

The Lattice



Vol. 2, No. 3, August 1986

Council Actions

Cost of Reviews in Mineralogy Volumes Going Up; Member Discount Increases

The MSA Council at its meeting May 18 in Baltimore voted to increase the cost of all volumes in the *Reviews in Mineralogy* series by an average of 30 percent. To offset the new prices, the Council also voted to increase the member discount from 20 to 30 percent on these volumes. Prices are effective January 1, 1987.

The overall price increase is a reflection of the fact that the volumes are excessively underpriced. One indication of this is that bookstores are buying the volumes from MSA and then reselling them for \$25 to \$30 indicating that the fair market value of the books has risen. The new prices also reflect the increased actual cost of handling and postage. Long suspected to be higher than the amount assessed under current prices, actual costs have now been identified by the Business Office and incorporated into the new prices.

To keep the increase minimal for MSA members, and to attract new members, the Council elected to increase the membership discount on volumes in the *Reviews in Mineralogy* series from 20 percent to 30 percent. This results in an average increase to members of just over 12 percent. It also

means that if a student purchases an average of three books, the member discount would be \$15.30 or enough to pay student dues for one year. In the past a student would have had to purchase an average of six books to realize a discount of \$15.

Advertisements and promotions for the *Reviews in Mineralogy* series will be increased in the coming years. MSA hopes to attract more of the nonmember market that is currently purchasing the publications from bookstores at a marked-up price. Current sales figures indicate that over half of all sales are to nonmembers. Annual sales of the *Review* volumes are approximately \$75,000, or about 4,000 volumes, making up a large share of the Society's annual income. Sales are not expected to decline noticeably with the price increase.

The new prices include postage and handling if an order is prepaid. All orders that total \$70 or less must be prepaid. Orders over \$70 will be invoiced if accompanied by a purchase order. Invoiced orders will be charged postage and handling. Books are mailed within the week that the order is received. Telephone orders will be accepted if charged to a credit card. Books are mailed

via book rate in the U.S. and by foreign book rate overseas. Air mail and UPS service are available for an additional charge. Staff members at the Business Office will be happy to take a telephone order, paid for by a credit card, or answer any questions.

Council Reviews First Six Months of 1986

The MSA Council met May 18 at Johns Hopkins University in Baltimore for its second session of the Society year. Called to order by MSA President Paul B. Barton the day-long meeting resulted in several decisions, most of which are outlined below.

One of the main topics of discussion at this meeting has traditionally been price increases for the coming year. After careful consideration, the Council decided to accept the recommendations of Treasurer Gordon L. Nord. Dues in 1987 for members and fellows, students, and spouse members will not be increased. The dues will remain at \$35, \$15, and \$10 respectively.

The subscription price charged libraries and institutions for *The American Mineralogist* will increase to \$130 from \$115 for U.S. subscribers and \$120 for non-U.S. subscribers. This represents a change from the past. Previously, subscribers outside the U.S. were charged \$5 more than subscriptions sent to addresses within the U.S. Subscribers will continue to receive any new volumes of the *Reviews in Mineralogy* series published in 1987.

The Council also voted to increase the cost of the volumes in the *Reviews in Mineralogy* series an average of 30 percent. At the same time the Council elected to increase the member discount on the *Review* volumes

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	Non-member Price 1986	Non-member Price 1987	Member Price 1987
Volume 1	\$10.00	\$13.00	\$ 9.10
Volume 2	\$13.00	\$17.00	\$11.90
Volume 3	\$14.00	\$18.00	\$12.60
Volume 4	\$10.00	\$13.00	\$ 9.10
Volume 5	\$14.00	\$18.00	\$12.60
Volume 6	\$13.00	\$17.00	\$11.90
Volume 7	\$14.00	\$18.00	\$12.60
Volume 8	\$13.00	\$17.00	\$11.90
Volume 9A	\$13.00	\$17.00	\$11.90
Volume 9B	\$13.00	\$17.00	\$11.90
Volume 10	\$13.00	\$17.00	\$11.90
Volume 11	\$13.00	\$17.00	\$11.90
Volume 12	\$14.00	\$18.00	\$12.60
Volume 13	\$13.00	\$17.00	\$11.90
Volume 14	\$13.00	\$17.00	\$11.90
Volume 15	\$14.00	\$18.00	\$12.60

From the President

MSA Participates in Discussion of Earth Science's Role in Society

Dear MSA Members:

As a result of the sterling efforts of the organizing committee chaired by Charles T. Prewitt, the back-up support of the MSA Business Office under Barbara Minich, and, most especially, to the high quality scientific presentations by the 700 participants, the 1986 meeting of the International Mineralogical Association at Stanford proved an unqualified success. It serves to remind me how much we all can accomplish as a team compared to what an individual can do alone! Thanks!

On February 7 of this year Barbara Minich and I attended the initial summit meeting of the Presidents and Executive Directors of about 28 solid-earth-science-related societies at the National Academy of Sciences in Washington. The meeting was sponsored by the National Research Council's (NAS) Board on Earth Sciences chaired by MSA Past President and current GSA President Gary Ernst. The Board has three roles: 1) oversight of the health of the earth sciences; 2) identification of new research opportunities including the preparation of reports to effect implementation, and 3) provision of authoritative geologic information to decision-makers. The Board thus seeks to increase the vigor of our science and provides a window into the decision-making process involving the earth-sciences.

The Board of Earth Sciences is one of several boards under the auspices of the Commission on Physical Sciences, Mathematics and Resources; reporting to the Board are about 20 ad hoc or standing committees representing some, but not all (e.g., mineralogy, petrology and crystallography are not represented by name), disciplines and activities within the Earth Science community. The Board has a close, noncompetitive, working relationship with the American Geological Institute (AGI) which is a federation of 17 earth-science societies, AGI being more concerned with services to the profession and with a general educational outreach.

As NAS President Frank Press pointed out, this is indeed a time of concern for the earth sciences, for in spite of the huge intellectual and technical advances associated with the plate-tectonic revolution and with planetary exploration, the near demise of the hard-rock mining industry and the declining domestic activities in oil and gas have placed

employment, education and research under stress.

At the February 7 meeting, presentations of major new projects within the Lithosphere Program were given by leading scientists, including: Deep Crustal Reflection Profiling, Continental Scientific Drilling, Satellite Geodesy, the IRIS (Incorporated Research Institutes for Seismology) programs for

... This is indeed a time of concern for the earth sciences. . .

global and portable seismic networks, and the physics and chemistry of earth materials. The last topic is of particular interest within MSA. A workshop on this subject was held in April under the leadership of MSA Past President Charles T. Prewitt and a report is anticipated this Fall.

The status of several ongoing programs was summarized, including the GSA's Decade for North American Geology, the Ocean Drilling Program, the National Earthquake Hazards Reduction Program, the International Geosphere-Biosphere Program (a recently launched two-decade study of the interaction of chemical, physical and biological processes relative to the biosphere), and the International Geological Congress to be held in Washington in July 1989.

Several presentations of emerging problems were presented: the decline in the capability of the U.S. to produce and/or refine metals and petroleum products threatens almost total dependence on

imported non-fuel minerals and ever increasing foreign dependency and trade imbalance for petroleum; the decline in geologic mapping; and underfunding for research in the solid-sciences.

With regard to the last item, the earth sciences have experienced a slower growth than other sciences and also have a much lower dollar per grant average than other sciences (\$50K for earth sciences, \$89K for chemistry, \$219K for physics, and \$356K for astronomy in 1985). The funding of the large consortia has not been a major factor in the poor performance of the grants to individual researchers as the consortia represent less than 15% of the total earth science budget. The ratio of awards to proposals is similar for the fields noted, averaging just over 50%.

There was little encouragement for a suggestion to institute an earth-science-wide technical meeting, but a follow-up meeting of society representatives may well take place.

Finally, there is a recognition that the earth sciences have essential roles in solving several major, across-the-scientific-board technical difficulties facing society. The problems include: the deterioration of the domestic minerals and energy industries, the decline in

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the vigor of university education and the problem of a cyclic employment pattern, the intractability of the problem of predicting geologic hazards, the complex problem of

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1986 President: Paul B. Barton, Jr., U.S. Geological Survey
Past-President: Hans P. Eugster, Johns Hopkins University
Vice-President: Paul H. Ribbe, Virginia Polytechnic and State University
Secretary: Henry O. A. Meyer, Purdue University
Treasurer: Gordon L. Nord, Jr., U.S. Geological Survey
Executive Secretary: Barbara B. Minich

Published at the MSA Business Office, 1625 I Street N.W., Suite 414, Washington, D.C. 20006; (202) 775-4344.

The Lattice is published quarterly (February, May, August, November) by the Mineralogical Society of America. The newsletter is distributed to MSA members as a member service. Article and letters from readers are welcome.

Letter from the Vice-President

Everything You Wanted to Know About NSF Support of Mineralogy— But Were Afraid to Ask

Dear Colleagues,

In preparation for a time-honored but onerous task—the annual MSA Presidential Address—I have decided to deviate from the norm in my presentation which is scheduled for October 1987 in Phoenix, AZ. Rather than take on “Feldspars Then and Now” or a related topic, I am beginning a systematic study of the past and present support of mineralogy, petrology, geochemistry, and crystallography by the National Science Foundation (NSF). Programs in the Division of Earth Sciences, specifically Petrogenesis and Mineral Resources, Volcanology and Mantle Geochemistry, Experimental and Theoretical Geochemistry, and Instrumentation and Facilities, will be reviewed.

