific organizations many years ago. The fee needs to be sent with both paper copy and electronic submissions. (See the Executive Director's article, February issue of *GSA Today*, page 17).



Technical Program

The full daily technical session schedule appears in the September issue of *GSA Today* and on GSA's Web site, www.geosociety.org. If you are not a GSA member, please contact us, and we will gladly send you the schedule after September 1.

Presentation Modes

Oral Mode—This is a verbal presentation before a seated audience. The normal length of an oral presentation is 12 minutes, plus three minutes for discussion. Projection equipment consists of two 35 mm projectors, one overhead projector, and two screens. Additional equipment is available, but at the speaker's expense. Often, additional equipment costs can be shared with other speakers, but this can only be addressed on a

case-by-case basis. Please let us know *when you submit your abstract* if you have special presentation needs.

Poster Mode—Each poster session speaker is provided with two, horizontal, free-standing display boards which provide approximately an 8' wide by 4' high display space and a 4' draped table. The speaker must be present for at least two of the four presentation hours.

Papers for discipline sessions may be submitted in either oral or poster mode. *Papers for theme sessions, however, are to be submitted only in the mode noted in the theme description.* If a theme abstract is submitted in the incorrect mode, the abstract will be transferred automatically to a discipline session.

Speaker Kit

The speaker kit will be available to speakers on the Web and in paper copy, which will be mailed on request.

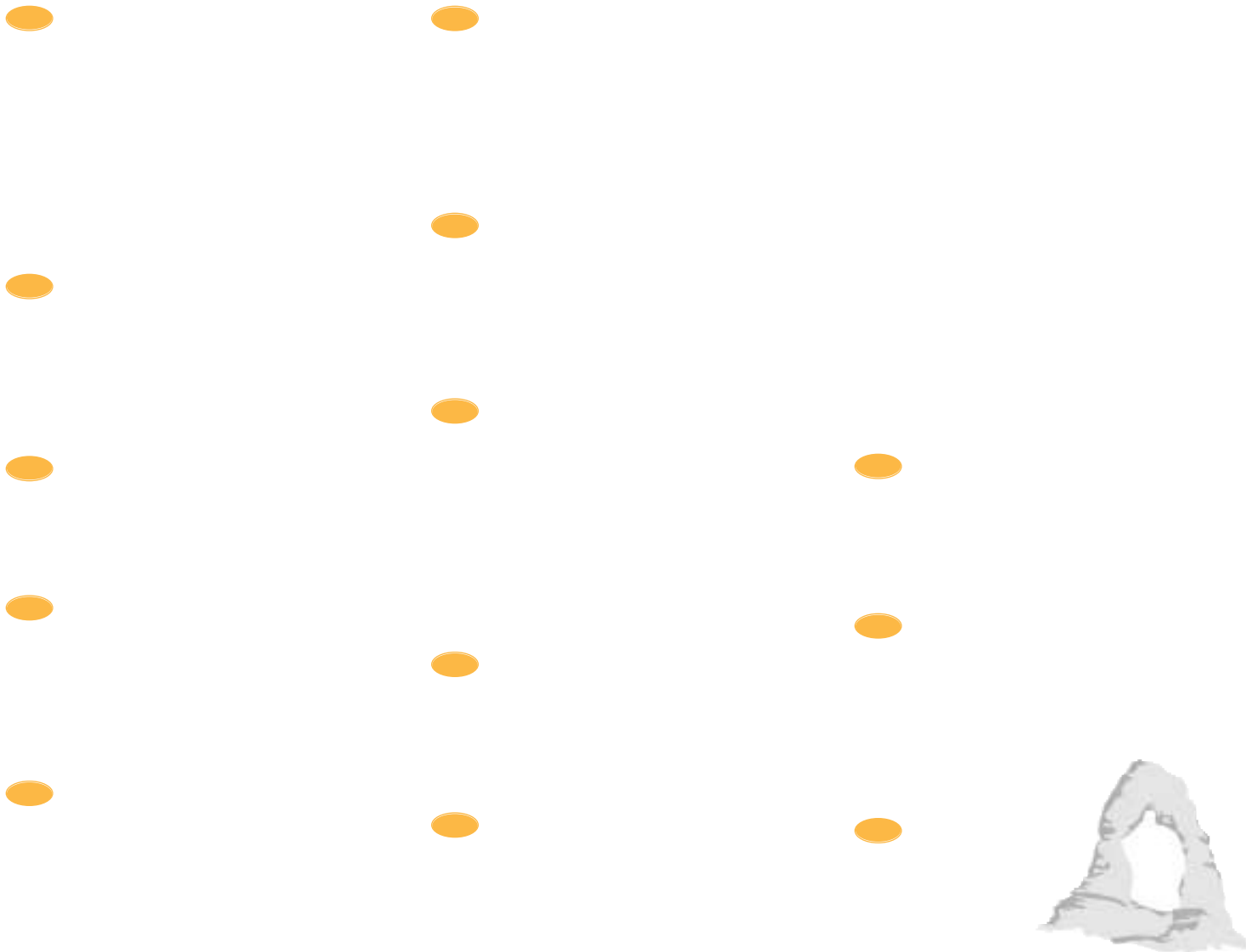
All invited abstracts (electronic and paper) are to be sent to GSA, which will forward the abstracts to the conveners for review.

FREE — and Prior to Publication!

GSA Technical Sessions on the Web

The titles and authors database will be available on the Web by August 25. You can view sessions, events, exhibits, field trips, and courses, together with a basic search and sorting software that will create your personal daily calendar, at www.geosociety.org.





Discipline Sessions

Papers are submitted to ONE scientific discipline. The JTPC representatives organize the papers in sessions focused on this discipline—for example, hydrogeology or mineralogy.

Theme Sessions

Papers are submitted to a specific pre-announced title and to ONE scientific category. Theme sessions are interdisciplinary; each theme may have as many as three cate-

Theme Topics

T1 *Geologic Mapping and GIS: Digital Map Production, Methods of Publication, and Expanded Uses of the Data.*

Larry N. Smith and Karen W. Porter, Montana Bureau of Mines and Geology.
Computers (3), Stratigraphy (30), Structural Geology (31). POSTER.

T2 *Plutons, Volcanoes, and Ore Deposits.*

Society of Economic Geologists. David John,

T15 *Field-based Investigations on School or Campus Sites: Examples That Work.*

National Association of Geoscience Teachers. P. Geoffrey Feiss, University of North Carolina, Chapel Hill; Florence Gullicksen, SW Guilford High School, High Point, North Carolina; Nancy West, University of North Carolina, Chapel Hill.

Environmental Geology (6), Geology Education (9). POSTER.

T16 *Great Geological Vacations in North America—How They Can Enhance Geoscience Literacy.*

National Association of Geoscience Teachers and National Earth Science Teachers Association. Steven C. Semken, Navajo Community College; Laurel E. Savoy, Mount Holyoke College.

Archaeological Geology (1), Environmental Geology (6), Geology Education (9). ORAL and POSTER.

T17 *Paleoseismology: Contributions to and Issues in Evaluating Seismic Hazards.*

Ivan G. Wong and Susan Olig, Woodward-Clyde Federal Services, Oakland, California. Geophysics/Tectonophysics (10), Quaternary Geology/Geomorphology (26), Tectonics (32). ORAL.

T18 *Geoscience Information Issues in a Rapidly Evolving Environment.*

Geoscience Information Society. Connie J. Manson, Washington Department of Natural Resources.

Geoscience Information (11). ORAL.

T19 *Geologic Mapping: Past, Present, and Future.*

Paul R. Seaber, Desert Research Institute; Robert Fakundiny, New York Geological Survey; Robert Michael Easton, Ontario Geological Survey.

History of Geology (12). ORAL and POSTER.

T20 *Linking Fault Zone Architecture and Quantitative Fluid Flow Studies.*

Craig Forster, University of Utah; James P. Evans, Utah State University.

Hydrogeology (13), Petroleum Geology (19), Structural Geology (31). POSTER.

T21 *Hydrogeology of Diagenesis.*

Matthew Davis, University of New Hampshire; Richard B. Wanty, U.S. Geological Survey.

Geochemistry, Aqueous (7), Hydrogeology (13), Sediments, Clastic (29). ORAL.

T22 *Hydrogeology of Continental Rift Systems.*

Hydrogeology Division. Ward Sanford, U.S. Geological Survey, Reston; Mark Person, University of Minnesota.

Hydrogeology (13), Petroleum Geology (19), Structural Geology (31). ORAL.

T23 *Regional Ground-water Flow and Hydrochemistry of Basins of Internal Drainage.*

Joseph S. Gates, U.S. Geological Survey, Salt Lake City, Utah; James R. Harrill, Pal Consultants, Inc., Carson City, Nevada.

Geochemistry, Aqueous (7), Hydrogeology (13), Quaternary Geology/Geomorphology (26). ORAL.

T24 *Approaches to Understanding Ground-water Flow and Contaminant Transport in Carbonate Aquifers.*

Carol Wicks, University of Missouri; Ira D. Sasowsky, University of Akron.

Geochemistry, Aqueous (7), Hydrogeology (13). ORAL.

T25 *Recent Advances in Density-dependent Fluid Flow and Solute Transport.*

Robert A. Schincariol, Western University of Ontario; E. A. Sudicky, University of Waterloo; F. W. Schwartz, Ohio State University.

Environmental Geology (6), Geochemistry, Aqueous (7), Hydrogeology (13). ORAL.

T26 *Hydrochemistry of Poorly Confined Aquifer Systems.*

Hydrogeology Division. Brian G. Katz, U.S. Geological Survey, Tallahassee; Carl I. Steefel, University of South Florida.

Geochemistry, Aqueous (7), Geochemistry, Other (8), Hydrogeology (13). ORAL.

T27 *Investigations of Transport Processes in Fractured Rock Using Ground-water Tracers.*

Hydrogeology Division. Lucy C. Meigs, Sandia National Laboratories; Gerilyn Moline, Oak Ridge National Laboratory.

Environmental Geology (6), Geochemistry, Other (8), Hydrogeology (13). ORAL and POSTER.

T28 *Progress in Dating Young Ground Water.*

Hydrogeology Division. L. Niel Plummer, U.S. Geological Survey, Reston; Robert Poreda, University of Rochester.

Environmental Geology (6), Geochemistry, Aqueous (7), Hydrogeology (13). ORAL.

T29 *Isotopic Tools for Detection of the Origin and/or Fate of Environmental Contaminants.*

Hydrogeology Division. Barbara Sherwood Lollar, University of Toronto; Jun Abrajano, Memorial University of Newfoundland.

Environmental Geology (6), Geochemistry, Aqueous (7), Hydrogeology (13). ORAL.

T30 *Role of Natural Organic Matter in Solute Fate and Transport.*

William P. Johnson, University of Utah; Paul Westerhoff, Arizona State University.

Environmental Geology (6), Geochemistry, Aqueous (7), Hydrogeology (13). ORAL.

T31 *Hydraulic Properties and Diagenetic Processes of Municipal Solid Waste.*

Peter J. Hutchinson, The Hutchinson Group, Ltd., Murrysville, Pennsylvania.

Environmental Geology (6), Geochemistry, Aqueous (7), Hydrogeology (13). ORAL.

T32 *Dense, Nonaqueous Phase Liquids (DNAPL) Migration and Remediation in Fractured Rock.*

Bernard H. Kueper, Queens University; Neil Thomson, University of Waterloo.

Computers (3), Environmental Geology (6), Hydrogeology (13). ORAL.

T33 *Theoretical Molecular Methods in Earth Sciences.*

Antonio C. Lasaga, Yale University; David J. Wesolowski, Oak Ridge National Laboratory.

Computers (3), Geochemistry, Aqueous (7), Paleoceanography/Paleoclimatology (17). ORAL.

