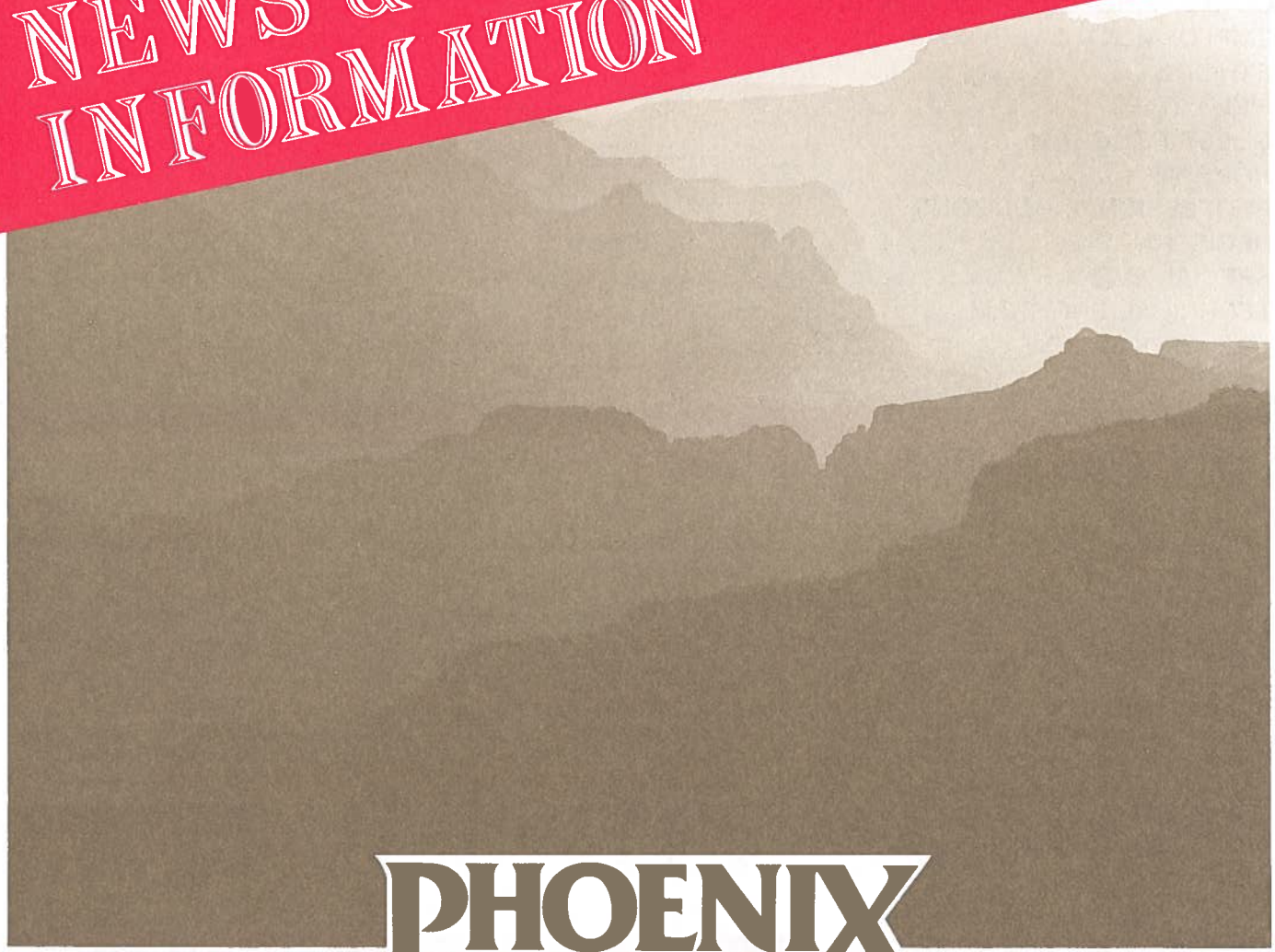


GSA

NEWS &
INFORMATION

G.S.A. ARCHIVES

Volume 9, Number 8
August 1987
ISSN 0164-5854



PHOENIX

1987 ANNUAL MEETING AND EXPOSITION

PHOENIX CIVIC PLAZA • PHOENIX, ARIZONA • OCTOBER 26-29, 1987



GEOLOGICAL SOCIETY OF AMERICA

For further information contact, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020

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APPRECIATION FROM GSA

The Geological Society of America is grateful to and sincerely thanks all those who have contributed so much to the success of this meeting: the speakers for their contributions to the science; exhibitors for their financial support, products, and information; the local committee for its leadership; the associated societies for their programs and patience; and you geoscientists for your attendance and ongoing support of the Society. To each and every one, a special thanks from GSA's Council and staff.

GSA NEWS & INFORMATION VOLUME 9, NUMBER 8 AUGUST 1987

GSA NEWS & INFORMATION (ISSN 0164-5854) is the monthly newsletter of The Geological Society of America, Inc., P.O. Box 9140, Boulder, Colorado 80301. Second-class postage rates paid at Boulder, Colorado and additional mailing office.

Prepared from contributions from the staff and membership. Executive Director: F. Michael Wahl; Managing Editor: Faith Rogers; Associate Editor: Lee Gladish; Director of Communications: Nancy A. Reed; Production and Advertising Manager: James R. Clark; Marketing/Advertising Assistant: Ann H.F. Crawford; Assistant Production Manager: Meredith L. Larson; Production Assistants: Mona T. Gonzales and Joan E. Manly.

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

WELCOME

Geologists and their guests are warmly welcomed to the geologic wonderland of the Southern Cordillera. In this area are the Rocky Mountains, the Colorado Plateau, much of the Basin and Range province, the Cordilleras of Mexico, and the Rio Grande rift.

Geologists will be treated to an extensive array of field trips. They will be challenged by data from recent research that shows fresh insights and raises new questions. This promises to be one of the Society's largest and most interesting meetings.

Phoenix is a gateway to reach impressive natural wonders and unusual cultures that excel in their beauty, scale, and emotional impact. Arizona's boundaries encompass the Grand Canyon, Lake Powell, San Francisco Peaks, Sedona, Oak Creek Canyon, Monument Valley, and Canyon de Chelly. If at all possible, plan to extend your visit through a weekend during this exquisite time of year.

TECHNICAL PROGRAM/SYMPOSIA

The technical program consists of volunteered papers that are presented in oral or poster sessions and invited papers presented in symposia. Symposia are as follows:

- 1. Geology of Human Origins and Cultural Evolution.** Archaeological Geology Division; Fekri Hassan, Washington State University.
- 2. Predicting Coal Quality by Means of Basin Analysis, Geophysical Data, and Geochemical Techniques.** Coal Geology Division; Frederick Kuellmer, New Mexico Institute of Mining and Technology.
- 3. Neotectonics in Earthquake Evaluation.** Engineering Geology Division; Ellis Krinitsky, Waterways Experiment Station.
- 4. California-Arizona Crustal Transect: Detachment Terrane to Colorado Plateau.** Geophysics Division; Keith Howard, USGS, Menlo Park.
- 5. History of Studies of Arid Lands: Ancient and Modern.** History of Geology Division; William Jordan, Millersville University.
- 6. Geochemical Reactions and Related Physical Processes Associated With Organic Compounds in Ground Water.** Hydrogeology Division; Mary Jo Baedeker, USGS, Reston.
- 7. Global Change: A Geological Perspective on Earth-System Science.** Planetary Geology Division and Quaternary Geology and Geomorphology Division; Victor Baker, University of Arizona; James Head, Brown University.
- 8. Tectonic versus Eustatic Effects on Cretaceous Sedimentation of the Western Interior of North America.** Sedimentary Geology Division; Niall Mateer, Laramie, Wyoming.
- 9. Structure and Tectonics of Accretionary Prisms.** Structural Geology and Tectonics Division; Darrel Cowan, University of Washington.
- 10. Paleooceanography and Paleontology of the Gulf of California.** Cushman Foundation; James Ingle, Stanford University.
- 11. Cenozoic Potassium-Rich Igneous Rocks of the Colorado Plateau and Surrounding Regions.** Geochemical Society; G. Nell Tyner, Florida Institute of Technology.
- 12. Collections for the Future: Archivists, Curators, Historians, Bibliographers Speak.** Geoscience Information Society; Jean Eaglesfield, Massachusetts Institute of Technology.
- 13. Synchrotron Radiation Research in Geological Sciences.** Mineralogical Society of America; Gordon Brown, Jr., Stanford University.
- 14. Time, Life, and the Rock Record: New Implications for Teaching.** National Association of Geology Teachers; Robert Norris, University of California, Santa Barbara.
- 15. Rates of Evolution in Fossil Lineages.** Paleontological Society; Bjorn Malmgren, University of Uppsala.
- 16. Proterozoic Ores of the Southern Cordillera.** Society of Economic Geologists; Spencer Titley, University of Arizona.
- 17. Phanerozoic Ore-Bearing Granite Systems: Petrogenesis and Mineralization Processes.** Society of Economic Geologists; Holly Stein, USGS, Denver.
- 18. Geology and Tectonics of Mexico.** Joaquin Ruiz, University of Arizona.
- 19. The Cordilleran-Caribbean Connection: Mesozoic Geology from the Mojave Desert to the Gulf of Mexico.** William Dickinson, University of Arizona.
- 20. Sedimentary Facies, Biostratigraphy, and Paleocology of the Southwestern Margin of the Cretaceous Western Interior Seaway.** Dale Nations, Northern Arizona University.
- 21. Tertiary Extensional Tectonics of the Lower Colorado River Region.** Gary Axen, Northern Arizona University.
- 22. Early Proterozoic Continental Assembly of Southwestern North America.** Karl Karlstrom, Northern Arizona University.
- 23. "Anorogenic" Silicic Magmatism.** Eric Christiansen, Brigham Young University.
- 24. Inception and Timing of Deformation in the Late Mesozoic and Early Cenozoic Cordilleran Fold-Thrust Belt.** Tim Lawton, New Mexico State University.
- 25. Geology in China.** B. Clark Burchfiel, Massachusetts Institute of Technology.
- 26. Origins of Methane in the Earth.** Martin Schoell, Chevron Oil Field Research Company, La Habra, California.
- 27. Structure and Evolution of the Rio Grande Rift.** Kenneth Olsen, Los Alamos National Laboratory.

PHOENIX

CONTENTS OF TECHNICAL PROGRAM

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- Geology and Tectonics of Mexico Oct. 27
- The Cordilleran-Caribbean Connection: Mesozoic Geology from the Mojave Desert to the Gulf of Mexico Oct. 27
- Sedimentary Facies, Biostratigraphy, and Paleogeology of the Southwestern Margin of the Cretaceous Western Interior Seaway Oct. 28
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- III Late Cenozoic Climate Change, Uplift and Geomorphic Response in the Rio Grande Rift Oct. 29

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- DNAG, GLIMPCE — Special Poster Displays Daily
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- Poster Session II Oct. 26
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- Poster Session III Oct. 27
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- Poster Session IV Oct. 27
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- Poster Session V Oct. 28
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- Poster Session VI Oct. 28
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- Poster Session VII Oct. 29
- Economic Geology, Geomorphology, Glacial Geology, Quaternary Geology

TECHNICAL PROGRAM SCHEDULE — 1987

= SYMPOSIA IDENTIFICATION ITALICS = THEME SESSIONS UPPER/LOWER CASE = VOLUNTEERED SESSIONS ALL CAPS = POSTER SESSIONS

SUNDAY OCT. 25	MONDAY OCT. 26	TUESDAY OCT. 27	WEDNESDAY OCT. 28	THURSDAY OCT. 29
8:15 a.m.—12:00 noon	8:00 a.m.—12:00 noon	8:00 a.m.—12:00 noon	8:00 a.m.—12:00 noon	8:00 a.m.—12:00 noon
#11 Geochem—Part I #16 SEG—Part I #26 Orig of Methane—Part I	# 2 Coal # 6 Hydrog # 9 Struct #12 GIS Econ I General/Precam I Geochem I Ig Pet I Micropaleo Paleo/Petroleum Quat I/Glacial Tect-Geophys I MIN CRYST., PETROLOGY, SED PET., SEDIMENT	# 7 Planet/Quat—Part I #15 Paleo #19 Cordilleran-Caribbean Connection Arch Econ III Hist/Geol Ed/GIS Hydrog II Min Cryst Sed Pet II Strat II Tect II Tect-Geophys II COAL, ENG, MARINE, PETROLEUM, OCEAN, STRUCT	#14 NAGT #20 Western Interior Seaway #21 Tect Colo R Region #23 "Anorogenic" silicic magmatism <i>Climate Change S. Lat./ODP</i> Environ Geochem III Geomorph I <i>Late Cret Tect N Cordillera</i> Met Pet II Struct III Tect IV GEOCHEM, PALEO, PALEOBOT, MICROPALAO	#22 Proter. Assembly SW N Amer #24 Cordilleran Fold/Thrust Belt #27 Rio Grande Rift Econ V Ex Pet II Geochem V Marine II Paleo Paleobot III Sediment III Struct IV Tect VI Volcan I ECON, GEOMORPH, GLACIAL, QUAT
LUNCHEONS:	GIS	ENG, GEOPHYS, HYDROG, MSA, NAGT, PS	COAL, GEOCHEM, HIST, QG&G, SEG	
1:00—5:00 p.m.	1:00—5:00 p.m.	1:30—5:30 p.m.	1:30—5:30 p.m.	1:00—5:00 p.m.
#11 Geochem—Part II #16 SEG—Part II #26 Orig of Methane—Part II	# 3 Eng # 5 History #10 Cushman #13 MSA Coal Econ II Hydrog I/Sed Pet I/Strat I Paleo Paleobot I Quat II Struct I Tect I HYDROG, PLANET, REMOTE, STRAT	# 1 Arch # 7 Planet/Quat—Part II #18 Geol of Mexico Eng/Econ IV Geochem II Hydrog III Ig Pet II Met Pet I Ocean/Marine I/Sediment I Sediment II Struct II Tect III GENERAL, PRECAM, TECT, TECT-GEOPHYS	# 4 Geophys # 8 Sediment #17 SEG #25 China Ex Min/Ex Pet I Geochem IV/Ig Pet III Geomorph II/Quat III Paleo Paleobot II Planet/Remote Precam II Strat III Tect V ARCH, ENV, GEOL ED, GIS, HIST, IG & MET PET, VOLCAN	Econ VI Geochem VI Ig Pet IV <i>Late Ceno Rio Grande</i> Met Pet III Paleo Paleobot IV Sediment IV Sediment V/Sed Pet III Struct V Tect VII Volcan II/ Tect-Geophys III/Struct VI

FIELD TRIPS

Phoenix represents the first formal, comprehensive exposé of the geology of Arizona, as presented in the context and tradition of an annual GSA meeting. Late October/early November is a perfect time for field work in the southern Colorado Plateau and Basin and Range. Above and beyond the quality of exposure and the natural aesthetic appeal of the Southwest, the trips will provide a sense of the discovery and momentum which attends geological research in the Southwest, during this the close of the first century of GSA. How appropriate indeed that the 100th meeting of the Geological Society of America be held in the Grand Canyon state.

All trips originate and end in Phoenix, unless otherwise specified. Participants must provide their own transportation to the starting point and from the termination point, for those trips not originating or terminating in Phoenix. Trips are technical in nature and can be physically rigorous.

Trip cost includes transportation for the trip itself and guidebook. It also may include costs of other services as noted by the following symbols: B—Breakfast; L—Lunch; D—Dinner; S—Snack; ON—Overnight lodging. **FOR SOME PREMEETING TRIPS, GROUP RATE AIRFARES HAVE BEEN ARRANGED TO GET PARTICIPANTS TO PHOENIX AT THE TERMINATION OF THE FIELD TRIP. IF YOU DO NOT WISH TO TAKE ADVANTAGE OF THIS AIR TRAVEL, PLEASE REGISTER USING THE FEE LISTED WITHOUT AIRFARE FOR THAT TRIP.**

Preregistration for a field trip is recommended because of participant limitations. All participants are selected on a first-come, first-served basis through GSA headquarters only.