Jim Hays, Division Director, has promised cooperation in this effort. Once my report has been presented, I am considering asking that each program (or perhaps these four programs combined) present an update to us annually in the form of a poster session at the annual MSA/GSA meeting.

The reason for this letter is to ask you to send me questions that you would like to have answered in my report. Some examples that my colleagues have volunteered: What individuals and universities get funded and for how much? Who are the reviewers and who are on the panels that judge proposals? What is the track record of funded individuals and programs? (A survey of the Citation Index is contemplated.) What effects

do the various consortia (e.g., Deep Sea Drilling) that are being formed in increasing numbers have on the funding of “nonmember” proposals?

Please let me hear from you! This promises to be an interesting project and your input is enthusiastically solicited. Call me at (703) 961-6880 or write to Geology, VA Tech, Blacksburg, VA 24061.

Congenially,

Paul Ribbe
Vice-President

Council Actions

Continued from page 1.

from 20 percent to 30 percent. This means that the price to members will increase by less than 13 percent. (See article in this issue further discussing the price increase for volumes in the *Reviews in Mineralogy* series.)

In other action at the meeting, Councillor A. J. Naldrett formally resigned from his position on the Council due to a pending sabbatical leave in Europe. The Executive Committee voted to fill his position by appointing former Councillor J. R. Craig, Virginia Polytechnic and State University, to serve the remaining year of Naldrett's term. The position will be up for election on the 1987 member ballot.

The Financial Advisory Committee, chaired by H. Catherine Skinner, reported that all of the Society's investment funds have been transferred from an investment manager and are now invested in shares of mutual funds managed by Fidelity Investments and Reich and Tang. A substantial profit was realized from the sale of stocks, increasing the overall value of the Society's endowment fund. (For a complete financial report see the report of the Treasurer and the Financial Advisory Committee in the May/June issue of *The American Mineralogist*.)

James Hays, chair of the Management Committee, reported that the move from the

American Geophysical Union has been completed. The Business Office is operating entirely on its own, without outside supporting services from AGU. In response to this, Council passed a resolution thanking AGU Executive Secretary Fred Spilhaus and the staff of AGU for their support during the transition.

The report of the Committee on Committees prepared by Vice President Paul Ribbe was received. The selection of committee representatives for the coming year has previously been made at the Third Council Meeting in the Fall. By submitting the report early, it is hoped that the

committees will be in place at the beginning of 1987 so that they can function effectively for a complete year. In the past it has been difficult to contact each committee member so that full committees were not able to begin working until late in the Spring. In this year of transition, individuals who wish to volunteer for committees will be added throughout the Summer. A call for volunteers for 1988 will be published in the November and February issues of the newsletter so that interested individuals can be incorporated into the Committee's report next Spring.

MSA Members in the News

Congratulations to . . . Susan W. Kieffer, U.S. Geological Survey, and Joseph V. Smith, University of Chicago, who have been elected to the National Academy of Sciences . . . Gordon E. Brown, Jr., who has been named chair of the Department of Geology, Stanford University . . . Charles T. Prewitt, who has been named Director of the Geophysical Laboratory of the Carnegie Institution of Washington, D.C. where he succeeds MSA member Hatton S. Yoder who has retired . . . Gary Ernst, University of California, who serves as president of the Geological Society of America and chair of the Board of Earth Sciences under the National Research Council . . . E-an Zen, U.S. Geological Survey, who will receive the GSA's Day Medal for the application of physics and chemistry to earth-science problems.

This column is for recognizing outstanding achievements by MSA members. Please help us recognize all members by sending this type of information to the MSA Business Office, 1625 I Street N.W., Suite 414, Washington, D.C. 20006.

Short Course Provides Overview of Behavior of Stable Isotopes in High-Temperature Environment

Interest is high for the 1986 MSA Short Course: Stable Isotopes in High Temperature Geological Processes. Plan to attend! To make it easy, you may use the registration form on page 5. Complete the form and mail it to the MSA Business Office, 1625 I Street N.W., Suite 414, Washington, D.C. 20006 before October 15.

The short course will provide a comprehensive overview of the behavior of stable isotopes in the high-temperature environment. Discussion will include theoretical and experimental aspects of isotopic fractionation, isotopic variation in natural waters, the kinetics of isotopic exchange, isotopic exchange in open and closed fluid/rock systems, the early history of the solar system, isotopic variation in the mantle, isotopic behavior in magmatic fluids, oxygen and hydrogen isotopic studies of igneous rocks, meteoric/hydrothermal systems, submarine hydrothermal systems, isotopic behavior during metamorphism, and stable isotopes and ore genesis.

The program features 12 well-known specialists: J. W. Valley (co-convener), University of Wisconsin-Madison; H. P. Taylor (co-convener), California Institute of Technology; J. R. O'Neil, U.S. Geological Survey; D. R. Cole, Oak Ridge National Laboratory; H. Ohmoto, Pennsylvania State University; M. F. Sheppard, Nancy, France; R. T. Gregory, Monash University; R. N. Clayton, University of Chicago; T. K. Kyser, University of Saskatoon; B. E. Taylor, Geological Survey of Canada; R. E. Criss, U.S. Geological Survey; and K. Muehlenbachs, University of Alberta.

The registration fees are as follows:

- MSA Member: \$175
- Non-member: \$210*
- MSA Student Member: \$75
- Non-member student: \$90*
- (*includes MSA membership for 1987)

The registration fee includes *Volume 16* of the *Reviews in Mineralogy* series, lunch on Friday and Saturday, November 7 and 8, daily coffee breaks, and the opening reception Thursday evening, November 6.

Some student scholarships may be available. Students who are interested should send one paragraph (up to 250 words) describing how attendance at the short course will benefit their research interests. Send the paragraph with a completed registration form to the MSA Business Office by October 1. Recipients of scholarships will be notified in early October. Individuals not receiving scholarships will also be notified so

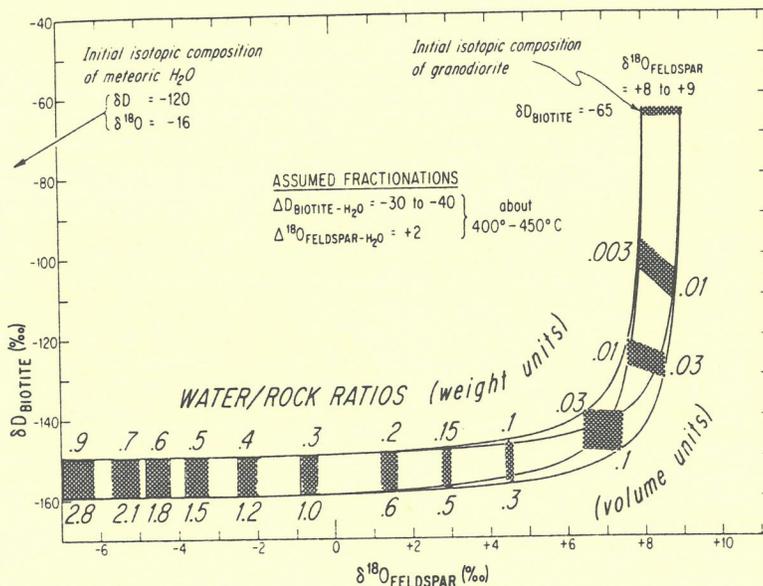
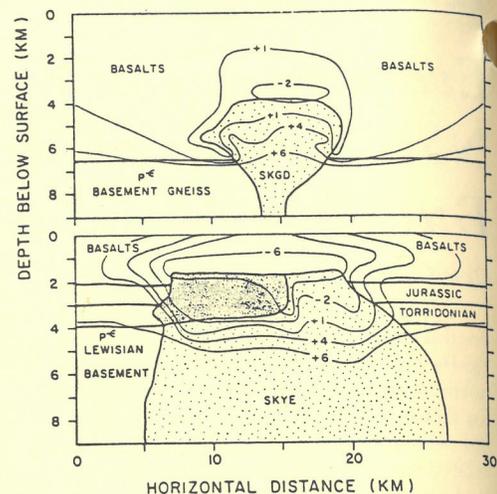
that they can make alternate arrangements to attend the Short Course.

The meeting will be held at the El Tropicano Hotel, located on the river in San Antonio. Participants are responsible for making their own housing reservations. The room rates for meeting participants are: single occupancy—\$49; double occupancy—\$59. A block of rooms has been reserved. Make your reservations as early as possible by calling the hotel directly at (512) 223-9461. Be sure to tell them that you are attending the MSA Short Course.

An easy-to-use public transportation system connects the El Tropicano Hotel to the other hotels being used by MSA/GSA meeting participants as well as the San

Antonio Convention Center. The hotel is approximately 30 minutes away from the convention center by public transportation or a 20-minute walk. You may make reservations at the El Tropicano Hotel through the MSA/GSA Annual Meeting at the same room rates.

Short course participants may take advantage of special convention air fare rates (up to 5% off any ticket including ultrasavers) arranged through Business Travel Associates. All restrictions apply, including advance purchase requirements. Reserve early by calling Bud or Paula at 1-800-443-4502 or 202-659-8314. Be sure to tell them you are attending the MSA Short Course.



REGISTRATION FORM

Stable Isotopes in High Temperature Geological Processes

November 7-9, 1986
El Tropicano Hotel
San Antonio, Texas

Return this registration form, completed, to the MSA Business Office, 1625 I Street N.W., Suite 414, Washington, D.C. 20006. Payment must accompany this form.

