Beginning the Second Century

by Brian J. Mitchell
General Chairman, 1989 Annual Meeting

St. Louis, the gateway to the West, welcomes you to the 1989 meeting of the Geological Society of America. Beginning nearly two centuries ago, intrepid explorers, frontiersmen, settlers and their families set out from St. Louis for points unknown in quest of knowledge or a new life, and they pushed the frontiers of our country farther westward. Drawing on the symbolism of the westward expansion, the St. Louis organizing committee has taken "Frontiers in Geoscience" as the theme for the 1989 Annual Meeting.

The committee, consisting of faculty and students from the host institutions, St. Louis University and Washington University, as well as representatives from the University of Missouri at Columbia, the Missouri Division of Geology and Land Survey, the U.S. Army Corps of Engineers, and the Defense Mapping Agency, has planned a memorable meeting with which to begin the second century of the GSA. It will indeed be a "frontiers" meeting, one which emphasizes new discoveries, emerging methodologies and technologies, and their expected influence on geologic research and teaching over the next decade and beyond.

The technical program will differ from programs at previous meetings by including many more theme sessions. These theme sessions have permitted individuals to advocate topics that fall under the overall theme of the meeting. Many of these topics are in the forefront of geoscience research, and include the origins and effects of fluids in the crust, applications of artificial intelligence in geological sciences, rock deformation, crustal processes and structure, new directions in geologic mapping, and important contemporary topics in paleontology, geomorphology, stratigraphy, and sedimentology. Other theme sessions address environmental issues and geoscience education. As in previous years, associated societies and divisions of the GSA will present symposia. Like the theme sessions, these emphasize "frontier" topics in diverse areas of geologic research, ranging from foraminifera to intraplate seismicity to geoscience information.

The St. Louis organizing committee has convened a symposium on Geoscience Research and Public Policy which will address the topics of priorities and funding in geoscience research that might be expected over the next decade. Leaders who are expected to influence policy in these areas will make presentations from the perspective of their offices or positions and respond to questions (continued on p. 242)
More 1989 Annual Meeting Local Committee members. Above: Raymond Arvidson; right, upper: Jerry Vineyard, W. Keith Wedge; right, lower: Judith Mitchell, Mark Wuenschel.

from the audience. Participants in science-related offices or government include James F. Hays of the National Science Foundation, Dallas Peck of the U.S. Geological Survey, Frank Press of the National Academy of Sciences, as well as representatives from the United States Senate and House of Representatives. Academic participants are Robert A. Pinney, Princeton University, Peter J. Wyllie, California Institute of Technology, and William Fisher, University of Texas at Austin.

The GSA is sponsoring ten short courses, two of which, on fission track analysis and Quaternary climates, are featured as part of the Frontiers in Geoscience theme. Societies associated with the GSA will offer other short courses, as well as several forums and workshops.

The field trip committee has planned 19 pre- and post-meeting trips to interesting sites over a broad region of the central United States. They cover a spectrum from Precambrian volcanics and metamorphics to recent archeological excavations. During the meeting you may want to take one of these half-day trips in the St. Louis area.

The offering of special events is indeed special. In addition to the traditional Welcoming Party and Alumni Night, there will be a cruise on a Mississippi riverboat with local bands playing blues music, the music that has made St. Louis famous. The 5K/10K runs will go through beautiful Forest Park, site of the 1904 World's Fair and Olympic games. For the first time the GSA will host a photography salon. Amateur photographers will be submitting photographs in both science and nonscience categories which will be displayed and judged at the meeting.

The Science Theater will also include something new. The rapid proliferation of inexpensive video cameras is allowing individuals outside of the usual film/video companies to produce their own videos for classroom or research use. In recognition of this growing phenomenon, the Science Theater will offer a selection of "home-grown" videos produced by geologists.

The Guest Program promises a variety of interesting trips and activities offering historical and contemporary perspectives on St. Louis and nearby areas. The trips range from a visit to historic St. Charles, where the Lewis and Clark expedition began, to the St. Louis riverfront, where it ended, to the cave country of the Ozarks where Jesse James hid out, and of course, to areas of St. Louis noted for historic grandeur or modern importance.

As General Chairman of the 1989 meeting, I welcome you to St. Louis. You will find it to be a vibrant city, particularly in the downtown area and on the riverfront near the meeting site. That vibrance blends with the historic charm of the city and provides a wonderful setting in which to meet. The organizing committee has gone all out to arrange an important and interesting meeting. As Meriwether Lewis and William Clark led their "Corps of Discovery" from St. Louis in 1804 to expand our nation's physical frontiers, we hope that the 1989 meeting of the GSA will contribute to expanding frontiers in geoscience, research, and teaching. It is a meeting that you will want to experience.
updates on final wrap-ups of books  
nearly under control

As of this writing, just after the 4th of July, the Eastern Pacific volume is paged, indexed, and will go to the printer as soon as Tanya Atwater's textile plate is proofed and checked. Because of production delays at our end and Tanya's travels, this will be about mid-August, so the book should be printed and available about Thanksgiving.

The Appalachian-Ouachita volume has been looked over by the editors, and as soon as Warren Manspeizer returns the galley for his megachapter (expected any day), this book will go back to the typesetter for final paging and indexing. The book will go to the printer as soon as we know we have Phil Osberg's plate through the proofing process and composited.

The Surface Water Hydrology volume has been looked over by its editor and will be ready for pasing as soon as one final chapter text is received from Reds Wolman. The plates for this volume are already printed, and the book will move quickly to the printer when the final chapter is copy edited, typeset, and proofed.

Acknowledgment of the casts of characters for the two latter volumes will be printed in next month's column.

other volumes

Nothing new on the Arctic and Caribbean volumes; both sets of editors are now working on dates in late August and early September to go over galleys of their books. Meanwhile, the volume Archaeological Geology of North America is rapidly reaching completion and may be a part of the group of books to be available by the end of 1989.

Canadian Volumes

Five of the nine Canadian volumes are complete and through review. One (Quaternary) is at the printer. The others are caught up in delays caused by a government decree that all volumes must be published in both French and English; thus, they are awaiting the completion of the French translations (including figures).

transects

Transsect C-1, Mendocino Triple Junction to the North American Craton, is now being printed (3 sheets) and will be available by the time you read this. This completes the set of transects along the Pacific coasts of the conterminous U.S. and Canada. Two transects across the Pacific coast of Mexico are in color separation, as are the stacked, comparative transect sheets for the eastern and western coasts of North America at 1:1,000,000. These should be ready for the printer before the end of the year.

wall maps

The Stress Map of North America is now plotted and being prepared for printing. This should move quickly once we get the legend materials from Mary Lou Zoback, and will probably be available sometime this fall.

notice of council meeting

The Council of the Society reminds you that meetings of Council are open to all Fellows, Members, and Student Associates as observers, except during executive sessions. Only councilors, officers, and section representatives may speak to agenda items, except by invitation of the chair. Because of space and seating problems, notification of attendance must be received by the Executive Director in advance of the meeting. The next meeting of the Council will be Wednesday morning, November 8, 1989, at the annual meeting in St. Louis.

1989 GSA Annual Meeting & Exposition

November 6-9

Detailed descriptions of field trips, short courses, theme sessions, and other meeting events can be found in the August issue of GSA News & Information. The August issue also contains registration and housing forms. For additional information you are welcome to call the GSA Meetings Department, (303) 447-2020.

PREREGISTRATION IS DUE BY OCTOBER 6. HOUSING DEADLINE IS OCTOBER 13.
Two New Trustees Appointed

The Board of Trustees of the GSA Foundation has appointed Peter T. Flawn and William B. Heroy, Jr. to five-year terms ending in 1994. They will assume their new posts at the 1989 GSA Annual Meeting in St. Louis in November. The two vacancies on the board result from the expiration of the terms of Michel T. Halbouty and John C. Maxwell, both of whom have served as trustees since the Foundation was formed in December 1980.

Pete Flawn received his undergraduate degree from Oberlin College, and his M.S. and Ph.D. from Yale University. Flawn worked briefly for the U.S. Geological Survey and then joined the Bureau of Economic Geology at the University of Texas in Austin. He served that institution in a variety of positions, ultimately becoming its president in 1979. Flawn is a member of numerous national organizations, including the National Academy of Sciences, the National Research Council, and the National Academy of Engineering. He is an honorary member of the Association of American State Geologists, and a Fellow of the Geological Society of America. Flawn was a GSA Councilor from 1972 to 1974 and served on the Executive Committee, the Committee on Investments, the Centennial Steering Committee, the Fund-Raising Task Force, and the ad hoc Committee on Enhancement of Mexican Participation in GSA. Flawn was president of GSA in 1978, and he was president of the American Geological Institute in 1988.

Bill Heroy graduated from Dartmouth College after majoring in geology and geophysics. He received a Ph.D. degree in geology from Princeton University. His career began in 1941 as a geologist with Texaco. Later, he joined Geotech Corporation, ultimately becoming president in 1961. Subsequently, he was president of the Geotech Division of Teledyne, Inc., and later, was assistant to the president of that company. Heroy joined the faculty of Southern Methodist University in 1979 and also served that institution as vice-president and treasurer. Currently, he holds the title of professor emeritus at SMU. Heroy is a Fellow of GSA and a member of the Society of Exploration Geophysicists, the Society of Economic Geologists, AAPG, and a life member of AGU. He has served GSA extensively since the early 1960s, on numerous committees, as an associate editor, as a councilor, and as treasurer and a member of the Executive Committee from 1977 to 1982.

Trustee Chairman Phil LaMoreaux, upon announcing these appointments, said, "The Foundation's Board of Trustees is extremely pleased to have both Pete Flawn and Bill Heroy accept positions as trustees. We are losing very valued board members Mike Halbouty and John Maxwell, who have been with us right from the beginning and who are precluded by Foundation bylaws from new terms at this time. We couldn't have asked for better replacements to step into their shoes than Pete Flawn and Bill Heroy. These two leaders in our profession have devoted many years to serving GSA, and it is most fortunate for the Society that they are willing to continue in this new capacity."
Travel Grants—The Students Speak

In the May issue of GSA News & Information we reported the quantitative results of the student travel grant program during 1988. This program is jointly sponsored by the GSA sections and the Foundation. Lately, we have been hearing from the students. A sample of their comments follows.

"On behalf of . . . I would like to thank you and the Rocky Mountain Section of GSA for your generous support. Your travel award greatly offset our travel expenses from Northern Arizona University in Flagstaff, Arizona, to the Spokane, Washington, meeting. We enjoyed the meeting and the opportunity to share our research with that of other workers."

"My presentation went well and the convention was very educational. Many expenses were incurred with slide preparation, travel, and lodging; I could not have done it without your support!"

"I doubt that I would have been able to attend this meeting without the generous financial support of the Society."

"My poster presentation, in conjunction with . . . met with a great success and provided us an opportunity to talk with many other professionals and peers about our work."

"The Denver convention was my first experience with a poster session, and the feedback which I received will be invaluable as I turn now to the task of writing."

"It was an invaluable experience for me to present my research myself, to receive comments first hand, and mostly, to get recognized as a worker in my field, and not merely as so and so's student. I certainly hope that you will continue this program."