PREREGISTRATION DEADLINE: Must be RECEIVED at GSA headquarters no later than SEPTEMBER 25, 1987.

Registration form and procedures are provided in this announcement. Registration for field trips after the deadline may be possible if trip logistics and space permit; contact Kathy Ohmie, Field Trip Coordinator. On-site registration MAY be possible for postmeeting trips during the meeting at the Field Trip Desk, Lobby 2, Civic Plaza.

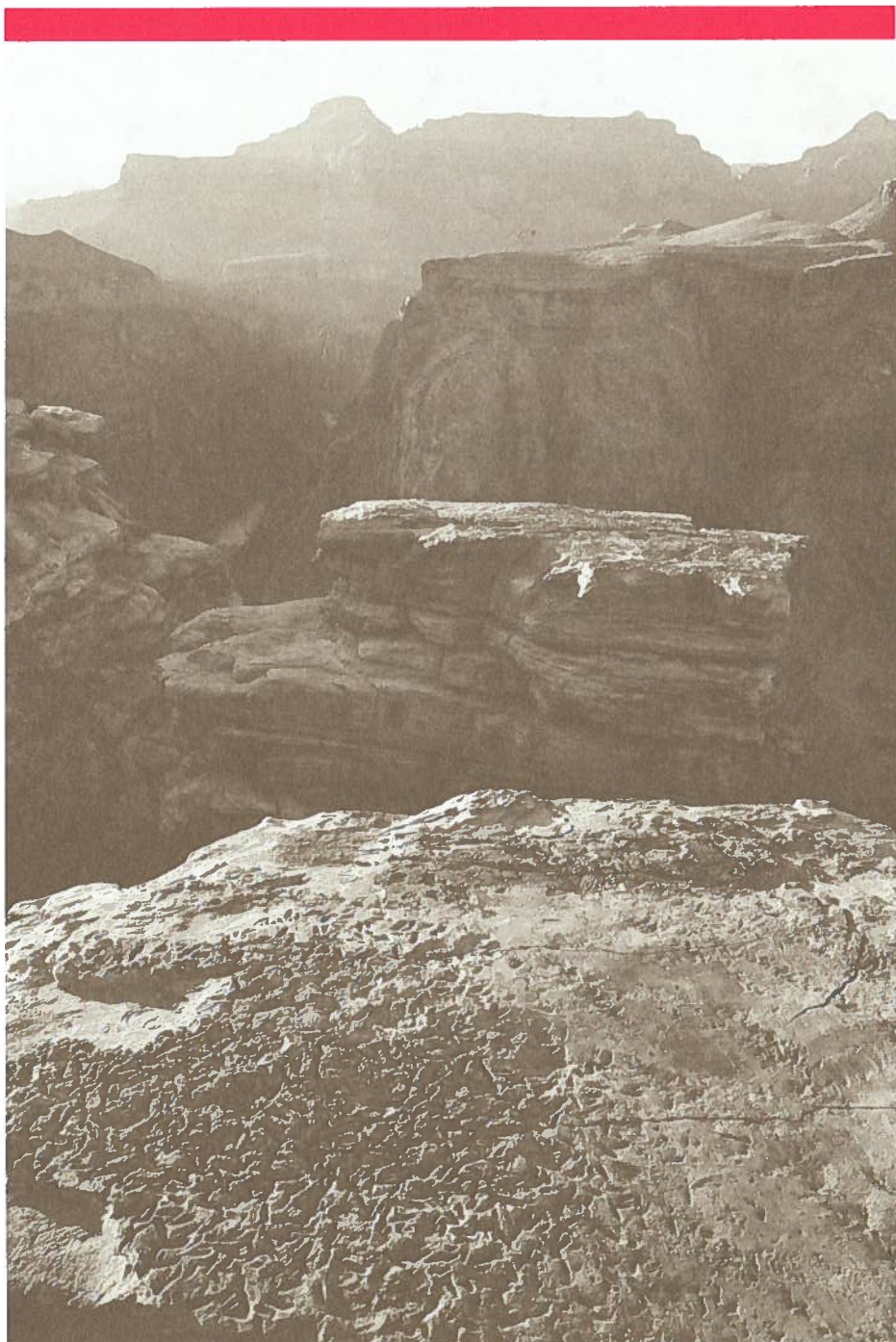
CANCELLATION DEADLINE IS OCTOBER 2. No refunds will be given for cancellations received after this date. If GSA must cancel a field trip because of logistics or registration requirements,

a full refund will be issued to trip registrants as soon as possible after the meeting.

GUIDEBOOKS may be purchased at the field trip desk during the meeting. After the meeting, contact Larry Fellows, State Geologist, Bureau of Geology/Mineral Technology, 845 N. Park, Tucson, AZ 85719.

For further trip information, contact the

Field Trip Chairman, George H. Davis, Administration 512, Univ. Arizona, Tucson, AZ 85721, (602) 621-3592; Field Trip Co-Chairman, Jon E. Spencer, Bureau of Geology/Mineral Technology, 845 N. Park, Tucson, AZ 85719, (602) 621-7906; Field Trip Coordinator, Kathy Ohmie, GSA headquarters; or the designated field trip leaders.



Plateau Point View, Grand Canyon—Peter Kresan

PREMEETING TRIPS

1. Mesozoic Thrust Faults, Tertiary Detachment Faults, and Associated Rocks, Fabrics, and Mineralization, Whipple-Buckskin-Harcuvar Area, Western Arizona and Southeastern California

Jon Spencer and Stephen Reynolds, Bureau of Geology, 845 N. Park Ave., Tucson, AZ 85719, (602) 621-7906; Gregory A. Davis and J. Lawford Anderson, Univ. Southern California, Los Angeles, CA. Three days, Oct. 23-25.

The trip includes the Hercules thrust and related structures and fabrics in the western Harquahala and southeastern Granite Wash Mountains, Mesozoic mineralization in the southeastern Granite Wash Mountains, and multiple thrust faults and slivers related to at least two periods of deformation in the northern Granite Wash Mountains; the Whipple Mountain detachment fault and associated upper- and lower-plate structures and lithologies, including lower-plate mylonitic crystalline rocks and synkinematic sills; and the Buckskin Mountain detachment fault, upper- and lower-plate rocks and structures, and base- and precious-metal mineralization along, above, and below the detachment fault. Limit: 52 participants. Cost: \$198 (incl. 2 ON, 3 L, 1 D).

2. Terraces of the Lower Salt River Valley in Relation to the Late Cenozoic History of the Phoenix Basin, Arizona

Troy L. Péwé, Dept. Geology, Arizona State Univ., Tempe, AZ 85287, (602) 965-2883. One day, Oct. 25.

Rivers entering the basin from east and north are flanked by sets of paired terraces that diverge upstream. The terrace sediments are progressively more cemented by caliche, from the younger, lower terraces to the older, higher terrace remnants. Emphasis will be on origin and age of terraces based on geomorphology, origin and age of the caliche development, and pediment formation. Limit: 40 participants. Cost: \$54 (incl. 1 L).

3. Lower Cretaceous Coral-Algal-Rudist Patch Reefs in Southeastern Arizona

Joseph F. Schrieber, Jr., Dept. Geosciences, Univ. Arizona, Tucson, AZ 85721, (602) 621-2153; Robert W. Scott, Amoco Production Co., Tulsa, OK. Two and one-half days, Oct. 23-25.

The trip will include the stratigraphic setting of the Mural limestone in the Mule Mountains east of Bisbee and the patch reefs in the upper member of the Mural at Paul Spur Ridge; Guadalupe Canyon east of Douglas, where there is a thick and very fossiliferous carbonate-siliciclastic section in the lower member of the Mural, which in turn is capped by a patch reef; and the patch reef core and flanking beds exposed in the quarry and on surrounding slopes at Lee Siding, 12 km northeast of Douglas. Return to Phoenix via Tombstone and Tucson. Trip departs from Tucson. Limit: 25 participants. Cost: \$166 (incl. 2 ON, 3 L, 1 D, 3 S).

4. Archaeological Geology of Paleo-Indian Sites in Southeastern Arizona

Michael R. Waters, Dept. Anthropology, Texas A&M Univ., College Station, TX 77843, (713) 845-3211; C. Vance Haynes, Jr., Univ. Arizona, Tucson, AZ. Two and one-half days, Oct. 23-25.

Participants will examine the alluvial stratigraphy, geochronology, paleo-Indian archaeology, and vertebrate paleontology at the Murray Springs Clovis site, the Escapule mammoth site, and other localities in the San Pedro Valley; and, in Whitewater Draw in the southern part of the Sulphur Springs Valley, the alluvial stratigraphy and the context of the early archaic Cochise culture and megafaunal remains at the Double Adobe and Skeleton sites. The trip will end with the lacustrine features and geoarchaeology of ancient pluvial Lake Cochise. Trip departs from Tucson. Limit: 52 participants. Cost: \$184 (incl. 2 ON, 2 L).

5. Paleocology and Taphonomy of Recent to Pleistocene Intertidal Deposits, Gulf of California

Karl W. Flessa, Dept. Geosciences, Univ. Arizona, Tucson, AZ 85721, (602) 621-6023; A. A. Ekdale, Univ. Utah, Salt Lake City, UT. Three and one-half days, Oct. 22-25.

The northern Gulf of California is characterized by an extreme tidal range that exposes a diversity of intertidal sedimentary habitats. The region is a natural laboratory for the study of taphonomic processes, ichnofossils, and sedimentation along a desert coastline. The trip will include a 3-km walking tour across the intertidal flats and estero of Bahia Cholla and will provide an opportunity to examine and collect from a diverse, subtropical fauna dominated by mollusks and echinoderms, to observe trace fossils in the making, and to see varied sedimentary bedforms. The trip will be based at CEDO, a small marine station in the vicinity of Puerto Penasco, Sonora. Limit: 30 participants. Cost: \$214 (incl. 3 ON, 3 B, 3 L, 3 D).

6. Late Paleozoic Depositional Systems, Sedona-Jerome Area, Central Arizona

Ronald C. Blakey and Larry T. Middleton, Dept. Geology, Box 6030, Northern Arizona Univ., Flagstaff, AZ 86011, (602) 523-2740. Two days, Oct. 24-25.

The interaction of the depositional systems will be stressed, and the local settings will be related to regional depositional and tectonic frameworks. Examine eolian, sabkha, and marine shoreline and sand-wave deposition in the Permian Esplanade and Coconino Sandstone and Schnebly Hill Formation and fluvial deposition in the Hermit Formation; a lateral change from eolian to sabkha deposition in the Schnebly Hill; and marine siliciclastic and carbonate sequences in the Supai Group and marine carbonate sequences in the Martin Formation and Redwall Limestone during the return to Phoenix via Jerome. Limit: 40 participants. Cost: \$123 (incl. 1 ON, 2 L, 2 S).

7. Geomorphology and Structure of Colorado Plateau/Basin and Range Transition Zone, Arizona

Richard A. Young, Dept. Geological Sciences, SUNY Geneseo, Geneseo, NY 14454, (716) 245-5291; H. Wesley Peirce, Bureau of Geology & Mineral Technology, Tucson, AZ; James E. Faulds, Univ. New Mexico, Albuquerque, NM. Three and one-half days, Oct. 22-25.

Examine the diverse structural and geomorphic evidence for the Tertiary evolution of areas immediately adjacent to the Colorado Plateau margin (Mogollon Rim) from western Arizona (Kingman) eastward to the Fort Apache Indian Reservation near Roosevelt Lake. Stops will include several of the key early Tertiary sections that demonstrate the antiquity of the modern plateau surface and contrast the early Tertiary geomorphology with the modern structural landscapes. This trip also provides a brief introduction to some of the classic geology exposed across central Arizona from the Precambrian through the Cenozoic. Limit: 39 participants. Cost: \$132 (incl. 3 ON, 3 L).

8. Tectonic and Magmatic Contrasts Across a Two-Province Proterozoic Boundary in Central Arizona

Clay M. Conway, USGS, 2255 N. Gemini Dr., Flagstaff, AZ 86001, (602) 527-7199; Karl E. Karlstrom, Northern Arizona Univ., Flagstaff, AZ; Leon T. Silver, California Inst. Technology, Pasadena, CA; Chester Wrucke, USGS, Menlo Park. Three days, Oct. 23-25.

The boundary between two major Early Proterozoic tectonic-stratigraphic provinces in the southwestern U.S. is best exposed in central Arizona. The northern province consists of island-arc volcanics and associated batholiths that display ductile deformation. The southern province exposes felsic ash-flow suites and temporally related quartz arenite sequences deformed by thrusting and folding at high crustal levels. The trip will focus on lithologic and structural characteristics that help constrain magmatic and tectonic evolution across the boundary and will emphasize magmatism associated with accretion and postaccretion events, deformation related to thrusting and strike-slip juxtaposition of provinces, and sedimentation in a variety of tectonic settings. Limit: 40 participants. Cost: \$163 (incl. 2 ON, 3 L, 3 S).

9. Colorado River Float Trip to Examine the Geology of Eastern Grand Canyon, Arizona

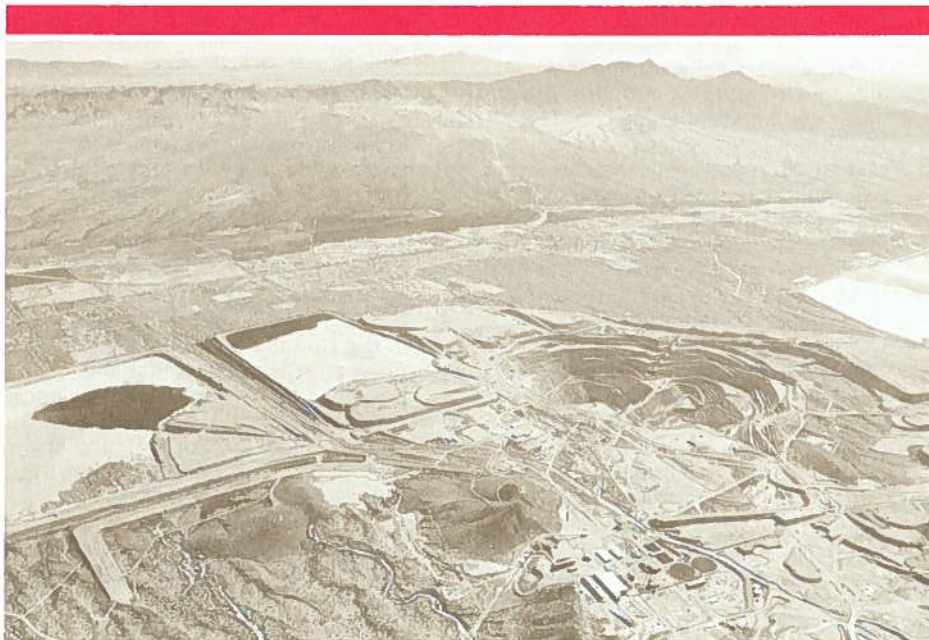
Stanley S. Beus, Dept. Geology, Box 6030, Northern Arizona Univ., Flagstaff, AZ 86011, (602) 523-7179; Ivo Lucchitta, USGS, Flagstaff, AZ. Seven and one-half days, Oct. 17-24.

This float trip through 140 km of Marble Canyon and eastern Grand Canyon from Lee's Ferry to Phantom Ranch will provide opportunities to examine the entire Paleozoic and Proterozoic rock record in the Grand Canyon. Exposures include 1200 m of Paleozoic strata of Cambrian through Permian age, 4000 m of Middle Proterozoic strata and volcanics, and igneous and metamorphic rocks of the Early Proterozoic Vishnu Group. Early registration is required. Trip departs from Flagstaff. Good physical condition required. Camping. Limit: 24 participants. Cost: \$920 (incl. lodging and meals).

10. Late Cenozoic Volcanism in the San Francisco and Mormon Volcanic Fields, Southern Colorado Plateau, Arizona

Richard F. Holm, Box 6030, Northern Arizona Univ., Flagstaff, AZ 86011, (602) 523-7200; George E. Ulrich, USGS, Hawaii Volcano National Park, HI. Two and one-half days, Oct. 23-25.