T34 *Applications of Plant Taphonomy to Paleoenvironmental, Paleogeographic, and Paleoclimatic Problems.*

Judith Totman Parrish, University of Arizona; Robert A. Gastaldo, Auburn University.

Paleoceanography/Paleoclimatology (17), Paleontology/Paleobotany (18), Sediments, Clastic (29). ORAL.

T35 *Volcanic Eruptions: From the Deep Oceans to Deep Space.*

James Zimbelman, Smithsonian Institution; Tracy Gregg, Woods Hole Oceanographic Institution.

Planetary Geology (23), Volcanology (33). ORAL.

**Abstract Deadline
July 8th**

Special Session

Mars Pathfinder Lander and Rover Mission First Results: Field Geology on Mars

Tuesday, October 21, evening session, Salt Palace Convention Center
Larry Crumpler, New Mexico Museum of Natural History and Science; Matthew Golombek, Mars Pathfinder Mission Scientist, Jet Propulsion Laboratory

Field geologic studies of Mars will be conducted for the first time this summer by the Mars Pathfinder lander and rover. Mars Pathfinder, launched last December, will land at the mouth of Ares Vallis, an ancient river channel that once drained the highlands of Mars. Imaging and in situ chemical analysis of rocks and soils during the traverse will reveal a new world. This session will present some of the first publicly discussed results from the perspective of mission scientists.

T36 *The Galilean Satellites: Exploring Their Connections.*

Planetary Geology Division. Robert Pappalardo, Brown University; Robert Sullivan, Arizona State University.

Geophysics/Tectonophysics (10), Planetary Geology (23), Remote Sensing (27). ORAL.

T37 *Volatiles in Planetary Mantles and Basalts.*

Mineralogical Society of America and Planetary Geology Division. Charles K. Shearer, University of New Mexico; Clive R. Neal, University of Notre Dame.

Geochemistry, Other (8), Petrology, Igneous (21), Planetary Geology (23). ORAL.

T38 *The Southern Laurentian Late Proterozoic: What Happened?*



All trips begin and end in Salt Lake City at the Salt Palace Convention Center, North Lobby, South Temple Street entrance, unless otherwise indicated. If you register for a field trip only, you must pay a \$35 nonregistrant fee in addition to the field trip fee. This fee may be applied toward meeting registration if you decide to attend the meeting.

Students, spouses, and interested guests are cordially encouraged to attend. Trips are technical in nature, and some can be physically rigorous. Participants should be prepared for cold weather. Trips are one to five days in duration and led by active field researchers. Please note that several of the premeeting field trips, indicated by an asterisk (*), end in Salt Lake City on Saturday night, October 18, so that participants can attend one-day trips or courses on Sunday, October 19.

Trip fees include transportation during the trip and a guidebook. Other services such as meals and lodging are noted by the

Premeeting

1 *Late Pleistocene–Holocene Cataclysmic Eruptions at Nevado de Toluca and Jocotitlan Volcanoes, Central Mexico.*

Tuesday, October 14 through Saturday, October 18. Jose Luis Macias, Instituto de Geofísica, UNAM, Coyoacan 04510, Mexico D.F., Mexico. (52) 5-6224124, macias@tonatiuh.igeofcu.unam.mx; Juan Manuel Espindola Castro, Claus Siebe. This trip originates and ends at the Mexico City airport; participants will make their own flight arrangements. Maximum: 22; minimum: 10. Cost: \$370 (4B, 5L, R, 4ON, vans).

Five-day tour of spectacular recent volcanoes in central Mexico. The main purpose of this trip is to examine the Pleistocene–Holocene deposits produced by cataclysmic volcanic eruptions of Nevado de Toluca and Jocotitlan volcanoes. We will visit amazing exposures that exhibit a wide spectrum of volcanic rocks, which include debris avalanche deposits from sector collapse, pyroclastic surges, pyroclastic flows, lahars, Plinian fall, and lava flows. We will discuss the stratigraphic, sedimentological, and petrological aspects of these deposits which provide insights into the transport and emplacement mechanisms of these materials. We will also have the opportunity to visit some nearby pre-Hispanic archaeological sites.

2 *Late Devonian Alamo Impact Event, Global Kellwasser Events, and Major Eustatic Events, Eastern Great Basin, Nevada and Utah.*

Thursday, October 16 through Sunday, October 19. Charles A. Sandberg, U.S. Geological Survey, Box 25046, MS 939, Federal Center, Denver, CO 80225, (303) 236-5763, fax 303-236-8822; sandberg@usgs.gov; John E. Warme, Jared R. Morrow. This trip originates in Las Vegas, Nevada, and ends in Salt Lake City, Utah. Maximum: 40; minimum: 20. Cost: \$370 (4L, 2D, R, 3ON, vans).

First and second days around Alamo in southern Nevada provide an east-west transect

of the widespread megabreccia and possible crater rim created by the Late Devonian Alamo impact event and a visit to the only large Late Devonian reef documented in the western United States, at Mt. Irish. Third day features a deep-water chert sequence in the Hot Creek Range and the type Devils Gate slope sequence west of Eureka, both displaying the Kellwasser Event (late Frasnian mass extinction). Fourth day shows positions of both events, and several eustatic events, in the Confusion Range, Utah. Evening meeting explores theory of multiple Late Devonian global impacts. Meal stops at petroglyph site, at Lonely Rachel, north of Area 51 on Nevada's Extraterrestrial Highway, and at restored Opera House in Historic Eureka mining district.

3 *Grand Tour of the Ruby–East Humboldt Metamorphic Core Complex, Northeast Nevada.*

Thursday, October 16 through Sunday, October 19. Arthur W. Snoke, Dept. of Geology and Geophysics, University of Wyoming, Laramie, WY 82071-3006; (307) 766-5457, fax 307-766-6679, snoke@uwyo.edu; Keith A. Howard, Calvin G. Barnes, Allen McGrew, Brad Burton, Mark Peters, James E. Wright. This trip originates at the Salt Lake City Airport. Maximum: 40; minimum: 15. Cost: \$285 (3B, 3L, 2D, R, 3ON, vans).

This trip will involve a review of the last decade of multi-disciplinary research on the classic Ruby–East Humboldt core complex, north-eastern Nevada, as well as new, ongoing research. The Ruby Mountains–East Humboldt Range area provides the opportunity to examine superb exposures of a kilometer-scale extensional mylonitic shear zone and associated brittle detachment fault system, large-scale fold-nappes, remobilized Archean basement rocks, upper amphibolite-facies miogeoclinal rocks, mid-crustal Tertiary granitic intrusions, Tertiary synextensional sedimentary and volcanic rocks, and a large, late Eocene pluton that ranges from hornblende + biotite granodiorite to two-mica granite.

4 **Late Ordovician Mass Extinction and Glacio-Eustasy—Sedimentologic, Biostratigraphic, and Chemostratigraphic Records from Platform and Basin Successions, Central Nevada.*

Thursday, October 16 through Saturday, October 18. Cosponsored by *Paleontological Society*. Stan Finney, Dept. of Geological Sciences, California State University—Long Beach, Long Beach, CA 90840, (562) 985-8637, scfinney@csulb.edu; John Cooper, William Berry. Maximum: 30; minimum: 16. Cost: \$220 (3L, R, 2ON, vans).

Upper Ordovician to Lower Silurian stratigraphic sections are well exposed at Lone Mountain, at Copenhagen Canyon in the Monitor Range, and at Vinini Creek in the Roberts Mountains. They represent platform, platform margin, and ocean basin depositional environments, respectively, and contain distinct records of the Late Ordovician extinction and associated glacio-eustatic and paleoceanographic events, which are being studied by a multidisciplinary team of specialists and will be examined on this trip. The Vinini Creek section, which is in the upper plate of the Roberts Mountains allochthon, provides a unique opportunity for integrating the biostratigraphies of graptolites, conodonts,

and organic-walled microfossils with each other and with distinct sequence-stratigraphic and chemostratigraphic records through the extinction interval. Important complementary records are provided by the autochthonous, shelf successions at Copenhagen Canyon.

5 **Neotectonics, Fault Segmentation, and Geologic Hazards Along the Hurricane Fault in Utah and Arizona.*

Thursday, October 16 through Saturday, October 18. Cosponsored by *Engineering Geology Division*. Meg Stewart, Dames & Moore, One Blue Hill Plaza, Suite 530, Pearl River, NY 10965, (914) 735-1200, prvmes@dames.com; Wanda Taylor, Philip Pearthree, Barry Solomon, Hugh Hurlow. This trip originates in Las Vegas and ends in Salt Lake City. Maximum: 26; minimum: 10. Cost: \$235 (2B, 2L, R, 2ON, vans).

The Hurricane fault is an active high-angle normal fault that marks the boundary between the relatively unextended Colorado Plateau and the transition zone into the seismically active part of the Basin and Range Province. As a marker between major provinces, the Hurricane fault provides a good field example of an end member for normal faulting. Stops at two fault segment boundaries will focus on various data used to identify the segment boundaries and fault segments that have significant implications for seismic risk in the area. We will see damage from the September 1992 magnitude 5.8 St. George, Utah, earthquake and will discuss seismicity. Pre-1992 earthquake fault scarps also will be examined. The Hurricane fault is 250 km long; this trip will traverse approximately 50 km of the fault in southwestern Utah and northwest-

Fluvial to shallow-marine siliciclastic rocks deposited during Cretaceous and early Tertiary time along the leading edge of the Sevier thrust-fold belt and into the foreland basin are completely and continuously exposed in central Utah. The aim of this trip is to study the sequence stratigraphy, the variations in non-marine and time-equivalent shallow-marine facies, and the changes in depositional architecture in a transect from the foreland basin into the thrust belt. Outcrops are analyzed with respect to depositional environments and parasequence stacking patterns. Excellent examples of structurally enhanced sequence boundaries, conglomeratic fills, lowstand delta complexes, and progradational shorelines are visited. The field trip focuses on the application of sequence stratigraphy to basin analysis, is workshop-style, and integrates outcrop sections with well logs, available biostratigraphy, cores, and where applicable, aerial photography.

8 **Stratigraphy and Structure of Sevier Thrust Belt and Proximal Foreland-Basin System in Central Utah: A Transect from the Sevier Desert to the Wasatch Plateau.*

Thursday, October 16 through Sunday, October 19.
Cosponsored by *Sedimentary Geology Division*.
Timothy Lawton, Dept. of Geological Sciences,
New Mexico State University, Las Cruces, NM 88003;
(505) 646-4910, tlawton@nmsu.edu; Douglas Sprinkel,
Peter DeCelles, Gautam Mitra, Aviva Sussman,
Malcolm Weiss. Maximum: 29; minimum: 13.
Cost: \$240 (3L, R, 3ON, vans).

ATTENTION, STUDENTS: The Sedimentary Geology Division will SUBSIDIZE ALL STUDENTS WHO ARE VALID DIVISION MEMBERS. Students MUST PAY THE FULL COURSE FEE when registering, but will be reimbursed \$100 after the GSA meeting by the Sedimentary Geology Division.

Traverse of the Cretaceous central Utah thrust belt from the Sevier Desert to the Wasatch Plateau. Topics include structural culmination in Cambrian rocks of Canyon Mountains; structure and growth strata in conglomerate of both hanging wall and footwall of the Canyon Range thrust; structure and conglomerate deposition near the Leamington fault zone; fan-delta and alluvial-fan deposits of the foreland-basin axis and backthrust zone of the Gunnison thrust system, San Pitch Mountains; progressive unconformities in Sixmile Canyon; stratigraphy and correlation of oldest preserved foreland-basin strata, San Pitch Mountains and Salina Canyon. The trip will emphasize interplay of structural development and deposition as a means of interpreting thrust-belt kinematics and timing. Itinerary includes both driving stops and four 3-hour walking traverses.