Yes, the program is continuing in 1989, and many grants have already been paid to students attending section meetings. Because of the enthusiastic response from GSA sections and the students themselves, the Foundation plans to continue this financial support for the foreseeable future, and we hope to increase the dollar level in future years as the Foundation’s income improves.

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Preliminary Announcement and Call for Papers

NORTHEASTERN SECTION, GSA, 25th Annual Meeting
Syracuse, New York
March 4-7, 1990

Syracuse University, together with Colgate University, Cornell University, Hamilton College, and Hobart and William Smith Colleges, will host the Northeastern Section of the Geological Society of America meeting at the Sheraton University Inn and Conference Center on the campus of Syracuse University. The Eastern Section of the Society of Economic Paleontologists and Mineralogists (ES-SEPM), the Northeastern Section of the Paleontological Society (NE-PS), the Eastern Section of the National Association of Geology Teachers (ES-NAGT), and the Association of Women Geoscientists will be meeting with GSA's Northeastern Section. The meeting will run from 7:00 p.m. Sunday, March 4, through noon, Wednesday, March 7.

DETAILED INFORMATION
Information concerning registration, accommodations, and activities will appear in a future issue of GSA News & Information and as part of Abstracts with Programs for 1990. Requests for additional information or suggestions should be addressed to the General Program Co-Chairmen,

Henry T. Mullins
Department of Geology
Heroy Geology Laboratory
Syracuse University
Syracuse, NY 13244
(315) 443-4706 or 2672

Donald I. Siegel
Department of Geology
Heroy Geology Laboratory
Syracuse University
Syracuse, NY 13244
(315) 443-3607 or 2672

CALL FOR PAPERS
Papers are invited for presentation at oral and poster sessions as well as symposia. A total of twenty minutes (presentation and discussion) will be the format for general technical session presentations, whereas thirty minutes will be an available option for symposia presentations. Papers that place northeastern geology in a global perspective will especially receive priority for presentation. Papers of regional or general interest will also be considered. Poster presentations are highly encouraged, as are student papers. Every attempt will be made to assure that oral and poster sessions will not conflict with related technical sessions.

SYMPOSIA
The following symposia will be presented at the Syracuse meeting. Those wishing to contribute to a symposium should contact the convenors directly. General information regarding symposia can be obtained from Cathryn R. Newton, Department of Geology, Heroy Geology Laboratory, Syracuse University, Syracuse, NY 13244; (315) 443-3710 or 443-2672.


2. Phanerozoic Paleogeography, Paleoclimatology, Biogeography and Paleomagnetism. Rob Van der Voo, University of Michigan, (313) 764-1435.


5. The Grenville Province from Front to Back: Sudbury to Vermont. James McClelland, Colgate University, (315) 824-1000.

6. Subglacial Melts: Landforms and Sediment. John Shaw, Queens University, (613) 545-6033 or 545-6030.


8. Crustal Signatures of Northern Appalachian-Caledonide Terranes. Gary Boone, Syracuse University, (315) 443-3869 or 443-2672.


11. Global Biological Events in Earth History. George McGhee, Rutgers University, (201) 932-2044; Peter Sheehan, Milwaukee Public Museum, (414) 278-2741; sponsored by the Paleontological Society and IGCP 216.

12. Ground-Water Contamination: How Real are the Hazards? Don Siegel, Syracuse University, (315) 443-3607 (mini-symposium and public forum).


POSTER SESSIONS
Poster booths (8' x 8') will be framed by pipe and drape and have three 4' x 8' Homosote tack boards. For general information regarding poster sessions, contact Teresa Jordan, Department of Geological Sciences, Snee Hall, Cornell University, Ithaca, NY 14853; (607) 255-3596. Poster sessions will be held in the Goldstein Auditorium of the Schine Student Center on the Syracuse University campus immediately adjacent to the Sheraton Conference Center.

Special Poster Session
Classic Field Sites for Teaching Earth Science in the Northeast sponsored by Eastern Section and New England Section of NAGT. Those wishing to contribute to this special poster session should contact Jim O'Connor, University of District of Columbia, Environmental Science Department, 4200 Connecticut Ave. NW, Washington, D.C. 20008, (301) 593-7831.

ABSTRACTS
Abstracts are limited to 250 words and must be submitted camera-ready on the official 1990 GSA abstract form available from

Abstracts Coordinator
Geological Society of America
P.O. Box 9140
Boulder, CO 80301
(303) 447-8850

Donald Woodrow
Geoscience Department
Hobart and William Smith Colleges
Geneva, NY 14456
(315) 789-5500, ext. 215

(continued on p. 247)
Northeastern Section (continued from p. 246)

Send one original and five copies of abstracts to be considered for all general technical sessions and poster sessions to Technical Program Chairman Donald Woodrow, Geoscience Department, Hobart and William Smith Colleges, Geneva, NY 14456. Abstracts (one original and five copies) for all symposia should be sent to Symposia Coordinator Cathryn R. Newton, Department of Geology, Heroy Geology Laboratory, Syracuse University, Syracuse, NY 13244.

ABSTRACTS ARE DUE NOVEMBER 9, 1989

Acceptance or rejection of abstracts will be based on review by the Technical and Symposia Program Committees. Abstracts will be judged on the basis of scientific merit, information content, and readability. There is no limit to the number of abstracts that may be submitted, but no more than two abstracts bearing an individual's name as first author will be accepted. No author may give more than one oral presentation. Notification of acceptance or rejection will be made by early December 1989.

PROJECTION EQUIPMENT

All slides must fit in a standard 35-mm carousel tray. Two projectors and two screens will be provided in all technical sessions and symposia. If possible bring your own loaded tray labeled with name, session, and time of paper.

EXHIBITS

Exhibits of geological research equipment and educational material will be on display in the Goldstein Auditorium adjacent to poster sessions and refreshments. Booths (8' x 8') will be framed with pipe and drape and contain tables and chairs. Special rates are available for nonprofit and educational organizations. For additional information, contact Barbara Tewsbury, Department of Geology, Hamilton College, Clinton, NY 13323, (315) 859-4011.

SPECIAL EVENTS

Heroy Open House—Sunday, March 4—An open house featuring the research facilities of the Heroy Geology Laboratory will be available from noon to 5 p.m.

Plenary Session—Sunday, March 4—A plenary session will be held in Goldstein Auditorium of the Schine Student Center beginning at 7 p.m. The keynote address, Appalachian-Caledonian Geology and the Evolution of Tectonic Thought will be given by John F. Dewey, Oxford University.

Welcoming Party—Sunday, March 4—A welcoming party with liquid refreshment and hors d’oeuvres will be held in the lounge of the Schine Student Center immediately following the Plenary session.

Geology Photo Contest—Sunday, March 4—A contest for geologically interesting photographs (color or black and white) will be held in the Art Gallery of the Schine Student Center Lounge in conjunction with the welcoming party. Photographs must be large-format size; cash prizes of $100 for first place, $50 for second, and $25 for third will be awarded. For further information, contact Special Events Coordinator Gary Boone, Department of Geology, Heroy Geology Laboratory, Syracuse University, Syracuse, NY 13244, (315) 443-3607 or 443-2672.

NE GSA Annual Banquet—Monday, March 5—Regency Room of the Sheraton Convention Center, 7:30 p.m. to 10:00 p.m.

Public Forum—Tuesday, March 6, evening—A mini-symposium and open discussion will be held on Ground-Water Contamination: How Real Are the Hazards in the Regency Room of the Sheraton Conference Center. The general public will be welcome. For further information contact Donald Siegel, Department of Geology, Heroy Geology Laboratory, Syracuse University, Syracuse, NY 13244, (315) 443-3607 or 443-2672.

SHORT COURSES

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

1. Role of Critical Thinking in Geology Education. Paul Pinet, Department of Geology, Colgate University, Hamilton, NY 13346.


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

SCIENCE THEATER

A wide variety of scientific films and videos of geologic interest, including a "classic film festival," will be presented at lunchtime and in the evening. For further information or suggestions, contact Bob Darling, Science Theater Coordinator, Department of Geology, Heroy Geology Laboratory, Syracuse University, Syracuse, NY 13244, (315) 443-3828 or 443-2672.

REGISTRATION

Registration will begin at noon on Sunday, March 4, in the lobby of the Heroy Geology Laboratory. All subsequent registration will be in the lobby of the Sheraton Conference Center. Meeting participants are strongly encouraged to use Sunday, March 4, as a travel day and register Sunday afternoon in the Heroy Lobby in order to participate in the plenary session and welcoming party Sunday evening. In addition, a full slate of technical programs will begin 8 a.m. Monday morning. Registration forms will be provided in the December issue of GSA News Information.

HOUSING

Blocks of rooms have been reserved at the Sheraton University Inn, Holiday Inn downtown, and the Hotel Syracuse. Guaranteed rates will be per room regardless of the number (maximum 4) of occupants. All three hotels have restaurants and there are many inexpensive restaurants on Marshall Street immediately adjacent to the Sheraton, as well as a cafeteria at the Schine Student Center. For conference planning and budgetary purposes it is critical that meeting participants preregister. February 9, 1990 has been established for receipt of hotel reservations. Accommodation reservations received after this date will be on a space-available only basis. Please preregister and make your hotel reservations as early as possible! A housing form will be provided in the December issue of GSA News Information.

Coming Soon . . .

1989 GSA Short Course Notes for Sale

If you cannot attend a 1989 GSA-sponsored short course at the Annual Meeting in St. Louis, but you would like a copy of the course notes, copies will be available for sale starting in October. Mail-order forms will be printed in future issues of GSA News & Information. During the St. Louis meeting, notes may be purchased at the Abstracts with Programs counter in the meeting registration area.
Preliminary Announcement and Call for Papers
SOUTH-CENTRAL SECTION, GSA, 24th Annual Meeting
Stillwater, Oklahoma
March 5-6, 1990

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

CALL FOR PAPERS
Papers are invited for oral presentation at technical sessions and symposia, or in poster sessions. The format for technical sessions will be fifteen minutes for presentation and five minutes for discussion. Poster sessions will be available for viewing for one-half day or a full day. Papers of regional interest to geologists in the south-central United States, as well as those of general geological or educational interest, will be considered for the program.

STUDENT PAPERS
To encourage student participation, cash awards for travel to the meeting and for outstanding papers will be presented. Special student accommodation rates have also been arranged. Judging for travel awards will be based upon evaluation of abstracts for quality of research and writing. Outstanding paper awards will be judged upon both quality of research and effectiveness of presentation. To be eligible, only students may be listed as authors on the paper, and it must be designated on the abstract form as a student paper.

REGISTRATION
Preregistration will be by mail. Forms will accompany the Final Announcement in the December issue of GSA News & Information. On-site registration will take place on Sunday, March 4, 1990, from 3 to 8 p.m. in the Conference room of the Noble Research Center and will continue there daily from 7:45 a.m. to 5 p.m. for the duration of the meeting. For lower registration fees and to assist the local committee in planning, PREREGISTER BY FEBRUARY 9, 1990!

SYMPOSIA
The following symposia have been organized or are planned. Authors of papers to be considered for inclusion in a symposium should send abstracts directly to the convener. Contact the convener(s) as well for further information.