The trip will include the northern and eastern parts of the San Francisco field, where basaltic flows, cones, and maars are well displayed and their relations to structures and prevolcanic erosion surfaces of the Colorado Plateau are observable; the San Francisco Mountain composite volcano, its caldera, and two of its peripheral silicic centers, as well as the youngest (Sunset Crater) basaltic units of the San Francisco field; and, south through the Mormon volcanic field, (1) flood lavas, a basaltic shield, and lava domes and flows of the Mormon Mountain silicic center, and (2) basalt lava flows and inter-layered silicic tuffs on the Mogollon Rim. Trip departs from Flagstaff. Limit: 38 participants. Cost: \$162 (incl. 2 ON, 2 L, 2 S).



Open Pit Copper Mine—Peter Kresan



Grand Canyon—Peter Kresan

11. Geology of the Grand Canyon (backpack)

Wayne Ranney, 823½ W. Aspen, Flagstaff, AZ 86001, (602) 523-4561; Ralph Hopkins, Flagstaff, AZ. Three and one-half days, Oct. 22–25.

This backpack trip into the Grand Canyon from the South Rim will provide an opportunity to walk through the classic stratigraphy. Beginning at 2150 m, the trip will descend through the Kaibab and Toroweap Formations and into the eolian Coconino Sandstone and the fluvial Hermit Shale, then continue downward through Supai, Redwall, Muav, Bright Angel, and Tapeats. The contact of the Paleozoic sequence with underlying Proterozoic sedimentary rocks is spectacularly exposed. Proterozoic igneous rocks will signal arrival at the Colorado River and Phantom Ranch, at elevation 740 m. The final day's hike will be out of the canyon along Bright Angel trail. The trip departs from Flagstaff. Physically rigorous. Camping. Limit: 14 participants. Cost: \$212 (incl. 2 ON, 2 B, 3 L, 2 D, 2 S).

12. Miocene Extension, Volcanism, and Sedimentation in the Eastern Basin and Range Province, Southern Nevada

Eugene I. Smith, Dept. Geoscience, Univ. Nevada, Las Vegas, NV 89154, (702) 739-3262; R. Ernest Anderson, USGS, Denver, CO; Robert J. Bohannon, USGS, Menlo Park, CA; Gary Axen, Northern Arizona Univ., Flagstaff, AZ. Four days, Oct. 22–25.

Emphasis will be on the nature of the boundary between the Basin and Range and the Colorado Plateau. The trip will include mid-Miocene detachment structures in the Beaver Dam Mountains, Tule Spring Hills, and the East Mormon Mountains; structures related to the Lake Mead fault zone, a major left-lateral strike-slip fault system; stratigraphy of several volcanic centers in the Lake Mead area; low-angle and high-angle normal faults, including the Saddle Island detachment fault; and a brief stop at Hoover Dam to view the volcanic stratigraphy and spectacularly exposed faults. Trip departs from Las Vegas. Limit: 35 participants. Cost: \$235 (incl. 3 ON, 2 D, 3 L, 3 S). Optional airfare to Phoenix: \$40.

13. Late Pleistocene Alluvium and Megafauna Dung Deposits of the Central

Larry D. Agenbroad and Jim I. Mead, Dept. Geology, Box 6030, Northern Arizona Univ., Flagstaff, AZ 86022, (602) 523-2379. Four days, Oct 22–25.

Since 1983, several deposits of Pleistocene megafauna dung (mammoth, sloth, shrub ox, etc.) have been discovered and are being investigated on the central Colorado Plateau. Radiocarbon dates of the Pleistocene dung units range from 28,000 B.P. to 11,670 B.P. The youngest deposits are thus about 700 yr older than the extinction of many of the animals that created the deposits. The dung beds record floral and faunal evidence for dramatic climatic and environmental change in the past 11,000 yr. Hiking and boating to two dry cave localities and other shelters in the remote Glen Canyon region, participants will observe numerous sand dune and alluvial profiles. Camping. Limit: 16 participants. Cost: \$256 (incl. 3 ON, 3 B, 4 L, 3 D, 4 S).

14. Large-Scale Silicic Volcanism of the Jemez Mountains and Geology of the Adjacent Rio Grande Rift, New Mexico

Stephen Self, Dept. Geology, Univ. Texas, Box 19049, Arlington, TX 76019, (817) 273-2978; Jamie Gardner and Fraser Goff, LANL, Los Alamos, NM. Three and one-half days, Oct. 22–25.

Specific attention will be paid to the pyroclastic geology of the rhyolitic Bandelier Tuff(s) ignimbrites (1.4 and 1.1 Ma), the climatic eruptions of which caused the Valles Caldera complex. Examine precaldera and postcaldera rocks, as well as surface evidence of the active hydrothermal system beneath the caldera; and products of effusive and explosive phreatomagmatic basaltic eruptions in the adjacent Rio Grande Rift. A rift-filling alluvial fan sequence containing primary volcanic units and a great range of volcanoclastic sediments allows us to unravel the preclimax eruptive history of the eastern part of the Jemez Mountains. Trip begins and ends in Albuquerque. Limit: 45 participants. Cost: \$323 (incl. 3 ON, 1 D, 3 B, 3 L). Optional airfare to Phoenix: \$43.

15. Cretaceous of Black Mesa and Kaiparowits Basins, Northeastern Arizona and Southeastern Utah

Dale Nations, Dept. Geology, Northern Arizona Univ., Flagstaff, AZ 86011, (602) 523-7180; James Kirkland and Jeff Eaton, Univ. Colorado, Boulder, CO; David Carr, Arizona Dept. Water Resources, Phoenix, AZ; Gus Gustafson, RPI International, Boulder, CO. Four days, Oct. 22–25.

Examine the stratigraphic record of four transgressive-regressive cycles from Cenomanian to Santonian age in northeast Arizona and southeast Utah. The trip focuses on exposures of Cretaceous rocks in three regions: between Cannonville and Escalante just east of Bryce Canyon National Park; along the "Cockscomb" on the eastern margin of the Kaibab uplift; and along the margins of Black Mesa, just south of Monument Valley. Limit: 40 participants. Cost: \$226 (incl. 3 ON).

16. Crustal Transect: Colorado Plateau–Detachment Terrane–Salton Trough

Eric G. Frost, CALCRUST, Dept. Geological Sciences, Univ. California, Santa Barbara, CA 93106, (805) 961-2820. Five days, Oct. 21–25.

This joint CALCRUST, COCORP, and PACE field trip, sponsored by the Geophysics Division of GSA, will focus on the crustal structure from the stable Colorado Plateau across the mid-Tertiary detachment terrane, the Mesozoic thrust and nappe terrane, and into the Salton Trough transform rift region. Seismic reflection profiles from the CALCRUST Colorado River transect will be integrated with those of the COCORP western Arizona profile. Industry seismic records donated by EXXON, Phillips, Shell, and CGG will also be studied, as will the seismic refraction profiles of the USGS PACE group. The overall purpose of this trip is to try to match the geologic relations to the reflection profiles to produce a crustal-scale cross section from the Colorado Plateau to the Salton Trough. Limit: 60 participants. Cost: \$323 (incl. 4 ON, 1 D, 4 L).

17. Coal Deposits and Facies Changes along the Southwestern Margin of the Late Cretaceous Seaway

Gretchen Roybal, Frank E. Kottlowski, Edward C. Beaumont, New Mexico Bur. Mines and Resources, Albuquerque, NM 87801, (505) 835-5640. Four and one-half days, Oct. 21–25.

The trip begins in Albuquerque and will examine stratigraphy and coal deposits in a direction approximately at right angles to the Late Cretaceous shore line. Participants will visit the Lee Ranch Mine area, the McKinley Mine area, and the new Fence Lake–Salt Lake Coal District in New Mexico, the Pinedale Coal District in Arizona, and intervening stratigraphic sections. Limit: 40 Participants. Cost: \$275 (incl. 4 ON, 3 L, 1 D, 4 S).

18. Selected Hydrogeologic Problems in Central Arizona

Thomas L. Holzer, USGS, 345 Middlefield Rd., Menlo Park, CA 94025, (415) 853-8300; Mario R. Lluria, Salt River Project, Phoenix, AZ, (602) 236-5520. One day, Oct. 25.

This field trip will visit parts of the Salt River and Lower Santa Cruz Basins near Phoenix and Casa Grande where efforts to mitigate the overdraft by artificial recharge are underway and where surface effects from the massive withdrawals can be seen. The Cave Creek Artificial Recharge Project will be visited in the morning and the hydrogeology and design of the facility will be examined. Nearby outcrops of aquifer units will be inspected. Examples of subsidence and associated surface deformation will be inspected in the Eloy–Casa Grande area. An 8.7-km-long network of earth fissures adjacent to the Casa Grande Mountains and a 15.8-km-long fault scarp that has offset highway I-10 east of Picacho will be visited. Limit: 45 Participants. Cost: \$41 (incl. 1 L).

19. Mesozoic Tectonics of Southeastern California in the Big Maria–McCoy–Mule–Chocolate Mountains Transect

Warren Hamilton, USGS, MS 964, Denver, CO 80225, (303) 236-1329; Gordon Haxel, Richard Tosdal, Paul Stone, USGS, Menlo Park, CA. Four days, Oct. 22–25.

This trip will include deformation and metamorphism of cratonic Paleozoic and lower Mesozoic strata and of Precambrian and Jurassic granites within the Big Maria Mountains. See tectonic attenuation of the complete Grand Canyon section to 1% of its original thickness! Examine sedimentology of the very thick Lower Cretaceous fluvial clastic strata of the McCoy Mountains Formation within the McCoy Mountains; and the Mule Mountains thrust (terrane boundary to some, local structure to others). The trip also features the Orocopia thrust and the Orocopia Schist—a window through the continental crust to subducted oceanic rocks beneath, as exposed in the Chocolate Mountains. Limit: 40 participants. Cost: \$319 (incl. 3 ON, 3 B, 3 L, 2 S).



Pinacate Volcanic Field—Peter Kresan

POSTMEETING TRIPS

20. Geology of the Lower Grand Canyon and Upper Lake Mead by Boat—An Overview

Frederick W. Bachhuber and Stephen Rowland, Dept. Geoscience, Univ. Nevada, Las Vegas, NV 89154, (702) 739-3120; Peter Huntoon, Univ. Wyoming, Laramie, WY. Three days, Oct. 30–Nov. 1.

Participants will travel by boat from Pierce's Ferry upstream into the lower Grand Canyon to Separation Canyon (where Powell's party separated). There will be excellent opportunities to examine Cambrian stratigraphy, characteristics of the Precambrian crystalline basement, and Quaternary basalt flows. Traveling downstream into Lake Mead, the trip will cross the transition zone between the Colorado Plateau and Basin and Range provinces. In this area participants will examine Paleozoic facies changes and Basin and Range structural, geomorphic, and basin-fill characteristics. Trip begins and ends in Las Vegas. Camping. Limit: 25 participants. Cost: \$362 (incl. 1 ON, all meals). Optional airfare to Las Vegas: \$40.

21. A Geologic Reconnaissance into the Western Grand Canyon, Arizona

George H. Billingsley, John D. Hendricks, and Ivo Lucchitta, USGS, 2255 N. Gemini Dr., Flagstaff, AZ 86001, (602) 527-7198. Three and one-half days, Oct. 29–Nov. 1.

Participants will travel 34 km down Peach Springs Canyon to the Colorado River at Diamond Creek, examining Mississippian to Precambrian rocks, then transfer to rafts and begin a 2-1/2 day, 105 km trip through the rapids of the Colorado River to the backwaters of Lake Mead in the lower Granite Gorge. Side-canyon hikes will allow examination of Paleozoic stratigraphy and Laramide structures in the context of the transition from Colorado Plateau to Basin and Range geology. Participants will see some of the largest landslides in the Grand Canyon. Good physical condition suggested. Camping. Limit: 30 participants. Cost: \$458 (incl. 2 ON, 3 L, 2 D, 2 B).

22. Metamorphic Core Complexes, Mesozoic Thrusts, and Cenozoic Detachments: Old Woman Mountains–Chemehuevi Mountains Transect, California–Arizona

Keith A. Howard, USGS, 345 Middlefield Rd., Menlo Park, CA 94025, (415) 853-8300; Barbara E. John, Univ. California, Santa Barbara, CA; Calvin F. Miller, Vanderbilt Univ., Nashville, TN. Four and one-half days, Oct. 29–Nov. 2.

This trip includes a transect across the Colorado River extensional corridor, from breakaway faults in California to giant up-ended allochthonous tilt-blocks in Arizona. Participants will study evidence for the evolution of Mesozoic compressional tectonics and Cenozoic extensional tectonics. Emphasis will be on the Chemehuevi Mountains and the Old Woman–Piute range, where Mesozoic deep-seated thrusts and mylonites, Tertiary extensional detachment faults, and synextensional deposits are well exposed. Limit: 48 participants. Cost: \$348 (incl. 4 ON, 4 B, 4 L, 3 D, 4 S).

23. Alkaline Rocks and Volcanic Structures of the Pinacate Volcanic Field, Sonora

Daniel J. Lynch and Peter Kresan, Dept. Geosciences, Univ. Arizona, Tucson, AZ 85721, (602) 621-6001 or 6000; and James T. Gutmann, Wesleyan Univ., Middletown, CT. Three and one-half days, Oct. 29–Nov. 1.

The Pinacate volcanic field contains perhaps the most varied collection of basalt volcanic landforms of any field on the continent. The rocks and structures are beautifully exposed in the arid environment of the Sonoran Desert. Participants will hike from Red Cone to the top of Pinacate Peak on Volcan Santa Clara, 6 km distant and nearly 800 m higher, much of the hike in loose cinder, and then travel south to examine the Ives pahoehoe flow. The final day features Elegante Crater, the most famous and spectacular maar within the volcanic field. Camping. Limit: 40 participants. Cost: \$256 (incl. 2 ON, all meals).

24. Land Subsidence and Earth Fissure Formation in Eastern Phoenix Metropolitan Area, Arizona

Troy L. Péwé, Dept. Geology, Arizona State Univ., Tempe, AZ 85287, (602) 965-2883; Herbert Schumann, USGS, Water Resources Division, Phoenix, AZ; Richard H. Raymond, Tempe, AZ. One day, Oct. 30.

Enormous withdrawals of ground water in alluvial basins of south-central Arizona have resulted in land subsidence of as much as 5 m locally. Unequal compaction of underlying dewatered sediments has resulted in the formation of surface earth fissures. Participants will examine fissures on the south side of the Phoenix basin and the north edge of the Sand Tank Mountains and will discuss origin in relation to the underlying buried bedrock topography. The trip includes fissures in the vicinity of Apache Junction and their relation to the newly constructed Central Arizona Project Aqueduct System, which crosses this disturbed area. Limit: 40 participants. Cost: \$48 (incl. 1 L, 1 S).

25. Late Cenozoic Mammal Faunas and Magnetostratigraphy, Southeastern Arizona

Everett Lindsay, Dept. Geosciences, Univ. Arizona, Tucson, AZ 85721, (602) 621-6022; Neil D. Opdyke, Univ. Florida, Gainesville, FL; Noye M. Johnson, Dartmouth College, Hanover, NH. Two days, Oct. 30-31.

Late Cenozoic mammal fossils at the two chief sites (the 111 Ranch and Curtis Ranch) on this trip include some of the earliest records of South American immigrants during the main pulse of the Great American Interchange. The trip will go up the Gila River Valley to the fluvio-lacustrine deposits exposed at 111 Ranch, across Pleistocene Lake Cochise, then into the San Pedro Valley, to study the section from the base of the Gauss magnetic chron to the Olduvai subchron in the Curtis Ranch section. Limit: 40 participants. Cost: \$116 (incl. 1 ON, 2 L).