9 *Bimodal Magmatism, Basaltic Volcanic Styles, Tectonics, and Geomorphic Processes of the Eastern Snake River Plain, Idaho.*

Friday, October 17 through Sunday, October 19. Scott Hughes, Dept. of Geology, Idaho State University, Box 8072, Pocatello, ID 83209; (208) 236-4387; fax 208-236-4414, hughscot@isu.edu; Richard P. Smith, William Hackett, Mike McCurry, Steve Anderson, Gregory Ferdock. Maximum: 22; minimum: 10.
Cost: \$255 (2B, 3L, 2D, R, 2ON, vans).

Pleistocene and Holocene volcanic rocks



22 *Carbonate Sequences and Fossil Communities from the Upper Ordovician–Lower Silurian of the Eastern Great Basin.*

Thursday, October 23 through Sunday, October 26.
Mark Harris, Dept. of Geosciences, University of Wisconsin–Milwaukee, P.O. Box 413, Milwaukee, WI 53201, (414) 229-5777, mtharris@csd.uwm.edu; Peter Sheehan. Maximum: 3I; minimum: 8. Cost: \$235 (3L, R, 3ON, vans).

Upper Ordovician–Lower Silurian carbonates of the Eastern Great Basin consist of a stack of prograding ramp and rimmed shelf sequences that provide insights into the application of carbonate sequence stratigraphic models and the evolution of shelf communities. Sections in the Barn Hills, Southern Egan Range, and Pancake Range illustrate facies changes from middle shelf to mid-ramp–slope settings, permitting the tracing of sequence boundaries (including a spectacular karst surface). Changes in shelf communities reflect the end Ordovician extinction and, at a less extreme scale, shelf exposure episodes.

23 *Depositional Sequence Stratigraphy and Architecture of the Cretaceous (Turonian) Ferron Sandstone: Implications for Coal and Coal Bed Methane Resources.*

Thursday, October 23 through Saturday, October 25.
Cosponsored by *Coal Geology Division*. James R. Garrison, Jr., The Ferron Group Consultants, L.L.C., 117 South 200 East, Emery, UT 84522-0117, (801) 286-2377, ferron_group@compuserve.com; T. C. V. van den Bergh, Charles E. Barker, and David Tabet. Maximum: 30; minimum: 10. Cost: \$215 (2B, 2L, 2D, R, 2ON, vans).

This trip to the Cretaceous Ferron Sandstone Member of the Mancos Shale in east-central Utah will focus on the architecture and high-resolution depositional sequence stratigra-

ground-water sapping of sandstone, and landslides and pediments at the north end of the Henry Mountains.

28 *Triassic and Jurassic Macroinvertebrate Faunas of Utah: Field Relationships and Paleobiologic Significance.*

Thursday, October 23 through Saturday, October 25.
Cosponsored by *Paleontological Society*. Carol M. Tang, University of California Museum of Paleontology, Valley Life Sciences Bldg., University of California, Berkeley, CA 94720, (510) 642-8690.



Professional Horizons: Continuing Education Programs

GSA-Sponsored Continuing Education Courses

Would you like to learn something new, brush up on the latest, or refresh your knowledge of the basics? GSA's continuing education courses will be held immediately before the Annual Meeting and are open to members and nonmembers.

A course-only fee of \$35 is required if you are not attending the meeting. This fee may be applied to a full meeting registration if you decide to attend. Preregistration is recommended; on-site registration is \$30 additional. You may register for GSA courses on the Annual Meeting Preregistration Form. For more complete course descriptions, learning outcomes, and additional information, see GSA's Web site, <http://www.geosociety.org>, or call for a copy of GSA's Continuing Education Brochure.

Continuing Education Unit (CEU) Service



All continuing education courses sponsored by GSA offer CEUs. A CEU is defined as 10 contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction, and qualified instruction. A contact hour is defined as a typical 60-minute classroom instructional session or its equivalent. Ten instructional hours are required for one CEU. For CEU record keeping purposes, please be sure to include your social security number on the registration form.

Cancellation Deadline: September 26

For more information, contact Edna Collis, GSA Continuing Education Coordinator, (303) 447-2020, ext. 134, or ecollis@geosociety.org.

**Preregistration
Deadline —
September 19**

1 *Analysis of Veins in Sedimentary Rocks—An Introduction for Structural Geologists.*

Saturday, October 18 and Sunday, October 19, 8:00 a.m. to 5:00 p.m. Salt Palace Convention Center. Cosponsored by *Structural Geology and Tectonics Division*.

The purpose of this course is to introduce the participants to the integration of geochemical, fabric, and fluid-inclusion data in interpreting the formation and significance of veins. It is intended for those with little background in geochemistry, yet an interest in unraveling the fluid sources, conditions of formation, and tectonic significance of veins. The format will be lectures, case histories, and exercises. Topics covered include: Overview of vein research; hydrology of

veins; subsurface fluids and precipitations kinetics; applications of isotopes to veins; problems and potential of fluid inclusions in veins; case histories of the application of structural geology and geochemistry to understanding fluid composition; temperature and pressure during tectonism.

Faculty: **David V. Wiltschko**, Dept. of Geology and Geophysics, Texas A&M University, College Station; Ph.D., Brown University.

John W. Morse, Dept. of Geology and Geophysics, Texas A&M University, College Station; Ph.D., Yale University. **Danny M. Rye**, Dept. of Geology and Geophysics, Yale University, Ph.D., University of Minnesota. **Will Lamb**, Dept. of Geology and Geophysics, Texas A&M University, College Station; Ph.D., University of Wisconsin—Madison.

Limit: 40. Fee: \$280, students \$260; includes course manual and lunch both days. CEUs: 1.6.

2 *Techniques of Geostatistical Estimation and Simulation Applied to Environmental Geology.*

Saturday, October 18 and Sunday, October 19, 8:00 a.m. to 5:00 p.m. University of Utah.

Cosponsored by *Engineering Geology Division*.

ATTENTION, STUDENTS: The Engineering Geology Division will SUBSIDIZE THE FIRST FIVE STUDENTS WHO ARE VALID DIVISION MEMBERS. Students MUST PAY THE FULL COURSE FEE when registering, but will be reimbursed \$50 after the GSA meeting by the Engineering Geology Division.

Geoscientists are often involved in making decisions regarding the amount and distribution of spatially heterogeneous materials based upon limited sample data. This course will introduce the students to a suite of geostatistical tools that allow geoscientists to model and use the spatial correlation inherent in earth science data to build maps and quantify the uncertainty in those maps. The techniques covered in this course include exploratory data analysis, calculation and modeling of spatial correlation with variograms, spatial estimation through kriging, spatial simulation techniques, and uncertainty analysis. Example problems from environmental sites will be evaluated with hands-on instruction using public domain software.

Faculty: **Sean A. McKenna**, Sandia National Laboratories, Albuquerque, New Mexico; Ph.D., Colorado School of Mines. **Christopher A. Rautman**, Sandia National Laboratories; Ph.D., University of Wisconsin—Madison.

Limit: 25. Fee: \$320, students \$300; includes course manual and lunch both days. CEUs: 1.6.

3 *Computer Visualization of Three-Dimensional Deformation and Application to Upper-Crustal Settings.*

Saturday, October 18 and Sunday, October 19, 8:00 a.m. to 5:00 p.m. Salt Palace Convention Center. Cosponsored by *Structural Geology and Tectonics Division*.

Computer visualization is an extremely effective way to study progressive three-dimensional deformation. We will (1) show how to use visual displays as a means to understand the con-

tinuum mechanics and tensor algebra of three-dimensional deformation, (2) illustrate the differences between infinitesimal properties (velocity fields, strain rates, stress axes, or principal motion directions) and those correlated with total displacements (finite strain or particle paths), and (3) relate mathematical quantities to rock fabric elements. On the first day, we will concentrate on forward modeling of ideal deformations. On the second day, we will concentrate on how to constrain displacement fields of naturally deformed rocks by "backing out" the boundary conditions. The computer programs (written for Quickbasic, Mathematica, Explorer) used in this course (and other supporting software) are freeware, and will be distributed to the participants.

Faculty: **Steven F. Wojtal**, Dept. of Geology, Oberlin College; Ph.D., Johns Hopkins University. **Basil Tikoff**, Dept. of Geological Sciences, Rice University; Ph.D., University of Minnesota.

Limit: 30. Fee: \$380, students \$360; includes course manual, computer software, and lunch both days. CEUs: 1.6.

4 *Applications of Environmental Isotopes to Solving Hydrologic and Geochemical Problems.*

Sunday, October 19, 8:00 a.m. to 5:00 p.m. Salt Palace Convention Center. Cosponsored by *Hydrogeology Division*.

ATTENTION, STUDENTS: The Hydrogeology Division will SUBSIDIZE THE FIRST STUDENT WHO IS A VALID DIVISION MEMBER. The student MUST PAY THE FULL COURSE FEE when registering, but will be reimbursed \$50 after the GSA meeting by the Hydrogeology Division.

This course will focus on practical applications of environmental isotopes for gaining a better understanding of hydrologic systems. Because a thorough understanding of the fundamentals is a critical prerequisite to successfully applying the methods, the systematics of isotope fractionation and the distributions of selected isotopes in natural systems will be discussed briefly. However, the main focus of the class will be on applications of isotopes, emphasizing applications where isotopes can be an especially cost-effective tool for tracing waters and solutes in hydrologic systems. Several case studies presented in class will introduce the attendees to data analysis and interpretation, and there will be time for group discussions.

Faculty: **Carol Kendall**, Water Resources Division, U.S. Geological Survey, Menlo Park; Ph.D., University of Maryland. **Thomas D. Bullen**, Water Resources Division, U.S. Geological Survey, Menlo Park; Ph.D., University of California, Santa Cruz.

Limit: 50. Fee: \$205, students \$155; includes course manual, lunch, and casual postcourse reception. CEUs: 0.8.

5 *Buck Rogers, Field Geologist: 21st Century Electronic Wizardry for Mapping and Field Data Collection.*

Sunday, October 19, 8:00 a.m. to 5:00 p.m. Salt Palace Convention Center. Cosponsored by *History of Geology Division*.

ATTENTION, STUDENTS: The History of Geology Division will SUBSIDIZE THE

FIRST TWO STUDENTS WHO ARE VALID DIVISION MEMBERS. Students MUST PAY THE FULL COURSE FEE when registering, but will be reimbursed \$50 after the GSA meeting by the History of Geology Division.

This course will bring participants up to speed on the latest electronic tools for field mapping and data acquisition and management. Participants will become familiar with hardware and software advancements for computerized field-mapping, proposed standard data models for the representation of geologic map information in a Geographic Information System (GIS), and implications of those models for data collection. Hardware described or displayed will include rugged pen computers used as electronic plane tables, laser range-finder binoculars, hand-held Global Positioning System (GPS) receivers, and digital cameras. Software will include PC-based data mapping and geographic information systems used by USGS and other workers.

Faculty: **John H. Kramer**, Condor Earth Technologies, Inc., Sonora, California; Ph.D., University of California, Santa Barbara. **Todd Fitzgibbon**, U.S. Geological Survey, Menlo Park, California; BA, University of California, Santa Barbara.

Limit: 35. Fee: \$230, students \$210; includes course manual and lunch. CEUs: 0.8.

6 *Dynamical Systems Modeling for Undergraduate Education: From Coleman Coolers to Computers.*

Sunday, October 19, 8:00 a.m. to 5:00 p.m. New Horizons Computer Facility. Cosponsored by *National Association of Geoscience Teachers*.