1. Pander Society Symposium. Scott M. Ritter, School of Geology, Oklahoma State University, Stillwater, OK 74078.
   This one-day symposium will focus upon recent advances in stratigraphical, palaeobiological, and geochemical applications of the phylum Conodonta.

2. Tectonic Habitat and Structural Styles in the Midcontinent and Southern Oklahoma: Implications for Hydrocarbon Accumulations. Ibrahim Cemen and Zuhair Al-Shaieb, School of Geology, Oklahoma State University, Stillwater, OK 74078.
   The symposium will focus on current structural and tectonics research in the southern midcontinent and southern Oklahoma regions and intends to provide a well-organized discussion on the interactions of different structural styles. These two regions contain several diverse structural styles ranging from rift tectonics in the Nemaha ridge area and wrench tectonics in the Wichita and Arbuckle Mountains, to a well-developed fold and thrust belt in the Ouachita Mountains. The symposium plans to address persisting questions related to the structural and tectonic evolution of these regions. It will also include several presentations on the relation between the structural styles and hydrocarbon accumulations in these areas based on the research within the last decade.

3. Paleontological Society Symposium—Middle Carboniferous Biostratigraphy: Recent Advances. Patrick K. Sutherland, School of Geology and Geophysics, University of Oklahoma, Norman, OK 73019; Walter L. Manger, Dept. of Geology, University of Arkansas, Fayetteville, AR 72701.
   The South-Central Section of the Paleontological Society will sponsor a one-day symposium devoted to recent advances in middle Carboniferous biostratigraphy. Presentations are invited dealing with aspects of Chesterian, Morrowan, and Atokan faunal and floral sequences. Publication of a symposium volume is planned in the Circular series of the Oklahoma Geological Survey.


5. Applied Hydrogeology. Wayne A. Pettyjohn, School of Geology, Oklahoma State University, Stillwater, OK 74078.
   During the past few years a number of fundamental concepts have been developed that allow a better understanding of groundwater recharge, flow, discharge, and mass transport. This symposium will consist of presentations that deal with these concepts and techniques, all of which can or have been applied to the evaluation of regional hydrogeology and the investigation of contaminated sites.


FIELD TRIPS
1. Depositional Facies, Karst Features, and Styles of Deformation in the Arbuckle Mountains, Oklahoma. A one-day field trip to examine several outcrops in the Arbuckle Mountains. Participants will be introduced to the results of ongoing research on the Arbuckle Group. Various interesting features of the shoaling-upward sequences, thermal dolomite, karstification, and exposures of other subaerial features will be emphasized in addition to the several structural features. Zuhair Al-Shaieb and Ibrahim Cemen, School of Geology, Oklahoma State University, Stillwater, OK 74078.

2. Middle Carboniferous Lithofacies and Biostratigraphy of the Southern Ozarks. The South-Central Section of the Paleontological Society is sponsoring a two-day, premeeting field trip to examine lithofacies changes and biostratigraphic relations within Chesterian and Morrowan rocks along a traverse from north-central Arkansas to northeastern Oklahoma. Planned in conjunction with Symposium 2. Walter L. Manger, Dept. of Geology, University of Arkansas, Fayetteville, AR 72701; Patrick K. Sutherland, School of Geology and Geophysics, University of Oklahoma, Norman, OK 73019.

3. Paleozoic Stratigraphy and Conodont Biostratigraphy of the Arbuckle Mountains, Oklahoma. A two-day field trip to examine excellent exposures of Ordovician to middle Carboniferous strata of the Arbuckle Mountains in light of recent conodont (continued on p. 249)
South-Central Section (continued from p. 248)

studies. Planned in conjunction with Symposium 1, James E. Barrick, Dept. of Geosciences, Texas Tech University, Lubbock, TX 79409; Jeffrey A. Bauer, Shawnee State University, Portsmouth, OH 45662; Raymond L. Ethington, Dept. of Geology, University of Missouri—Columbia, Columbia, MO 65211; Robert C. Grayson, Jr., Dept. of Geology, Baylor University, Waco, TX 76798.

ABSTRACTS

Abstracts are limited to about 250 words and must be submitted camera-ready on the official 1990 GSA abstract form available from

Abstracts Coordinator or School of Geology
Geological Society of America Oklahoma State University
P.O. Box 9140 105 Noble Research Center
Boulder, CO 80301 Stillwater, OK 74078-0451
(303) 447-8850 (405) 744-6358

Send one original and five copies of abstracts to be considered for technical sessions, carefully marked for type of session (oral or poster) and category of interest, to the Technical Program Chairman,

Arthur W. Cleaves
School of Geology
Oklahoma State University
105 Noble Research Center
Stillwater, OK 74078-0451
(405) 744-6358

Send one original and five copies of abstracts for symposia directly to the convener (first name following symposium topic or title). Acceptance or rejection of all abstracts will be based upon technical review. Abstracts will be judged on the basis of scientific merit, informative content, readability, and significant problems. You may submit as many abstracts as you wish, but no more than two bearing an individual’s name as first author will be accepted for the program. No author may give more than one oral presentation. Authors will be notified of acceptance or rejection during December 1989.

ABSTRACTS ARE DUE NOVEMBER 3, 1989

PROJECTION EQUIPMENT

All slides must be 2” x 2” and fit in a standard carousel tray. Two projectors and two screens will be provided in each technical session. Please bring your own loaded carousel trays. A speaker ready room equipped with projectors will be available for review and practice. Overhead projectors will not be available.

EXHIBITS

Exhibits will be adjacent to the technical session rooms. The cost of booths for educational and nonprofit institutions will be reduced. For further information contact

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

SPECIAL EVENTS

A welcoming party will be held on Sunday evening, March 4. The annual banquet is scheduled for Monday evening, March 5, and will feature a distinguished geologist as speaker.

DETAILED INFORMATION

Information concerning registration, accommodations, and activities will appear in the December 1989 issue of GSA News & Information and in the South-Central Section Abstracts with Programs for 1990. Requests for additional information or suggestions should be addressed to the General Chairman,

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

GSA Goes Kiwi

New Zealand: 1991

2½ to 3 Week Geological Vacation Trip emphasis on South Island

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

Approximate cost: $2000–$2400 plus airfare

Guests welcome

GSA members will receive a special discount

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

GSA NEWS & INFORMATION, September 1989
ENVIRONMENT

Tucson is a city of approximately half a million people located in the Sonoran Desert of southern Arizona only an hour by car or bus from Nogales on the international border with Mexico. Maximum and minimum temperatures in mid-March, which may be windy but is seldom wet, range from 65°–85°F to 40°–55°F, respectively.

CALL FOR PAPERS

Papers are invited for presentation in technical sessions, symposia, theme sessions, and poster sessions. Papers dealing with all aspects of the Cordilleran region of North America are encouraged. Technical sessions will allow 15 minutes for presentation and 5 minutes for discussion. Symposia and theme sessions may allow equivalent or longer times for presentation at the option of conveners and the symposium coordinator.

CONFERENCE LANGUAGES

[Idiomas Para Las Conferencias]

Abstracts and presentations of papers may be in either English or Spanish. [Los resumenes y presentaciones de los trabajos pueden ser en inglés o español.]

FIELD TRIPS

Both premeeting and postmeeting field trips are planned. For details, contact the respective field trip leaders. Questions should be addressed to Field Trip Coordinator George E. Gehrels, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-6026 (direct) or 621-6024 (department). Preregistration forms will be available in the December 1989 issue of GSA News & Information.

Premeeting

1. Cenozoic Stratigraphy and Tectonics of the Safford, Tonto, and Payson Basins (2 days). Dale Nations, Department of Geology, P.O. Box 6030, Northern Arizona University, Flagstaff, AZ 86011-6030, (602) 523-7180; Brenda Houser, USGS–Tucson; David Brumbaugh, Northern Arizona University; Larry Anderson, Bureau of Reclamation, Denver.
3. Juxtaposition of Contrasting Crustal Levels, 1.65 Ga Mazatzal Orogen, Arizona (2 days). Karl Karlstrom, Department of Geology, P.O. Box 6030, Northern Arizona University, Flagstaff, AZ 86011-6030, (602) 523-7171; Sam Bowring, Washington University; Michael L. Williams, University of Massachusetts; Clay M. Conway, USGS—Flagstaff.
5. Late Cretaceous and Tertiary Deformation of the Santa Catalina Metamorphic Core Complex (2 days). Stephen Naraj, Shell Western E&P, Inc., P.O. Box 576, Houston, TX 77001, (713) 870-4414; Ann Bykerk-Kaufman, University of Arizona.
6. Paleozoic Stratigraphy of the Whetstone Mountains, Cochise County, Arizona (2 days). Joseph F. Schreiber, Jr., Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-2153; W. Marc Connolly, Department of Geology, Texas A&M University, College Station, TX 77843, (409) 845-2461; Richard K. Armin, Unocal Corporation; Robert W. Stanton, Texas A&M; Augustus K. Armstrong, New Mexico Bureau of Mines and Mineral Resources.
7. The Early Jurassic Cordilleran Magmatic Arc in Southern Arizona: Plutons to Sand Dunes (2½ days). Nancy Riggs, Geology Department, University of California, Santa Barbara, CA 93106, (805) 961-2782; Gordon Haxel, USGS—Flagstaff; Cathy Busby-Spera, University of California—Santa Barbara.
11. Quaternary and Environmental Geology of the Northeastern Gulf of California (4 days). Owen Davis, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-7953; Alan Cutler, Keith Meldahl, University of Arizona; Nick Lancaster, Arizona State University; Brian Lock, University of SW Louisiana; Joseph F. Schreiber, Jr., Manuel Palacios-Fest, University of Arizona; Chris Shaw, George C. Page Museum.

Postmeeting

12. Quaternary Geology and Geologic Hazards of the Canada del Oro Region (1 day). William B. Bull, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-2219; Edgar J. McCullough, Jr., Peter Kresan, University of Arizona.
14. Late Cretaceous and Early Tertiary Deformation and Plutonism, South-Central Arizona (2 days). Dick Todsal, U.S. (continued on p. 251)
Cordilleran Section (continued from p. 250)

Geological Survey, 345 Middlefield Road, Menlo Park, CA 94025, (415) 329-5423; Gordon Haxel, USGS—Flagstaff; Tom Anderson, University of Pittsburgh.

15. Late Cenozoic San Pedro Valley Deposits and Geoaehnology (2 days). Everett H. Lindsay, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-6022; C. Vance Haynes, University of Arizona; Gary Smith, University of New Mexico; Richard Ernst, University of Arizona.


17. Tectonics and Stratigraphy of the Paleozoic and Triassic Southern Margin of North America, Sonora, Mexico (4 days). John H. Stewart, U.S. Geological Survey, M.S. 901, 345 Middlefield Road, Menlo Park, CA 94025, (415) 329-5412; Forrest Poole, Keith Ketner, USGS—Denver; Raul Madrid, Palo Alto, California; Jaime Roldan, Instituto de Geologia, UNAM; Ricardo Amaya, Universidad de Sonora.


SYMPOSIUM

The following symposia will include both invited papers and selected volunteered papers. Prospective authors are encouraged to contact the respective conveners. Questions should be addressed to Symposium Co-convenor Judith Toman Parrish, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4595 (direct) or 621-6024 (department).