26. Geology of Porphyry Copper Ores in the Globe-Miami District

Spencer R. Tittley, Dept. Geosciences, Univ. Arizona, Tucson, AZ 85721, (602) 621-6018. One day, Oct. 30.

This trip, co-sponsored by SEG, will travel to Globe and Claypool to visit the operations of the Pinto Valley Copper Company and the Inspiration Copper Company. The mines of this district are centered on stocklike phases of the Schultze Granite emplaced into Precambrian host rocks. Visits in the open pits will allow study of the intrusions, wall rocks, alteration, and mineralization in orebodies of this classic district. Limit: 42 participants. Cost: \$41 (incl. 1 L, 1 S).

27. Ductile to Brittle Evolution of the South Mountains Metamorphic Core Complex

Stephen J. Reynolds, Arizona Geol. Survey, 845 N. Park Ave., Tucson, AZ 85719, (602) 621-7906; Brian M. Smith, Unocal Science and Technology, Brea, CA. One day, Oct. 30.

The South Mountains near Phoenix are one of the geologically simplest metamorphic core complexes of the North American Cordillera. Participants will examine the complete array of structures formed during ductile to brittle evolution of the complex and will traverse from undeformed granodiorite to mylonitic granodiorite to chloritic breccia and microbreccia derived from the granodiorite. Special emphasis will be on examining criteria for determining the sense of shear in the mylonitic rocks. Limit: 90 participants. Cost: \$38 (incl. 1 L).

28. Structural Geology of the South Mountains, Rincon, and Pinaleno Metamorphic Core Complexes, Southeastern Arizona

George H. Davis, Admin. Bldg. 512, Univ. Arizona, Tucson, AZ 85721, (602) 621-3592; Stephen J. Naruk, Univ. Arizona, Tucson, AZ; Charles H. Thorman, USGS, Denver, CO; Stephen J. Reynolds, Arizona Geol. Survey, Tucson, AZ. Three days, Oct. 30-Nov. 1.

Visit the Pinaleno Mountains, the northeast flank of which displays the progressive transformation of non-mylonitic Precambrian crystalline rocks to S-C mylonites. Examine the nearby Eagle Pass detachment, which features the fundamental characteristics of detachment faults. Discuss the kinematic-geometric-spatial interrelationships of core complex mylonites and detachment faults. Study the transformation of mylonite to microbrecciated mylonite to ultracataclasite within Saguaro National Monument in the Rincon Mountains. First day combined with trip #27 (Reynolds and Smith). Trip ends in Tucson. Limit: 32 participants. Cost: \$208 (incl. 2 ON, 3 L, 2 D, 2 S).

29. Tectonic Setting and Sedimentological Features of Upper Mesozoic Strata in Southeastern Arizona

William R. Dickinson, Margaret A. Klute, Dept. Geosciences, Univ. Arizona, Tucson, AZ 85721, (602) 621-4051; William L. Bilodeau, Univ. Colorado, Denver, CO. Three and one-half days, Oct. 29-Nov. 1.

The late Mesozoic tectonic and depositional setting was dominated by development of the Bisbee Basin, an intracratonic rift that was a northwestern extension of the Chihuahua Trough. Prerift strata, including volcanics related to the Cordilleran Jurassic magmatic arc, are overlain by rift-related volcanics and alluvial fan deposits. During subsequent thermotectonic subsidence and marine transgression, a suite of fluvial, lacustrine, deltaic, strandline, and marine shelf facies infilled the basin by mid-Cretaceous time. Participants will examine key localities of the Bisbee Group and Canelo Hills Volcanics and will view the overlying Fort Crittenden Formation of Laramide age. Trip ends in Tucson. Limit: 40 participants. Cost: \$257 (incl. 3 ON, 2 B, 3 L, 2 D, 3 S).

30. Geology, Structure, and Alteration of the Jerome, Arizona, Ore Deposits

Paul Lindberg, 205 Paramount Dr., Sedona, AZ 86336, (602) 282-1247; Mae S. Gustin, Univ. Arizona, Tucson, AZ. One day, Oct. 30 or repeated Oct. 31.

This trip, co-sponsored by SEG, will visit the Proterozoic massive volcanigenic sulfide ore occurrence at Jerome, Arizona. This deposit is a classic occurrence of massive copper-gold ore in felsic volcanic rocks, exposed in such a way that much of the associated stratigraphy and peripheral characteristics can be examined with some ease in the field. Limit: 40 participants. Cost: \$45 (incl. 1 L).

31. Upper Holocene Alluvium of the Southern Colorado Plateau

Richard Hereford, USGS, 2255 N. Gemini Dr., Flagstaff, AZ 86001, (602) 527-7159. Three and one-half days, Oct. 29–Nov. 1.

Examine modern (post-1940) and premodern (A.D. 1400–1880) alluvial deposits in several southern Colorado Plateau streams. The purpose of the trip is to develop the geologic and geomorphic history of these very young but extensive alluvial deposits and to point out applications to land management, geomorphology, archeology, and surface-water hydrology. Limit: 30 participants. Cost: \$263 (incl. 3 ON, 2 B, 3 L, 2 D, 3 S).

32. Mesquite Mine

Stanley Watowich, Goldfields Mining Corp., 1201 W. 9th St., P.O. Box 329, Yuma, AZ 85364, (602) 782-1695; Eric Frost, Univ. California, Santa Barbara, CA. Two and one-half days, Oct. 29–31.

This trip, co-sponsored by SEG, will concentrate on the structural, magmatic, and geochronologic setting of the world-class gold mineralization present in southeastern California, especially in the region of Goldfields' Mesquite Mine. It will focus on the localization of gold mineralization by Tertiary detachment faulting as it is overprinted on the Mesozoic structural and magmatic elements of the district. Participants will study exposures in the Picacho Mine

region and within the Mesquite Mine and its immediate vicinity. CALCRUST seismic profiles of the crustal structure in this and adjacent regions will be analyzed with respect to exploration models for similar gold deposits. Limit: 44 participants. Cost: \$254 (incl. 2 ON, 2 D, 2 L).

33. Cross-bedding and Other Eolian Structures in the Navajo and Entrada Sandstones

David M. Rubin and Ralph E. Hunter, USGS, 345 Middlefield Rd., MS 999, Menlo Park, CA 94025, (415) 853-8300. Three and one-half days, Oct. 29–Nov. 1.

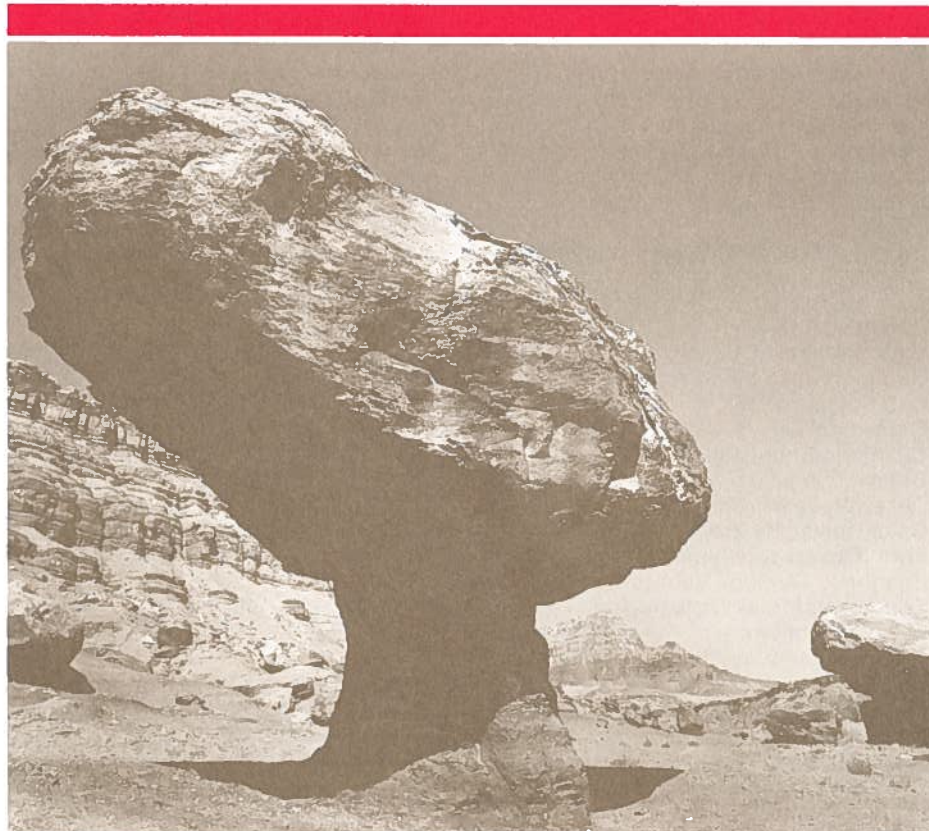
Lingering doubts about the origin of some "classic" eolian sandstones have been dispelled. This trip will visit outcrops that have been selected to illustrate new interpretive techniques. New techniques include using spatial variations in sedimentary structures to identify the depositional structures that operated on different parts of individual dunes, using thicknesses of sand-flow layers and models of dune climbing to place limits on dune

size; using cyclic cross-bedding inferred to result from daily and annual wind cycles to determine dune migration rates, and using compound cross-bedding to determine the shape, trend, and migration directions of superimposed dunes and the main dunes that supported them. Trip ends in Las Vegas; optional transportation back to Phoenix by bus. Limit: 41 participants. Cost: \$212 (incl. 3 ON, 3 L, 3 S).

34. Superstition Volcanic Field

Michael Sheridan, Dept. Geology, Arizona State Univ., Tempe, AZ 85287, (602) 965-5081. One day, Oct. 30.

Examine Tertiary volcanic rocks and structures with eruptive centers and calderas in the eastern part of the Superstition volcanic field. Typical rock types include latite lava and breccias, silicic welded tuffs, rhyolitic dome complexes and associated pyroclastic deposits, and moat-filling lahars. Caldera structures include high-angle boundary faults and low-angle gravity-slide blocks. Limit: 44 participants. Cost: \$46 (incl. 1 L).



Vermillion Cliffs—Peter Kresan

PHOENIX

EXHIBITS

EXHIBIT HOURS PHOENIX CIVIC PLAZA

MONDAY OCTOBER 26	TUESDAY OCTOBER 27	WEDNESDAY OCTOBER 28
9:00 a.m. to 6:30 p.m.	9:00 a.m. to 5:00 p.m.	8:00 a.m. to 4:00 p.m.

Exhibit space MAY still be available at this time, although the remaining spaces were limited as we went to press. Please contact Kathy Ohmie, Exhibits Coordinator.

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SPECIAL EVENTS

Welcoming Party

Sunday, Oct. 25, 6:00 p.m.–9:00 p.m.
Symphony Plaza (between Civic Plaza and Hyatt Regency)

*In the unlikely event of rain:
South Ballroom, Civic Plaza*

This is the time and place to relax with your friends and colleagues. The welcoming reception will be outdoors under the Arizona sky, with light music and cash bars. For your convenience, registration will be open until 7:00 p.m. in Lobby 2, Civic Plaza. Shuttle buses will be servicing the GSA Hotels from the Civic Plaza until 9:30 p.m.

GSA Presidential Address/Awards/Honorary Fellows

Monday, Oct. 26, 5:00 p.m.–6:00 p.m.
Civic Plaza

Everyone is welcome to attend President Jack Oliver's address, which will be followed immediately by the GSA awards ceremonies for the Penrose and Day Medalists. President Oliver's address: Discovery and Innovation in Geoscience.

After his address, President Oliver will present GSA's prestigious awards to 1987 Day Medalist Don L. Anderson and the 1987 Penrose Medalist Marland P. Billings. Recognition will also be given to newly elected Honorary Fellows Maria Bianca Cita, Mervyn S. Paterson, and Leo Y. Picard.

All-GSA Awards Reception

Monday, Oct. 26, 6:00 p.m.–7:00 p.m.
Civic Plaza

GSA will host this special reception honoring GSA's Penrose and Day Medalists. Everyone is invited to meet the medalists and to celebrate in their

honor. This one-hour reception will be held in the South Ballroom of the Civic Plaza. Every registrant and guest is welcome to attend.

Alumni Night

Monday, Oct. 26, 7:00 p.m.–9:30 p.m.
Civic Plaza

Approximately 60 universities will be represented in the Group Alumni Reception held in the South Ballroom of the Civic Plaza (same location as Awards Reception). In addition, several other universities will hold individual, private receptions at both the Hyatt Regency and Adams Hilton hotels. If you would like to participate in the group reception, contact Jean Kinney, Events Coordinator.

Awards Luncheons and Other Ticketed Meal Functions

Associated Societies and GSA Divisions hold annual catered events that honor medalists and address important issues. The events are open to anyone wishing to attend. See the registration form for dates and ticket orders. Locations and times will be listed in the Annual Meeting Program received on-site.

SPORTS EVENTS

Invitational Tennis

Sunday, Oct. 25, 8:30 a.m.–1:00 p.m.
Phoenix Tennis Courts (top of Hyatt Regency Parking Garage)

Join in the fun of a light-hearted, round-robin doubles tournament with good players. Bring your racket and tennis shoes, and meet at the City Center Tennis Courts, 121 East Adams, at

8:30 a.m. to draw your partners. No singles will be played. Entry will be limited to the first 40 registrants. Awards will be given to the top three players. Showers and locker facilities will be available. The fee includes beverage, balls, and court fees. This event is by preregistration only.

If you have any questions on Sunday morning, call or visit the GSA Annual Meeting office either at the Hyatt Regency or the Civic Plaza anytime after 7:00 a.m.

Fee per person: \$10.

Phoenix Fun Run 5K/10K Race

Wednesday, Oct. 28, 7:15 a.m.–8:45 a.m.
El Dorado Park, Scottsdale

Runners, joggers, and walkers: take an early morning, mid-week break and participate in the fourth annual 5K/10K races. The late October weather should be excellent. Runners will be picked up by special buses in front of each GSA hotel beginning at 6:30 a.m. The race will be professionally directed and timed. Water will be provided on the course, refreshments and prizes at the finish line. Return buses will take you back to the Civic Plaza only.

For your competitive pleasure, members of the Structural Geology and Tectonics Division hereby challenge other GSA Divisions to team(s) competition. Each division is responsible for organizing its own team(s). For information: Edna Collis, GSA headquarters.

Finnigan MAT will again provide race shirts. Select shirt size on the registration form. Additional shirts may be purchased on-site. Shirts and race maps may be picked up in the registration area beginning on Sunday, Oct. 25.

Fee (includes shirt): \$10.

Ice Hockey Evening

On Tuesday, Oct. 27, there will be a GSA pick-up, no slap-shot, no checking ice hockey game. Game time is 10:45 p.m.–12:30 a.m. at the Oceanside Ice Rink in Tempe. You are required to bring your own helmet. Limited rental equipment (skates, sticks) will be available at the facility. There will be a nominal fee for participation. You need not be of NHL calibre—fun and friends are the emphasis in this game. For further information and sign-up, contact Randy Cygan, Dept. Geology, 245 Natural History Building, Univ. Illinois, Urbana, IL 61801; (217) 244-6280.

Wanted: Dead or Alive...

GEOLOGISTS FOR A

“COOKOUT AT GSA'S OK CORRAL”

... under Arizona stars ...

WEDNESDAY, OCTOBER 28, 6:30-9:30 P.M.

... and the Old West lives!

Dust off your dancin' boots, and check your six-gun at the door
(city slickers also welcome)

ROPE A FRIEND ... TWO-STEP IN AND SWING ON BY

Two superb bands and Miss Kitty's Saloon Dancers
plus

HEAPIN' BAR-B-QUE BUFFET FOR ALL WHO RIDE INTO TOWN

Cost: \$16, U.S. dollars (solid gold nuggets and deeds
to producing mines also accepted)

PHOENIX

PROFESSIONAL HORIZONS

GSA SHORT COURSES

Interested in increasing your professional abilities? GSA courses are open to members and nonmembers. Registration for the meeting is not required.

You may register for **GSA courses** on the Annual Meeting Preregistration Form.