This hands-on, one-day course will explore the application of dynamical systems modeling to geoscience education. The approach used combines actual physical modeling, mathematical modeling, and computer modeling of simple dynamical systems. By investigating the same systems with each of these techniques, we help develop in students a firm conceptual understanding of the relationship between the actual physical phenomena and the mathematical or computer-based abstraction of those phenomena. Participants will be introduced to an inquiry-based pedagogical approach, to the basic theory of systems modeling, and to user-friendly computer software for systems modeling. The course will be interactive, during which the techniques we have developed will be demonstrated for the course participants. A variety of modeling topics will be explored, including radioactive growth and

11 *Paleosols for Sedimentologists.*

Sunday, October 19, 8:00 a.m. to 5:00 p.m. Salt Palace Convention Center. Cosponsored by *Sedimentary Geology Division*.

ATTENTION, STUDENTS: The Sedimentary Geology Division will SUBSIDIZE ALL STUDENTS WHO ARE VALID DIVISION MEMBERS. Students MUST PAY THE FULL COURSE FEE when registering, but will be reimbursed \$100 after the GSA meeting by the Sedimentary Geology Division.

The potential of paleosols to aid in solving a variety of problems related to earth history has started to be realized during the past decade. Reconstruction of ancient climate, stream behavior within sedimentary basins, semiquantitative determination of subsidence and sediment accumulation rates, and delineation of terrestrial paleoecosystems are examples of research areas significantly advanced by the study of paleosols. Despite this increased interest, many sedimentary geologists are not thoroughly conversant in paleosol recognition and application as an interpretative tool. This course focuses on the fundamental aspects of paleosol description, recognition, and interpretation, concentrating on (1) field and petrographic features indicative of paleosol development, (2) key terminology applicable to paleosols, and (3) interpretative uses of paleosols for reconstructing basin histories and paleoclimates.

Faculty: **Greg H. Mack**, Dept. of Geological Sciences, New Mexico State University; Ph.D., Indiana University. **H. Curtis Monger**, Dept. of Agronomy and Horticulture, New Mexico State University; Ph.D., New Mexico State University.

Limit: 30. Fee: \$195, students \$175; includes course manual and lunch. CEUs: 0.8.

12 *Practical Remote Sensing for Geology.*

Sunday, October 19, 8:00 a.m. to 5:00 p.m. Salt Palace Convention Center. Cosponsored by *Quaternary Geology and Geomorphology Division*.

This course is designed to help participants better understand and exploit relatively new, yet proven tools that can increase their ability to

geologists, and biologists, as well as educators seeking the latest information on living and fossil echinoderms.

Faculty: Richard Aronson, William Ausich, Tomasz Baumiller, Carlton Brett, Brian Bodenbender, Burt Carter, Mike Foote, Thomas Guensburg, Peter Holterhoff, Richard Jefferies, Chuck Messing, David Meyer, Richard Mooi, Ronald Parsley, Andrew Smith, James Sprinkle, Colin Sumrall, Wendy Taylor, and Johnny Waters.



National Association of Geoscience Teachers Innovative and Effective Teaching Follow-up Workshop.

9:00 a.m. to 12:00 noon, The Wyndham Hotel. Sponsored by *National Association of Geoscience Teachers* and *GSA's SAGE Program*.

This workshop will provide an opportunity for participants to share their successes in using techniques discussed in an NAGT Effective Teaching workshop attended at a previous meeting and will include a session on a topic that will be selected on the basis of suggestions from participants.

Limit: 40. No fee. Participants must pre-register with Heather Macdonald by **October 4, 1997**. For information: Heather Macdonald, Dept. of Geology, College of William and Mary, Williamsburg, VA 23187, (757) 221-2443, fax 757-221-2093, rhmacd@facstaff.wm.edu; Barbara Tewksbury, Dept. of Geology, Hamilton College, Clinton, NY 13323, (315) 859-4713, fax 315-859-4807, btewksbu@hamilton.edu.

Preparing Successful Grant Proposals to Fund Curriculum Innovation in the Geosciences.

1:00 to 5:00 p.m., Wyndham Hotel. Sponsored by *National Association of Geoscience Teachers* and *National Science Foundation*.

This workshop will provide an overview of national initiatives to integrate research and education and will focus on new directions, programs, and funding opportunities. Through selected proposal examples, participants will gain knowledge of effective proposal elements and key quality indicators used in the review process.

Limit: 60. No fee. Preregistration recommended. For information: Robert W. Ridky, Division of Undergraduate Education, National Science Foundation, Room 835, 4201 Wilson Blvd., Arlington, VA 22230, (703) 306-1666, ext. 5886, fax 703-306-0445, rridky@nsf.gov.

Monday, October 20

Geoscience Education Division Breakfast.

7:00 to 8:30 a.m.

Learning from the Fossil Record.

8:00 a.m. to 5:00 p.m., Wyndham Hotel. Sponsored by *Paleontological Society*, *Society of Vertebrate Paleontology*, *University of California Museum of Paleontology*, *Paleontological Research Institute*, *Cushman Foundation* and *GSA's SAGE Program*.

How have scientists used fossil evidence to reconstruct the past? How can teachers use students' interests in fossils to encourage them to be scientists themselves? Join paleontologists and educators from across North America in a full-day workshop to learn about the effectiveness of using paleontology in the classroom. The study of the history of Earth and of ancient life is a very "user-friendly" way of teaching science and provides a natural integration of the multiple disciplines of science. This workshop will concentrate on what science is and is not, teaching the process of science, major concepts in paleontology and related sciences, and available resources for teachers and their students. The format will be a combination of informative sessions followed by hands-on activities presented by grade level. All participants will receive free materials for the classroom and a complimentary copy of the 300-page book full of information, activities, and resources.

Limit: 60. Cost: \$10. Preregistration required. For information: Judy Scotchmoor, University of California, Berkeley, Museum of Paleontology, Berkeley, CA 94720, (510) 642-4877; Richard Stucky, Denver Museum of Natural History, 2001 Colorado Blvd., Denver, CO 80225, fax 303-331-6492; Ken McKinney, Dept. of Geology, Appalachian State University, 118 Rankin Science Building, Boone, NC 28608, (704) 262-2748.

Expanding Your Future with the USGS Education Program.

9:00 a.m. to 12:00 noon, Wyndham Hotel. Sponsored by *U.S. Geological Survey* and *GSA's SAGE Program*.

The USGS education program provides a means of connecting science teachers with the nation's largest scientific agency. This program includes data for educational GIS, real-time scientific data on the Internet, sets of teacher lessons on a variety of science topics, and a wide variety of maps, posters, and other publications. Through this hands-on workshop, attendees will understand the extent of the available resources and how to connect with the education program. They will work through standards-based educational lessons and will receive samples of USGS educational materials.

Limit: 40. Cost: \$5. Preregistration is recommended. For information: Joseph Kerski, U.S. Geological Survey, Box 25046, MS 507, Denver, CO 80225-0046, (303) 202-4315, jkerski@denlab0.cr.usgs.gov; Leslie Gordon, U.S. Geological Survey, 345 Middlefield Rd., MS 919, Menlo Park, CA 94025-3591, (415) 329-4006, lgordon@usgs.gov.

NAGT Luncheon.

11:30 a.m. to 2:00 p.m.

Mapping and Spatial Analysis Tools for the Earth Science Classroom and Library: An Introduction to GIS.

1:00 to 4:00 p.m., Wyndham Hotel. Sponsored by *Environmental Systems Research Institute (ESRI)*, and *GSA's SAGE Program*.

This workshop will be a minds-on introduction to GIS (geographic information systems). In this session, participants will learn basic GIS concepts; discuss the importance of spatial thinking and information skills; guide and watch demonstrations of GIS and mapping applications in action (ArcView 3.0, ArcView Spatial Analyst, BusinessMAP 2.0); and peruse classroom teaching materials. Participants will receive a video describing integrative GIS efforts at three schools and a CD filled with background documents, classroom exercises, example map images, cool human and physical geographic data sets, tutorials, and demos.

Limit: 40. Cost: \$5. Preregistration required. For information: Charlie Fitzpatrick or George Dailey, ESRI Schools and Libraries Program, 3460 Washington Dr., Suite 101, St. Paul, MN 55122, (612) 454-0600, fax 612-454-0705, cfitzpatrick@esri.com, <http://www.esri.com/base/markets/k-12/k-12.html>.

Earth Science Educators and PEP Members Social Hour.

4:00 to 5:30 p.m.; Salt Palace Convention Center.

Earth Science Information "Share-A-Thon" for K-16 Educators.

4:00 to 5:30 p.m., Salt Palace Convention Center.

The share-a-thon is designed to promote the sharing of teacher-developed earth science materials and ideas with other educators. Teachers are invited to present earth science activities that they have successfully used in the classroom. Presenters will be stationed so that participants can circulate freely. Each station will have explanatory materials available. Registration required only for presenters. To be a presenter, check the appropriate box on the GSA registration form in this issue.

Rock Raffle.

4:00 to 5:30 p.m., Salt Palace Convention Center.

Outstanding specimens of rocks, minerals, and fossils could be yours! Come to the Rock Raffle and bid on your favorite sample. All proceeds go to the National Earth Science Teachers Association.

Tuesday, October 21

Elementary and Secondary Teacher Preparation and National Standards.

5:00 to 6:30 p.m., Wyndham Hotel. Sponsored by *National Association of Geoscience Teachers*, *GSA Geoscience Education Division*, and *GSA's SAGE Program*.

Earth and space science materials and methods should be part of every teacher's preparation. National Science Education Standards and the AAAS/2061 Benchmarks project have defined developmentally appropriate earth science outcomes (what students should know or should be able to do). Five speakers will spend 5 minutes each addressing key elements of this broad topic, leaving one hour for general discussion, including practical advice for improving teacher preparation.

Limit: 75. No fee. No registration required. Refreshments provided. For information: Whitman Cross II, Dept. of Physics and Earth/Space Science, Towson State University, Towson, MD 21252, (410) 830-3134, cross@midget.towson.edu; David Mogk, Dept. of Earth Sciences, Montana State University, Bozeman, MT 59717-0348, (406) 994-6916, dmogk@montana.campus.mci.net.

Coalition for Earth Science Education Open Forum.

8:00 to 10:00 p.m., Wyndham Hotel. Sponsored by *Coalition for Earth Science Education*, and *GSA's SAGE Program*.

This special evening session will discuss the outcome of the Second International Conference on Geoscience Education. Among the principal outcomes of the conference will be the determination of the global state of earth system education. Panelists will include those secondary and post-secondary conference participants who were recipients of an NSF conference grant stipend. Panel moderators will be John R. Carpenter, University of South Carolina, and M. Frank Watt Ireton, American Geophysical Union.

Special Programs

Employment Service

Sunday, October 19, 1:00 to 5:00 p.m.,
Monday, October 20 through Wednesday,
October 22, 8:00 a.m. to 5:00 p.m., Salt
Palace Convention Center

Do you need qualified scientists to fill staff needs? Or are you looking for employment in the earth sciences? If so, you are invited to participate in the GSA Employment Interview Service.

All interested organizations seeking qualified earth scientists to fill staff needs are urged to submit notices of their vacancies and their requests for computer listings of applicants in advance of the meeting. Interview booths may be reserved at the meeting in half-day increments for a nominal fee. GSA staff will handle all interview scheduling with Employment Service applicants.

Many job seekers have found the Employment Interview Service critical to their successful search for positions. The annual registration fee is \$30 for GSA members and associates—and \$60 for nonmembers. This fee provides year-round service, but also includes interviewing at the annual meeting. Students completing doctoral and master's theses during 1997 are particularly encouraged to join the Employment Service and to check the job offerings at the meeting.

Applicants who sign up with the Employment Service by August 30, 1997, will have their information included in the materials that employers receive prior to the meeting, so submit your application form and résumé early to receive maximum exposure—and be sure to indicate on the form that you will be attending the meeting.