8. The Environmental History of the American Southwest during the Last Glacial Termination: The Black Mat. Owen K. Davis, Department of Geosciences, University of Arizona, Tucson, AZ 85721.


THEME SESSIONS

Theme sessions are similar to symposia in their focus on specific topics, but each is an open forum where all papers are volunteered (whereas symposia include many invited papers). Prospective authors are encouraged to contact the respective conveners. The following theme sessions have been proposed and will be held if enough relevant papers are submitted.


ABSTRACTS

Abstracts are limited to about 250 words and must be submitted camera-ready on the official 1989 GSA abstract form, available from Abstracts Coordinator, Geological Society of America, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020.

ABSTRACT DEADLINE: NOVEMBER 14, 1989

An original and five copies of all volunteered abstracts should be sent to Program Coordinator Roy A. Johnson, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4890 (direct) or 621-6024 (department). Authors who think that a paper might be suitable for inclusion in a theme session or symposium should send an extra copy of the abstract to the appropriate convenor (see list above).

An original and five copies of all invited abstracts should be sent to Symposium Co-convenor Judith Toman Parrish, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4595 (direct) or 621-6024 (department), and an extra copy of the abstract should be sent to the appropriate symposium convenor (see list above).

Abstracts will be reviewed for informative content and format, appropriate geographic coverage (Cordilleran region), and originality. Only one volunteered paper may be presented by each individual, although a person may also co-author papers presented by others and may present additional papers invited for symposia.

PROJECTION EQUIPMENT

All slides must be 2" x 2" and fit standard 35-mm carousel trays. Two projectors and two screens will be available for all oral sessions, but overhead projectors will not be available. Please bring loaded carousel trays, if possible.

(continued on p. 252)
Cordilleran Section (continued from p. 251)

POSTER SESSIONS
Four half-days of poster sessions, including one poster symposium (see above), will be available (Wednesday p.m., Thursday a.m. & p.m., Friday a.m.). Poster sessions will be located adjacent to the exhibit area. Please identify your preference for a poster session on the GSA abstract form if you wish to take advantage of this highly effective means of communication.

EXHIBITS
Exhibits will be located one block from the registration area; snacks and refreshments will be continuously available for exhibit visitors. The cost of standard booths will be $250 for commercial exhibitors and $125 for educational or nonprofit institutions. For further information and space reservations, contact Exhibits Coordinator Joseph F. Schreiber, Jr., Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-2153 (direct) or 621-4051 (department).

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

EVENING EVENTS
After-hours events will include a no-host welcoming party on Tuesday evening, a keg poster session on core complexes and superextension, alumni gatherings on Wednesday evening, and a geosciences forum following an informal buffet of Arizona/ Sonoran food on Thursday evening.

GUEST ACTIVITIES
A program of spouse and guest excursions will include visits to the Arizona-Sonora Desert Museum, the Amerind Foundation, and other local attractions.

TRAVEL ARRANGEMENTS
Reduced airfare options, with flexibility for premeeting and postmeeting field trips, will be available for those attending the sessions in Tucson. Detailed information will be provided in the final meeting announcement and should be consulted before making your travel arrangements.

SPECIAL REGISTRATION
To encourage attendance by geoscientists from Mexico and Central America, registration fees (but not field trip fees) will be waived for participants who reside in that region. Admission to technical sessions will also be free for precollege earth-science teachers.

DETAILED INFORMATION
Information concerning registration, travel, accommodations, and activities will appear in the December 1989 issue of GSA News & Information and as part of the Cordilleran Section Abstracts with Programs for 1990. Preliminary questions and suggestions should be addressed to General Chairman William R. Dickinson, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4051.

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LOOK FOR US UNDER THE BANNER!
Penrose Conference on Nonmarine Cretaceous Correlations
To Meet in May 1990

A GSA Penrose Conference "Correlation of Nonmarine Cretaceous Strata" will be held May 9–13, 1990, in Breckenridge, Colorado. Conveners are Niall J. Mateer, 1467 N. 17th, Laramie, WY 82070, (307) 721-4946; and Norman O. Fredericksen, USGS, 970 National Center, Reston, VA 22092, (703) 648-5277.

Stratigraphic research on the Cretaceous system has focused mainly on marine strata due largely to the rich and well-defined paleontological record. The nonmarine Cretaceous strata are more difficult to correlate and have been largely ignored worldwide.

The correlation of nonmarine Cretaceous strata has been attempted using a variety of fossils and, more recently, other stratigraphic criteria. A problem, however, has been the lack of coordination between workers using different fossil groups and workers using newer stratigraphic techniques (e.g., high-resolution and seismic stratigraphy) with respect to nonmarine sequences.

Nonmarine biostratigraphic zonations in North America are limited to pollen and spores, and to a lesser extent, fossil vertebrates, although other fossil groups are used on other continents (e.g., ostracods). The localized effects of climate, ecology, and dispersal on all fossil groups (e.g., pollen/spores, plant megafossils, mammals, reptiles, molluscs, ostracods, conchostracans) are not fully understood, and this impairs our ability to assess their contributions to a potentially comprehensive biostratigraphic zonation. There is a necessity to improve correlations with marine fossil zones where suitable interfingerings occur.

Because of the inherently discontinuous nature of most nonmarine strata, there is a need to integrate a comprehensive biostratigraphic zonation with other, nonbiological stratigraphical methodologies (e.g., event stratigraphy, high-resolution stratigraphy, magnetostratigraphy, and chemostratigraphy). Initial research has been forthcoming in these areas, but relatively little unified research has been published.

Despite the long history of study of nonmarine Cretaceous strata and fossils in the western interior of North America, much of the stratigraphy is informal and based on many assumptions lacking hard data (e.g., the supposedly ubiquitous Lower Cretaceous hiatus separating the presumed Jurassic Morrison Formation from the mid-Cretaceous strata; the status of the Dakota unit).

Outside North America similar problems exist, although these often have different biases owing, for example, to differential abundances of various fossils, or to the state of local expertise.

The purpose of this conference is to develop some implications for nonmarine strata outside of the Cretaceous system and for the Global Sedimentary Geology Program project "Cretaceous Rhythms, Events, and Resources."

These are the issues that this conference will consider. The Cretaceous system has been chosen due to:

- The activities of IGCP-245, "Nonmarine Cretaceous Correlations"
- The great extent of nonmarine Cretaceous rocks in the western interior
- The current interest in these strata (e.g., the K-T boundary, stratigraphic setting of dinosaurs, economic deposits).

The conference will consist of a full-day field trip which will visit the nonmarine Cretaceous-Tertiary boundary section at South Table Mountain and selected localities along the Dakota Hogback, all near Golden, Colorado. Scientific and logistical details of the field trip will be assembled into a brief handout. The remaining three days will consist of brief key presentations by invited speakers followed by extensive discussion periods. The key themes will be paleontology, magnetostratigraphy, paleoclimates, sedimentology, and nonclimatic impacts on the stratigraphic record, with the emphasis being on their correlation potential.

Participation will be limited to 70 persons. Prospective participants should apply by January 15, 1990, outlining their interest in this conference and their current research to either convenor. The conference registration fee will be about $550.

Penrose Conference on Large Lakes and Their Stratigraphic Record
Scheduled for September 1990

A GSA Penrose Conference "Large Lakes and Their Stratigraphic Record" will be held September 9–13, 1990 at the Granlibakken Conference Center at Lake Tahoe, California. Conveners are Andrew S. Cohen, Department of Geosciences, University of Arizona, Tucson, AZ 85721, (602) 621-4691; and Thomas C. Johnson, Department of Geology, Duke University Marine Laboratory, Beaufort, NC 28516, (919) 728-2111.

Large lakes of the world span all climatic zones and vary significantly in their origin, chemistry, and response to climatic forcing. During the past few years, significant new information has been obtained on the structure and sedimentology of modern large lakes and concurrently there has been renewed interest in the sedimentology, structure, geochemistry, and paleoecology of ancient lacustrine basins. The time is appropriate for geologists working on ancient lake deposits and sedimentologists, geophysicists, and limnologists working on modern lakes to communicate their interests, problems, and recent results for the purpose of providing a better perspective for the formulation of future research directions.

Large lakes behave as small oceans in many respects. They are large enough to respond to large-scale climatic events—at times in very dramatic ways. They contain distinct inshore and offshore zones, pelagic and benthic ecosystems, and in some instances, very strong chemical gradients as, for example, between oxygenated surface waters and anoxic bottom waters. Many contain well-developed sublacustrine fans and associated turbidite features, as well as sufficiently strong deep-water circulation to cause major erosional surfaces and current drift deposits. Evaporites of widely varying composition occur in some lakes, and extensive carbonate sequences and organic-rich facies in others. Sedimentation rates in large lakes typically fall in the range of 0.1–5 m/ka. Consequently, lacustrine sediments carry a record of Earth history that is resolvable to decades, if not years. The age of some large tectonic lakes may exceed 10 m.y.; thus, they hold the longest high-resolution record of global change in existence on our planet.

This conference will concern the genesis, diagenesis, and interpretation of lake sediments: the modern processes that influence them, the structure of basins that contain them, and their record of global change. The first goal of the conference on stratigraphy and depositional systems of large lakes is to provide a forum in which geological limnologists, paleolimnologists,

(continued on p. 254)
Sarewitz Named GSA Congressional Science Fellow for 1989–1990

Daniel R. Sarewitz has been selected as the fourth GSA Congressional Science Fellow. He will work as a special legislative assistant on the staff of a committee or member of the U.S. Congress from September 1989 through August 1990.

In this position, Sarewitz will advise members of Congress on the implications of geology- and other science-related legislative matters. Also, he will focus on science education policy, particularly at the university level. "President Bush has emphasized his commitment to improving science and math education in America, so this is a propitious time to pursue legislative and budgetary initiatives," he said in his application for fellowship. "It is widely argued that science education in the United States is inadequate. Shortages of well-trained scientists and engineers are predicted for the future, and, of more to concern to me, nonscientists (including legislators), are increasingly ill-equipped to evaluate issues that have scientific or quantitative underpinnings."

Sarewitz received his B.S., with honors, in geology from Haverford College in 1978, his M.S. from Oregon State University in 1983, and his Ph.D. in geology in 1986 from Cornell University. Since 1986, he has been a research associate for the Department of Geological Sciences at Cornell. Previously, he worked as a geological consultant in the Department of Geology at Indiana University, developing tectonic models for earthquake distribution in Soviet Central Asia; as a research assistant at Cornell analyzing structural, stratigraphic, and geophysical data bearing on the evolution of the Eurasia/Philippine Sea plate boundary; and as a staff engineer in private industry studying techniques for coal dust suppression and fire control in mines. He recently was in the USSR to study the relations between geologic structures and active seismicity in the Garm region. In addition, Sarewitz was the chief scientist on the R/V Moana Wave, implementing and supervising a survey of the Philippine interior seas.

The Fellowship
The GSA Congressional Science Fellowship is intended as a way to obtain first-hand experience in the public policy process and to educate the earth science community about the need for informed involvement; to demonstrate the value of such science-government interaction; and to make practical contributions to the more effective use of scientific and technical knowledge in government. Requirements for the fellowship include exceptional competence in some area of the earth sciences, cognizance of a broad range of matters outside the fellow's particular area, and a strong interest in working on a range of public policy problems.