PREREGISTRATION DEADLINE:
SEPTEMBER 25, 1987

**Preregistration is recommended—
on-site is \$25 additional**

**FOR MORE INFORMATION
ON GSA'S COURSES:
EDNA COLLIS,
COURSE REGISTRAR**

Cancellation

Requests for refunds must be received by GSA no later than October 2, 1987. Registration substitutions may be made at any time.

Planetary Geology and Remote Sensing: Short Courses and Field Trips

**Friday, Oct. 23; Saturday, Oct. 24; and
Sunday, Oct. 25**

Co-sponsor: Planetary Geology Division

You may register for one, two, or all three days of this combination of short courses and field trips.

Day One Remote Sensing
**Friday, Oct. 23, 7:30 a.m.–7:30 p.m.,
Arizona State Univ., Tempe**

Designed as an up date for those with a remote sensing background, the course will emphasize imaging spectrometry as applied to mineral exploration. Course will include an afternoon field trip to the Silver Bell Mining District.

Faculty: *Raymond Arvidson*, Earth Science/Geology Dept., Washington Univ.; Ph.D., Brown Univ. Arvidson has participated on various NASA science advisory and mission planning panels and currently heads the Committee on Data Management of the National Academy of Sciences. *Michael Abrams*, Jet Propulsion Laboratory, Pasadena. Abrams, a remote sensing geologist, has wide experience in the applications of remote sensing technologies to geological problems. He was a

primary contributor to the NASA/Geostat test case project final report. *Alex Goetz*, Dept. of Geological Sciences, Univ. Colorado; Ph.D., Caltech. A Fellow of CIRES, Goetz is also the Director of the Center for the Study of Earth From Space. *Edward Guinness*, Dept. of Earth & Planetary Sciences, Washington Univ.; Ph.D., Washington Univ. Guinness has more than 12 years experience in the field of remote sensing. He specializes in the construction of geologic maps from Earth and Mars and the study of eolian transport of sediments on Mars.

Cost includes field trip transportation and a course manual that contains numerous black and white and color high-quality photographic prints acquired from aircraft and satellite sensors. Limit: 30. Cost: \$85.

Day Two Introduction to Planetary Geology
**Saturday, Oct. 24, 8:00 a.m.–4:00 p.m.,
Arizona State Univ., Tempe**

Aimed at those with a basic background in geoscience or for those with an interest in planetary geoscience, this is an introductory course to the fundamentals of planetary geology and the results of solar system exploration.

Faculty: *Ronald Greeley*, Dept. Geology, Arizona State Univ.; Ph.D., Univ. Missouri. Greeley is active in planetary geology research, including analysis of Mars data and the Galileo mission to Jupiter. He received NASA's Public Service Award for selection of Mars landing sites during the Viking mission. Greeley leads a consortium of engineers and scientists simulating planetary processes in the laboratory using wind tunnels and NASA's hypervelocity ballistic impact range. *Donald Gault*, NASA-Ames Research Center, retired. Former Branch Chief, Planetology, NASA, Gault is well known in the field of planetology, and received the NASA Medal for Exceptional Scientific Achievement in 1967. This year Gault is the recipient of the G. K. Gilbert Award presented by the GSA Planetary Geology Division. *James W. Head*, Dept. Geological Sciences, Brown Univ.; Ph.D., Brown Univ. Head won NASA's Medal for Exceptional Scientific Achievement in 1971 and the GSA Special Commendation in 1973, both for the geologic training of the Apollo astronauts. *Paul Spudis*, Geologist, Astrogeology Branch, U.S. Geological Survey, Flagstaff, Arizona.

Cost includes course manual. Limit: 30. Cost: \$45.

Day Three Crater Field Trip (The "Holey" Tour) to Flagstaff, Arizona
**Saturday, Oct. 24, 4:00 p.m. to Sunday,
Oct. 25, 7:00 p.m., Howard Johnson's
Hotel, Tempe**

Designed for those with a background in geoscience, but appropriate for anyone with an interest in planetary geology, this field trip to Flagstaff, Arizona, will examine craters of six different origins. The field trip begins on Saturday, Oct. 24; buses depart at 4:00 p.m. from Howard Johnson's Hotel in Tempe, Arizona. A picnic supper will be served en route during a stop-over at Sunset Point, Black Mesa. The trip arrives at the Americana Motel in Flagstaff at 10 p.m. On Sunday, Oct. 25, beginning at 7:30 a.m., the trip continues to Meteor Crater (impact crater), Rattlesnake Butte (maar crater), Sunset Crater (volcanic cinder cone), Mormon Lake (volcano-tectonic depression), Stoneman Lake (basalt pit crater), and Montezuma's Well (karst sink hole). Arrival back at the Civic Plaza is scheduled for 7:00 p.m., in time for the GSA Welcoming Party.

Cost includes transportation, a picnic supper, and motel accommodations on Oct. 24, and a box lunch on Oct. 25. Limit: 30. Cost: \$70.

Contaminant Hydrogeology

**Saturday, Oct. 24, and Sunday,
Oct. 25, 8:30 a.m.–4:30 p.m. Civic Plaza**
Co-sponsor: Hydrogeology Division

This course will provide an introduction to the theory and practice of contaminant hydrogeology. It will be of interest to working professionals and graduate students who want to develop a basic understanding of this field. The course will include an examination of

- fundamental concepts of physical mass transport, advection, dispersion, and diffusion;
- the most important geochemical processes that influence the spread of contaminants, including surface reactions, complexation, and mineral precipitation; and
- the mathematical formulation and solution of mass transport equations with an emphasis on approaches and concepts rather than detailed mathematics.

Examination of these topics will be linked to practice through the use of case histories and problems, group discussions, and demonstrations.

Faculty: *Frank W. Schwartz*, Dept. Geology, Univ. Alberta; Ph.D., Univ.



Medera Canyon Fan, Santa Rita Mountains—Peter Kresan

Illinois. Internationally known for his work in groundwater modeling, field and theoretical aspects of contaminant hydrogeology, watershed hydrology, and groundwater geochemistry, Schwartz is the author of more than 40 scientific publications. *J. Leslie Smith*, Dept. Geology, Univ. British Columbia; Ph.D., Univ. British Columbia. As a consultant and researcher, Smith has worked on problems of the emplacement of high-level radioactive wastes in the subsurface, modeling of flow and transport in fractured media, and groundwater resource evaluation. Smith is internationally known for his work on stochastic modeling of groundwater flow. Schwartz and Smith were co-recipients of the O. E. Meinzer Award for 1984.

Cost includes course manual. Limit: 100. Cost: \$135.

Quantitative Sedimentary Basin Modeling

Saturday, Oct. 24, 8:00 a.m.–5 p.m., Civic Plaza

Co-sponsor: Sedimentary Geology Division

Aimed at those with a general sedimentary geology background but no previous knowledge of basin modeling, this course is designed to teach participants the theory and application of

analyzing basin subsidence histories and mechanisms. Covered in the course will be

- the causes of basin subsidence in various tectonic settings,
- generating tectonic subsidence histories—geohistory analysis and backstripping,
- lithospheric flexure and basin formation, and
- thermal histories of sedimentary basins.

The course will emphasize the application of these quantitative methods to specific basin examples with the goal that participants learn the tools necessary to analyze subsidence histories of basins on their own. Participants may also wish to enroll in the GSA short course "Current Aspects of Basin Analysis and Sedimentary Geology" on Sunday, Oct. 25, as a follow-up.

Faculty: *Charles L. Angevine*, Dept. Geology & Geophysics, Univ. Wyoming; Ph.D., Cornell Univ. Angevine has published more than 15 articles on various aspects of basin mechanics and quantitative modeling of geologic processes. *Paul L. Heller*, Dept. Geology & Geophysics, Univ. Wyoming; Ph.D., Univ. Arizona. Heller has published more than 20 articles on various aspects of sedimentation and basin analysis, including subsidence studies of North American basins.

Cost includes course manual and lunch. Limit: 50. Cost: \$90.

Site Characterization for High-Level Nuclear Waste Disposal

Saturday, Oct. 24, and Sunday, Oct. 25, 8:00 a.m.–5:00 p.m., Civic Plaza

This course will be of interest to newcomers who are entering the serious scientific study of the geologic aspects of the disposal of high-level nuclear waste, as well as those who already have a contact with the field and wish to broaden their perspective on the subject. Faculty, in the field of environmental aspects of geology, will find this course of use in expanding their understanding of the geologic issues involved in characterizing a potential site. Non-technical persons will gain a better grasp of the general geologic issues of long-term disposal of high-level radioactive waste. The course will consist of lectures, slides, videos, and overheads of the repository areas and research programs. In addition, each guest lecturer will discuss his or her own area of expertise.

Faculty: *Richard G. Craig*, Dept. Geology, Kent State Univ.; Ph.D., Pennsylvania State Univ. Craig has worked with nuclear waste disposal problems since 1980. His research emphasizes the effect of climatic change upon long-term waste stability. He prepared the Site Characterization Plan for the Hanford Repository on this topic. His other work

PHOENIX



Near Lake Mead, northwestern Arizona—Faith Rogers

includes effects of catastrophic floods upon defense waste storage sites and preparation of a geological simulation model for the Nevada Test Site. *Carol Hanlon*, Office of Geologic Repositories, U.S. Dept. Energy, Washington, D.C. Hanlon has worked for the DOE since 1972. She has been involved with site selection of repositories for permanent disposal of commercial high-level radioactive wastes, and is currently Program Manager for site characterization in the Technology Branch of DOE. Travel arrangements for Hanlon provided by DOE.

Cost includes course manual, lunch both days, and dinner Saturday evening. Limit: 50. Cost: \$145.

Current Aspects of Basin Analysis and Sedimentary Geology

Sunday, Oct. 25, 8:00 a.m.–5:00 p.m., Civic Plaza

Co-sponsor: *Sedimentary Geology Division*

This course will provide an introductory overview of the interacting fields of basin analysis and sedimentary geology. The content is intended for earth scientists in advanced academic and governmental programs as well as those in oil, mining, or hydrologic/engineering companies. The goal is to stress interdisciplinary aspects of basin analysis, focusing particularly on how geodynamic processes of basin formation influence both the nature of sediment fills and the maturation of the sediment through diagenesis, fluid circulation, and thermal history. Tectonic subsidence analysis (including back-

stripping principles) of sedimentary basins is stressed. Additional topics included are basin classification, cratonic sequences, sea-level history and seismic stratigraphy, paleogeography, sedimentary facies, black shales, pelagic cycles, fluid migration through sedimentary basins, and clastic diagenesis. These topics are used to illustrate the role of interpreting sediments as a barometer of basin tectonic processes, and extrinsic basin processes during basin evolution. The course incorporates basin analyses from the Illinois Basin and the North Sea to illustrate the interdisciplinary approaches discussed in lecture. Participants may also wish to enroll in the GSA short course "Quantitative Sedimentary Basin Modeling" on Saturday, Oct. 24.

Faculty: *George deV. Klein*, Dept. Geology, Univ. Illinois at Champaign-Urbana; Ph.D., Yale Univ. Well known in the fields of basin analysis and clastic sedimentary geology, Klein has more than 25 years experience and is the author of more than 100 publications.

Cost includes course manual and lunch. Limit: 100. Cost: \$90.

Spreadsheets on Microcomputers: Versatile Geological Tools

Sunday, Oct. 25, 8:00 a.m.–5:00 p.m., Civic Plaza

Co-Sponsor: *Computer Oriented Geological Society*

Directed toward those with little or no experience with microcomputer spreadsheet programs, including computer novices, this course will enable geolo-

gists to manipulate many different types of geological data. Course participants will receive a complete commercial spreadsheet program on-disk with printed manual, on-disk geological examples, and a course notebook containing discussion of geological uses of spreadsheets. Registrants will receive hands-on instruction in

- entering text and numerical data into a spreadsheet program,
- defining and using formulas, both simple and complex, and using built-in arithmetic, statistical, and trigonometric functions,
- evaluating the advantages and disadvantages of using the spreadsheet as a database manager,
- using the built-in graphics of the spreadsheet to make x-y plots and histograms, and
- using the built-in programming language of the spreadsheet (also known as macros).

Faculty: *Carol A. Petersen*, Executive Director and co-founder of the Computer Oriented Geological Society (COGS); M.S. in geology, Univ. Utah. Petersen has worked for a state geological survey, a geological consulting firm, and a major oil company. *R. Mark Maslyn*, co-founder of Computer Oriented Geological Society (COGS); M.S. in geology, Colorado School of Mines. Maslyn has 10 years of geological experience in the fields of uranium and petroleum exploration and 15 years of programming experience.

Cost includes spreadsheet program, course manual, and diskette of exercises. Limit: 30. Cost: \$175.

Writing History of Geology: A Workshop

Sunday, Oct. 25, 8:00 a.m.–5:00 p.m., Civic Plaza

This course is designed for two groups: beginners in the history of geology, and geologists with some experience in the topic. The course will concentrate on how to research and write two common types of history of geology: (1) biographies (including memorials), and (2) review essays (summaries of a major tradition or line of advance leading to present thinking). The objective of the course is to improve the skills of those who already have some experience in the history of geology and to share those experiences with those who are just starting in the field. This course will be significantly helpful to researchers working on historical projects in connection with the GSA Centennial Celebration in 1988.

Faculty: *Mott Greene*, John B. Magee Distinguished Professor in the Honors

Program, Univ. Puget Sound; Ph.D., Univ. Washington. Greene received the MacArthur Fellowship after publishing a major book on 19th century theories on mountain building. He is currently at work on a book on Alfred Wegener. *Michele L. Aldrich*, American Association for the Advancement of Science, Washington, D.C.; Ph.D., Univ. Texas, Austin. Aldrich has written numerous articles and books on 19th century American geology. *Clifford M. Nelson, Jr.*, U.S. Geological Survey, Reston; Ph.D., Univ. California, Berkeley. Nelson has presented numerous papers on the history of paleontology and stratigraphy. He is currently at work on a biography of F. B. Meek.

Cost includes course manual. Limit: 35. Cost: \$65.

Paleoseismology and Active Tectonics

Thursday, Oct. 29, 7:00 p.m.–9:00 p.m.;
Friday, Oct. 30, 8:00 a.m.–5:00 p.m.; and
Saturday, Oct. 31, 8:00 a.m.–3:00 p.m.,
Hyatt Regency

Co-sponsor: *Structural Geology and Tectonics Division*

Directed toward earth-science professionals—college-level instructors and practicing geologists—this course will review the types of near-surface displacements by normal, reverse, and strike-slip faults and by folds, the geology of the earthquake source region, and how a geologist should view seismological data. Also covered will be slip-rate and recurrence-interval determination, the identification of paleo-earthquakes, and Quaternary dating techniques, including scarp degradation. The course will conclude with a discussion of how earthquake-related data should be treated and how geologists should interact with both engineers and the general public.

Faculty: *Robert S. Yeats*, Dept. Geology, Oregon State Univ.; Ph.D., Univ. Washington. Yeats has studied active reverse faults and folds in southern California, New Zealand, and the Himalayas. *Clarence R. Allen*, Div. Geological & Planetary Science, California Inst. Technology; Ph.D., California Inst. Technology. Internationally well known, Allen has been carrying out field studies of major active fault systems of the world and their relation to local seismicity patterns and to problems of seismic hazard. *Kerry E. Sieh*, Div. Geological & Planetary Science, California Inst. Technology; Ph.D., Stanford. Sieh is currently

studying the geologically recent behavior of the San Andreas fault system in California and the neotectonics of southern China. *Richard H. Sibson*, Dept. Geological Sciences, Univ. California, Santa Barbara; Ph.D., Univ. London. Sibson's research concerns the deep structure of fault zones, particularly as it pertains to the origin of shallow crustal earthquakes. He is the author of *Earthquakes and Rock Deformation in Crustal Fault Zones* (Annual Reviews of Earth and Planetary Sciences, 1986, vol. 14). *David B. Nash*, Dept. Geology, Univ. Cincinnati; Ph.D., Univ. Michigan. Nash has more than 10 years experience in the field of scarp dating and hillslope modeling.