Name _____
(First) (Middle Initial) (Last)

Address _____

(City) (State) (Zip) (Province) (Country) (Postal Code)

Telephone Numbers () ()
(Office) (Home)

Please check appropriate registration category:

<input type="checkbox"/> MSA Member \$175	<input type="checkbox"/> MSA Student Member \$75	Total Due
<input type="checkbox"/> Non-member \$210*	<input type="checkbox"/> Non-member Student \$90*	\$ _____

(*includes MSA membership for 1987)

Please check method of payment:

Enclosed is a check in the amount of \$ _____.

Please charge my Visa Mastercard American Express credit card
in the amount of \$ _____.

_____ (Card Number) _____ (Name on Card)

_____ (Exp Date) _____ (Signature)

The registration fee includes the opening reception (Thursday evening, November 6), lunch on Friday and Saturday, daily coffee breaks, and Volume 16 of the Reviews in Mineralogy series, the text for the course. Please list below any special meal requirements _____.

IMA 86 Resounding Success Attracting Scientists from 32 Countries

One fact noted by on-site organizers of the IMA 86 meeting was that everyone who said they would be there showed up. In fact, 700 people from 32 countries attended the week-long meeting, July 13-18 at Stanford University, Stanford, CA. Sponsored by MSA and the U.S. Geological Survey, the meeting brought together scientists from around the world for a truly international discussion of the latest findings in mineralogical, petrological and crystallographic research.

A plenary lecture was held each day setting the tone for many of the lectures and poster sessions that followed. The sessions, spread out among the buildings on the beautiful Stanford campus, provided plenty of new information and topics for discussion. Six symposia were held simultaneously each day. Similar topics were grouped together so that participants could move between sessions to hear selected speakers.

Perhaps the biggest attraction however, were the poster sessions. Under a festive tent outdoors in the pleasant California weather, and lubricated with appropriate beverages, the poster sessions attracted virtually all participants each afternoon. Over 300 posters were presented in three days, allowing many participants time to discuss their research in detail. The poster sessions spawned many small group discussions afterward as participants took advantage of the sunshine in the nearby outdoor cafeteria.

In addition to the science, the business of the International Mineralogical Association (IMA) was also conducted. Individuals at the first business meeting on Monday, 14 July, heard reports from the numerous working groups and commissions which form the active element of IMA. Delegates in the second business meeting on Thursday, 17 July, elected a new Council which will serve through 1990. Peter J. Wyllie, California Institute of Technology, was elected president for a four-year term. Chairs and other officers for the commissions and working groups were also elected.

The commissions and working groups met independently during the course of the meeting to discuss their respective activities. These commissions and working groups, involving scientists from around the world, are responsible for continuing the research and international communication which is the primary purpose of IMA.

Mixed with the plenary sessions, the symposia and the poster sessions were numerous social events. The highlight of these activities was the dinner and reception attended by more than 500 participants at the

California Academy of Sciences in Golden Gate Park. Meeting attendees were able to wander through the many exhibits, from the earthquake machine to the aquarium. Several bars located throughout the building promoted social and scientific discussions prior to the buffet dinner. The evening provided participants a chance to meet one another, carry on discussions, and view a magnificent building with many fascinating exhibits.

The *Abstract Volume* from the meeting is

Did you know . . .

. . . The 1984 Index for *Mineralogical Abstracts* has been mailed to all who were subscribers to the journal in 1984. If you have not received your copy, please contact the MSA Business Office. The mail date for the 1985 Index is not yet available.

. . . November 1 is the deadline for receipt of nominations for the 1987 American Mineralogist Undergraduate Award. To nominate an outstanding undergraduate student, send a letter on department letterhead to the MSA Business Office giving the student's full name and departmental address, year in school, interest area, MSA sponsor, and the date and a brief description of the award ceremony at which the certificate will be presented.

Students nominated for this award receive a complimentary student membership in MSA, a certificate, and a subscription to *The American Mineralogist* for 1987.

To be eligible to nominate a student, a department must offer at least one course in mineralogy, petrology or crystallography and have a permanent (or tenure-track) faculty member who is a member or fellow of MSA. The certificate must be presented during a departmental or university award program. Each department may nominate one student per year.

. . . Additional copies of the *Richard H. Jahns Memorial Issue* (March/April 1986 issue of *The American Mineralogist*) are available for purchase from the MSA Business Office. The issue contains 30 papers on the mineralogy and petrology of granitic and pegmatitic rocks. The \$20 cost includes postage.

available from the MSA Business Office for the price of \$10, including postage and handling. Please mail your payment to the Business Office, 1625 I Street N.W., Suite 414, Washington, D.C. 20006.

The next meeting of IMA will be held in Beijing, China in July of 1990. For more information contact Wu Ganmei, Director, China International Conference Center for Science and Technology, China Association for Science and Technology, Sanlihe, Beijing, China.

. . . The *Abstract with Program Volume* from the 14th General Meeting of the International Mineralogical Association, held July 13-18, is available from the MSA Business Office. The *Volume* contains some 550 abstracts from 30 countries. The cost is \$10 including postage.

. . . Renewal notices will be mailed to all members in late October. Once again, we have been able to avoid a dues increase. Dues for 1987 will remain at \$35 for members and \$15 for student members. This renewal notice will provide MSA members with the last opportunity to purchase the *Reviews in Mineralogy* volumes at the current costs before the prices increase in 1987.

. . . Each year MSA sponsors a symposium at the MSA/GSA Annual Meeting. The topic for the San Antonio meeting in November is "Crystal-Liquid Reactions in Granites and Migmatites." It is being organized and convened by Richard Abbott and Robert Tracy. At Orlando last year, the topic was "Quantitative Petrology: Theory, Experiment and Field" (in honor of David R. Wones). Suggestions for symposia topics of future MSA/GSA meetings are now being sought by Roger Burns, one of the MSA representatives to GSA's Joint Technical Program Committee. Members with suggestions for the 1987 meeting should contact Roger Burns, MIT, 54-816, Dept of Earth, Atmospheric and Planetary Sciences, Cambridge, MA 02139, (617) 253-1906, or the Business Office by October 1, 1986. If possible, please suggest names of potential participants along with the symposia topics.

. . . Volume 16 of the *Reviews in Mineralogy* series, *Stable Isotopes in High-Temperature Geological Processes*, will be available at the MSA Booth during the MSA/GSA Annual Meeting November 10-14 in San Antonio, TX.

Welcome!

The following new members and students have joined MSA effective January 1, 1986. Welcome! Applications for membership may be obtained from the Business Office, 1625 I Street N.W., Suite 414, Washington, D.C. 20006. Memberships received from October 1 through December 31, 1986 will be made effective January 1, 1987 unless otherwise requested.

Albertini, Claudio, Via A. Grandi, 22, 18026 Omegna, (Novara) Italy. *H:* 0323-62923. (M-86)MI Sponsor: MSA.

Anderson, Alan J., 144 Albert Street, Kingston, Ontario, Canada. *H:* (613) 544-9688. (ST-86)IP Sponsors: J. G. Snyder and R. C. Peterson.

Black, John E., Dept of Geology, Stanford University, Stanford, CA 94305. *O:* (415) 723-2537 *H:* (415) 325-4540. (ST-86)EG Sponsors: G. E. Brown, Jr. and J. G. Liou.

Boatner, L. A., Solid State Division, Bldg. 2000 ORNL, Oak Ridge, TN 37831. *O:* (615) 547-5492. *H:* (615) 482-4833. (M-86)CC Sponsors: R. E. Ewing and I. D. Mackinnon.

Bowles, John F. W., 109 Asheridge Road, Chesham Buckinghamshire, England HP5 2P2. *O:* (0480) 62626. *H:* (0494) 72740. (M-86)MI Sponsor: MSA.

Caslen, Jennifer A., 7127 Peachtree Road, Lynchburg, VA 24502. *H:* (804) 237-4574. (ST-86)MI Sponsor: L. E. Kearns.

Chaplinsky, Peter P., Dept of Geology, University of Iowa, Iowa City, IA 52242. *O:* (319) 353-4300. *H:* (319) 337-7489. (ST-86)MP Sponsors: C. T. Foster, Jr. and G. R. McCormick.

Charusiri, Punya, 401 Princess Tower #1214, Princess Street, Kingston, Ontario K7L 5C9, Canada. *H:* (613) 549-8252. (ST-86)EG Sponsors: J. G. Snyder and R. C. Peterson.

Chaudhuri, Jyotirindra N. B., 27A, Raja Basanta, Ray Rd. 700026 Calcutta, India. *O:* (0091) 33 46-2032. *H:* (0091) 33 46-2032. (M-86)MI Sponsors: H. Strunz and B. F. Leonard.

Corson, Peter A., Box 246, Farmington, ME 04938. *H:* (207) 778-4792. (ST-86)MI Sponsor: MSA.

Duck, Jr., John J., 260 Datura Drive, Pittsburgh, PA 15235. *H:* (412) 241-6926. (ST-86)MI Sponsors: A. Cohen and E. Lidiak.

Drexler, John W., University of Colorado, Dept of Geology, Box 250, Boulder, CO 80309-0250. *O:* (303) 492-5251. *H:* (303) 499-8058. (M-86)MI Sponsors: J. L. Munoz and J. Smyth.

Fluk, Linda, 19 Bradbury Street, Allston, MA 02134. *H:* (617) 782-0604. (ST-86)IP Sponsor: MSA.

August, 1986

Ford, Frederick D., 16119 Hurontario St., RR #2, Caledon, Ontario L0N 1C0, Canada. *H:* (416) 838-2456. (ST-86)CC Sponsors: R. C. Peterson and M. Corlett.

Gaetani, Glenn, P.O. Box 387, North Amherst, MA 01059. *H:* (413) 549-5554. (ST-86)IP Sponsors: P. Robinson and S. A. Morse.