The fellowship is funded by GSA and by a grant from the U.S. Geological Survey. Guided by the American Association for the Advancement of Science, the program places highly qualified, accomplished scientists with the offices of individual members of Congress and committees for a one-year assignment. Fellows perform in much the same way as regular staff members; they have the opportunity to be involved in varied legislative, oversight, and investigative activities. They offer their special knowledge, skills, and competence for the opportunity to acquire experience and the chance to contribute to the formulation of national policy. The GSA Congressional Fellow reports periodically to the GSA membership and to the USGS during the one-year period.

Selection Committee
On the selection committee for the fellowship this year were Chairman Clement F. Shearer, USGS; William R. Greenwood, USGS; Marcus Milling, University of Texas at Austin; and ex officio members James E. Evans, 1988 GSA Congressional Fellow; and F. Michael Wahl, GSA Executive Director.

Penrose Conference on Large Lakes (continued from p. 253)

geologists studying pre-Pleistocene lake deposits can discuss topics of mutual interest. Prior to the establishment of the IGCP-219 working group on lakes, geoscientists from these three subdisciplines had limited interaction. Recent meetings and published symposia volumes demonstrate that within specific interest groups there is movement toward synthesizing the knowledge of neo- and paleo-limnologists. The second goal of the conference is to broaden this synthesis beyond specific areas of study and create a dialogue among (for example) the sedimentologist monitoring bottom current effects on deep water sediment transport, the Quaternary paleo-limnologist investigating the taphonomy of pollen assemblages, and the petroleum explorationist looking for mechanisms to explain the occurrence of subtle deep-water lacustrine stratigraphic traps. All three of these disciplines may have more interests in common than is currently realized.

The conference will consist of 3½ days of oral presentations, poster sessions, discussions, and two field trips. Sessions will be organized around four major themes: (1) The Lake as a Small Ocean; (2) Basin Analysis of Lake Deposits; (3) The Interpretation of Ancient Large-Lake Deposits; and (4) Lake Deposits as Records of Regional and Global Change. Each thematic session will be opened by a keynote presentation, to be followed by a limited number of formal talks followed by extended discussion. Daily informal poster sessions will be scheduled to allow all interested participants to present recent research results.

The first field trip will be a half-day excursion to examine the coastal sedimentology and depositional processes of modern Lake Tahoe. The second field trip will examine the limnology and Quaternary sedimentology and stratigraphy of Mono Lake, California. Both field trips will provide excellent opportunities for examining the controls exerted by structure, limnology, and volcanic processes on facies distribution in two well-studied tectonic lake basins. The Quaternary history of the Mono Lake basin will provide an excellent forum for discussions of the impact of global climatic change on lacustrine stratigraphy.

The conference will be limited to 50–60 participants who are actively pursuing research on the geology of large lakes or the stratigraphic record of lake deposits. Prospective participants should send a letter of application stating the relevance of their research to the conference to either of the co-conveners. The deadline for applications is April 1, 1990. The registration fee is not yet determined but probably will be about $600. It includes food, lodging, and field trips. Limited support will be available for qualified graduate students and overseas participants.

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CONTENTS OF THE TECHNICAL PROGRAM

1. Search here for the topics in which you are interested.
2. Refer to the following Program Schedule for details.
3. Speaker information will be listed in the abstracts volume and in the on-site Program.

SYMPOSIA
S1. Geoscience Research and Public Policy, 1989 Annual Meeting Committee Frontiers Symposium
S2. Cenozoic Deep-Sea Foraminifera: Distribution and Environments, CF
S3. Molecular Approaches to Paleoclimatic and Paleoenvironmental Reconstruction, USSM, GQ Division
S4. Frontiers in Geoscience Information, GIS
S5. Application of Modern Powder Diffraction Techniques to Problems in Mineralogy and Geology, MSA
S7. Radiations and Recoveries from Mass Extinctions, PS
S8. Potential for Oil & Gas in the Terrace, Cu Muir-Use Deposits, Granite-Rhyolite Terranes, Midcontinent, USA, SEG
S9. Mississippi Valley-type Deposits, SEG
S10. Modern and Ancient Examples, Parts I & II
S11. The Legacy of T.C. Chamberlin, Quaternary/Geomorphology Division
S12. Implications for the Geological Sciences from Remote Sensing, GS, QG Division
S13. Sigma Gamma Epsilon Research Poster Symposium, SGE
S14. Geologic Controls on the Regional Distribution of Archaeological Sites, Archaeology Division
S15. Modern and Ancient Examples, Parts I & II
S16. Site Characterization for Conditions of Non-Darcian Flow, Engineering and Geophysical Division,
S17. Rates and Duration of Deformational Processes and Orogenic Events, Structure/Tectonics Division, Parts I & II

THEME SESSIONS—Oral and Poster
T1. Geological Mapping in the Next Several Decades Parts I & II (Posters)
T2. Effect of Magma on the Mississippi River and Its Delta
T3. Correlation and Basin Analysis of Nonfossiliferous Sedimentary Rocks
T4. Magma Currents, Melt Migration, and Geochemical Transport in Mafic Igneous Complexes
T5. Trace Element and Isotopic Studies with the Ion Microprobe Parts I (Posters) & II
T6. Suevite in a New Light: A Debris Water Brine Precipitate: An Alternative to the Evaporite Hypothesis
T8. Global Sedimentary Geology
T9. A Growing Crisis in Geoscience Education, Parts I & II
T10. The Lunar Science Frontier: Implications for the Earth's Past and Future, Parts I & II
T11. Tectonomeromorphism, Parts I, II, III, & IV (Posters)
T12. Continental Dynamics
T13. Mantle Plumes and Mass Extinctions
T14. Growth of the Crust, Parts I & II (Poster)
T15. New Concepts in Understanding Fluid-Rock Interactions at High Temperatures: Problems and Solutions
T16. Fractional Crust Research, Parts I & II
T17. Application of Artificial Intelligence, Expert System, or Knowledge-Based System Methods
T18. Geodynamics of the Arches, Parts I & II (Poster)
T19. Geologic Causes of Natural Radon-Anomaly Anomalies
T20. Rock-Water Interactions in Carbonate Rocks and Sediments, Sedimentary Geology Division, Parts I & II

VOLUNTEERED POSTER SESSIONS
Poster Session I
Geochemistry, Engineering and Environmental Geology, Petroleum Geology
Poster Session II
Geohazard and History of Geology, Micropaleontology, Stratigraphy
Poster III
Geophysics, Remote Sensing, Geoscience Information, Paleontology, Mineralogy/Crystallography
Poster IV
Geology, Volcanology
Poster V
Igneous Petrology, Tectonics
Poster Session VI
Hydrogeology, Petroleum Geology
Poster Session VII
Arctic Geology, Metamorphic Petrology, Planetary Geology
Poster Session VIII
Marine Geology, Sedimentology, Tectonics/Geophysics

VOLUNTEERED ORAL SESSIONS
Archaeology
Coastal Geology
Economic Geology
Engineering Geology
Environmental
Experimental Petrology
Geochemistry
Geochronology
Geological Education
Geomorphology
Geophysics
Geoscience Information
Glacial Geology
History of Geology
Hydrogeology
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Volcanology


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## 1989 TECHNICAL PROGRAM SCHEDULE

### Sunday

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<td>SESSION 16, 8:00 a.m., CCC:261-262</td>
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<td>SESSION 2, 1:00 p.m., CCC:130</td>
<td>SESSION 17, 8:00 a.m., CCC:275</td>
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<td>S3. GS-OGD SYMPOSIUM: MOLECULAR APPROACHES TO PALEOCILMATIC AND PALEOVIRONMENTAL RECONSTRUCTION</td>
<td>T24. GEOMORPHIC PROCESSES AND LANDFORM EVOLUTION</td>
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<td>SESSION 3, 1:00 p.m., CCC:121-122/125-126</td>
<td>SESSION 18, 8:15 a.m., CCC:274</td>
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<td>S9. SEG SYMPOSIUM: MISSISSIPPI VALLEY-TYPE DEPOSITS</td>
<td>HYDROGEOLOGY</td>
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<td>SESSION 21, 8:30 a.m., CCC:270</td>
<td>T26. HYDROTHERMAL ORGANIC GEOCHEMISTRY</td>
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### Monday

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**SESSION 52, 8:00 a.m., CCC:123-127**
S12. GSA QUATERNARY GEOLOGY AND GEOMORPHOLOGY DIVISION SYMPOSIUM: THE LEGACY OF T. C. CHAMBERLIN

**SESSION 53, 8:00 a.m., CCC:130**
S2. CUSHMAN FOUNDATION SYMPOSIUM: GENOZOIC DEEP-SEA FORAMINIFERA: DISTRIBUTION AND ENVIRONMENTS

**SESSION 54, 8:00 a.m., CCC:276**
SEDIMENT HOSTED ORES/CU-Ni AND PLATINUM DEPOSITS

**SESSION 55, 8:00 a.m., CCC:261-262**
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**SESSION 56, 8:00 a.m., CCC:265-266**
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**SESSION 57, 8:00 a.m., CCC:275**
T11. GLOBAL SEDIMENTARY GEOLOGY

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T14. TECTONOMETAMORPHISM I

**SESSION 59, 8:00 a.m., CCC:120-124**
T31. GEOLICAL CAUSES OF NATURAL RADIOUNCIDE ANOMALIES

**SESSION 60, 10:00 a.m., CCC:274**
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**SESSION 62, 10:00 a.m., CCC:270**
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**SESSION 66, 1:30 p.m., CCC:270**
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<td>POSTER SESSION VII: NATG—GEOLOGY EDUCATION</td>
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<td>Session 101</td>
<td>1:30 p.m., CCC:120-124</td>
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<td>POSTER SESSION VII: SEG—ECONOMIC GEOLOGY</td>
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<td>Session 102</td>
<td>1:30 p.m., CCC:120-124</td>
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<td>POSTER SESSION VII: T18. GEOSCIENCE AND THE ARTS II</td>
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<td>Session 103</td>
<td>1:30 p.m., CCC:274</td>
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<td>P9—PALEONTOLOGY IV: PALEOECOLOGY—AUT- AND SYN-</td>
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<td>Session 104</td>
<td>1:30 p.m., CCC:121-122</td>
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<td>S1. 1989 LOCAL COMMITTEE SYMPOSIUM: GEOSCIENCE RESEARCH AND PUBLIC POLICY</td>
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<td>Session 105</td>
<td>1:30 p.m., CCC:121-122/125-126</td>
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<td>POSTER SESSION VII: T6. TRACE ELEMENT AND ISOTOPIC STUDIES WITH THE ION MICROPROBE</td>
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<td>Session 106</td>
<td>1:30 p.m., CCC:121-122/125-126</td>
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<td>POSTER SESSION VII: T14. TECTONOMETAMORPHISM IV</td>
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### THURSDAY NOVEMBER 9

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**SESSION 135**, 1:00 p.m., CCC-270  
**Tectonics V:**  
Tectonics/Sedimentation/Basin Analysis