Cost includes course manual, set of forty 35-mm color slides, and dinner Friday evening. Limit: 75. Cost: \$150.

OTHER SHORT COURSES/WORKSHOPS

Fossil Prokaryotes and Protists

Sunday, Oct. 25, 8:00 a.m.–5:00 p.m.
Sponsored by the Paleontological Society and the Cushman Foundation

A short course dealing with the chief prokaryotes (bacteria and similar organisms) and protists (single cells) that have a good fossil record. Eleven experts will discuss the morphology, systematics, evolution, paleobiology and stratigraphic and paleoecological significance of stromatolites, dinoflagellates, acritarchs, calcareous nannofossils, diatoms, silicoflagellates, foraminifera, and radiolaria. Each presentation is designed to update the field and to provide an overview suitable for nonspecialists and teachers in paleontology.

There is no preregistration or cost. Short course notes will be available for inexpensive purchase. For information: *Jere H. Lipps*, Department of Geology, Univ. California, Davis, CA 95616, (916) 752-2234.

GeoRef Workshop: Learn to Search the Geological Literature by Computer

Tuesday, Oct. 27, 2:00 p.m.–4:00 p.m.
Sponsored by Geoscience Information Society and American Geological Institute

Learn how to search AGI's GeoRef online database of over a million geological references from 1785 to the present. *Carol Messick*, Senior Reference Librarian at the USGS Library,

will teach beginning and prospective searchers about (1) the GeoRef database and its subject coverage, (2) Boolean logic, (3) online search commands, and (4) techniques in devising effective search strategies. Sample searches will be displayed and the GeoRef Thesaurus and other online search aids will be described. General discussion and questions will follow.

There is no preregistration or cost. For information: *Kay Yost*, AGI, 4220 King St., Alexandria, VA 22302, (800) 336-4764 outside Virginia or (703) 379-2480; *Barbara Chappell*, Workshop Coordinator, USGS Library, Reston, VA 22092, (703) 648-6088.

GeoRef Advanced Workshop

Wednesday, Oct. 28, 8:00 a.m.–12:00 noon. Sponsored by *Geoscience Information Society and American Geological Institute*

The workshop is designed to address the skills and knowledge needed to search the GeoRef database effectively and efficiently beyond the beginner level. A panel of expert searchers will share experiences on special techniques and problems. Questions from attendees will be discussed by the panel and others attending who may have appropriate expertise.

There is no preregistration or cost. For information: *Joanne Lerud*, Library, Montana College of Mineral Science and Technology, Butte, MT 59701; (406) 496-4283.

GIS Database Forum

Tuesday, Oct. 27, 4:00 p.m.–6:00 p.m.
Sponsored by Geoscience Information Society

Representatives of major online databases will discuss how their databases can be used to retrieve the worldwide earth science literature. These databases include journal articles, books, conference papers, dissertations, maps, government documents, and patents. Most disciplines in the geosciences will be covered (geology, hydrology, geophysics, petrology, paleontology, mineralogy, geochemistry, etc.) Learn which databases will best satisfy your information needs.

There is no preregistration or cost. For information: *Barbara Pearson*, Library Services Coordinator, Exxon Production Research Co., P.O. Box 2189, Houston, TX 77252-2189; (713) 965-4541.

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Thermodynamic Modeling of Geological Materials: Minerals, Fluids, Melts

Thursday–Sunday, Oct. 22–25.

Sponsored by Mineralogical Society of America

Thermodynamic analysis of geological materials and processes has become an indispensable tool for petrologists and geochemists. During this short course, which is oriented toward earth materials, 15 active workers will demonstrate how you can treat your favored substances, ranging from minerals to electrolyte solutions, supercritical fluids, volcanic gases, ore and metamorphic fluids, natural waters, and silicate melts. Conveners: I.S.E. Carmichael, University of California, Berkeley, and H. P. Eugster, Johns Hopkins University.

Cost: Professional—\$365–\$450; Student—\$230–\$270 (includes course, lodging, and all meals). For information: MSA Business Office, 1625 I Street, N.W., Suite 414, Washington, DC 20006; (202) 775-4344

FORUMS/PANELS

The Urbanized Desert: A Challenge for the Geosciences

Tuesday, Oct. 27, 5:30 p.m.–7:30 p.m., Hyatt Regency. Sponsored by the GSA Committee on Geology and Public Policy

The goal of this forum is to alert and to inform geologists and other interested citizens of the role of earth science information in major public policy issues. Using Arizona as an example, a variety of geological and environmental issues and phenomena related to human settlement of arid lands and management of these lands will be addressed. The planned topics include fluvial water supply and water quality, ground water management, desertification, drainage problems, earth fissures, and slope stabilization. Discussion will begin with presentations by a panel of representatives from various segments of the public and private sectors, government and science alike, who are involved in different aspects of the study of the phenomena or implementation of policies affecting these resources or hazards. After the short formal presentations, the moderator will lead the audience and panelists in an informal discussion.

There is no preregistration or cost. Open to meeting attendees and the general public.

GSA Employment Service Forum: Future Employment Opportunities in the Geological Sciences

Monday, Oct. 26, 1:00 p.m.–3:00 p.m., Hyatt Regency. Sponsored by the Geological Society of America

Are you interested in salary scales, tips for successful interviews, and an overview of employment opportunities? What are the current trends in academia, government, industry, consulting, and the impact of federal legislation on job demand? Attend the GSA Employment Service Forum to hear from seven experts. Each panel member will speak briefly on the outlook in his or her special area and answer questions from the audience. Speakers: Chairman Dick Paull, University of Wisconsin; Sam Adams, Colorado School of Mines; J. D. Edwards, Pecten International Company; Penny Hanshaw, USGS; Charlie Mankin, Oklahoma Geological Survey; Dave Stephenson, Dames & Moore; and Steve Stow, Oak Ridge National Laboratory. For further information: Clara Hodgson, GSA Membership Coordinator.

Tectonic versus Eustatic Effects on Cretaceous Sedimentation of North America

Wednesday, Oct. 28, 7:30 p.m.–10:00 p.m., Hyatt Regency. Sponsored by the Sedimentary Geology Division

This panel discussion is a continuation of the symposium given during the afternoon session at the Civic Plaza. Authors will be present and invite you to participate in an open discussion.

Free beer and soft drinks will be provided.

There is no preregistration or cost.

PUBLIC DOMAIN SOFTWARE DEMONSTRATION

Tuesday, Oct. 27, 8:00 a.m.–12:00 noon, Civic Plaza

The Computer Oriented Geological Society (COGS) will sponsor a demonstration of public domain software of interest to geologists. Software will be IBM and Macintosh compatible.

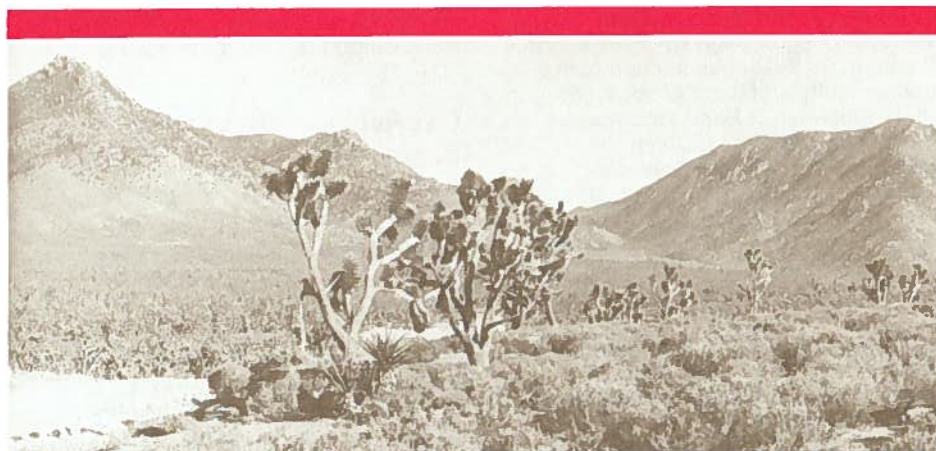
OPENSOURCE COMPUTER TIME

Wednesday, Oct. 28, 8:00 a.m.–12:00 noon, Civic Plaza

Professionals interested in sharing software are invited to bring demonstration disks. The software must be IBM compatible. The system will have 640K RAM, two floppy drives, and a monochrome monitor. Hercules graphics package will be used, but no printer or plotter will be available. This is not open to commercial vendors. If interested, contact Carol Petersen, Executive Director, COGS, 9056 East Floyd Pl., Denver, CO 80231; (303) 751-8553.

SCIENCE THEATER

Science Theater 1987 will feature both new and classic films and videos in the geosciences and related fields. This is a great opportunity to preview audio-visual material for possible use in the classroom. Special features will include presentations on the eruption of Parícutín Volcano in Michoacan, Mexico; the Byrd Expedition sledge journey across the Ross Ice Sheet, Antarctica; and the 1908 Tunguska Cometary Impact in Siberia.



Colorado Plateau, western Arizona—Faith Rogers

FUTURE ANNUAL MEETING DATES

1988	Denver Centennial Celebration	October 31–November 3
1989	St. Louis	November 6–9
1990	Dallas	October 29–November 1
1991	San Diego	October 21–24
1992	Cincinnati	October 26–29
1993	Boston	October 25–28

GUEST PROGRAM

The Phoenix Guest Committee welcomes you to Arizona and to Phoenix. To make your visit interesting and enjoyable, the committee presents the program described below.

You must be registered as a guest to participate in the program and to have access to the Hospitality Room. Please note, however, that guest registration does not include admission to the technical program.

The Hospitality Room is in the Curtis Room of the Hyatt Regency. Hours are 12:00 noon–4:00 p.m. on Sunday and 8:30 a.m.–4:00 p.m. Monday through Thursday. Please wear your badge. Light refreshments and a place to relax will be provided. Hostesses will be available to help in any way they can.

NONTECHNICAL PROGRAM

Collecting Native American Art

Monday, Oct. 26, 10:00 a.m.–11:00 a.m.
Hyatt Regency

An illustrated talk on buying and collecting Native American art. Presented by Ann Marshall, Curator of Collections, Heard Museum.

There is no preregistration or cost.

Saguaros and Other Cacti

Tuesday, Oct. 27, 10:00 a.m.–11:00 a.m.
Hyatt Regency

An illustrated guide to these unusual plants and how to grow them. Presented by Steve Priebe, Chief Horticulturist, Desert Botanical Gardens.

There is no preregistration or cost.

TOURS

All tours will depart from and return to the bus stop area across the street from the main entrance to the Hyatt Regency. These tours have been organized to show the best of Arizona and the Phoenix area. There is limited space on the tours, and they will be filled on a first-come, first-served basis. Preregister to insure a place on the tours of your choice. Note the registration and cancellation deadlines.

Trail Ride to the Superstition Mountains

Monday, Oct. 26, 9:00 a.m.–4:00 p.m.

Travel to the beautiful Superstition Mountains for a four-hour trail ride (on horseback) to Hieroglyphic Canyon to see the Indian petroglyphs. En route stop at an old gold mine for lunch prepared by a cowboy chef. This is an easy ride, and gentle horses are available for those with little riding experience.

Cost including transportation, lunch, and horse rental: \$45.

Sedona and Oak Creek Canyon

Tuesday, Oct. 27, 8:30 a.m.–5:00 p.m.

The trip from Phoenix to Sedona gives one a good cross section of Arizona, from the desert to the plateau. The first stop is at Montezuma's Castle for a tour of one of the best preserved prehistoric cliff dwellings in the Southwest. The tour

continues to Sedona and Red Rock Country, featuring colorful rock formations. Lunch will be in Sedona, a community well known for Southwestern art galleries and shopping. You will have several hours to visit some of the many shops and boutiques.

Cost including transportation and lunch: \$45.

Desert Botanical Gardens and Scottsdale Tour

Wednesday, Oct. 28, 9:30 a.m.–3:30 p.m.

Visit the Desert Botanical Gardens in Phoenix to see one of the best collections of desert flora in the world (over 1,000 different cacti and unusual desert plants). This will be followed by lunch in Scottsdale and a visit to the Borgata, one of Scottsdale's most interesting and exclusive shopping areas.

Cost including transportation and lunch: \$30.

Heard Museum

Thursday, Oct. 29, 9:45 a.m.–11:30 a.m.

A morning tour of the Heard Museum to see its nationally recognized collection of Native American art and artifacts.

Cost including transportation and admission: \$4.

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TRANSPORTATION

AIRLINE

GSA has designated The Cain Travel Group of Boulder, Colorado, as the official airline reservation agent for the Phoenix meeting. United and Delta/Western Airlines are the official co-airlines. Cain Travel has served the GSA Annual Meeting for the past six years. The agency service is free, and it can save you both time and money.

Reduced rates will be up to 40% off coach, depending on the dates of travel. United and Delta/Western have also offered an additional 5% off any available fare, but restrictions will apply. The reduced rates will be available only to GSA travelers and their companions.

All participants booking through Cain Travel will automatically become eligible for inclusion in a drawing for two round-trip tickets to anywhere in the continental United States prior to August 31, 1988, subject to certain restrictions. In addition, clients will be eligible for a second drawing for \$500 in travel credits through Cain Travel.

Reservation Procedures

1. Book early. Understand restrictions, if applicable.
2. Call Cain Travel for reservations: (800) 346-4747 (toll free outside Colorado) or (303) 443-2246, Monday-Friday, 7:30 a.m.-5:30 p.m. Mountain Time. Identify yourself as a GSA traveler.
3. Payment options: Check payable to Cain Travel group, major credit card, or invoice to company. The final payment must reach Cain Travel no later than seven days prior to departure to allow for mailing time.
4. Tickets will be mailed via certified mail upon receipt of payment.

5. Airfares are subject to increase or decrease at any time. After the ticket is issued, you are protected against a fare increase. If airfare should decrease, contact Cain Travel for an adjustment.
6. There will be an on-site customer service desk at the Civic Plaza staffed by Cain Travel employees to assist with itinerary changes or problems.

GROUND

The Phoenix Sky Harbor International Airport is 7 miles from the Civic Plaza and downtown area—an approximately 15-minute ride. The Financial Center is 12 miles from the airport—an approximately 25-minute ride. Means of transportation are as follows:

Super Shuttle

Airport to hotel. Operates 24 hours a day, 7 days a week. Departs every 15 minutes from outside the baggage area. The blue vans are designated with red, diamond-shaped signs. Identify yourself as a GSA delegate and get a discount. Guaranteed cost: \$5.

Hotel to Airport. Call 24 hours in advance for reservations, 244-9000. Hotel pick-ups are NOT automatic. Guaranteed cost: \$5.

Taxi Cabs

Airport service. Three cab companies service the airport. They offer either a flat rate of \$5 to \$10 (based on destination), or metered charges ranging from \$1.80 to \$2.10 for the first mile and \$0.80 to \$1.10 for each additional mile. Charges vary depending on cab company.

Downtown service. Several cab companies service the downtown and all other areas by meter. See above charges.

GSA Shuttle

GSA will operate a free shuttle service throughout the meeting. GSA hotel guests will be transported to and from the Civic Plaza during event hours.

NOTE: Hyatt Regency, Adams Hilton, San Carlos, and Park Inn Heritage are within walking distance of the Civic Plaza; therefore, no shuttle will be available from these hotels.

On Sunday, service will run from 9:30 a.m. to 9:30 p.m. Monday through Thursday, service will begin at 6:30 a.m. Depending on the time of day, buses will run in 15- or 30-minute intervals. Length of service will also vary, depending on daily meeting activities.

Look for shuttle schedules posted in all GSA hotel lobbies and in registration packets.

Each bus will be identified by a "GSA Shuttle Bus" sign in the front window.

Phoenix Transit

The city transit system services downtown and major sightseeing locations. Phoenix Transit runs from 5:00 a.m. to 8:00 p.m. Monday through Saturday (not on Sunday). Stops every 10 to 20 minutes. Route maps will be provided in registration packets. Cost: \$0.75 per ride (\$0.35 for senior citizens).