Gallagher, Larry, 159 E. Ravenwood Avenue, Youngstown, OH 44507. *H:* (216) 782-2639. (ST-86)MI Sponsor: MSA.

Gallagher, Vincent, 32 Windsor Pk., Blackrock, Co., Dublin, Ireland. (ST-86)EG Sponsor: R. Elsdon.

Hanson, Alain R. D., 136 av. de Peville, Grivegnée-Liege, Belgium B4030. *O:* (041) 56.22.04. *H:* (041) 42.18.19. (ST-86)MI Sponsor: F. Andre-Mathieu.

Hayden, Karl P., Box 1087, Beloit College, Beloit, WI 53511. (ST-86)MI Sponsor: MSA.

Hayward, Jennifer, Department of Earth Sci., James Hall UNH., Durham, NH 03824. *O:* (603) 862-1718. *H:* (603) 895-2892. (ST-86)IP Sponsors: David A. Gust and Cecil J. Schneer.

Heinrich, Christoph A., BMR Petrology Geochemistry, GPO Box 378, Canberra, ACT 2601, Australia. *O:* 062499468. *H:* 062864907. (M-86)EG Sponsor: R. W. T. Wilkins.

Helsel, Laura, 11102 Bennington Drive, Largo, MD 20772. *H:* (301) 336-0807. (ST-86)MP Sponsor: G. M. Boone and J. Dickey.

Holl, Albert, Inst. Fuer Petrographie, Kaisterstrasse 12, 7500 Karlsruhe, Fed. Republic of Germany. (ST-86)IP Sponsors: H. Puchelt and W. Smykatz-Kloss.

Huckaby, Scott A., 574 Martina Drive N.E., Atlanta, GA 30305. *O:* (404) 658-2272. *H:* (404) 233-0455. (ST-86)MI Sponsors: D. A. Vanko and T. E. LaTour.

Inouye, Cindy, 1915 W. 253rd Place, Lomita, CA 90717. *O:* (818) 354-0278. (M-86)MI Sponsor: MSA.

Kingma, Kathleen J., 395 Alexandria Colony East, Columbus, OH 43215. *O:* (614) 221-7419. *H:* (614) 221-7419. (ST-86)CC Sponsors: J. W. Downs and M. Barton.

Metzger, Ellen P., Dept of Earth Sciences, University of North Carolina, Wilmington, NC 28403. *O:* (919) 395-3495. *H:* (919) 392-5465. (M-86)MP Sponsor: MSA.

McAninch, Brian Ellis, Box 1846, Dept of Geological Sciences, Brown University, Providence, RI 02912. *O:* (401) 863-1932. *H:* (401) 351-6425. (ST-86)CC Sponsors: E. Snow and R. A. Yund.

Milburn, John, 3302 Sawtelle Blvd 22, Los Angeles, CA 90066. *O:* (213) 256-6388. *H:* (213) 397-2506. (ST-86)MI Sponsors: W. Dollase and M. Barton.

Miyawaki, Ritsuro, Sakura-mura, Ibaraki, 350 Japan. *O:* (0298) 64-3106. *H:* (0298) 53-4520. (ST-86)CC Sponsor: MSA.

Mueller, Gerd, Institut Fuer Mineralogie, Schnittspanstr. 9, D-61 Darmstadt, West Germany. *O:* (06151) 165280. *H:* (06071) 1624. (M-86)MI Sponsors: H. Wondratschek and W. Muller.

Nelson, Joan C., Box 1215, Beloit College, Beloit, WI 53511. (ST-86)MI Sponsor: MSA.

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Noh, Jin Hwan, Dept of Geology, Kanweon National University, Chuncheon 200, Korea. *O:* (0361) 53-4551. *H:* (0361) 52-3183. (M-86)MI Sponsors: S. J. Kim and S. H. Lee.

Obrient, James D., Chevron USA, 6001 Bollinger Canyon Road, San Ramon, CA 94583. *O:* (415) 842-0715. *H:* (415) 938-5507. (M-86)IP Sponsor: MSA.

Oh, Chang Whan, Dept of Geology, Stanford University, Stanford, CA 94305. *O:* (415) 723-1010. (ST-86)MP Sponsors: J. G. Liou and M. Cho.

Ohmasa, Masaaki, Inst. of Materials Sci., Univ. of Tsukuba, Sakura-mura, Ibaraki, 305 Japan. *H:* (0298) 53-5012. (M-86)CC Sponsor: MSA.

Ottaway, T. L., Dept of Mineralogy, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario, Canada M5S 2C6. *O:* (416) 586-5815. *H:* (416) 699-6880. (ST-86)GE Sponsors: F. J. Wicks and J. D. Grice.

Paige, Matthew L., Dept of Geology/Geophysics, Boston College, Chestnut Hill, MA 02167. *H:* (617) 787-5234. (ST-86)IP Sponsor: J. W. Skehan, SJ.

Piccoli, Phil, 308 Haugh Drive, Pittsburgh, PA 15237. (ST-86) Sponsor: MSA.

Rink, Jack, Dept of Geology, Florida State Univ., Tallahassee, FL 32306. *O:* (904) 644-5860. (ST-86)CC Sponsors: G. W. DeVore and B. F. Buie.

Sheridan, Amy W., Dept of Geology and Geophysics, Boston College, Chestnut Hill, MA 02167. (ST-86) Sponsor: J. W. Skehan, SJ.

Sheu, Juang-Ling, Dept of Chemistry, Arizona State University, Tempe, AZ 85287. *H:* (602) 967-5712. (ST-86)CC Sponsors: T. Stanton and H. Nekvasil.

Sidle, William C., P.O. Box 12394, Columbus, OH 43212. *O:* (614) 424-5916. *H:* (614) 890-5687. (M-86)IP Sponsor: MSA.

Simms, James H., Rt. 10, Box 1320, Lufkin, TX 75901. (ST-86) Sponsor: V. Gobel.

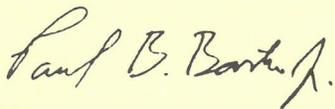
Continued on page 8.

From the President

Continued from page 2.

toxic waste management, and the decline in available quality water supplies.

Those attending meetings such as this one, especially for the first time, often feel a sense of frustration in just sitting, listening and discussing major problems; one usually leaves with little sense of accomplishment. However, the perception of shared problems is often the first step toward answers; major national programs do emerge from small beginnings, from germs of ideas that recognize needs and/or opportunities. Just as an individual experiment seldom solves a problem all by itself, so each meeting does not achieve instant success; but eventually, the right ideas expressed in the right words reach the right person at the right time and the whole scientific engine lurches forward another notch. MSA will continue to participate when opportunities come along; we shall try to keep you informed, and we welcome comments and suggestions from all.



Paul B. Barton, Jr.
President

New Members

Continued from page 7.

Simon, Steven B., Inst. Study Mineral Dept., S.D. School of Mines, Rapid City, SD 57701. O: (605) 394-6175. H: (605) 341-2930. (ST-86)IP Sponsors: J.J. Papike and Edward F. Duke.

Stork, Allen L., Geology Dept., Western State College, Gunnison, CO 81230. O: (303) 943-3044. H: (303) 641-3267. (M-86)IP Sponsor: MSA.

Tsai, Ping Ping, 14 Major Lane, Plainsboro, NJ 08536. O: (201) 932-3811. H: (609) 799-4154. (M-86)MI Sponsor: MSA.

Uzochukwu, Godfrey A., Dept of Plant Sc. & Tech., Greensboro, NC 27411. O: (919) 379-7779. (M-86)MI Sponsor: MSA.

Vlassopoulos, Dimitrios, Dept of Geological Sciences, McGill University, Frank Dawson Adams Bldg., 3450 Univ. Street, Montreal, Quebec, Canada H3A 2A7. (ST-86) Sponsor: R. F. Martin.

Wilson, James R., Geology Dept—2507, Weber State College, Ogden, UT 84408. O: (801) 626-6208. H: (801) 544-4611. (M-86)MI Sponsors: W. T. Parry and E. U. Petersen.

Yamamura, Brian K., 1-123 King Street East, Kingston, Ontario K7L 2Z9, Canada. H: (613) 546-5149. (ST-86)EG Sponsors: J. G. Snyder and R. C. Peterson.

8/The Lattice

From the Editor

Additional Pages Reduce Backlog; Tables Now Typeset

The September/October issue of *The American Mineralogist* has been sent to the printer. In an effort to dispatch the backlog of manuscripts ready to be published, the MSA Council authorized extra pages for the November/December issue. Because of this decision, the existing backlog has been cut by approximately one-half. I hope to be able to reduce the average publication time for manuscripts in *The American Mineralogist* to less than 12 months in 1987. So, if you were considering mailing that rare, award-winning paper of yours to another journal, feel free to reconsider.

I want to tell you about an important change in *The American Mineralogist* format. Effective immediately, all tables will be typeset. The reasons for this change are (1) MSA will save space and a little money because many tables take less space typeset than photographed camera-ready; (2) it will take authors less time and hassle in preparing manuscripts; and (3) the appearance of the journal will be enhanced. Of course this means that authors must carefully proofread their tables in page proofs, but in most cases that will still be less burdensome than preparing camera-ready tables according to our former specifications. For authors already in the system, your tables are being marked for typesetting, and you will have to look at them carefully in page proofs. For future authors, please note that henceforth all tables must be double-spaced to allow for insertion of the printer's coding. Also please indicate for complicated tables any special alignment of tabular information that is essential to preserve your meaning. Please contact the editorial office directly if you have specific questions about preparing your tables.