For additional information or forms, contact T. Michael Moreland, Membership Services Manager, GSA headquarters, (303) 447-2020; member@geosociety.org or see GSA's World Wide Web site at <http://www.geosociety.org> and check under the Membership section.

Employment Opportunities in the Geological Sciences Roundtable Discussions

Sunday, October 19, 1:00 to 3:00 p.m.,
Salt Palace Convention Center

This annual forum on employment opportunities in the geosciences allows valuable one-on-one interaction between panel members and individuals or small groups. Experts in each of the areas listed below will conduct



Anasazi pictograph, "All American Man," Southeast Utah.
Photo by Martin Miller

his or her own "mini-roundtable" discussion designed to provide a better opportunity to field both general and specific questions on a more personal, individualized basis.

These roundtable discussions will be in the Employment Service area during the interview registration time; however, **YOU DO NOT HAVE TO BE SIGNED UP FOR EITHER THE ANNUAL MEETING OR THE EMPLOYMENT SERVICE TO PARTICIPATE IN THESE DISCUSSIONS.**

Everyone—professionals and students—is encouraged to attend, to talk with as many of the experts as you like, and to pick up a free copy of the informational booklet "Future Employment Opportunities in the Geological Sciences."

Roundtable discussion leaders from the following areas will be featured this year: Academic and Educational; Mining; Federal Government; State and Local Government; Petroleum; Consulting; and Federal Legislation and Environmental Restoration.

For further information, contact T. Michael Moreland, Membership Services Manager, GSA headquarters, member@geosociety.org.

A Celebration of Laurence L. Sloss, Super Stratigrapher.

Sunday, October 19, 1997, 2:00 to 5:00 p.m.,
Salt Palace Convention Center. Sponsored by the *History of Geology Division*. Organized and moderated by Robert H. Dott Jr., University of Wisconsin.

L. L. Sloss, distinguished stratigrapher, former President of GSA, Penrose Medalist, and long-time professor at Northwestern University, died November 2, 1996, just days after attending the GSA Annual Meeting in Denver. Join the many friends, students, and admirers of Larry Sloss in celebrating the remarkable career of this outstanding geologist, whose pioneer work in formulating the concept of unconformity-bounded stratigraphic sequences has been so influential during the past five decades. A few of Sloss's close associates will make brief

GSA Goes Global!

International Surveys Invited for '97 Meeting

JOIN US FOR THIS INTERNATIONAL EVENT

- ◆ The Salt Lake City Organizing Committee has invited geologists from national geological surveys around the globe to participate in an international program in conjunction with the 1997 Annual Meeting.
- ◆ The program will include a technical poster session on global geology, exhibits on new geological or environmental developments in various countries, and a hosted reception that will be attended by your international colleagues, program sponsors, business and industry representatives, and government officials.

Here's an opportunity to meet and talk geology with your colleagues from around the world.

BE PART OF THE WORLD THAT'S COMING TO SALT LAKE CITY!

Sponsored by: GSA International Division, U.S. Geological Survey, Association of American State Geologists, U.S. Department of Energy, and State of Utah.

Corporate sponsorship is available.

For more information please contact Diane Conrad, Chair of the International Program Committee, (801) 799-2160 or E-mail I03046.I3I3@compuserve.com.



ATTENTION STUDENTS!

GSA Student Reception

Monday, October 20, 7:30 to 8:30 a.m., Salt Palace Convention Center, Hall A

Graduate and undergraduate students are invited to attend the first annual GSA Student Reception, which will take place in the Graduate School Information Forum area. Members of the GSA Executive Committee will be on hand to answer questions and address student issues. In addition, representatives from graduate schools that are exhibiting or participating in the Graduate School Information Forum will be present to discuss graduate school options. Registered students will receive complimentary coupons redeemable toward breakfast during this reception. Take this opportunity to network with fellow students and meet the officers of the Society.

Graduate School Information Forum

Monday, October 20 through Wednesday, October 22, 9:00 a.m. to 4:00 p.m., Salt Palace Convention Center, Hall A

This is a great opportunity for you to search for the right graduate school. Come to Salt Lake City and meet with representatives of top graduate schools without spending the travel time and money to go to each school for information and interviews.

A complete list of participating schools, with contact names and telephone numbers, is available. A schedule of participating schools will be published in the September issue of *GSA Today*. If you would like to reserve a space for your school or receive the list of participants, please contact Matt Ball, mball@geosociety.org. The deadline for schools to register for the forum is *August 15*.

presentations, after which the floor will be open for volunteered comments about personal associations, influences, and numerous incidents involving Larry.

GSA Demo Theater

Monday, October 20 through Thursday, October 23, 8:00 a.m. to 5:00 p.m., Salt Palace Convention Center

This year GSA is offering a unique opportunity for demonstrations of products and services at the Annual Meeting. The theater will be located just inside the exhibit hall and will feature a variety of demonstrations, which will take place in 30-minute blocks designated for these categories: Products and

Services, CD-ROMs, Commercial Software, Shareware or Freeware. A schedule of presentations will appear on GSA's Web site in August and in the on-site Program.

Commercial demonstrations will be charged a fee of \$100–\$200, and you do not have to be an exhibitor to participate. Shareware and freeware developers may demonstrate for free and are encouraged to participate. If you are interested in demonstrating in any of the above categories, please contact Matt Ball, mball@geosociety.org or (303) 447-2020, ext. 141, or see GSA's Web site for information and an online form, www.geosociety.org.

Earth Scientists on Capitol Hill

Wednesday, October 22, 12:00 noon to 1:00 p.m., Salt Palace Convention Center. Sponsored by *Geology and Public Policy Committee*.

The GSA Congressional Science Fellow program places earth scientists on the staffs of congressional offices. Congressional Science Fellows participate in the policy process by providing scientific and technical expertise to members of Congress and congressional committees. GSA's eleventh Congressional Science Fellow, Tamara Nameroff, served on the staff of Senator Joseph Lieberman (D-CT). At this open session, Nameroff will report on her experiences on the Hill and will discuss the potential role of earth scientists in the public policy sphere.

Funded by GSA and by a grant from the U.S. Geological Survey, the Congressional Science Fellowship program is at the center of GSA's efforts to increase involvement by the earth science community in the policy process.

Geology and Public Policy Forum

Wednesday, October 22, 1:00 to 2:30 p.m., Salt Palace Convention Center. Sponsored by *Geology and Public Policy Committee*.

The GSA Committee on Geology and Public Policy will conduct a forum on local earth science policy outreach. What is the role of a geologist with respect to community needs and how can a geologist become involved with critical earth science issues locally? Our panelists will share their successes and failures and help guide the GSA membership into the local policy arena.

Guest Activities

Formal Tours

All GSA meeting registrants are welcome to sign up for the formal tours offered as part of the Guest Program. Reservations for all tours will be accepted on a first-come, first-served basis. Space is limited and these trips will be popular, so register early. The tour operator requires a final guarantee several days in advance for most tours. Therefore, we recommend that you **don't** wait until you arrive in Salt Lake City to sign up.

All tours will leave from the Salt Palace Convention Center. There will be no pickups from the hotels. Plan to arrive in the hospitality room about 15–20 minutes before scheduled departure, for check-in.

Birds, Birds, Birds

Sunday, October 19, 6:30 a.m. to 1:00 p.m.

We are planning a special treat for GSA birds of a feather in Salt Lake! Our tour guides are from Westwings, recognized by the local



Flaming Gorge Reservoir. Photo by John Karachewski

Audubon Society as leading experts in Utah birdlife. We may be surrounded by nearly 100 species, including water fowl, shore birds, birds of prey, western songbirds, chukars, and gray partridges, as well as sharptail and sage grouse. The viewing sites will be selected immediately before our visit; potential locations may include the region's bird refuges or perhaps the Nature Conservancy's Layton Marsh. Minimum: 10; Maximum: 26. Cost: \$40 (includes transportation, birding guide, and continental breakfast).

Fossil Butte National Monument

Sunday, October 19, 8:00 a.m. to 4:00 p.m.

Join us for a full day of fossil discoveries at Kemmerer, Wyoming's Fossil Butte National Monument. The Monuments' visitor center features breathtaking displays of Eocene fossil specimens embedded in sandstone slabs of the Green River formation. Peter Ambrose,

resident paleontologist, will guide us to the site of his research fossil quarry, where we can try to picture arid Wyoming as an inland sea. You may even discover a trophy of your own! Wyoming weather is unpredictable in October, so come prepared for fall warmth or an early winter snowstorm! Minimum: 35; Maximum: 45. Cost: \$41 (includes transportation, tour guide, admission to monument, morning snack, box lunch).

Tabernacle Choir, Breakfast, and Snowbird Tram

Sunday, October 19, 8:30 a.m. to 3:00 p.m.

The morning begins on Historic Temple Square with the Mormon Tabernacle Choir for their weekly broadcast. Then, travel along the foothills of the magnificent Wasatch Mountains. Enjoy a delightful meal at LaCaille, a beautiful replica of an 18th century French chateau. Next is the Snowbird Ski Resort, located at the top of Little Cottonwood Canyon. The tram takes guests to the top of Hidden Peak at 11,000 feet above sea level for a view that is truly breathtaking. Easy nature trails abound for walking and picture taking. Minimum: 30; Maximum: 45. Cost: \$39 (includes transportation, tour guide, tram ticket, and continental breakfast).

Roots Workshop: Advanced Genealogy

Monday, October 20, 9:00 a.m. to noon

Join a professional genealogist in the world's largest family history library for a workshop that focuses on family lines that you select before your visit. After registration for this workshop, a pedigree chart will be sent to you to select two family lines for analysis by a professional genealogist. The actual workshop will consist of a short briefing about the library and several hours to begin your family research with the help of the genealogist. Minimum: 10; Maximum: 30. Cost: \$39.

Park City Silver Mine and Olympic Park

Monday, October 20, 1:00 to 5:00 p.m.

After some time on the Park City main street, travel to the Silver Mine Adventure. This family-oriented attraction highlights Park City's rich mining heritage in an exciting and educational setting. Descend 1,500 feet into an actual silver mine. While underground, view exhibits about mining geology and mythology, with a trip back in time to a turn-of-the-century soda fountain and country store. Information will be given on Bear Hollow, one of the venues for the 2002 Winter Olympic events including bobsled, luge, and ski jump. Minimum: 30; Maximum: 90. Cost: \$31 (includes transportation, tour guide, and admission to silver mine).

Salt Lake City Highlights

Monday, October 20, 1:30 to 4:30 p.m.

See the highlights of Salt Lake City on a tour that includes the most famous sites and buildings. The first stop is the Capitol, the city's crowning jewel. The view from the front steps takes in the Wasatch Mountains, the Great Salt Lake, and the Copper Mine. Drive by some elegant mansions built with wealth

derived from the Park City mining boom of the late 1800s. Next is the University of Utah's Rice Stadium, future site of the opening and closing ceremonies for the 2002 Winter Olympics, as well as Old Fort Douglas. Visit the This Is The Place Monument, a tribute to the pioneers who settled the Salt Lake area. En route back to downtown, view Trolley Square, a unique shopping and restaurant center. Minimum: 30; Maximum: 45. Cost: \$22 (includes transportation, tour guide).

Historic Walking Tour

Tuesday, October 21, 9:00 to 11:30 a.m.

Take a guided walk in downtown Salt Lake City for an up-close view of several historic sites and buildings, including the meridian marker, Joseph Smith Memorial Building, Family Search Genealogy Library, and the Beehive House, home of city founder Brigham Young. While visiting the Young family cemetery, guests will hear about Utah's pioneer heritage. The final stop is at Mormon Handicraft, a store that features handmade items at reasonable prices. Note: wear comfortable shoes, the approximate walking distance is seven long city blocks. Minimum: 10; Maximum: 100. Cost: \$11 (includes tour guide).