Please note: Unless prices are stated as "guaranteed," they are subject to change. Information is current as of press time.

Car Rental

Alamo is the official car rental agency for the meeting. Identify yourself as a GSA delegate and get guaranteed, discounted, daily/weekly rates as follows: Economy—\$21/\$89; compact—\$23/\$109; mid-size—\$25/\$129; full-size (two-door)—\$27/\$149; luxury—\$31/\$189. Add \$2 per day for 4-door models. Unlimited mileage. Vehicles MUST be returned to the same rental location. Call Alamo for advance reservations, (800) 732-3232; in Phoenix, call 244-0753. Give the GSA Group I.D. No. 21123 and the GSA Rate Plan Code No. G9.



Paramore Crater—Peter Kresan

EMPLOYMENT INTERVIEWS

Do you need qualified earth scientists to fill staff needs? Are you looking for employment in the earth-sciences fields? If so, you are invited to participate in the GSA Employment Interview Service, which will be conducted in the Civic Plaza.

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. The minimum fee for a printout of two specialty listings is \$125. A specialty code narrows the field of your search.

Interview booths may be rented at the meeting for a nominal fee in half-day increments from Monday through Wednesday, Oct. 26-28. GSA staff will handle all interview scheduling with Employment Service applicants.

Job seekers have found the Employment Interview Service critical to

their successful search for positions. The one-year registration fee is \$25 for GSA Members and Student Associates in good standing; \$50 for nonmembers. This applicant fee includes the interview service at the annual meeting.

Note to Applicants: If we receive your materials by **August 14**, your record will be included in the information that employers receive prior to the meeting. Submit your forms early to receive maximum exposure! Don't forget to indicate on your application form that you would like to interview in October.

For more information: Employment Service forms are in the March and July 1987 issues of *GSA News & Information* or may be obtained by contacting Clara Hodgson, Employment Service Coordinator.



Giant Earth Fissure—Peter Kresan

HOUSING

GSA has blocked rooms at ten hotels that are offering special convention rates to GSA meeting attendees. GSA endorses these hotels for quality, cleanliness, and service.

TO MAKE YOUR HOTEL RESERVATION

BY FRIDAY, OCTOBER 2, fill out the attached Official Housing Request Form and mail it immediately to the address shown on the form. No reservations will be accepted if not submitted on this form.

AFTER FRIDAY, OCTOBER 2, you are responsible for making your own reservation directly with the hotel. Note that (1) many hotels will be filled at this time, and (2) hotels are not required to offer the special GSA rate as shown.

ASSIGNMENT

Hotel rooms will be assigned on a first-come, first-served basis as they are received by the Housing Bureau. Once your request is received, the bureau will

send an acknowledgement to both you and to the hotel in which you have been assigned.

You will then receive a *confirmation* from the hotel. This is a notice that the hotel received the information from the bureau and that the reservation has been input into their system. If you did not include a credit card number on the housing form, you must now send a first night's room deposit directly to the hotel.

ROOM DEPOSITS/GUARANTEES

All GSA hotels require a first night's room deposit. Deposits can be made by (1) including a credit card number with your housing form, or (2) sending payment directly to the hotel once you have received your confirmation. **NOTE:** *The housing bureau will ONLY accept credit card numbers. If making payment directly to the hotel, be sure to give them your confirmed reservation number.*

Once the hotel receives your deposit, it automatically *guarantees* your reservation.

The guarantee assures you that no matter what time you arrive on your scheduled arrival day, your room will be held until 6:00 a.m. of the following day.

If you have not guaranteed your reservation, the hotel is not required to hold your room beyond 6:00 p.m. of the scheduled arrival day.

CHANGES AND CANCELLATIONS

BEFORE OCTOBER 2, all changes and cancellations to your room reservation must be sent, in writing, to the Housing Bureau.

AFTER OCTOBER 2, all changes and cancellations to your room reservation must be telephoned in to your hotel.

Supply your hotel reservation number at the time of any change or cancellation.

Your notice of cancellation must be received **AT LEAST 48 HOURS** in advance of your scheduled arrival in order to receive full refund of your first night's room deposit.

NOTE: All rooms are subject to a 7.6% room tax.

PHOENIX

Please make your reservation with the Housing Bureau.

1

QUALITY INN AIRPORT

1820 South 7th Street, Phoenix, AZ 85034
(602) 254-9787 (150 rooms)
1.5 miles from Civic Plaza; 10 minutes by car

Single: \$28 Double: \$30 & \$34
Children under 16 accompanied by parent—Free

Restaurant; cocktail lounge; outdoor heated swimming pool;
free outside parking; 10 minutes to airport

Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, DC, MC, V

2

HYATT REGENCY PHOENIX—HEADQUARTERS

122 North Second Street, Phoenix, AZ 85004
(602) 252-1234 (600 rooms)
1 block from Civic Plaza

Single: \$80 Double: \$90
Children under 18 accompanied by parent—Free

Full service hotel; 1st floor shopping mall;
revolving restaurant and lounge; terrace cafe;
cocktail lounge w/piano music; swimming pool & jacuzzi;
concierge; laundry and valet service; inside self-parking
(currently \$1.00–\$4.50/day); valet parking (currently \$6.25/day)

Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, DC, D, MC, V

3

THE ADAMS HILTON

Central and Adams, Phoenix, AZ 85001
(602) 257-1525 (475 rooms)
2 blocks from Civic Plaza

Single: \$63 Double: \$77
Children any age accompanied by parent—Free

Restaurant; coffee shop; cocktail lounge w/entertainment;
free use of 5th floor recreation deck w/heated swimming pool,
whirlpool, carpeted jogging track, ping pong; gift shops; florist;
inside self-parking (currently \$5/day)

Check-in: 1:00 p.m. Check-out: 1:00 p.m. CC: AX, CB, D, DC, MC, V

4

HOTEL SAN CARLOS

202 North Central Avenue, Phoenix, AZ 85004
(602) 253-4121 (90 rooms)
3 blocks from Civic Plaza

Single: \$37 Double: \$37
Children under 12 accompanied by parent—Free

Deli restaurant open M–F; heated outdoor swimming pool;
free continental breakfast in lounge; steam-heated rooms;
hotel-regulated air conditioning; showers; bathtubs in most rooms;
fee parking available

Check-in: 1:00 p.m. Check-out: 12:00 noon CC: AX, MC, V

5

PARK INN HERITAGE HOTEL

401 North First Street, Phoenix, AZ 85004
(602) 258-3411 (100 rooms)
3 blocks from Civic Plaza

Single: \$50 Double: \$50
Children under 18 accompanied by parent—Free

Richard's Restaurant; lounge w/free hors d'oeuvres and cocktails
during happy hour; outdoor heated swimming pool;
gift shop; one-day valet and laundry service; free outside parking

Check-in: 2:00 p.m. Check-out: 12:00 noon CC: AX, DC, MC, V

6

HOLIDAY INN FINANCIAL CENTER

3600 North Second Avenue, Phoenix, AZ 85013
(602) 248-0222 (275 rooms)
3.5 miles from Civic Plaza; 15 minutes by car

Single: \$52 Double: \$61
Children under 12 accompanied by parent—Free

Restaurant; cocktail lounge w/entertainment; 2 swimming pools;
free newspaper; across from shopping mall; free inside parking

Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, D, MC, V

7

LA MANCHA RESORT HOTEL & ATHLETIC CLUB

100 West Clarendon Avenue, Phoenix, AZ 85013
(602) 279-9811 (100 rooms)
3.5 miles from Civic Plaza; 15 minutes by car

Single: \$59 Double: \$59
Children under 18 accompanied by parent—Free

Restaurant; cocktail lounge; free use of full athletic club:
12 racquetball courts, basketball court, outdoor swimming pool,
jacuzzis, men's and women's steam and saunas, Nautilus equipment,
free weights, aerobic classes

Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, DC, MC, V

8

LES JARDINS HOTEL

3738 North Fourth Avenue, Phoenix, AZ 85013
(602) 234-2464 (50 rooms)
3.5 miles from Civic Plaza; 15 minutes by car

Single: \$60 & \$70 Double: \$60 & \$70
Children under 13 accompanied by parent—Free

Stylishly contemporary/distinctly European; excellent restaurant;
heated swimming pool and spa; access to athletic facilities;
free morning newspaper

Check-in: 3:00 p.m. Check-out: 12:00 noon CC: AX, CB, D, MC, V

9

PARK CENTRAL MOTOR HOTEL

3033 North 7th Avenue, Phoenix, AZ 85013
(602) 277-2621 (60 rooms)
3.5 miles from Civic Plaza; 15 minutes by car

Single: \$37 (studio) Double: \$41 (studio)
\$43 (suite) \$47 (suite)

Restaurant; outdoor heated swimming pool; free HBO;
spacious studios/apartment-size suites, both with kitchens;
free coffee in room; coin-operated laundromat; free outside parking

Check-in: 2:00 p.m. Check-out: 12:00 noon CC: AX, CB, D, DC, MC, V

10

BEST WESTERN ST. FRANCIS HOTEL

4321 North Central Avenue, Phoenix, AZ 85012
(602) 277-6671 (150 rooms)
4 miles from Civic Plaza; 15 minutes by car

Single: \$40 Double: \$44
Children under 12 accompanied by parent—Free

Restaurant located next door; heated outdoor swimming pool;
free coffee in lobby; free movie channel;
free refrigerator in room upon request; free outside parking

Check-in: 12:00 noon Check-out: 12:00 noon CC: AX, D, DC, V

Credit card codes: AX = American Express / CB = Carte Blanche / D = Discovery / DC = Diners Club / MC = MasterCard / V = VISA
NOTE: Free amenities are specifically stated as such.

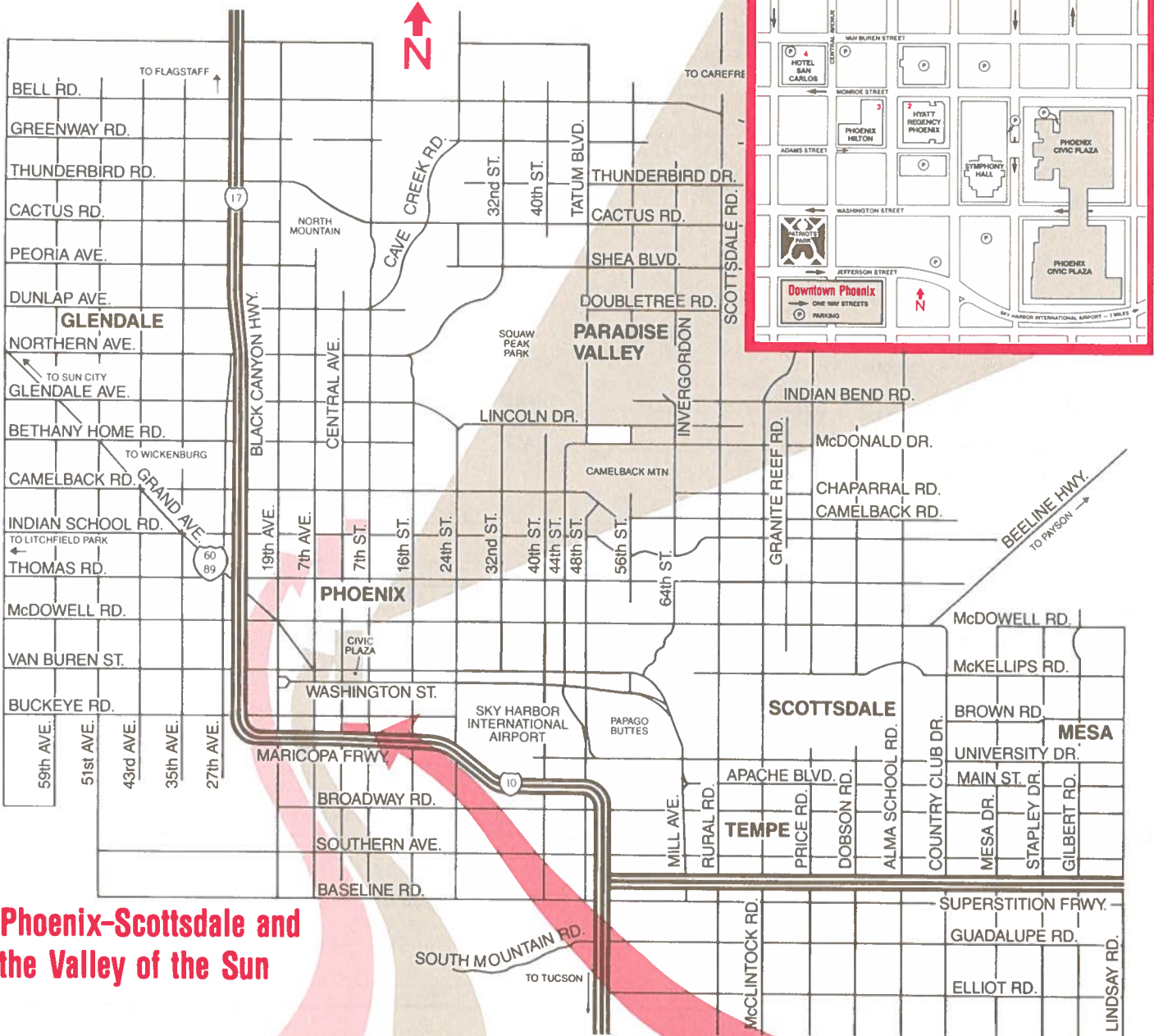
GSA HOTEL MAP

USE OF THIS MAP

Streets are shown 8-10 blocks apart. Travel time to the Civic Plaza is estimated. Allow more time at rush hours.

* Serviced by GSA Shuttle

Parking fees vary. Some locations are self-parking; others are by valet service. The valet service is more expensive, but allows in & out parking, which metered lots and parking buildings do not.



Phoenix-Scottsdale and the Valley of the Sun

- * **NORTH CENTRAL AREA—**
3.5-4 miles/15 minutes by car
- 10 St. Francis
- 9 Park Central
- 8 Les Jardins
- 7 La Mancha
- 6 Holiday Inn Financial

- * **DOWNTOWN AREA—**
1-4 block walking access
- 5 Park Inn Heritage
- 4 San Carlos
- 3 Hilton
- 2 Hyatt

- * **SKY HARBOR AREA—**
1.5 miles/10 minutes by car
- 1 Quality Inn

PHOENIX

OFFICIAL HOUSING REQUEST FORM

Please complete BY OCTOBER 2 and send to:

Phoenix Convention Bureau
GSA Housing Department
505 North Second Street, Suite 300
Phoenix, AZ 85004

(Please print or type all information below)

HOTEL/MOTEL PREFERENCE:

1. _____
2. _____
3. _____
4. _____

TYPE OF ACCOMMODATIONS NEEDED:

- | | |
|--|---|
| <input type="checkbox"/> Single (1 bed, 1 person) | <input type="checkbox"/> 1 Bedroom Suite |
| <input type="checkbox"/> Double (1 bed, 2 persons) | <input type="checkbox"/> 2 Bedroom Suite |
| <input type="checkbox"/> Dbl/Dbl (2 beds, 2 persons) | |
| <input type="checkbox"/> Triple (2 beds, 3 persons) | <input type="checkbox"/> Add rollaway to room |
| <input type="checkbox"/> Quad (2 beds, 4 persons) | |

NOTE: All rooms are subject to 7.6% tax.

ARRIVAL DAY/DATE _____ TIME _____ a.m./p.m.

DEPARTURE DAY/DATE _____ TIME _____ a.m./p.m.

NAMES OF OCCUPANTS:

- | | |
|----------|----------|
| 1. _____ | 3. _____ |
| 2. _____ | 4. _____ |

GUARANTEED ROOM RESERVATION AUTHORIZATION:

I understand that my reservation will not be held after 6:00 p.m. unless I guarantee my reservation. I also understand that the hotel may bill me for one night's housing if I fail to cancel at least 48 hours prior to arrival.

- Credit card information provided below to guarantee my reservation.
- My guarantee will be made directly to the hotel *after* I have received my hotel confirmation.
- I will take my chances. No guarantee deposit will be provided.