I want to say a brief word about manuscripts prepared on word processors. Some of them have been hard to deal with lately, so please take note. (1) A *high-quality* dot-matrix printer is OK, but if you have difficulty telling the difference between certain letters, the typesetters in Kansas probably will too. Of course "letter quality" is usually better, if you have access to such a printer. (2) Please use a decent ribbon! You all know what I mean. (3) Bigger is better! An average technical manuscript is literally covered with cryptic codes that the typesetters actually keyboard along with your words to tell the computer how to format your text, symbols, and equations. A 10-pitch font on 10-pitch spacing is better than a 12-pitch font on 12-pitch spacing. Either is

better than *any* proportional spacing, which is usually more characters per inch than 12. Double spacing (about 5mm of white space between lines), as opposed to "one-and-one-half" spacing is absolutely essential. For very complex mathematical and/or chemical copy, triple spacing would be a boon. (4) Turn off right justification! "Ragged right" is much easier to understand, in terms of spacing. Also, turn off end-of-line hyphenation; carry the word down to the next line. Remember, the folks in Kansas who are typesetting your manuscript don't know ferrocapholite from pligionite. (5) To those using laser printers—please make your typeface larger if you have lots of subscripts and superscripts. Alternatively, don't reduce the size of your subscripts and superscripts. They must be clearly legible even though surrounded with copy editing marks and computer codes.

The Publications Committee is preparing a report for the Fall Council meeting on possible "author-prepared" options for *The American Mineralogist*. If any of you have had any noteworthy experiences—good or bad—in preparing "author-prepared" manuscripts for other journals, please let me know. I am very interested in your comments on this important subject.

I hope that the rest of your summer is enjoyable and productive. Please visit us if your travels bring you through Boulder.

Jim Munoz
Editor

In Memoriam

We regret to announce the passing of the following MSA members and fellows. MSA extends its condolences to the friends and families of these scientists.

Behre, Jr., Charles, H.
Life Fellow, 1934

Fisk, Henry G.
Life Member, 1929

Korzhinskii, D. S.
Honorary Fellow, 1980

Phemister, James
Life Fellow, 1959

Valentine, Wilbur G.
Life Member, 1941

Mark Your Calendar!

MSA Hosts Reception for Members and Their Guests at MSA/GSA Annual Meeting

Each year MSA and the other associated societies of the Geological Society of America (GSA) work together prior to the annual meeting to review and select abstracts, then schedule symposia and poster sessions. It is the combined effort of these society representatives (this year R. N. Abbott, R. Burns and J. Laird) that consistently produce a quality meeting. This year's meeting, November 10-13, in San Antonio, Texas, promises to be no exception.

This year, MSA will host a reception for members and their guests, in addition to its other activities. The MSA Reception will be held Tuesday evening, November 11, from 5:30-6:30 at the Hyatt Regency Hotel. All MSA members and scientists interested in mineralogy, petrology, and crystallography are invited to attend. Mark your schedules and come meet your colleagues. This is an ideal opportunity for individuals interested in joining the Society to do so, and for those members with ideas for the future to speak up.

In addition to the reception, MSA will host several other activities during the meeting. Below are brief descriptions of these events, including time, and where possible, location. Be sure that you purchase your ticket to the Luncheon when you register for GSA as seating is limited and last year's luncheon was quickly sold out! Plan to participate in these activities—and bring a colleague who should be a member of MSA!

MSA 1986 Short Course— *Stable Isotopes in High Temperature Geological Processes*

Friday-Sunday, November 7-9

El Tropicano Hotel

San Antonio, Texas

Contact: MSA Business Office
1625 I Street N.W., Suite 414
Washington, D.C. 20006
(202) 775-4344

This course will provide a comprehensive overview of the behavior of stable isotopes in the high-temperature environment. Instructors for the course include 12 well-known specialists, including conveners: H. P. Taylor, Jr., California Institute of Technology and J. W. Valley, University of Wisconsin-Madison. Topics to be covered include: theoretical and experimental aspects of isotopic fractionation; the kinetics of isotopic exchange; isotopic variation in natural waters; isotopic exchange in open and closed fluid/rock systems; the early history of the solar system; isotopic variation in the mantle; isotopic behavior in magmatic fluids; oxygen and hydrogen isotopic studies of igneous rocks; meteoric/hydrothermal systems; submarine hydrothermal systems; isotopic behavior during metamorphism; and stable isotopes and ore genesis.

Registration fees for the short course are:

MSA Members: \$175

MSA Student Members: \$75

Non-members: \$210*

Non-member Students: \$90*

(*includes MSA membership for 1987)

To register, please use the registration form in this issue of *The Lattice*. Participants are responsible for making their own room reservations. Room rates are \$49 for single occupancy; \$59 for double occupancy. These are the rates for all GSA participants. To make a reservation, contact the hotel directly at (512) 223-9461. Be sure to state that you will be attending the MSA Short Course.

Third Meeting of the 1986 Council

Sunday, November 9

The 1986 Council, at their third and final meeting, will act on recommendations from the Nominating Committee for Officers, the Nominating Committee for Fellows, the Roebing Medal Committee, the MSA Award Committee, and the Research Grant (Mineralogy/Petrology) Committee. Additional agenda items will conclude the activities of this Council.

Past Presidents' Breakfast

Monday, November 10

The Past Presidents of the Society meet annually at this breakfast to discuss the long-term goals and activities of MSA.

MSA Symposium— Crystal-Liquid Reactions in Granites and Migmatites

1:00-5:00 p.m.

Monday, November 10

This symposium will bring together a number of divergent and convergent studies addressing the characterization and consequences of various crystal-liquid reactions in granitic systems. The studies will include the following aspects of the problem: 1) theory; 2) experiment; 3) petrography; and 4) trace element-REE geochemistry.

Participants include: Richard N. Abbott, Jr., Appalachian State University, convener; Robert J. Tracy, Yale University, convener; Thomas W. Dougan, James Grant, Calvin F. Miller, Michael T. Naney, E. Bruce Watson, Eileen McLellan, J. Alex Speer, D. Barrie Clarke, Sakiko N. Olsen, E-An Zen, Peter I. Nabelek, Joseph G. Arth, Jr., H. Y. Nesbitt, and J. Lawford Anderson.

Presidential Address and Annual Business Meeting

Tuesday, November 11
10:30-11:45 a.m.
San Antonio Convention Center

MSA President Paul B. Barton, Jr., will give his presidential address, "Chalcopyrite disease in sphalerite: pathology and epidemiology," beginning at 10:30 a.m. The address will be followed by an open business meeting. MSA bylaws require that such a meeting be held annually whereby the membership is provided reports by the officers to familiarize themselves with Society activities. All members are encouraged to participate.

Annual Awards Luncheon

Tuesday, November 11
12:15-2:00 p.m.
Hyatt Regency Hotel

This annual luncheon is held to provide members with the opportunity to meet colleagues and to recognize outstanding contributors to the science. Dr. Edwin Roedder, U.S. Geological Survey, will be presented the 1986 Roebling Medal, MSA's highest honor. Antonio C. Lasaga, Yale University, will receive the MSA Award in recognition of outstanding achievements by a young scientist. Following these presentations, 1986 President Paul B. Barton, Jr. will pass the gavel to the 1987 President and a new Council will take office.

First Meeting, 1987 Council

Tuesday, November 11

The 1987 Council will meet for the first time to set goals and priorities for the coming year. This is the first opportunity for new Council members to meet and learn about the activities of the Council.

Geoscience Exhibit

Monday-Thursday, November 10-13

Visit the MSA booth at the Geoscience Exhibit. Volumes of the Reviews in Mineralogy series will be one sale, including the new Stable Isotopes in High Temperature Geological Processes, Volume 16. Please invite colleagues who should be members of MSA. Membership applications will be available as will members willing to act as sponsors.

Discount Air Fares Offered to MSA on Delta, United

Delta and United Airlines are offering MSA members, their families and guests discount airfares on roundtrip flights to San Antonio, TX, during the MSA/GSA annual meeting.

Both airlines are offering 40 percent of the regular coach fare or five (5) percent of the lowest available fares, including supersavers. This means that individuals can take advantage of advertised low fares and get an additional five percent discount.

By selecting an official airline, in this case both Delta and United Airlines, MSA benefits in several ways. Members receive a lower fare and the Society receives two free round-trip tickets. An additional free round-trip ticket is given to the Society for every 40 people who book flights through Business Travel Associates on these airlines.

To ensure the lowest fares on the flights you want, plan to purchase your tickets at least 45 days prior to your departure date. Tickets must be purchased a minimum of seven (7) days prior to departure at the regular coach fare. This offer is good on round-trip flights originating on or after November 4 and returning on or before November 17. Federal regulations restrict this offer to domestic flights only. All restrictions apply, including advance purchase requirements and cancellation penalties.

Bud Forrest at Business Travel Associates and his assistant Paula will be ready to make your reservations and issue your tickets and boarding passes. Contact them at 1-800-443-4502 or 202-659-8314. Be sure to tell them that you are an MSA member participating in the MSA/GSA annual meeting.

Tickets may be paid for by credit card. Personal checks will be accepted, but must be received 45 days prior to departure to ensure the supersaver fares.

For Your Information

The International Symposium on Iron Control in Hydrometallurgy will be held from October 19-22, 1986 at the Westin Hotel in Toronto, Canada. In addition to a technical program (42 papers in 7 sessions), the Symposium will feature a trade show and two technical tours. Proceedings will be available in book form at the meeting. For further details contact: D. J. MacKinnon, CANMET, 555 Booth Street, Ottawa, Ontario K1A 0G1, Canada; (613) 995-4851; telex: 053-3117 EMAR OTT.