**SESSION 151**, 1:00 p.m., CCC-275  
**Cretaceous Record of the Eastern Margin of the Western Interior Seaway II**

**SESSION 152**, 1:30 p.m., CCC-260  
**T13. The Lunar Science Frontier:**  
Implications for Earth’s Past and Future II

**SESSION 154**, 2:30 p.m., CCC-260  
**Planetary Geology/Remote Sensing**

**SESSION 153**, 2:45 p.m., CCC-274  
**NAGT—Geology Education**

**SESSION 155**, 3:00 p.m., CCC-261-262  
**T3. Correlation and Basin Analysis of Non-Fossiliferous Sedimentary Rocks**

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**SESSION 136**, 1:00 p.m., CCC-Hall B  
**Poster Session VIII:**  
Marine Geology and Oceanography

**SESSION 137**, 1:00 p.m., CCC-Hall B  
**Poster Session VIII:**  
Sedimentology

**SESSION 138**, 1:00 p.m., CCC-Hall B  
**Poster Session VIII:**  
Tectonics/Geophysics

**SESSION 139**, 1:00 p.m., CCC-Hall B  
**Poster Session VIII:**  
Tectonics/Geophysics

**SESSION 140**, 1:00 p.m., CCC-Hall B  
**Poster Session VIII:**  
T29. Thermal and Hydrologic Evolution of Accretionary Prisms II

**SESSION 141**, 1:00 p.m., CCC-276  
**Ps—Paleontology VI:**  
Biostratigraphy and Biogeography

**SESSION 142**, 1:00 p.m., CCC-267  
**Quaternary II**

**SESSION 143**, 1:00 p.m., CCC-121-122/125-126  
**S17. GSA Hydrogeology and Engineering Geology Divisions Symposium:**  
Site Characterization for Conditions of Non-Darcian Flow II

**SESSION 144**, 1:00 p.m., CCC-123-127  
**SED/SED PET VI:**  
Provenance and Clastic Diagenesis

**SESSION 145**, 1:00 p.m., CCC-120-124  
**SEG—Economic Geology IV:**  
Epithermal, Metamorphic-Hosted, and Other Deposits

**SESSION 146**, 1:00 p.m., CCC-130  
**Structure/Tectonics: Extensional Terranes**

**SESSION 147**, 1:00 p.m., CCC-274  
**T12. A Growing Crisis in (Geo)Science Education II**

**SESSION 148**, 1:00 p.m., CCC-131-132  
**T21. Frontiers of Fluid-Inclusion Research II**

**SESSION 149**, 1:00 p.m., CCC-265-266  
**T6. Trace Element and Isotopic Studies with the Ion Microprobe**

**SESSION 150**, 1:00 p.m., CCC-261-262  
**T7. Sub-Mediterranean “Giant Salt” as a Deep-Water Brine Precipitate:**  
An Alternative to the Evaporite Hypothesis

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**HIGHLIGHTS OF EVENTS**

**WEDNESDAY, NOVEMBER 8**

**Cervantes Convention Center:**
- Registration: 7:30 a.m. to 2:00 p.m.
- Exhibits: 8:00 a.m. to 4:00 p.m.
- Science Theater, Room 263, 9:00 a.m. to 4:30 p.m.

**Guest Tour—A Visit to St. Charles:**
- 9:30 a.m. to 2:30 p.m.

**Guest Tour—Historic St. Louis Walking Tour:**
- 9:30 a.m. to 11:30 a.m.

**Coal Geology Luncheon:**
- 12:00 noon, Adam's Mark, St. Louis Ballroom B

**GS Luncheon:**
- 12:30 p.m., Adam's Mark, Promenade Ballroom E

**Quaternary Geology & Geomorphology Luncheon:**
- 12:00 noon, Adam's Mark, Promenade Ballroom D

**SEG Luncheon:**
- 11:30 a.m., Adam's Mark, Promenade Ballroom D

**BLUES CRUISE:**
- 7:30 p.m., The President Riverboat

**THURSDAY, NOVEMBER 9**

**Cervantes Convention Center:**
- Registration: 7:30 a.m. to 12:00 noon
- Science Theater, Room 263, 9:00 a.m. to 4:30 p.m.

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**DALLAS**

**OCTOBER 29—NOVEMBER 1, 1990**
GSA Division and Section Awards for 1989

The Coa l Geology Division presented its second annual Antoinette Lieran Medlin Scholarship Award in 1989 to Eric J. Daniels, University of Illinois, for his proposal titled “Coal Mineralogy of Pennsylvanian Anthracite Region.” The Division considers proposals from any full-time graduate student who is conducting research in coal geology.

The Geophysics Division presented its second annual Allan V. Cox Student Research Award in 1989, for an outstanding student research proposal submitted to the GSA Research Grants Program, to Robert V. Enright, a Master’s candidate at Florida State University. The award was for his research project titled “The Response of Well-Water Levels in a Confined Aquifer, Sarasota County, Florida, to Oceanic Tidal Loading.”

The Quaternary Geology and Geomorphology Division awarded Mackin grants to two students in 1989. Master’s degree candidate Garrett Jackson, University of Arizona, will study “Tectonic Geomorphology of the Toroweap Fault, Western Grand Canyon, Arizona,” and Andrew Fox, a Ph.D. candidate from Cornell University will study “Glacial History of the Central Andes Mountains.”

Twenty-nine Mackin Grants have been awarded since the Division made its first award in 1974.

The Sedimentary Geology Division presented its third annual award for an outstanding student research proposal, submitted to the GSA Research Grants Program, to Harvey A. Cohen, a Ph.D. candidate at Princeton University. The award was for his research project titled “Sedimentologic and Provenance Study of a Microcontinent—Continent Collision: Gravina Belt, Southeast Alaska.”

The Structural Geology and Tectonics Division presented two awards for outstanding research proposals in 1989. The recipients were Joanne L. Hoffard, M.S. candidate at the University of Nevada, Reno, for “Quaternary Fault History of Western Pahrump Valley and Stewart Valley, Nevada and California,” and Karl J. Mueller, Ph.D. candidate at the University of Wyoming, Laramie, for “Cenozoic Extensional History of the Windermere Hills, Elko County, Nevada.”

The North-Central Section of GSA awarded two research grants to students in the section this year. The recipients and the titles of their research projects are: Jennifer B. Kupperman, University of Illinois, “Short-term Tectonic Subsidence Analysis of Pennsylvanian Cyclothems in a Transect from a Platform to a Foreland Basin,” and Zakaria Lasemi, Miami University, for “Porosity Reduction in Micr;ocrystalline Limestones: Recognizing the Relative Effects of Cementation and Compaction.” Eligibility is restricted to students attending colleges or universities in the North-Central Section geographic area who have submitted applications to the GSA Research Grants Program. This is the fifth year that the North-Central Section has awarded student grants. There have been twenty awards presented by the Section.

The South-Central Section of GSA presented its second annual research awards to qualified students in the Section in 1989. Recipients are students who attend a college or university in the South-Central Section geographic area and have submitted applications to the GSA Research Grants Program. The three awards presented this year went to Kay C. McQueen, Ph.D. candidate at Oklahoma State University, for “Paleohydrology of Black Creek, Oklahoma,” and to William A. Bandy and Carlos A. Motteram-Gutierrez, both Ph.D. candidates at Texas A&M University, co-applicants of the proposal “Gravity Study of the Crustal Structure of the Colima Graben – An Inclined Continental Rift in the Western Pacific Coast of Mexico.”

by June Forstrom
Research Grants Administrator


The committee’s budget included $150,000 from the Penrose Endowment, and $3500 income from the Harold T. Stearns Fund. It also included $23,500 from the GSA Foundation, as follows: $500 from the Cox Fund (Geophysics Division Award), $700 from the Dillon Fund for Alaska Research, over $13,000 from the GSA Foundation Research Fund (which includes $7000 from oil companies), and over $9000 from Unrestricted Funds.

Of the 210 proposals recommended for support, 66 were master’s proposals and 144 were doctoral proposals. The size of the average award increased only slightly, from $850 in 1988 to $859 this year. Proposal requests totaled $534,793.

AWARDS

Gladys W. Cole Memorial Research Award. The committee regrets that there were no qualified applicants for this award in 1989.

John T. Dillon Alaska Research Award. This award was established in 1988 by the family and friends of John Dillon in memory of him and his dedication to field research. Dillon was particularly noted for his radiometric dating work in the Brooks Range, the results of which have had a major impact on the geologic understanding of this mountain range. The 1989 recipient is Arlene V. Anderson, University of Alaska, Fairbanks, for “Relation between Stratigraphy and Structural Geometry across a Major Structural Boundary, Northeastern Brooks Range, Alaska.”

Robert K. Fahnstock Award. This grant is awarded to the applicant with the best proposal in sediment transport or related aspects of fluvial geomorphology. The 1989 recipient is Ted Roy Turner, Montana State University, Bozeman, for “Spatial and Temporal Response of the Madison River to Point Sediment Loading; the Madison Slide, SW Montana.”

Harold T. Stearns Fellowship Award. The four recipients of this award, for research on aspects of the geology of the Pacific Islands and the circumpacific region, are Wendy A. Bohrson, University of California, Los Angeles, “Geology and Geochemistry of Socorro Island, Mexico”; Carter D. Hull, University of Oregon, Eugene, “Determining Absolute Ages of Authigenic Mineralization by U-Th Disequilibria Techniques in the Mazama Geothermal Wellcore, Crater Lake, Oregon”; Dale A. Kramer, Bowling Green State University, “Sedimentology and Basin Analysis of Sovi Trough (L. Miocene–E. Pliocene), Southwest Viti Levu, Fiji”; and Michael Donald Moore, University of California, Berkeley, “Catastrophic El Niños and Indonesian Droughts: A Paleoclimatic History from Fluorescent Bands in Long-Lived Indonesian Reef Corals.”

Outstanding Mention. The committee on Research Grants specially recognized nine of the proposals as being of exceptionally high merit in conception and presentation: Cynthia L. Balek, University of Illinois, for “A Reassessment of the Genetic Relationship Between the Early Wisconsinan Roxana Silt, Late Sangamonian Lag Concentrate, and Sangamon Soil B Horizon”; Paul K. Doss, Northern Illinois University, for “Hydrogeology and Geochemistry of the Miller Woods Wetland System, Indiana Dunes National Lakeshore, Indiana”; Carl-Henry Geschwind, Brown University, for “The Effect of Viscosity and Volatile Content on Eruptive Style: Mount Shasta, California”; Carter D. Hull, University of Oregon, for “Determining Absolute Ages of Authigenic Mineralization by U-Th Disequilibria Techniques in the Mazama Geothermal Wellcore, Crater Lake, Oregon”; Michael E. Lane III, University of Hawaii, for “Dissolution Kinetics of Carbonate Fluorapatite”; Maribeth Hughett Price, Princeton University, for “Characterization of Textures and Their Development and Deformation in Granitoid Rocks”; Jeffrey A. Snyder, University of Colorado, for “Lacustrine Sedimentation and Holocene Glaciation, Lake Linne, Spitsbergen”; Carl I. Steefel, Yale University, for “A Study of the Effects of Coupled Flow, Reaction, and Heat Transfer on the Geochemistry of the Main-Stage Veins at Butte, Montana”; Koren L. Taylor, Florida State University, for “Testing for Scales of Darcian-like Behavior in Fractured Media”.