PLEASE DO NOT SEND ANY MONIES WITH THIS FORM

Please guarantee my room reservation with the following:

American Express Carte Blanche Diners Club Discovery MasterCard VISA

SIGNATURE _____

CARD NUMBER _____ EXP. DATE _____

MAIL CONFIRMATION TO: (Please type or print)

Name _____ Telephone () _____
Address _____ City _____
State _____ ZIP _____ Country _____

CONVENIENCE INFORMATION

INFORMATION/MESSAGES

GSA information and message desks will be located at both Civic Plaza and the Hyatt Regency from Friday, Oct. 23 through Thursday, Oct. 29.

Civic Plaza	GSA Information	239-7020
Civic Plaza	GSA Messages	239-7021
Hyatt Regency	GSA Information	252-1234

Provide the above telephone numbers, as well as your hotel telephone number to both home and office. In this way, messages will be taken and received in the most efficient way.

PHOTOGRAPHY

GSA has named Jeff Jowdy as the official Annual Meeting photographer. Jeff worked with us in San Antonio and is back by popular demand.

Two types of services are available:

1. Individual or group photography. If you or your group have photography needs, contact Jeff directly to make arrangements. You will be charged for actual photography time, proofsheets if requested, and prints.
2. Speculative photography. Jeff will be working through various activities planned during the meeting. His pictures will be displayed in the Civic Plaza. Place an order and have your prints the following day.

To place an order or for further information, contact: Jeff Jowdy, 11711 Braesview, Suite 505, San Antonio, TX 78213; (512) 824-9471.

CHILD CARE

The following child-care options are available in Phoenix during the Annual Meeting:

1. The Hyatt Regency Concierge recommends the following babysitting services: Arizona Babysitting Service, (602) 247-0260; The Granny Company, Inc., (602) 264-5454; and Margaret Gross, (602) 870-9346. You should contact any of the above as far in advance as possible.
2. GSA offers a cooperative child-care service. UNTIL OCT. 2, the GSA Events Coordinator will accept names, addresses, and phone numbers of interested participants. ON OCT. 9, the above information will be distributed to only those who have responded. Participants are responsible for contacting one another. Optional: You may include the number of children, ages, hotel where you will stay, and the phone number.

VISITOR FACTS

WEATHER

Phoenix weather is warm, sunny, dry, and delightful. The yearly average temperature for Phoenix is 72°F. Phoenix averages sunshine during 86% of all possible sunshine hours—between 295 and 306 sunny days each year. Travelers should bring casual clothes; few places require a tie. Light sweaters or jackets are suggested for GSA Annual Meeting time.

GOLF

Phoenix offers several beautiful and challenging golf courses that are open to the public. The following are recommended for either their proximity to the downtown area or picturesque setting. The Arizona Biltmore Country Club is located closest to the downtown area and offers rental equipment. The Orange Tree Club, a more difficult course, is located in Northeast Phoenix. The Tournament Players Club, home of the Phoenix Open, and the McCormick Ranch Golf Club are located in Scottsdale. Most courses require that you use a golf cart. Reservations should be made well in advance. Cost is approximately \$45 per person, and includes green fees, cart, and tax. For more information, call the Arizona Office of Tourism at (602) 255-3618.

ARIZONA TOURIST INFORMATION

Arizona Office of Tourism
1480 E. Bethany Home Road
Phoenix, AZ 85014
(602) 255-3618

Grand Canyon National Park Lodges
P.O. Box 699
Grand Canyon Village
Grand Canyon, AZ 86023
(602) 638-2401

Phoenix & Valley of the Sun
Convention & Visitors Bureau
505 North Second Street, Suite 300
Phoenix, AZ 85004
(602) 254-6500
(800) 221-5596

PHOENIX

REGISTRATION

PREREGISTRATION DEADLINE: MUST BE RECEIVED NO LATER THAN SEPTEMBER 25

1. There is a 17% savings in registration fees if you register before the preregistration deadline! Advance registration is suggested for many of the special activities because of participation limits. Use the preregistration form provided in this announcement.
2. Registration is required for all attendees. Badges will be required for ALL activities 10:00 a.m. Sunday through 5:00 p.m. Thursday. There will be a fee charged for all lost badges.
3. Registration discounts are given to GSA or Associated Society members. Associated Societies that qualify for this discount are indicated on the registration form. Please indicate your affiliation(s) and member number, and register using the member rates.
4. Full payment MUST accompany registration. Unpaid purchase orders are not accepted as valid registration. Charge cards are accepted as indicated on preregistration form. If using a charge card, please recheck the card number given—errors will delay your registration.
5. Register one professional or student per form. Copy the form for your records. One-day registrants MUST indicate the day they plan to attend on the registration form.
6. Guest registration is required for guests attending guest activities, special events, and luncheons. The registration fee does not include admission to the technical sessions. Guest registrants MUST be accompanied by either a professional or student registrant.
7. CURRENT student ID is required to obtain student rates at both the on-site and preregistration counters.

REGISTRATION FEES

	Advance*	On-Site	One-Day
Professional—Member	\$ 90	\$105	\$52
Professional—Nonmember	\$130	\$145	\$72
Student—Member	\$ 45	\$ 52	\$26
Student—Nonmember	\$ 65	\$ 72	\$36
Guest	\$ 30	\$ 45	- -

*Registration fees received before September 25.

ON-SITE REGISTRATION SCHEDULE

Civic Plaza, Lobby 2

Sunday, Oct. 25	10:00 a.m.—7:00 p.m.
Monday, Oct. 26	7:30 a.m.—5:00 p.m.
Tuesday, Oct. 27	7:30 a.m.—5:00 p.m.
Wednesday, Oct. 28	7:30 a.m.—2:00 p.m.
Thursday, Oct. 29	7:30 a.m.—2:00 p.m.

CANCELLATIONS AND REFUNDS

GSA will refund advance registration fees for cancellations received in writing by OCTOBER 2. NO REFUNDS WILL BE MADE ON CANCELLATION NOTICES RECEIVED AFTER THIS DATE. Refunds will be mailed from GSA after the meeting; a \$10 processing fee will be charged. Refunds for fees paid by credit card will be credited according to the card number on the preregistration form. NO refunds for on-site registration and ticket sales.

NEW MEMBERSHIP DISCOUNTS

A \$40 member discount on registration applies to any professional member of GSA or an Associated Society. The Associated Societies that qualify are listed on the registration form. Professional registrants who paid the nonmember registration fee and apply for GSA membership by March 31, 1988, will be entitled to a \$40 discount from the 1988 membership fee. Students will receive a \$15 discount from the 1988 Student Associate membership fee. Only ONE discount will apply per person. In order to receive the reduction, a copy of the meeting registration form MUST be attached to the membership application. Membership applications are available from GSA headquarters. During the meeting, you can pick up applications at the GSA Bookstore (Exhibit Hall, Booth #612), Employment Service, or Membership Desk, Registration Area, Civic Plaza.

PREREGISTRATION FORM

GSA Annual Meeting • October 26-29, 1987

Preregistration must be RECEIVED by September 25. Payment and form MUST accompany all preregistration requests. Unpaid purchase orders NOT accepted as valid registration. One form per registrant. Cancellation deadline: October 2. No refunds on cancellations received after this date.

Please print • Copy for your records

Name (Last) _____ (First) _____

Institution/Employer _____ Nickname for badge _____

Mailing Address _____

City _____ State _____ ZIP code _____

Country _____ Business phone _____ Home phone _____

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

City _____ State/Country _____

Circle member affiliations: (1) GSA (2) CF (3) GS (4) GIS (5) MSA (6) NAGT (7) PS (8) SEG

		PRICE	QTY	AMOUNT
Professional Member (member of affiliation checked above)	(1)	\$ 90	1	\$ _____
	Member One-Day (circle day S M T W T)	(2)	\$ 52	1
Professional Nonmember	(3)	\$130	1	\$ _____
	Nonmember One-Day (circle day S M T W T)	(4)	\$ 72	1
Student Member (member of affiliation checked above)	(5)	\$ 45	1	\$ _____
	Member One-Day (circle day S M T W T)	(6)	\$ 26	1
Student Nonmember	(7)	\$ 65	1	\$ _____
	Nonmember One-Day (circle day S M T W T)	(8)	\$ 36	1
Guest (fill in name above for badge)	(9)	\$ 30		\$ _____

ABSTRACTS WITH PROGRAMS (reserved for on-site pickup) (80) \$ 19

Trail Ride Superstition Mountain	Oct. 26	(10)	\$ 45	\$ _____
Sedona & Oak Creek Canyon	Oct. 27	(11)	\$ 45	\$ _____
Desert Gardens & Scottsdale	Oct. 28	(12)	\$ 30	\$ _____
Heard Museum	Oct. 29	(13)	\$ 4	\$ _____

Invitational Tennis	Oct. 25	(14)	\$ 10	\$ _____
10K Run (check T-Shirt Size __S __M __L __XL)	Oct. 28	(15)	\$ 10	\$ _____
5K Run (check T-Shirt Size __S __M __L __XL)	Oct. 28	(16)	\$ 10	\$ _____
Cookout at GSA Corral	Oct. 28	(17)	\$ 16	\$ _____

Geoscience Information Society	Oct. 26	(18)	\$ 15	\$ _____
Engineering Geology 40th Anniversary	Oct. 27	(19)	\$ 15	\$ _____
Geophysics Division	Oct. 27	(20)	\$ 15	\$ _____
Hydrogeology Division	Oct. 27	(21)	\$ 15	\$ _____
Mineralogical Society	Oct. 27	(22)	\$ 15	\$ _____
National Association of Geology Teachers	Oct. 27	(23)	\$ 15	\$ _____
Paleontological Society	Oct. 27	(24)	\$ 15	\$ _____
Sedimentary Geology Breakfast	Oct. 27	(25)	\$ 10	\$ _____
Women Geoscientists Breakfast	Oct. 27	(26)	\$ 10	\$ _____
Coal Geology Division	Oct. 28	(27)	\$ 15	\$ _____
Geochemical Society	Oct. 28	(28)	\$ 15	\$ _____
History of Geology	Oct. 28	(29)	\$ 15	\$ _____
Quaternary Geology and Geomorphology	Oct. 28	(30)	\$ 15	\$ _____
Society of Economic Geologists	Oct. 28	(31)	\$ 15	\$ _____

SUBTOTAL \$ _____

GO TO NEXT PAGE 

PHOENIX



SUBTOTAL CARRIED FORWARD \$



FIELD TRIPS

meeting registration not required

			PRICE	QTY	AMOUNT
1. Mesozoic Thrust Faults	Oct. 23-25	(32)	\$198	1	\$ _____
2. Terraces, Lower Salt River Valley	Oct. 25	(33)	\$ 54	1	\$ _____
3. Lower Cretaceous Patch Reefs	Oct. 23-25	(34)	\$166	1	\$ _____
4. Archaeological Geology, Southeastern Arizona	Oct. 23-25	(35)	\$184	1	\$ _____
5. Paleocology, Taphonomy, Gulf California	Oct. 22-25	(36)	\$214	1	\$ _____
6. Late Paleozoic Depositional Systems	Oct. 24-25	(37)	\$123	1	\$ _____
7. Geomorphology, Structure, Colorado Plateau	Oct. 22-25	(38)	\$132	1	\$ _____
8. Tectonic Magmatic Contrasts, Central Arizona	Oct. 23-25	(39)	\$163	1	\$ _____
9. Colorado River Float Trip	Oct. 17-24	(40)	\$920	1	\$ _____
10. Late Cenozoic Volcanism, Southern Colorado Plateau	Oct. 23-25	(41)	\$162	1	\$ _____
11. Geology of Grand Canyon, backpack	Oct. 22-25	(42)	\$212	1	\$ _____
12a. Miocene Extension, Sedimentation, Southern Nevada	Oct. 22-25	(43)	\$235	1	\$ _____
12b. Miocene Extension with air to Phoenix	Oct. 22-25	(44)	\$275	1	\$ _____
13. Late Pleistocene Alluvium Megafauna	Oct. 22-25	(45)	\$256	1	\$ _____
14a. Large-Scale Silicic Volcanism	Oct. 22-25	(46)	\$323	1	\$ _____
14b. Large-Scale Silicic with air to Phoenix	Oct. 22-25	(47)	\$366	1	\$ _____
15. Cretaceous Black Mesa, Kaiparowits Basin	Oct. 22-25	(48)	\$226	1	\$ _____
16. Crustal Transect: Colorado Plateau	Oct. 21-25	(49)	\$323	1	\$ _____
17. Coal Deposits, Facies Changes	Oct. 21-25	(50)	\$275	1	\$ _____
18. Selected Hydrogeologic Problems	Oct. 25	(51)	\$ 41	1	\$ _____
19. Mesozoic Tectonics, Southeastern California	Oct. 22-25	(52)	\$319	1	\$ _____
20a. Geology Lower Grand Canyon by Boat	Oct. 30-Nov. 1	(53)	\$362	1	\$ _____
20b. Geology Lower Grand with air to Las Vegas	Oct. 30-Nov. 1	(54)	\$402	1	\$ _____
21. Geologic Reconnaissance, Western Grand Canyon	Oct. 29-Nov. 1	(55)	\$458	1	\$ _____
22. Metamorphic Core Complexes, Old Woman Mountains	Oct. 29-Nov. 2	(56)	\$348	1	\$ _____
23. Alkaline Rocks, Volcanic Structures	Oct. 29-Nov. 1	(57)	\$256	1	\$ _____
24. Land Subsidence, Earth Fissure Formation	Oct. 30	(58)	\$ 48	1	\$ _____
25. Late Cenozoic Mammal Faunas, Southeastern Arizona	Oct. 30-31	(59)	\$116	1	\$ _____
26. Geology Porphyry Copper Ores, Globe	Oct. 30	(60)	\$ 41	1	\$ _____
27. Ductile Brittle Evolution, South Mountains	Oct. 30	(61)	\$ 38	1	\$ _____
28. Structural Geology, South Mountains	Oct. 30-Nov. 1	(62)	\$208	1	\$ _____
29. Tectonic Setting, Sedimentological Features	Oct. 29-Nov. 1	(63)	\$257	1	\$ _____
30a. Geology, Structure, Alteration, Jerome	Oct. 30	(64)	\$ 45	1	\$ _____
30b. Geology, Structure, Alteration, Jerome	Oct. 31	(65)	\$ 45	1	\$ _____
31. Upper Holocene Alluvium, Southern Colorado Plateau	Oct. 29-Nov. 1	(66)	\$263	1	\$ _____
32. Mesquite Mine	Oct. 29-31	(67)	\$254	1	\$ _____
33. Cross-Bedding, Other Eolian Structures	Oct. 29-Nov. 1	(68)	\$212	1	\$ _____
34. Superstition Volcanic Field	Oct. 30	(69)	\$ 46	1	\$ _____

SHORT COURSES

meeting registration not required

1. Planetary Geology and Remote Sensing:					
Short Courses and Field Trips	Day One	Oct. 23	(70) \$ 85	1	\$ _____
	Day Two	Oct. 24	(71) \$ 45	1	\$ _____
	Day Three	Oct. 25	(72) \$ 70	1	\$ _____
2. Contaminant Hydrogeology		Oct. 24-25	(73) \$135	1	\$ _____
3. Quantitative Sedimentary Basin Modeling		Oct. 24	(74) \$ 90	1	\$ _____
4. Site Characterization, Nuclear Waste		Oct. 24-25	(75) \$145	1	\$ _____
5. Basin Analysis and Sedimentary Geology		Oct. 25	(76) \$ 90	1	\$ _____
6. Spreadsheets on Microcomputers		Oct. 25	(77) \$175	1	\$ _____
7. Writing History of Geology: Workshop		Oct. 25	(78) \$ 65	1	\$ _____
8. Paleoseismology and Active Tectonics		Oct. 29-31	(79) \$150	1	\$ _____

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Lake Mead, Colorado Plateau—Faith Rogers

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Grand Canyon, North Rim—Peter Kresan

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