The Clay Minerals Society will host its 23rd Annual Meeting and the 35th Annual Clay Conference October 12-15, 1986. Clay 86 will feature soils, zeolites and industrial clays of the region under the theme 10/The Lattice

of "Manufacturing and Engineering Aspects of Synthetic and Natural Soils, Clays, and Zeolites"; a pre-meeting workshop on electron microscopy and microprobe techniques in clay analysis October 11; and field excursion(s) of the geology, geomorphology, and soils of the Coastal Plain, zeolites, light-weight aggregate, and bentonite. The meeting will be held at the Holiday Inn Downtown, Jackson, MS. For further information and registration fees, contact William R. Reynolds, Dept of Geology/Geological Engineering, University of Mississippi, University, MS 38677; (601) 232-5818.

The Friends of Mineralogy Tucson Gem and Mineral Society symposium will be held on February 15, 1987 at the Tucson Community Center. The symposium topic will be quartz, the featured mineral for the Tucson Gem and Mineral Show. Papers covering any aspect of quartz mineralogy

including structure, physical and chemical properties, paragenesis, localities, etc., are invited. Presentations will be limited to 20 minutes with an additional five minutes for questions. Papers by students will be considered for the "Best Student Paper" award from Friends of Mineralogy. The award is intended to cover part or all of the travel expenses of the student attending the symposium. Abstracts should be sent to FM-TGMS 8th Symposium, Attn: Henry Truebe, St. Joe American Corp., 2002 North Forbes Blvd., Tucson, AZ 85745. The deadline is September 31, 1986.



San AntonioSM

1986
ANNUAL MEETING
AND EXPOSITION

November 10–13, 1986
San Antonio Convention Center
San Antonio, Texas

WELCOME

You are invited to San Antonio, a city of rich Mexican heritage and many gifts of nature. San Antonio is a major center for geologists, a place of history and tradition, a city carefully planned with excellent convention facilities and entertainment within easy walking distance.

The meeting is hosted by faculty from the University of Texas at San Antonio and at

Austin; Texas A&M, and St. Mary's universities; the Bureau of Economic Geology; and other local geologists and friends.

The field trips, technical program, and other events have been designed to bring you the best in the geosciences. In addition to the regular program of volunteered and invited papers, we expect to have special poster displays of new data from COCORP, the Ocean Deep Sea Drilling Project (ODP), the University of Texas

Institute of Geophysics, and recently completed transects from the Decade of North American Geology (DNAG) project. The newest information from the Voyager encounter with Uranus will also be presented, and a number of internationally recognized geoscientists will be discussing their most recent work.

TECHNICAL PROGRAM/SYMPOSIA

The technical program consists of volunteered papers that are presented in oral or poster session and invited papers presented in symposia. The symposia list appears below.

1. **Surveying and Prospecting for Archaeological Sites.** Archaeological Geology Division; John Gifford, University of Miami.
2. **Advances in Coal Characterization.** Coal Geology Division; Jesse Yeakel, Exxon Production Research Company.
3. **Engineering Geology in Public Policy.** Engineering Geology Division and GSA Committee on Geology and Public Policy; Christopher Matthewson, Texas A&M and John S. Scott, Geological Survey of Canada.
4. **Tectonics and Geophysics of the Western Himalayas.** Geophysics Division and Structural Geology and Tectonics Division; Lawrence Malinconico, Southern Illinois University and Robert Lillie, Oregon State University.
5. **Nineteenth-Century Geological Exploration in the Western Gulf Region.** History of Geology Division; Thomas Dutro, Jr., U.S. National Museum.
6. **Hydrogeology of Sedimentary Basins.** Hydrogeology Division; Charles Kreitler, Texas Bureau of Economic Geology.
7. **Mars—Ten Years After Viking.** Planetary Geology Division; Arden Albee, California Institute of Technology.
8. **Quaternary Evolution of the Mississippi Valley.** Quaternary Geology and Geomorphology Division; James Knox, University of Wisconsin.

9. **Tide- versus Storm-Dominated Shelves: Their Modern and Ancient Oceanographic Settings and Deposits.** Sedimentary Geology Division; Rudy Slingerland, Pennsylvania State University.
10. **Microbial Contributions and Transformations in the Sedimentary Record.** Geochemical Society; Robert Gagosian, Woods Hole Oceanographic Institution.
11. **The User and Geoscience Information.** Geoscience Information Society; Robert Bier, Lakewood, Colorado.
12. **Crystal-Liquid Reactions in Granites and Migmatites.** Mineralogical Society of America; Richard Abbott, Appalachian State University.
13. **Recent Advances in Hydrogeology: Implications for Instruction.** National Association of Geology Teachers; Bernard Pipkin, University of Southern California.
14. **Ontogeny and Heterochrony in the Fossil Record.** Paleontological Society; Michael McKinney, University of Tennessee.
15. **Precious Metals in Skarns and Limestone-Hosted Intrusion-Related Ore Deposits.** Society of Economic Geologists; Joaquin Ruiz, University of Arizona.
16. **Timing and Depositional History of Eustatic Sequences: Constraints on Seismic Stratigraphy.** Cushman Foundation; Charles Ross, Chevron USA.
17. **Scientific Advances in Geology and Hydrology from Studies of Contaminant Plumes.** Keros Cartwright, Illinois State Geological Survey.
18. **High Pore-Fluid Pressures in Active Tectonic Areas.** John Bredehoeft, USGS, Menlo Park.

19. **Terranes in the Circum-Atlantic Paleozoic Orogens.** David Dallmeyer, University of Georgia.
20. **New Perspectives on the Old Rocks in Northeastern Mexico.** Thomas H. Anderson, University of Pittsburgh.
21. **Sequence Stratigraphy.** Ashton Embry, Geological Survey of Canada.
22. **Late Cenozoic Evolution of Stream Systems in the Western United States.** Peter C. Patton, Wesleyan University.
23. **The Southern Margin of the North American Craton: Late Proterozoic to Permian.** M. Charles Gilbert, Texas A&M University.
24. **North American Continent-Ocean Transects Program—Atlantic, Arctic, Gulf Transects.** DNAG; Robert C. Speed, Northwestern University.
25. **Evolution of the Rio Grande Rift and the Geochemistry of Related Magmatism.** Geochemical Society; E. Craig Simmons, Colorado School of Mines.
26. **Restricted Basin Ore Deposits.** Society of Economic Geologists; Gregory E. McKelvey, Cominco American, Inc.
27. **Recent Concepts and Quantitative Methods Applied to Carbonate Aquifers.** Robert W. Maclay, USGS, San Antonio.
28. **The Precambrian Framework of the Caribbean and Gulf of Mexico.** Allan K. Gibbs, Cornell University.

San Antonio

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COCORP, DNAG, ODP—Special Posters Displays Daily.

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TECHNICAL PROGRAM SCHEDULE — 1986

= SYMPOSIA IDENTIFICATION

UPPER/LOWER CASE = VOLUNTEERED SESSIONS

ALL CAPS = POSTER SESSIONS

SUNDAY NOV. 9	MONDAY NOV. 10	TUESDAY NOV. 11	WEDNESDAY NOV. 12	THURSDAY NOV. 13
8:30 a.m.-12:00 noon *	8:00 a.m.-12:00 noon *	8:00 a.m.-12:00 noon *	8:00 a.m.-12:00 noon *	8:00 a.m.-12:00 noon *
#10 Geochem D #26 SEG E	# 2 Coal K # 3 Eng/Publ Policy C # 6 Hydrogeology H # 9 Sedimentology B #23 S. Margin G Econ Geol I A Geochem I E Ign Pet I F Struct I J Tect I D GEOCHEM, GIS, MARINE, MICROP, OCEAN, PALEO	# 4 Struct/Geophys B # 5 History J # 7 Planetary A #14 Paleontology H Eng & Environ G Exp Pet F Geochem II E Precamb K Sedimentol I C Struct II D ECONOMIC, GEOMORPH, GLACIAL, QUAT	#13 NAGT J #19 Circum-Atlantic A #22 Evol. Western B #25 Geochem-Rio C Geochem IV E Hist/Arch K Met Pet I F Min/Cryst G Paleo II H Tect IV D COAL, GEOPHYS, OCEAN TRANSECTS, PETROLEUM	#17 Contam. Plumes B #20 NE Mexico C Econ Geol IV A Geochem V E Micropaleo K Petroleum/Sed Pet II J Quat I H Struct III G Tect V D Volcan F EX PET, IGN PET, MET PET, MIN/CRYST, VOLCAN
LUNCHEONS:		ENG, GIS, HIST, PS, HYDRO, MSA, NAGT	COAL, GEOCHEM, QG&G, SEG	
1:00-5:00 p.m. *	1:00-5:00 p.m. *	1:30-5:30 p.m. *	1:30-5:30 p.m. *	1:00-5:00 p.m. *
#10 Geochem D #26 SEG E #27 Carbon Aquifer F #28 PreC Framework G	# 3 Eng/Publ Policy C #11 GIS K #12 MSA G #18 High Pore-Fluid E #24 DNAG: Transects B Econ Geol II A Paleo I H Remote Sensing/ Planet F Strat J Tect II D HIST, HYDRO, SED PET, SEDIMENT	# 1 Archaeology G # 4 Struct/Geophys B # 8 Quaternary D #15 SEG/Skarns A Coal K Geochem III E Ign Pet II F Marine I/Ocean J Sedimentol II C Tect III H ENG/ENV, PLANET, PRECAMB, REMOTE, STRAT	#16 Cushman C #21 Sequence Strat E Econ Geol III A Geomorph F Geophys/Marine II D Hydro I J K/T Boundary B Met Pet II H Paleo III K Sed Pet I G ARCH, STRUCTURE TECTONICS	Geochem VI D Geol Ed/GIS H Hydro II J Ign Pet III E Quat II K Struct IV G Tect VI C GENERAL, GEOL ED

* ROOM KEY: A = Theater (1600)
B = South Banquet (1600)
C = Mission (770)
D = River (620)

E = Centro (646)
F = Plaza (534)
G = Fiesta AB (303)

H = Fiesta D (303)
J = Fiesta E (303)
K = Fiesta C (252)

FIELD TRIPS

San Antonio, Texas, via varied transportation means, offers ready access to diverse and unique geologic exposures in Texas and adjacent states. Trans-Pecos calderas and structure, Ouachita Mountains tectonics, Wichita Mountains stratigraphy and intrusives, High Plains morphology, Pennsylvanian cycles, Edwards limestone aquifer systems, Llano granites of the craton, salt domes, lignite resources, and coastal processes on barrier islands offer great diversity.