Industrial Donations and Awards. Donations from Marathon Oil Foundation ($5000), and Mobil Oil Corporation ($2000) are funding grants to the following applicants: Geriyn Sue Andrews, University of Arizona, for “Differentiation of Stratigraphic Controlling Mechanisms in Selected Ancestral Rocky Mountain Basins”; J. Lincoln Foreman, University of Tennessee, for “Characterization of Fluid Flow Mechanisms and Fluid Compositions Involved in Fluid-Rock Interactions in the Upper Cambrian Nolichucky Shale Using Stable Isotopic and Fluid Inclusion Evidence from Authigenic Calcite and Dolomite”; Lillian M. Hess, City University of New York, for “Petrophysical Reservoir Characteristics, Depositional Environments and Diagenesis of the Red River Formation (Upper Ordovician), Williston Basin, Montana and North Dakota”; John M. Kruger, University of Wisconsin—Madison, for “Cement-Stratigraphy and Diagenetic History of the Sub-Kaskaskia Sequence Boundary in the North American Mid-Craton”; Paula Noble, University of Texas—Austin, for “Biostratigraphy and Paleoceanographic Implications of Devonian-Mississippian Radiolarians of the Marathon Basin, West Texas”; Kevin R. Stank, Northern Illinois University, for “Laboratory and Field Investigations of the Influence of Organics on Diagenetic Processes in the Vadose Zone of the Antigua Formation, B.W.I.”; Koren L. Taylor, Florida State University, for “Testing for Scales of Darcian-like Behavior in Fractured Media”; Lyndon A. Yose, Johns Hopkins University, for “Stratigraphic Sequences in Triassic Carbonate Platform Systems of the Dolomites, Northern Italy: Indicators of Global Sea-Level Change or Products of Local Tectonics?”

GSA Research Grants (continued from p. 261)


GeoRef’s New CD ROM of USGS Publications Now Available from AGI


The data base consists of complete bibliographic references and GeoRef index terms for topics and locations as part of each reference. Reports with chapters by different authors have complete references for each chapter. The sheet size, scale, and latitude and longitude are given for maps. Each reference has an average of 13.4 index terms; some references have abstracts. Current prices are included for each USGS publication in stock and available for purchase. The source of the data base is GeoRef.

GeoRef includes 1.5 million references and is updated monthly with more than 6,000 new references. It is available online through STN, Maxwell Online, DIALOG, and in Canada through CAN/OLE.

The USGS publications data base on CD ROM is available as an annual subscription, and subscribers are required to sign a license agreement. Every year a new, cumulated CD ROM will be available by March 1. Monthly updates for January-November will also be available on diskettes.

The CD ROM annual subscription costs $350 a year, or $500 a year including the monthly updates. A user's manual and toll-free customer support number are provided. Included are two versions of Personal Librarian, one of which runs in Microsoft Windows. Initial subscriptions to this CD ROM are on a trial basis. If returned within 30 days, no payment need be made.

Meet the GSA Congressional Science Fellow

Elizabeth Robinson will be available at an informal lunch-hour session on Tuesday, November 7, during the GSA 1989 Annual Meeting in St. Louis. This open forum is sponsored by the GSA Geology and Public Policy Committee. Meeting location will be announced later.

In Memoriam

Ivan Barnes
Palto Alto, California
May 11, 1989

William H. Callahan
Franklin, New Jersey

W. Storrs Cole
Sun City, Arizona
June 14, 1989

George H. Chase
Dale City, Virginia
April 18, 1989

Carol Faul
Philadelphia, Pennsylvania

John J. Fisher
Kingston, Rhode Island

Hunter Yarborough
Houston, Texas
June 11, 1989

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GSA NEWS & INFORMATION, September 1989
Municipal Solid Waste Issues in Congress

by Beth Robinson
1988–1989 GSA Congressional Science Fellow

Last year, the Khian Sea steamed onto the front pages of America's newspapers. For two years, the garbage barge searched in vain for a place to deposit its rotting, blackened garbage while Haiti, Guinea-Bissau, the Bahamas, Honduras, and the Dominican Republic refused to allow it into their ports. Although America produces enough garbage to fill many barges every day, our waste policies reflect the aimless voyage of the Khian Sea.

Soon, we may have no place left to put our garbage. We now place over 80% of our trash into landfills. Yet, nearly half of the states will lose their landfill capacity in the next ten years. Some states (New Jersey, Florida, and New York) may run out even sooner.

Most states face nearly insurmountable barriers to siting a new landfill. Many communities feel that it should not be in their backyard. The geology and ground water have often been ignored in siting and construction of landfills so that many have problems with ground-water contamination or methane production.

Many other countries produce less trash than we do. The average American produces 3.5 lbs of garbage per day, in New York the average is 4.0 lb/day. Yet, in Tokyo, the average is 3.0 lb/day; in Paris, 2.4 lb/day; in Hamburg, 1.9 lb/day; and, in Rome, only 1.5 lb/day.

Along with producing less trash, other nations also treat it differently. West Germany recycles 15%, converts 30% to energy, and landfills 55%; Japan recycles 50%, converts 23% to energy, and landfills only 27%. America recycles 10%, incinerates 5–10%, and landfills over 80%. In America we have been blessed with so much land that we have not had to search for alternatives to landfilling, but those days are over.

Congress has begun to look at these problems. At least twenty separate bills have been proposed and most have a strong emphasis on alternatives to landfilling. With the coming debate over the reauthorization of the Resource Conservation and Recovery Act (RCRA), a more comprehensive approach can also be taken. RCRA prescribes a hierarchical approach to waste problems: waste reduction, recycling, incineration, and landfiling. However, our national hierarchy is exactly the opposite in practice. Landfilling is the most common method of dealing with waste, followed by incineration and recycling, and finally, reduction. Emphasis will be placed on reversing this hierarchy during this round of legislation.

Problems also exist with each of the waste treatment methods and legislation may be needed to address them. Poor siting and construction at landfills has led to leachate and methane contamination. Leachate forms when rain water percolates through a landfill, dissolving parts of garbage. Methane also collects at landfills and, in some cases, has become so concentrated it has ignited.

Almost 70% of landfills that are currently operating will close in the next 15 years. Siting of new landfills is a very contentious issue all over the nation. Because each state has its own regulations, some lax and others tough, Congress is considering developing a uniform minimum standard for siting landfills.

A number of bills in Congress have also dealt with the problems of incineration. Incinerator ash and effluent can contain high concentrations of toxic substances and, in many cases, ash from burning household refuse will constitute hazardous waste. If an incinerator is not run properly, these problems are made worse. The new generation of incinerators is much better than the older generation and even more improvements are expected. However, new incinerators will solve only part of the problem.

Congress may move to treat incinerator ash as a hazardous waste under RCRA. To dispose of the ash, a manifest would be kept from cradle to grave. Some incinerators have hazardous waste landfills nearby, but others will need to transport the material.

The last method of treating trash, recycling, is also not risk free. Many recycling processes are dangerous, as are those that went into manufacturing the original product. These recycling facilities will have to be issued permits and be monitored by the Environmental Protection Agency. Nevertheless, recycling is an excellent method of dealing with municipal waste. Many bills have been proposed to increase the recycling effort, from innovative methods of creating a national market for recycled goods to a national bottle bill. Most likely one or perhaps a number of approaches to recycling will be included in a comprehensive bill.

Finally, to get at the root of the problem, we must reduce the amount of waste that we produce. We must study ways of limiting our trash and give incentives to companies to redesign the products to produce less waste. Perhaps even more important, we must educate the public about solid waste problems and what can be done about them.

A Role for Geoscientists

Geoscientists have much to contribute to legislation on these issues, especially with the problems with siting landfills. Congress may act on these issues this year, and hearings have already been held on municipal solid waste issues in the House Subcommittee on Transportation, Tourism and Hazardous Materials of the Energy and Commerce Committee in preparation for the reauthorization of RCRA.

Members of GSA should feel free to call or write their congressman, or the chairmen of the appropriate committees, if they have any thoughts that they would like to add to the discussion. The committee chairmen on these issues are Energy and Commerce chairman Representative Dingell and subcommittee chairman Representative Loken in the House, and Environment and Public Works chairman Senator Burdick and subcommittee chairman Senator Baucus in the Senate. The coming debate will be worth the effort.

Editor's note: Elizabeth Robinson, GSA congressional Science Fellow for 1988–1989, is completing her term in the office of Congressman Richard A. Gephardt. The fellowship, which is for a one-year term, is jointly sponsored by funds from GSA and a grant from the USGS.
1989 Annual Meeting Symposia Highlights

This is the third in a series of four articles highlighting symposia to be presented in St. Louis at the 1989 GSA Annual Meeting. The first and second of the series appeared in the June and July issues of GSA News & Information. The fourth will appear in the October issue. The August registration issue of GSA News & Information gave a complete listing of symposia titles and authors.

S12. The Legacy of T. C. Chamberlin
Sponsored by the Quaternary Geology and Geomorphology Division
Conveners: Allan F. Schneider, University of Wisconsin—Parkside; Henry H. Woodard, Beloit College.
Speakers: Reid A. Bryson, Robert H. Dott, Jr., University of Wisconsin—Madison; Tod A. Froelking, Denison University; W. Hilton Johnson, University of Illinois—Urbana; James C. Knox, University of Wisconsin—Madison; Donald Mikulic, Illinois State Geological Survey; Meredith E. Ostrom, Wisconsin Geological and Natural History Survey; Allan F. Schneider, University of Wisconsin—Parkside; Daniel Schroeder, Beloit College; Laurence L. Sloss, Northwestern University; John Tandarich, University of Illinois—Urbana; Henry H. Woodard, Beloit College.

This symposium will honor Thomas Chamberlin, one of America's truly great geologists of the past. One of its original fellows, Chamberlin later served as president of the Geological Society of America (1894) and was the recipient of the Society's first Penrose Medal (1927). His influence in the field of natural science was not restricted to geology but pervaded virtually every scientific discipline of his day. Because of his long association with midwestern geology, it seems only appropriate that the Society pay tribute to this distinguished scientist at its St. Louis Annual Meeting in the heart of the midwest.

One purpose of the symposium will be to survey the scientific ideas and contributions of Chamberlin, to trace these ideas through the past 125 years, to assess them in the light of current scientific thought, and to examine the importance of his contributions in the context of the 1989 Annual Meeting theme "Frontiers in Geoscience." Thus, speakers will analyze not only the significance of Chamberlin's contributions to scientific advances in the past, but how they may affect the future direction of geoscience. Papers will be presented on such significant Chamberlin contributions as the concept of multiple working hypotheses as scientific method, the origin of planet Earth, climatic change and the causes of continental glaciation, the classification of Quaternary glacial deposits, and the geomorphic history of the Driftless Area. A second objective will be to review the distinguished career of Chamberlin in his several professional capacities as a teacher, an administrator, a scientist, and an editor. Papers will focus on Chamberlin's career as a professor at Beloit and Chicago, as state geologist of Wisconsin, as president of the University of Wisconsin, as founder and chairman of the geology department at Chicago, and as founder and editor of the Journal of Geology. Several papers on the program will integrate these two objectives.