Kennecott Open-Pit Mine

Tuesday, October 21 and Wednesday, October 22, 1:00 to 5:00 p.m. each day

A visit to the famous Kennecott mine, so large that shuttle astronauts can identify it from space! Since its beginning in 1906, five billion tons of ore have been extracted from the mine. Besides copper, trace amounts of gold and silver are found in this mineral rich area. The trip will include a stop at the Copper Store just outside the mine to satisfy the souvenir seekers. Minimum: 30; Maximum: 45. Cost: \$19 (includes transportation and tour guide).

Great Salt Lake Cruise

Tuesday, October 21, 1:00 to 5:00 p.m.

Enjoy an exciting cruise around the Great Salt Lake, the largest salt-water body of its kind in the world. At 20% salinity, it is ten times saltier than the oceans! Guests will learn about the lake's turbulent Ice Age beginnings as Lake Bonneville and its modern day significance to weather, industry, and recreation. Included is a stop at Antelope Island State Park, which, despite its name, is home to a rare buffalo herd. Visit the island's buffalo corral and the Visitor Center and learn about its pioneer settlement. Minimum: 30; Maximum: 90. Cost \$46 (includes transportation, tour guide, boat ride, admission to State Park).

Park City Shopping and Lunch

Wednesday, October 22, 10:00 a.m. to 2:00 p.m.

Stroll back in time in historic Park City. This once rowdy mining boomtown is now a bustling ski and summer resort. The old establishments lining Main Street now house charming specialty shops, unique art and history museums, and diverse eateries. Minimum: 30; Maximum: 45. Cost: \$23 (includes transportation and tour guide; shopping and lunch on your own).

Informal Tours

In addition to the tours listed above, you might enjoy visiting other area attractions with fellow guest attendees. Plan to sign up in the Guest Hospitality Room for these informal, self-guided tours.

Guest Hospitality Room

Beginning on Saturday, October 18, guests are invited to visit the Hospitality Room located at the Salt Palace Convention Center. Your hosts will provide a resource center with abundant information on Salt Lake City and surrounding areas. A local expert will be on hand to answer city-related questions from 9:00 a.m. to 3:00 p.m. Sunday through Wednesday. Formal and informal tour information will be available. Light refreshments will be served throughout the day.

Remember to wear your GSA badge; it will be required for admission to the hospitality room and exhibit hall. Guest registration includes an exhibit hall pass, but does not give access to the technical sessions. However, a guest can obtain a temporary pass to see a spouse or friend present a paper.

Guest Hospitality Room Hours

Saturday	1:00 p.m. to 4:00 p.m.
Sunday	8:00 a.m. to 4:00 p.m.
Monday	8:00 a.m. to 4:00 p.m.
Tuesday	8:00 a.m. to 4:00 p.m.
Wednesday	8:00 a.m. to 4:00 p.m.
Thursday	8:00 a.m. to Noon

Seminars

We have planned the following intriguing presentations as part of your registration fee. Further details on these seminars, including time and location, will be available in the Hospitality Room.

The Mormon Tabernacle Choir

Monday, October 20, 10:00 a.m.

A choir representative will tell us who the members are, what time commitments they must make, and how members are selected.

Our Nutritional Needs

Tuesday, October 21, 10:00 a.m.

A professional from the University of Utah's Nutrition Clinic will speak on foods that fight disease. Learn the nutritional truth in current food fads.

2002 Winter Olympics

Wednesday, October 22, 10:00 a.m.

The eyes of the world will be focused on Salt Lake City for the two weeks of winter sporting events. A member of the organizing committee will describe their olympic plan.



Opera and Dinner

Saturday, October 18, 6:00 to 10:00 p.m.
Join us for a delightful dinner followed by the opera *Lucia di Lammermoor* by Donizetti. This is the story of a family feud complete with murder, madness, and suicide! Music provided by the Utah Symphony. Nancy Adams of Travel to Music will be your hostess for the evening. Nancy will send additional information after you register. Limit: 40. Cost: \$65 (includes dinner and opera ticket).

Sweet Adelines Final Competition

Saturday, October 18, evening, Salt Palace Convention Center
Listen to the beautiful sounds of the final competition of the best of the Sweet Adelines vocal groups. Cost \$25 (transportation to Convention Center not included). Tickets will be mailed to you in advance.

Welcoming Party

Sunday, October 19, 5:00 to 7:30 p.m., Salt Palace Convention Center
All attendees must be registered for the meeting in order to attend. An Exhibit Hall (only) Pass is available for \$20 and is good for admission to the exhibits throughout the meeting. A complimentary drink ticket for this event will be provided with all paid meeting registrations. Registration will remain open until 7:30 p.m. for your convenience. Register, then join your colleagues and exhibitors Sunday evening to celebrate the grand opening of the 1997 GSA Annual Meeting and exhibits! This is the time to meet with friends and plan the next four days of meeting activities. Relax and take this uninterrupted opportunity to view the exhibits, eat, and enjoy your favorite beverage.

Behind the Scenes at the Utah Museum of Natural History

Sunday, October 19, 7:30 to 10:30 p.m.
Following the Welcoming Party, join us for a buffet dinner and behind the scenes tour of the Utah Museum of Natural History. In addition to the public displays highlighting Utah's natural wonders, curators will be on hand for a rare look at the museum's extensive geological, anthropological, and biological collections. Maximum: 300. Cost: \$20 (includes transportation, buffet dinner, museum admission).

GSA Presidential Address and Awards Ceremony

Monday, October 20, 5:45 to 7:45 p.m., Salt Palace Convention Center
The GSA Presidential Address and Awards Ceremonies will begin with President George Thompson's address, *Deep Mantle Plumes and Geoscience Vision*. A reception honoring the awardees will follow immediately.

Penrose Medal

John D. Bredehoeft

Arthur L. Day Medal

Edward Irving

Young Scientist Award (Donath Medal)

Edouard G. Bard

GSA Distinguished Service Award

Robert L. Fuchs, Faith E. Rogers

Recognition will also be given to newly elected Honorary Fellows

John R. L. Allen, Daniel Bernoulli, Umberto G. Cordani, Dan P. McKenzie

Awards Luncheons and Other Ticketed Group Functions

Associated societies and GSA divisions invite their members and other interested guests to join them for their annual meal functions, special addresses, and awards ceremonies. Due to catering guarantee deadlines, only a few tickets will be available on-site. Therefore, we recommend you purchase your tickets in advance using the Registration Form in this issue. The Registration Form includes the date of the events. Location and time of events will appear on the ticket and in the 1997 *Annual Meeting Program*.

Alumni Receptions

Monday, October 20, 7:00 to 9:30 p.m., Little America, Marriott, and Wyndham Hotels
Everyone knows someone at the popular Alumni Receptions. Plan to join your former classmates for an evening of memories and fun. Beer from several area brew pubs will be available at the Group Alumni Event. More than 80 colleges and universities will be represented. If you would like your university to hold a private reception or to be part of the Group Alumni Event, have your department chair contact Becky Martin at GSA headquarters, bmartin@geosociety.org.


Park City Silver Mine Adventure

Tuesday, October 21, 5:30 to 10:30 p.m., Park City, Utah



Convenience Information

Accessibility for Registrants with Special Needs

 GSA is committed to making the Annual Meeting accessible to all people interested in attending. If you need auxiliary aids or services because of a disability, check the appropriate box on the registration form. If you have suggestions or need further information, contact Becky Martin, GSA headquarters, (303) 447-2020, ext. 164, or bmartin@geosociety.org. Please let us know your needs by September 19.

Information, Messages, and Internet Services

Sunday, October 19 through Thursday, October 23, Salt Palace Convention Center. The information and message desk at the Convention Center will be available to take messages on your behalf. Leave the following number for your home and office: (801) 534-4759.

Registered attendees will be able to access the Internet for message sending and retrieval. Browse the World Wide Web between sessions! These services are provided by GSA and conveniently located in the registration area.

News Room

Sunday, October 19 through Thursday, October 23, Salt Palace Convention Center. The GSA News Room provides coordination and assembly of information on topics for release to the news media. Please let them know of material that is newsworthy for the science or general and local press. Members of the press may receive complimentary meeting registration with appropriate press credentials by contacting Sandra Rush, (303) 443-8489, or June Forstrom at GSA headquarters, jforstrom@geosociety.org.



Organ Rock Shale, Southeast Utah. Photo by Martin Miller

Child Care

Sunday, October 19 through Thursday, October 23, Salt Palace Convention Center. Guardian Angel Babysitting Services, approved and screened by the City of Salt Lake, will be providing child care services during the meeting. This company is a Utah-based, licensed, insured child care corporation with years of experience. They employ thoroughly screened professionals to provide quality care to the children of convention attendees.

Plan to attend the meeting while your child enjoys age-appropriate activities in a relaxed, balanced environment. The children can enjoy arts and crafts, story telling, games, puzzles, and toys. Parents are encouraged to contact Guardian Angel Babysitting Service for further information and/or interviews, (801) 856-8137.

Costs are \$3.50/hour for children over the age of 3 years; toddlers and infants under the age of 3 years are \$4.50/hour. Snacks are included. Preregistration by September 19, 1997, is recommended to secure appropriate staffing. Late registrations and on-site drop-ins will be \$1 per hour higher. A deposit of \$35.00 per child is required with each reservation and will be applied directly toward your child care fee. Full refunds will be given to all cancellations received in writing to Guardian Angel by September 26, 1997.

To register, send your child's name, age, brief profile of your child's likes and dislikes, and babysitting schedule to: Carol Passey, Guardian Angel Babysitting Service, 2709 Crestview Drive, Woodland, UT 84036. Deposit required with registration. Fax 801-783-4242, gdnangel@allwest.net, or contact Kathy Ohmie Lynch, GSA headquarters, klynch@geosociety.org.

A packet of registration materials will be sent within two weeks after receipt of each registration.

Tourist Information

Salt Lake Convention & Visitors Bureau
180 S. West Temple
Salt Lake City, UT 84101-1493
Phone (801) 521-2822
Fax 801-355-9323

Weather and Climate

Fall is the favorite season of many who visit and live in Utah. Vibrant colors splash across the mountains and canyons as the cooler



Utah Capitol. Photo courtesy of Salt Lake Convention and Visitors Bureau

temperatures turn the leaves all shades of gold, purple, red, green, and brown. Salt Lake City's high temperatures in October range from a low of 39°F to a high of 66°F. Mountain areas may be as much as 20° cooler. Average precipitation in October is only 1.14 inches.

We want your stay in Salt Lake City to be productive and enjoyable. Therefore, a word of caution about the high altitude. Decreased oxygen density and low humidity require a few simple precautions to reduce the chances of high-altitude syndrome. Suggestions include: eat lightly, drink plenty of liquids, avoid alcoholic beverages for the first 48 hours, and keep physical exertion to a minimum for the first two days.

Liquor Laws in Utah

Yes, you can get a beer in Salt Lake City! Liquor laws in Utah are easy to understand. Alcoholic beverages are served with your meal in restaurants and hotels. Liquor may be purchased in state liquor stores throughout Salt Lake and in private clubs (visitors are welcome at these clubs, and temporary memberships are available for a nominal fee, \$1-\$2). You can buy beer almost anywhere. Remember, Salt Lake is 4,500 feet above sea level. Please consume alcohol cautiously, as it has more of an effect at higher altitudes.

Exhibits

Salt Palace Convention Center, Halls A and B

Visit GSA's Web site, www.geosociety.org, to browse an on-line listing of products and services. A description and contact information is provided for each exhibitor. For information on becoming an exhibitor, contact Matt Ball, GSA headquarters, (303) 447-2020, ext. 141, or mball@geosociety.org.