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

Trip costs include transportation for the trip itself and guidebook. It also may include costs of other services as noted by the following symbols: M—Meals; A—Airfare; ON—Overnight lodging. **FOR SOME PREMEETING TRIPS, GROUP RATE AIRFARES HAVE BEEN ARRANGED TO GET PARTICIPANTS TO SAN ANTONIO AT THE TERMINATION OF THE FIELD TRIP. IF YOU DO NOT WISH TO TAKE ADVANTAGE OF THIS AIR TRAVEL, PLEASE REGISTER USING THE FEE LISTED WITHOUT AIRFARE FOR THAT TRIP.**

REGISTRATION. Field trip registrants are required to be registered for the meeting. If you do not plan to attend the meeting, but do plan to participate in a field trip, you may register using the one-day registration fee. This will entitle you to a one-day badge for the day of your choice. Registration fee cannot be refunded or transferred.

PREREGISTRATION DEADLINE: must be RECEIVED at GSA Headquarters no later than October 10, 1986. Preregistration is suggested because participants are selected on a first-come, first-served basis.

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

CANCELLATION DEADLINE IS OCTOBER 17. No refunds will be given for cancellations received after this date. If GSA must cancel a field trip because of logistics or registration requirements, a full refund will be issued to trip registrants as soon as possible after the meeting.

GUIDEBOOKS may be purchased at the field trip desk during the meeting. After the meeting, contact E. G. Wermund, Bureau of Economic Geology, University of Texas, Austin, TX 78713 for information on ordering guidebooks.

For further trip information, contact Field Trip Chairman E. G. Wermund, Bureau of Economic Geology, University of Texas, Austin, TX 78713, (512)471-1534; Field Trip Co-Chairman Weldon Hammond, Div. Earth & Physical Sciences, University of Texas, San Antonio, TX 78285, (512)691-4455; Field Trip Coordinator Kathy Ohmie, GSA Headquarters; or the designated field trip leaders.

PREMEETING TRIPS

1. *Quaternary Geology and Geomorphology of the Rolling Plains, Texas Panhandle*—Thomas C. Gustavson, Robert W. Baumgardner, Jr., Chris Caran, and Edward Collins, Bureau of Economic Geology, University of Texas, Austin, TX 78713 (512/471-1534); Walter Dalquist, Midwestern State University, Wichita Falls, Texas. Two and one-half days, Nov. 7-9.

Evidence for interpretations of geomorphic processes and Quaternary history in parts of the Rolling Plains of the Texas Panhandle will be described. Particular attention will be paid to the dissolution of evaporites, primarily salt, and collapse of overlying strata as a process that has had a significant effect on landscape development and Quaternary stratigraphy in this area. A preliminary discussion of newly recognized Quaternary deposits covering several hundreds of square miles will be presented. Trip originates at Lubbock, Texas, airport, 5:00 p.m., Nov. 7. The trip will be of interest to Quaternary geologists, geomorphologists, archaeologists, paleontologists, and anyone concerned with regional paleoclimate.

Cost: \$235; includes 2 ON, 2 M, A—Lubbock to San Antonio; \$155 without airfare. Limit 45.

2. *Archaeological Geology of Classic Paleoindian Sites on the Southern High Plains, Texas and New Mexico*—Vance T. Holliday, Department of Geography, University of Wisconsin, Madison, WI, 53706 (608/262-6300); Eileen Johnson, The Museum, Texas Tech University, Lubbock; Vance Haynes, University of Arizona, Tucson; Glen Evans, Austin, Texas; Dennis Stanford, Smithsonian Institution, Washington, D.C. Two and one-half days, Nov. 7-9.

The field trip will focus on the historical significance of the Lubbock Lake, Plainview, and Clovis (Blackwater Draw Locality #1) sites, the Paleoindian archaeology and geochronology, and the late Quaternary environmental records as related to the entire region. One other late Quaternary stratigraphic sequence in lower Blackwater Draw, near Lubbock Lake, may also be viewed. The trip should be of interest to archaeological geologists and Quaternary geologists and also those interested in the history of geology and, perhaps, vertebrate paleontology. Trip originates in Lubbock, Texas.

Cost: \$235; includes 2 ON, 2 M, A—Lubbock to San Antonio; \$155 without airfare. Limit 45.

3. *Igneous Geology of Trans-Pecos Texas*—Jonathan G. Price and Christopher D. Henry, Bureau of Economic Geology, University of Texas, Austin, TX 78713 (512/471-1534); Don F. Parker, Baylor University, Waco, Texas; Daniel S. Barker, University of Texas, Austin. Three and one-half days, Nov. 6-9.

The field trip will examine caldera structures, field relations of pyroclastic rocks, rheology of peralkaline ash-flow tuffs and lava flows, magma mixing within intrusions, and petrogenesis of silica-unsaturated and silica-saturated magmas. The Trans-Pecos region is an igneous province with some of the best exposures of alkalic rocks and calderas in the world. Highlights of the first full day of the field trip will be the Marble Canyon stock, an unusual alkalic intrusion that is zoned from a nepheline-bearing alkali-gabbro rim to a quartz-syenite core, and the Van Horn Mountains caldera, where

many classic caldera structures are well exposed. Highlights of the second day will be exposures of peralkaline ash-flow tuffs, which exhibit spectacular secondary flow features, inside and outside the Buckhorn caldera and exposures of alkalic rocks on the Paisano volcano in the Davis Mountains area. On the return to San Antonio on the last day, the trip will focus on pyroclastic rocks of the Pine Canyon caldera in Big Bend National Park. Trip originates in El Paso, airport, 5:00 p.m., Nov. 6.

Cost: \$250; includes 3 ON, 5 M. Limit 45.

4. *Ouachita Mountain Geology—Structure, Stratigraphy, Depositional and Thermal History, Arkansas*—Charles G. Stone, Arkansas Geological Commission, Little Rock, AR 72204 (501/371-1488); Boyd R. Haley, Little Rock. Three and one-half days, Nov. 6–9.

The trip examines the rather complex folded and thrust-faulted Paleozoic sedimentary rocks in the east-central core and adjoining areas of the Ouachita Mountains, Arkansas, and attempts to demonstrate the apparent deep-water depositional environments and the likely sediment sources of the Lower Ordovician Collier Shale through the Middle Pennsylvanian Atoka Formation; the major thrust faults, including the Alum Fork and other decollements; the respective stages, styles, and intensities of deformation in several of the structural belts (Hooper, Mount Ida, Avilla, Aly, etc.); and the effects of episodes of late Paleozoic thermal activity and, locally, later overprinting by Cretaceous intrusives on these rocks. There will be rather lengthy discussion of the several published and other proposed tectonic models for the formation of the rocks in the fold belt; the oil and gas potential, including maturation and possible levels of degradation; and the probable exhalative base metal and other mineral occurrences. Trip originates in Little Rock, Arkansas.

Cost: \$315; includes 3 ON, 3 M, A—Little Rock to San Antonio; \$236 without airfare. Limit 45.

5. *Engineering Geology of San Antonio, Texas*—Jeffrey R. Walker and Edward G. Miller, Raba-Kistner Consultants, P.O. Box 32217, San Antonio, TX 78216 (512/699-9090). One day, Nov. 9.

This trip will provide a general overview of the effect of geology on urban development in San Antonio. The general stratigraphy, structural geology,

hydrogeology, and physiography of the San Antonio region will be presented. The two distinct geotechnical environments in the area—the Tertiary sands and expansive clay formations of southern San Antonio and the Cretaceous limestones and marls of northern San Antonio—will be examined. The geology and geotechnical engineering of several large construction projects will be inspected, with particular emphasis on the engineering geology and geotechnical aspects of construction on the Balcones fault zone and with the Edwards Group Limestone.

Cost: \$45; includes 1 M. Limit 45.

6. *Stratigraphy and Structure of the Maverick Basin and Devil's River Trend, Lower Cretaceous, Southwest Texas*—C. I. Smith, Department of Geology, University of Texas, Arlington, TX 76019 (817/273-2987); Peter R. Rose, Telegraph Exploration, Telegraph, Texas; Bruce C. Miller, Exxon Company USA, Corpus Christi, Texas; R. E. Webster, Dallas; C. H. Humphreys, Ensearch Exploration, Dallas. Three days, Nov. 7–9.