S13. Implications for the Geological Sciences from Recent Developments in Geochemical Techniques and Instrumentation
Sponsored by the Geochemical Society
Conveners: J. Michael Rhodes, University of Massachusetts; Alan Zindler, Lamont-Doherty Geological Observatory.

About a quarter century ago, the introduction and development of many new instrumental methods for measuring major, trace, and isotopic abundances in rocks, minerals, and waters led to the quantification of geochemistry and petrology. Today we are at a similar threshold, with new generation instruments, as well as many totally new and varied analytical techniques. We have an increased capacity to analyze more elements and isotopes at lower concentrations, in smaller sized samples and on the surfaces of materials. Many of these techniques are expensive and require large facilities. The days of "a chicken in every pot" are probably gone. We will need to consider maintaining regional analytical facilities to be readily available to a wide clientele of geoscientists. This symposium will provide an overview by recognized leaders in their fields of many of these techniques, emphasizing their present and potential value for solving a wide range of geological problems.

S14. Sigma Gamma Epsilon Research Symposium
Sponsored by Sigma Gamma Epsilon
Conveners: Austin A. Sartin, Centenary College; Charles J. Mankin, Sigma Gamma Epsilon.

The inaugural Sigma Gamma Epsilon symposium was organized to recognize the wide range of research being conducted by students in the earth sciences. The symposium offers a forum for young geoscientists to present their research before a national audience. It is critical for these geoscientists to have their research efforts receive the open dialogue necessary for the advancement of the earth sciences. Research projects being conducted in geology, hydrology, geophysics, mining, geological engineering, petroleum engineering, geochemistry, and any other phase of earth science are eligible for the sixteen slots to be presented in the poster symposium.

Sigma Gamma Epsilon, the national honor society of the earth sciences, became an Associated Society of the Geological Society of America in 1987. The research symposium was proposed by the student delegates at the 32nd Biennial Convention of Sigma Gamma Epsilon to encourage its membership and other young geoscientists to participate in a national effort to inform the geoscience community of the many scientific advancements being achieved by undergraduate and graduate students at colleges and universities across the country.

S15. Geological Controls on the Regional Distribution of Archaeological Sites
Sponsored by the Archaeological Geology Division

This symposium will examine and illustrate how geologic factors influence the distribution of archaeological sites in a variety of geographic and geologic settings. Speakers will address the question, "To what extent does the presence or absence of archaeological remains for any time period reflect actual human settlement or demographic patterns, rather than the vagaries of the stratigraphic record?" As geologists, we view the physical record of former human activity as being strongly skewed and filtered by non-cultural processes responsible for the occupancy, burial, detection, and destruction of archaeological strata. Each stratigraphic association—alluvial, shoreline, eolian, underwater, periglacial, rock shelters—has unique processes that control or modify the distribution of human remains within a site and within a region. For example, apparent chronologic gaps in the archaeological record may be due to differential postplacement destruction or burial of sites rather than to cultural factors. Spatial gaps in site distributions are equally affected by geologic processes. Reconstructing the... (continued on p. 265)
Symposia Highlights (continued from p. 264)
settlement patterns and demographics of prehistoric peoples, an objective at the heart of archaeology, must take into account the influence of the geologic filter.

The protection of our archaeological heritage is mandated by federal and state laws under the rubric of “Cultural Resource Management” (CRM). A primary objective of CRM research is to identify and assess the importance of a site prior to human disturbance, which all too often lies beneath the blade of a bulldozer. The development of a lithostratigraphic model for predicting the probability of site occurrence and age would facilitate CRM goals by improving survey strategies and on-site assessments. Thus, an improved understanding of the geologic filter could be put to immediate and practical use. Examples of such uses will be described by some of our speakers.

S16. Modern and Ancient Environments of Coal Formation
Sponsored by the Coal Geology Division

Modern scientific theories about the origin of coal date back to the late eighteenth century when peat was first identified as the precursor of coal. Recently, scientific interest in the origin of coal deposits has been directed at identifying the type of peat swamp in which a particular coal was formed. Existing models for the formation of coal have focused on those modern depositional environments which best explain the origin of clastic deposits in coal-bearing sequences. Applications of models of coal formation based primarily on these clastic depositional environments require assumptions to be made to account for the occurrence of coal deposits. “Domino” of peat swamps, for example, is being cited in the geologic literature as a possible process which results in thick, low-ash and low-sulfur coals. However, there is little published research on the geologic characteristics of modern domed peat swamps.

Equatorial domed peat deposits in coastal Indonesia and Malaysia are possible analogs for the occurrence of some extensive, thick, low-ash and low-sulfur coals. Recent research on these peat deposits includes peat petrography, palynology, geochemistry, mineralogy, hydrology, and sedimentology. The geologic characteristics of these peat deposits are used to set constraints on criteria for the interpretation and recognition of peat-forming environments in the rock record.

The purpose of this symposium is to present the geologic characteristics of modern equatorial domed peat deposits and relate them to the origin of coal. Applications of the “doming” model based on these peats to coals will be presented. Tectonic, eustatic, and climatic conditions of these domed peats will be related to the rock record, as will the clastic sedimentary deposits adjacent to the domed peats. This symposium will influence the future direction of coal geology as researchers focus on recognizing the types of swamps which formed a given coal bed.

For 1989 Annual Meeting information: GSA Meetings Department, (303) 447-2020

The Age of Dinosaurs Short Course

Sunday, November 5, 8:15 a.m. to 5:30 p.m., Adam’s Mark Hotel.

This course is designed to bring nonspecialists up to date on recent advances in the knowledge of dinosaurs and to provide participants with a basis on which to develop an introductory dinosaur course in their own institutions. Dinosaurs are an endless source of interest for students, and they can be used to teach a spectrum of concepts from molecular evolution to geophysics. Dinosaur courses currently enroll 600 or more students and can stimulate all kinds of students to learn more about Earth and life history. (Department Chairs, please note!) This course will be taught by 12 dinosaur specialists, and ample discussion time is planned. Short course notes will supplement lectures and provide references. Geological, ecological, and evolutionary aspects will be covered along with new ideas and issues. The focus will be on both explaining recent advances and showing participants how to set up a dinosaur course.


No cost. Short course notes will be available on-site for approximately $15. PREREGISTRATION IS REQUIRED. To reserve a seat, please fill out the form and send by OCTOBER 1, 1989, to

Kevin Padian
Museum of Paleontology
University of California
Berkeley, CA 94720

Please reserve a seat for me at the Age of Dinosaurs Short Course, Sunday, November 5, 1989 at the GSA Annual Meeting in St. Louis.

Name ____________________________
Institution ________________________
Address __________________________

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Frontiers Photo Salon

An attraction at the GSA Annual Meeting in St. Louis this year will be GSA's first photo contest. Entries will be judged on basis of impact, content, composition, and overall presentation.

- Color or black and white prints.
- Print size: minimum of 8" × 10"; up to maximum of 23" × 24".
- Prints mounted on white, blue, beige, or black mat board.
- Description of print on front lower edge of mat board.
- Your name and address on back of mat board.
- Only 1 entry per photographer.

Entries will be screened for suitability. Photos will be displayed on the second level of Cervantes Convention Center. Judging, by GSA editors, will take place on Sunday, November 5. First, second, and third place prizes will be awarded. First place color winner will appear on the cover of Geology. (Photos that have already appeared on the cover of Geology are not eligible.)

All entries will be returned by November 30, 1989.

To enter, fill out the entry form and send it, along with your photo, before OCTOBER 1 to

Raymond E. Arvidson
Dept. of Earth & Planetary Sciences
Washington University
Campus Box 1169
St. Louis, MO 63130

Questions? Call GSA Meetings Dept., (303) 447-2020

--- Clip and send with entry by October 1 ---

Name ________________________________

Institution ____________________________

Address ______________________________

City __________________ State ________ ZIP ________

Telephone number: ( ) __________________

Description of photo: __________________

____________________________

GSA NEWS & INFORMATION, September 1989
MEETINGS

(Asterisk indicates new or changed information)

1989


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


1990 GSA Annual Meeting—Dallas, Texas
October 29-November 1
Dallas Convention Center

General Chairman: David E. Dunn,
University of Texas at Dallas

Short Course Deadline ............... December 15, 1989
Proposals are encouraged from members and nonmembers. Proposals will be reviewed by GSA’s Short Course Committee no later than January 31, 1990.

For short course proposal guidelines contact:
Short Course Coordinator
Edna Collis, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020

Theme Session and Symposia Deadline ... January 2, 1990
For 1990 program specifics contact:
Technical Program Chairman
Richard M. Mitterer, Program in Geosciences, University of Texas at Dallas, Richardson, TX 75083-6088, (214) 690-2401 (dept.), (214) 690-2462 (direct)

For general information on program participation (1990 and future years) contact:
GSA Meetings Manager
Sue Beggs, GSA, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020
MEETINGS (continued from p. 267)


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


34th Annual Midwest Ground Water Conference, October 18–20, 1989, Western Michigan University, Kalamazoo, Michigan. Information: Alan E. Kehew, Dept. of Geology, Western Michigan University, Kalamazoo, MI 49008; (616) 387-5495.


MAPFRE International Meeting on Catastrophes and Society, October 24–26, 1989, Madrid, Spain. Information: Ignacio G. Peso, Paseo de Recoletos, 25. 28004, Madrid, Spain; phone (1) 581 11 00; telex 48902 MAPFRE; fax 1-419 91 95.


Annual Meeting of the Association of Ground Water Scientists and Engineers, October 31–November 1, 1989, Houston, Texas. Information: Susan Crites, National Program, AGWSE/NWQA, 6375 Riverside Dr., Dublin, OH 43017; (614) 761-1711; telex 241302.

*Society of Vertebrate Paleontology 49th Annual Meeting, November 1-4, 1989, Austin, Texas. Information: SVP89, Vertebrate
MEETINGS (continued from p. 268)
Paleontology Lab., Balcones Research Center, 10100 Burnet Road, Austin, TX 78758-4497; (512) 471-6087.


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

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


1989 Petroleum Hydrocarbons Conference, co-sponsored by the Association of Ground Water Scientists and Engineers and the American Petroleum Institute, November 15-17, 1989, Houston, Texas. Information: National Water Well Association, P.O. Box 182039, Dept. #017, Columbus, OH 43218; (614) 761-1171; telex 241302.


Penrose Conference

1990


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

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


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


MEETINGS (continued from p. 270)

Information: Robert Hall, Department of Geological Sciences, University College, Gower St., London, WC1E 6BT, England.


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


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


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

*9th International Conference on Basement Tectonics, July 2-6, 1990, Canberra, Australia. Information: M. J. Rickard, ANU, GPO Box 4, Canberra ACT 2601; phone 026-492055.


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


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

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

7th International Conference on Geochronology, Cosmochronology and Isotope Geology, September 24-29, 1990, Canberra, Australia. Information: Organizing Committee, ICGG 7, Research School of Earth Sciences, Australian National University, G.P.O. Box 4, Canberra, A.C.T. 2601, Australia; phone 062-49-3406; fax 062-47-6639; telex 62693.

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

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

Penrose Conferences 1990


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

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