Meeting Exhibitors (as of 5/20/97)

Equipment and Instrumentation

AMS, Inc.
ASC Scientific
Campbell Scientific, Inc.
Finnigan MAT
Geoprobe Systems
Hugh Courtright & Company, Ltd. and Cases USA, Inc.
JEOL USA, Inc.
Leica, Inc.
LI-COR, Inc.
Magellan Systems Corporation
Meiji Techno America
Merchantek
MicroMass
Micro-Vid
Phillips Electronic Instruments
Prior Scientific, Inc.
Renishaw Inc.
Rigaku/USA, Inc.
Scintag, Inc.
Spectrex Corporation
SPEX Sample Preparation
Terraplus USA Inc.
TerraTek, Inc.
UIC, Inc./Coulometrics
VG Elemental

Field Supplies and Gear

Forestry Suppliers, Inc.
General Supply Corporation
Geographics
J. L. Darling Corporation
Miners Incorporated

Gems, Minerals, and Fossils

Cal Graeber Minerals
Donald K. Olson Minerals
Howard Minerals
Ikon Mining
Komodo Dragon
Mineral Wells
Nature's Own
The Sapphire Gallery

Geoscience Associations

American Association of Petroleum Geologists (AAPG)
American Geological Institute
American Geophysical Union
American Institute of Hydrology
American Institute of Professional Geologists

American Quaternary Association
Association for Women Geoscientists
Association of American State Geologists
Association of Engineering Geologists
Association of Geoscientists for International Development
Council on Undergraduate Research, Geology Division
Cushman Foundation
Geochemical Society
Geological Association of Canada
Geoscience Information Society
Mineralogical Association of Canada
Mineralogical Society of America
National Association of Geoscience Teachers
National Earth Science Teachers Association
Paleontological Research Institution
Paleontological Society
SEPM (Society for Sedimentary Geology)
Sigma Gamma Epsilon
Society for American Archaeology
Society of Economic Geologists, Inc.

Society of Vertebrate Paleontology
Utah Geological Association

Geological Society of America

GSA—Bookstore
GSA—Foundation
GSA—Geology & Public Policy
GSA—International Division
GSA—Partners for Education Program
GSA—SAGE Program

Government Resources

International GPS Service
Jet Propulsion Laboratory
Montana Bureau of Mines and Geology
NASA/EOSDIS
NASA/EOS
NASA/GCMD
National Park Service
National Research Council/National Academy of Sciences
National Science Foundation
Nevada Bureau of Mines and Geology
Oklahoma Geological Survey
U.S. Geological Survey
Utah Geological Survey

Institutions

Baylor University

Brigham Young University
Colorado School of Mines
Desert Research Institute
J C P D S—International Centre for Diffraction Data
JOI/US Science Support Program
University of Nevada, Las Vegas
University of Nevada, Reno
University of Oklahoma
Washington State University
Wright State University

Laboratory Services

Activation Laboratories Limited
Coastal Science Laboratory
Krueger Enterprises/Geochron Labs
XRAL Laboratories

Publishers

Academia Book Exhibits
Academic Press
American Journal of Science
Benjamin/Cummings—An imprint of Addison Wesley Longman
Blackwell Science, Inc.
Cambridge University Press
Chapman and Hall
Columbia University Press
Dorling-Kindersley Family Learning
Earth Magazine
Earth Observation Magazine

Elsevier Science Publishing Company, Inc.
Houghton Mifflin Company
Kendall/Hunt Publishing Company
Mountain Press Publishing Company
Oxford University Press
Plenum Publishing Corporation
Prentice Hall
Princeton University Press
Saunders College Publishing
Springer-Verlag New York, Inc.
University of California Press
University of Chicago Press
W. H. Freeman and Company
Wadsworth Publishing Company
Water Resources Publications, LLC
WCB/McGraw-Hill
John Wiley & Sons, Inc.
Worth Publishers, Inc.
Yale University Press

Services

Geotemps, Inc.

Software

Arc Science Simulations
CogniSeis
Earth'nWare, Inc.
Eighteen Software
RockWare, Inc.
Tasa Graphic Arts

GSA Headquarters Services Area

in addition to the regular exhibit hours, the Services area will be open again on Thursday, from 9:00 a.m. to 2:00 p.m.

Visit Us!



Salt Lake City skyline. Photo courtesy of Salt Lake Convention and Visitors Bureau

		Column B	
		Qty	Amount
<i>Guest Activities</i>			
1. Birding Field Trip	(101) \$40	___ \$	_____
2. Fossil Butte National Monument	(102) \$41	___ \$	_____

Preregistration Fees

Required for participation in field trips, technical sessions, courses, and exhibits.

*Member affiliation for member discount: (a) GSA (member # _____)
 (b) AASG (c) AEG (d) AGID (e) AWG (f) CF (g) CUR
 (h) GIS (i) GS (j) MSA (k) NABGG (l) NAGT (m) NESTA
 (n) PS (o) PRI (p) SEG (r) SGE (s) SVP

	Column A			
	Full Meeting	One Day	Qty	Amount
Professional Member (check affiliation above)* ..	(10) \$210	(11) \$128	1	\$ _____
Professional GSA Member (70 yrs. and over) ...	(12) \$160	(13) \$ 78	1	\$ _____
Professional Nonmember	(14) \$255	(15) \$148	1	\$ _____
Student Member (check affiliation above)*	(30) \$ 75	(31) \$ 51	1	\$ _____
Student Nonmember	(32) \$100	(33) \$ 61	1	\$ _____
K-12 Professional	(60) \$ 25		1	\$ _____
Guest or Spouse (no tech. session access)	(90) \$ 75		1	\$ _____
Field Trip or Course Only Fee	(1) \$ 35		1	\$ _____

Ticketed Group Functions

1. Geoscience Education Division Breakfast, Mon.	(301) \$13	___	\$ _____
2. NAGT Lunch, Mon.	(302) \$23	___	\$ _____
3. AWG Breakfast, Tues.	(303) \$13	___	\$ _____
4. GIS Lunch, Tues.	(304) \$23	___	\$ _____
5. Hydrogeology Division Lunch, Tues.	(305) \$23	___	\$ _____
6. MSA Lunch, Tues.	(306) \$23	___	\$ _____
7. Paleontological Society Lunch, Tues.	(307) \$23	___	\$ _____
8. SEG Lunch, Tues.	(308) \$23	___	\$ _____
9. MSA/GS Reception, Professional, Tues.	(309) \$10	___	\$ _____
10. MSA/GS Reception, Student, Tues.	(310) \$ 5	___	\$ _____
11. Engineering Geology Division Lunch, Wed.	(311) \$23	___	\$ _____
12. History of Geology Division Lunch, Wed.	(312) \$23	___	\$ _____

Continuing Education

	Professional	Student	
Soc. Sec. # For C.E.U.s _____			
1. Analysis of Veins in Sedimentary Rock.....	(501) \$280	(501) \$260	\$ _____
2. Techniques in Geostatistical Estimation	(502) \$320	(502) \$300	\$ _____
3. Computer Visualization of 3-D Deformation.....	(503) \$380	(503) \$360	\$ _____
4. Applications of Environmental Isotopes.....	(504) \$205	(504) \$155	\$ _____
5. Buck Rogers, Field Geologist	(505) \$230	(505) \$210	\$ _____
6. Dynamical Systems Modeling	(506) \$280	(506) \$260	\$ _____
7. Environ. Issues, Modern & Historic Sites	(507) \$200	(507) \$180	\$ _____
8. Geology of Coal Bed Methane	(508) \$200	(508) \$180	\$ _____
9. Geomorphic Applications of In-situ.....	(509) \$260	(509) \$240	\$ _____
10. Visualization in the Geosciences	(510) \$325	(510) \$305	\$ _____
11. Paleosols for Sedimentologists.....	(511) \$195	(511) \$175	\$ _____
12. Practical Remote Sensing in Geology	(512) \$240	(512) \$220	\$ _____

Total Column A \$ _____

BY MAIL:
GSA Annual Meeting,
P.O. Box 9140,
Boulder, CO 80301-9140

BY FAX (*available 24 hours*):
303-447-0648 or
303-447-1133
credit card use only.

Please do not send another copy in the mail.

All registration forms **received at GSA by September 19** will be processed and badges mailed two weeks before the meeting.

GSA and ASSOCIATED SOCIETY MEMBERS SAVE \$40 (professional) and \$20 (student) with preregistration fees.

NONMEMBERS SAVE an additional \$40 (professional) and \$20 (student) by joining GSA now. See how to get your discount below.

The member fees apply to members of both GSA and Associated Societies (listed on the form).

Registrations will not be processed unless full payment is received. Unpaid purchase orders are NOT accepted as valid registration. The confirmation sent by GSA will be your only receipt. You should receive it within two weeks after your registration is submitted.

Badges are needed for access to ALL activities, 10:00 a.m. Sunday through 5:00 p.m. Thursday.

A **guest registration** fee is available for a nongeologist spouse or friend of a professional or student registrant and is required for those attending guest activities and the exhibit hall. The guest registration fee will not provide technical session access. Any guest wishing to see a specific talk should come to the Guest Hospitality Room for a pass.

Students: A CURRENT student ID is required to obtain student rates. You will have to pay the professional fee unless you have the ID.

Please register only one professional or student per form and retain a copy for yourself.

All registrations received after September 19 will be considered ON-SITE registrations and charged accordingly. Absolutely no registrations should be mailed or faxed after

October 3. After this date we will handle registrations at the Convention Center during the registration hours listed below.

On-site fees for Continuing Education Courses are an additional \$30.

As a special consideration, GSA is offering a discount rate to our members who are 70 years of age and older. Please write your membership number in the space provided and be sure to bring a picture I.D. to ensure your discount.

Cancellations, Changes, and Refunds

All requests for additions, changes, and cancellations must be made in **writing and received by September 26, 1997**. Faxes are accepted. GSA will refund or credit preregistration fees for cancellations

received in writing by September 26. NO

REFUNDS WILL BE MADE ON CANCELLATION NOTICES RECEIVED

AFTER THIS DATE. Refunds will be mailed from GSA after the meeting.

Refunds for fees paid by credit card will be credited according to the card number on the preregistration form. There will be NO refunds for on-site registration, *Abstracts with Programs*, and ticket sales.

On-Site Registration Schedule

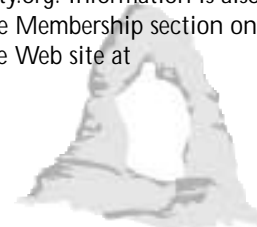
Salt Palace Convention Center, Hall A
Saturday, Oct. 18 7:00 a.m. to 5:00 p.m.
Sunday, Oct. 19 7:00 a.m. to 7:30 p.m.
Monday, Oct. 20 7:00 a.m. to 4:30 p.m.
Tuesday, Oct. 21 7:00 a.m. to 4:30 p.m.
Wednesday, Oct. 22 7:00 a.m. to 4:30 p.m.
Thursday, Oct. 23 7:00 a.m. to 11:00 a.m.

Members Pay Less! Join Now!

If you are not yet a GSA member, now is the time to join. Professionals save a sub-

stantial amount on their registration fee by paying the member rate—almost exactly the amount you'd pay to join GSA. That's like joining GSA for free! Likewise, students who pay the basic membership dues of \$20 to become a Student Member (graduate student) or Student Associate (undergraduate student) receive a \$20 discount on their Annual Meeting registration. Note: these discounts apply only to **full-meeting paid** registration—not to one-day or complimentary registrations.

Save time by joining **before** the meeting by contacting the Membership Services Department at (303) 447-2020, or member@geosociety.org. Information is also available under the Membership section on GSA's World Wide Web site at



Housing

To get your first choice of hotels, we highly recommend that you get your reservation in as early as possible. Convention hotels fill quickly. *Special note:* Another large convention is overlapping with GSA from October 16 to 19. If you plan to arrive during the premeeting weekend, we strongly recommend you make reservations **now**. All hotel reservations must be processed by the Housing Bureau of the Salt Lake Convention and Visitors Bureau to get the special GSA rates.

To Make Your Hotel Reservation

Fill out the housing reservation form on page 30 and either mail or fax it to the Housing Bureau of the Salt Lake Convention and Visitors Bureau. (They will not accept phone calls for reservations, only for changes or cancellations.) See the form for the address and fax number. If you are interested in a suite, please indicate this on your form; the bureau will contact you with information to request a suite directly from the hotel. All reservations should be received by Friday, September 19. From this date until October 7, the Housing Bureau will continue to accept new reservation requests, but rooms will be on a space-available basis only. The Housing Bureau will work with each individual hotel. No checks for deposits will be accepted by the Housing Bureau after September 19.

Assignment

Hotel rooms will be assigned on a first-come, first-served basis as the Housing Bureau receives requests. Please list your first three hotel choices in order of preference. If the hotels you have chosen are full, the Housing Bureau will review your selection preference on the Housing Form. Be sure to mark which is more important to you, proximity to convention center or comparable room rate. You will receive an acknowledgment from the Housing Bureau with your hotel assignment within 10

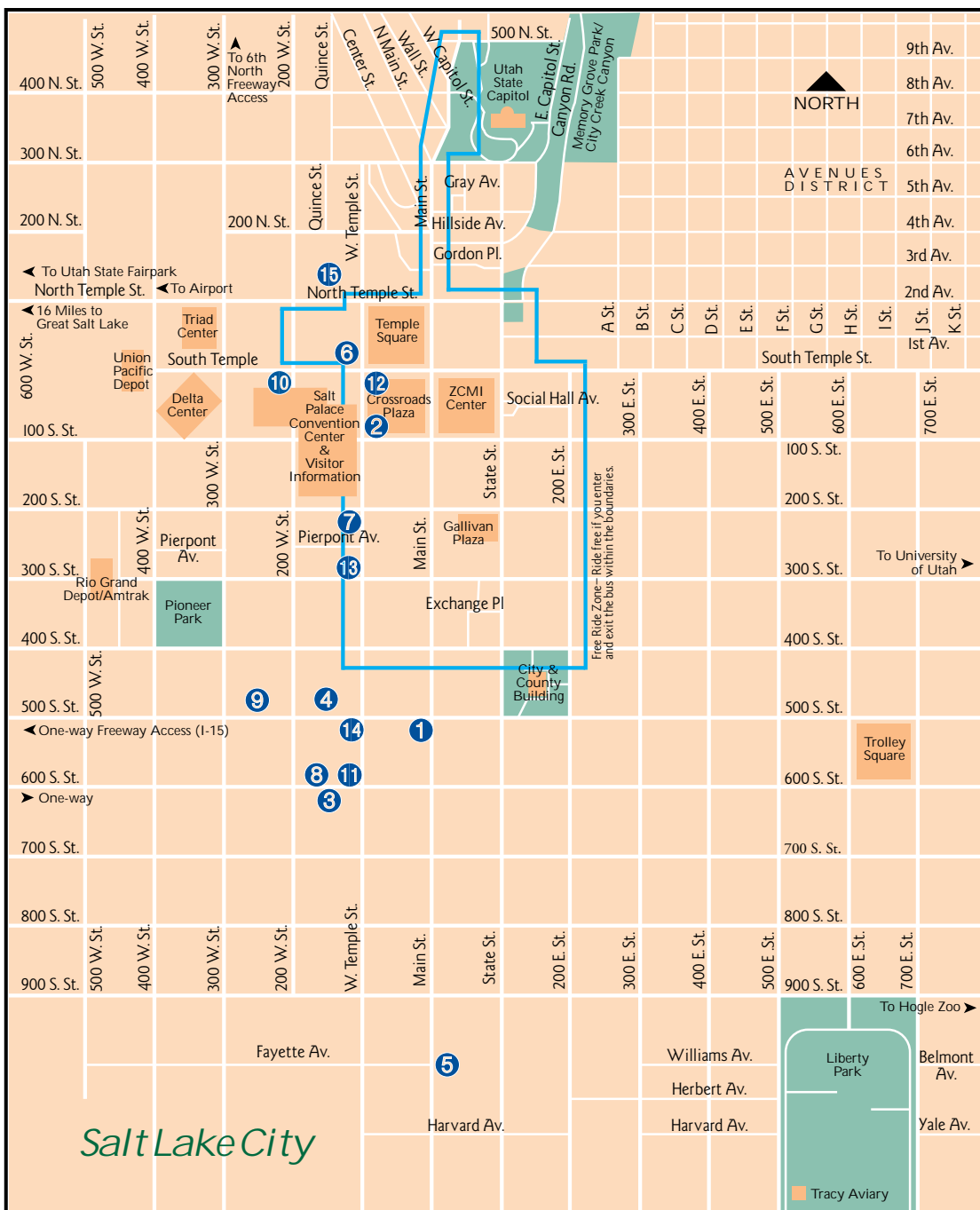
days of receipt. Check all information carefully for accuracy, including arrival date, departure date, and credit card information. If you do not receive an acknowledgment within two weeks, call the Housing Bureau at (801) 521-9025, to check the status of your reservation.

Room Deposits

All reservations require a deposit equal to one-night's stay plus 10.82% tax payable by check or credit card. If a deposit is not sent with the housing form, your reservation will not be processed.

Changes and Cancellations

Changes to arrival or departure dates, name changes, and cancellations should be made in writing (fax is accepted) to the Housing Bureau by Friday, September 19. After this date, changes and cancellations should be made directly with the hotel. Cancellations received prior to September 19 will receive a full refund of the deposit. A \$9.50 processing fee is deducted from the deposit refund for all cancellations made after September 19. The entire deposit is forfeited if cancellation is made less than three days (72 hours) prior to arrival.



Special Needs

The Americans with Disabilities Act ensures that barrier-free hotel rooms will be made available to GSA registrants. Those with special needs should specify this on the Housing Form. All properties except the Peery Hotel have accessible rooms for the disabled. If you have questions or would like to know more about the accessibility of a specific hotel, please contact Becky Martin at GSA headquarters by September 19.

Student Housing

Rooms have been reserved for students at two Travelodge properties. Students can sign up for one of the limited number of rooms at

this property using the housing form attached. Note: shuttle transportation will NOT be provided from the student properties. However, the Temple Square Travelodge is one block from the Convention Center and the City Center Travelodge is across the street from Little America, where shuttle stops are

GSA Annual Meeting, October 20–23, 1997

Housing Deadline: Friday, September 19. After this date convention rates may not apply!

INSTRUCTIONS (please print or type all information)

1. An ACKNOWLEDGMENT will be sent from the Housing Bureau and a CONFIRMATION will be sent directly from the hotel.
2. Select THREE hotels of your choice from the table on page 29. Enter the appropriate hotel code in the boxes below.
3. Select type of room desired, with arrival and departure dates and times. PRINT or TYPE names of occupants in the room.
4. One night's deposit is required with a credit card number or an enclosed check, made payable to the GSA Housing/SLCVB.

Getting To Salt Lake City

GSA's official travel agent, Travel King, has negotiated discounted airfares with United Airlines, one of Salt Lake City's primary carriers. Travel King is committed to obtaining the best possible fares for GSA Annual Meeting travelers.

Advance bookings with Saturday night stayovers are the best route to lowest fares. However, as with all airline reservations, please use caution regarding change and cancellation penalties that accompany low-fare tickets. This applies especially to field trip and continuing education participants, whose trip or course may be canceled after the September 19 preregistration deadline. Contact Travel King at 1-800-458-6398 or www.1TravelKingEast.com, for a reservation or more information.

GSA Student Associate Member Travel Grants

The GSA Foundation has awarded matching grants to the six GSA Sections. The money, when combined with equal funds from the sections, is used to assist GSA Student Associates traveling to GSA meetings. The following sections offer assistance to the Annual Meeting in Salt Lake City. The remaining two sections offer assistance to their section meeting. For information and deadlines, contact your section secretary.

- ◆ North-Central—George Hallberg, (319) 335-4500, ghallber@uhl.uiowa.edu
- ◆ Northeastern—Kenneth Weaver, (410) 554-5532, kweaver@aol.com
- ◆ South-Central—Rena Bonem, (817) 755-2361, bonemr@baylor.edu
- ◆ Southeastern—Harold Stowell, (205) 348-5098, hstowell@wgs.geo.us.edu

Getting to Your Hotel

The Salt Lake International Airport is seven miles from downtown. Nearly all downtown hotels offer free transportation to and from the airport. Those that do not are serviced by low-cost shuttle services. Taxi service to and from the airport is approximately \$16 one way.

Getting Around in Salt Lake City

GSA Shuttle. Most downtown Salt Lake City restaurants and hotels are within walking distance from the Convention Center and from each other. However, GSA will provide shuttle service between the



GSA-selected hotels and the Convention Center beginning on Sunday, October 19.

Taxicabs. Taxi service (24 hour) within downtown Salt Lake City costs approximately \$1.25 plus \$1.50 per mile. (No charge for additional passengers.) The bellman at most hotels can call for a taxi, or you can call direct to City Cab Company, (801) 363-8400.

Car Rental. Alamo is the official car rental agency for the meeting. Identify yourself as a GSA meeting attendee by giving Group ID number 85204 and Plan Code GR to get guaranteed, discounted, daily/weekly rates as follows: economy \$30/\$134; compact \$34/\$149; mid-size \$38/\$169; full size \$43/\$195; convertible \$58/\$265, luxury \$67/\$359; van \$58/\$265. Rates include unlimited mileage. Alamo is located in the Salt Lake International Airport parking facility across the street from the baggage claim level. Advance reservations are recommended. Call Alamo at 1-800-732-3232.



Call Travel King Today!

official travel agency for the Salt Lake City meeting

You could win 2 Roundtrip Air Tickets anywhere in the Continental U.S. (restrictions apply)

Book your Salt Lake City ticket through

TRAVEL KING

and your name will be entered for a drawing to be held November 14.

1-800-458-6398 toll free
(303) 776-2270 collect from outside U.S.
fax 303-776-5170
www.1TravelKingEast.com

8:30 a.m.—5:30 p.m. MST, Mon—Fri
until 8:00 p.m. on Wednesday

Special negotiated airfares for the GSA Meeting!

Deadlines

- ◆ Abstracts due July 8
- ◆ Preregistration & Housing due September 19 (*Registration and Housing forms enclosed*)
- ◆ Cancellation: September 26

Information

Call: (303) 447-2020
1-800-472-1988
Fax: (303) 447-0648
E-mail: meetings@geosociety.org

World Wide Web

Visit the GSA Web site to view more details and to get the latest information on short course and field trip status.

GSA Divisions

Archaeological Geology Division ◆ Coal Geology Division ◆ Engineering Geology Division ◆ Geophysics Division ◆ Geoscience Education Division ◆ History of Geology Division ◆ Hydrogeology Division ◆ International Division ◆ Planetary Geology Division ◆ Quaternary Geology and Geomorphology Division ◆ Sedimentary Geology Division ◆ Structural Geology and Tectonics Division

Associated Societies

American Institute of Professional Geologists ◆ Association for Women Geoscientists ◆ Association of Engineering Geologists ◆ Association of American State Geologists ◆ Association of Geoscientists for International Development ◆ Council on Undergraduate Research Geology Division ◆ Cushman

Advance-Copy Purchase

1997, Volume 29, Number 6

PRICE: \$24 net each for GSA members, \$30 net each for nonmembers.

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