The purpose of this trip is to describe, interpret, examine, and provoke discussion on (1) the stratigraphic and facies relationships of the Lower Cretaceous Fredericksburg–lower Washita (Albian) strata between the Maverick Basin and the Devil's River trend formations of the southern Edwards Plateau, (2) surface structural patterns and their relationship to Paleozoic (Ouachita) structural and tectonic trends, and (3) the hydrocarbon potential of the Lower Cretaceous sequence in the Maverick Basin. The field trip will focus not only on clarifying the genetic stratigraphic relationships but also on examination of Cretaceous structure, including the relationship between Cretaceous and Paleozoic structures.

Cost: \$265; includes 2 ON, 3 M. Limit 45.

7. *Petrology of the Cambrian Wichita Mountains Igneous Suite*—M. C. Gilbert, Department of Geology, Texas A&M University, College Station, TX 77843 (409/845-2451); B. N. Powell, Phillips Petroleum, Bartlesville, Oklahoma; R. Cooper, Lamar University, Beaumont, Texas. Three days, Nov. 7–9.

This trip will begin with examination of the Meers fault, the largest surface-breaking fault scarp east of the Rocky Mountains. The trip will familiarize participants with the layered mafic intrusion and/or A-type sheet granites and magma mixing associated with

the Southern Oklahoma aulacogen. The aulacogen extends approximately 450 km from southeastern Oklahoma into the midcontinent, where it forms a WNW-trending swath across crystalline basement rocks with ages of 1.3–1.4 Ga. Characteristics and differences of the igneous rocks will be demonstrated, including bimodal chemistry, major gabbroic units (one a layered cumulate complex), and assemblage of granitic sheets of A-type chemistry, a series of rhyolites including both ash-flow tuffs and thick flows, and a set of diabase dikes. Trip originates in Lawton, Oklahoma.

Cost: \$326; includes 2 ON, 4 M, A—Lawton to San Antonio; \$235 without airfare. Limit 45.

8. *Hydrology of the Edwards Aquifer, San Antonio Region, Texas*—Weldon W. Hammond, Jr., Geology Program, Earth and Physical Sciences, University of Texas, San Antonio, TX 78285 (512/691-4455); Dian Pavlicek, USGS, San Antonio; George Ozuna and Glenn Longley, Southwest Texas State University, San Marcos. One day, Nov. 8.

The Edwards Limestone contains one of the most highly permeable and productive carbonate aquifers in the United States. San Antonio is the largest city in the United States to be supplied entirely by ground water. This field trip will present evidence relating to regional differences in porosity development and the geologic controls on porosity development and as such will concentrate on the hydrogeologic characteristics of the aquifer. The trip will examine local recharge areas, faults, well fields, and springs. Emphasis will be placed on research relating to the fresh water–saline water interface and its relation to hydrostratigraphic controls and hydrodynamic responses within the aquifer.

Cost: \$55; includes 1 M. Limit 45.

9. *Paleoenvironments and Fossil Communities of the Late Pennsylvanian of North-Central Texas*—Thomas E. Yancey, Texas A&M University, College Station, TX 77843 (409/845-0643); Steve Schutter, Exxon Production Research Company, Houston. One and one-half days, Nov. 7–8.

This trip will examine paleontologic communities and transgressive-regressive sequences, cyclic stratigraphy, of the late Pennsylvanian Eastern Shelf. Upper Strawn Group, Canyon Group, and lower Cisco Group outcrops, approximately late Desmoinesian, Missourian, and early Virgilian age, will be visited. A transgressive

fauna in carbonate-dominated systems can be compared to a regressive fauna of predominantly delta-related sediments. Comparisons with classic midcontinent faunas are possible. Trip originates at the Dallas-Fort Worth airport, 5:00 p.m., Nov. 7.

Cost: \$140; includes 1 ON, 1 M. Limit 45.

10. *Geology of Gulf Coast Lignites*—Walter Ayers, Texas Bureau of Economic Geology, University of Texas, Austin, TX 78712 (512/471-1534); John Breyer, Texas Christian University, Fort Worth; John Johnston, Louisiana Geological Survey, Baton Rouge; Robert Finkelman, Houston, (713/497-0425). Three and one-half days, Nov. 6-9.

The major focus of this trip is an evaluation of the evidence used in interpreting the depositional environments of the Gulf Coast lignites. Sections will be examined at five active lignite mines in Louisiana and Texas. Four mines are in the Wilcox Group; the fifth is in the Jackson Group. In addition, there will be discussions on coal quality trends, mining methods, geochemistry, petrography, and environmental aspects of lignite mining. Trip originates in Shreveport, Louisiana.

Cost: \$265; includes 3 ON, 3 M. Limit 45.

11. *Geology and Mineral Resources of Gulf Coast Salt Domes*—Steven Seni, Bureau of Economic Geology, University of Texas, Austin, TX 78713 (512/471-1534); Fairis Samuelson, Texasgulf Chemicals Co., Newgulf, Texas; and Peter Price, Marathon Oil Co., Littleton, Colorado. One day, Nov. 9.

A resurgence of interest in salt domes and their cap rocks has been fueled by expanded use of domes for product storage such as the Strategic Petroleum Reserve and by proposed use of salt domes for nuclear and toxic-chemical waste disposal and for compressed air storage. Recent exploration has discovered Zn-Pb-Ag deposits in Gulf Coast cap rocks, and research indicates a genetic link between these cap-rock deposits and several classic ore deposit types in sedimentary terranes. Two salt domes on the Texas Coastal Plain provide a convenient and appropriate starting point for comparing mechanisms and timing of dome and cap-rock evolution and natural resource distribution. Sites to be visited include the cap rock limestone quarry at the Damon Mound and the Frasch sulfur operation at

Boling dome. General features of calcite and anhydrite cap rocks will be examined in cores from Hockley and Boling domes, including sulfur and Pb-Zn-Ag sulfide mineralization.

Cost: \$70; includes 1 M. Limit 45.

12. *Sedimentation in and Deformation of the Southern Oklahoma Aulacogen*—R. N. Donovan and T. Boone Pickens, Jr., School of Geology, Oklahoma State University, Stillwater, OK 74078 (405/624-6358). Three days, Nov. 7-9.

In the vicinity of the Wichita Mountains, the field trip will address the themes: (1) the basal transgression of the Upper Cambrian across an irregular land surface carved from volcanic rock; (2) the passage from a siliciclastic to a carbonate-dominated sedimentation pattern; (3) shallow carbonate platform sediments including evidence for vanished evaporites; (4) intense structural deformation involving faulting and folding of the lower Paleozoic rocks under the influence of a left-lateral compressive stress system; (5) the Permian alluvial fan conglomerates derived from an active fault scarp; and (6) the evidence for recent (ca. 10,000 B.P.) movement of the Meers fault. Trip originates in Lawton, Oklahoma.

Cost: \$326; includes 2 ON, 4 M, A—Lawton to San Antonio; \$235 without airfare. Limit 45.

POSTMEETING TRIPS

13. *Precambrian Granite Magmatism and Diapirism, Llano Uplift, Central Texas*—Volker W. Gobel, Department of Geology, Stephen F. Austin State University, Nacogdoches, TX 75962 (409/569-3701); Robert M. Hutchinson, Golden, Colorado. Two days, Nov. 14-15.

The trip will familiarize participants with the granite magmatic phase of the Llano orogenic basement rocks in central Texas and examine petrology, internal zoning, granite tectonics, and intrusion patterns as displayed by selected plutons. Characteristics and differences of the three-phase granitic cycles in the Llano Uplift region will be demonstrated: Town Mountain-type rapakivi granites and Six Mile-type and Oatman Creek-type granites.

Cost: \$150; includes 1 ON, 1 M. Limit 45.

14. *Geologic and Geomorphic History of the Edwards Limestone Aquifer and Surface*

Drainage System, South-Central Texas—Patrick L. Abbott, Department of Geological Sciences, San Diego State University, San Diego, CA 92182 (619/265-5591); Charles M. Woodruff, Jr., Austin. One day, Nov. 14.

The field trip will view and discuss the integrated geologic and geomorphic development of the Edwards Aquifer and the evolution of the surface drainage basin. View the Edwards Limestone outcrop in the Balcones fault zone between San Antonio and New Braunfels. The main message will be the geologic history of the Edwards Aquifer from the Cretaceous to the present and its interdependency with the surface drainage network. Outcrops to be visited will show the Balcones escarpment, Edwards Limestone depositional environments, discharge sites and major springs, collapsed caverns at mega-collapse localities in karstic plains, evidence for stream piracy, and recharge through stream bottoms and fractures.

Cost: \$60; includes 1 M. Limit 90.

15. *South Texas Modern Depositional Systems*—John L. Russell and Jon A. Baskin, Department of Geosciences, Texas A&I University, Kingsville, TX 78363 (512/595-3310). Three days, Nov. 14-16.

The field trip will examine Holocene depositional systems in Nueces, Kleberg, and Kenedy Counties, Texas. Estuarine, eolian, fluvial, deltaic, lagoonal, and barrier island environments will be investigated. The Nueces Bay-Corpus Christi Bay normal estuarine system will be compared to the Baffin Bay system, which commonly has reverse estuarine circulation. Baffin Bay is unique in the United States because it is commonly hypersaline and contains Holocene carbonate and evaporites. The South Texas Eolian Sand Plain will be examined. Fluvial and bay head delta systems of the Nueces River will be examined as well as lagoonal and barrier island environments on Mustang and North Padre islands.

Cost: \$200; includes 2 ON, 3 M. Limit 45.

16. *Stratigraphy of the El Paso Borderland, Texas*—David V. LeMone, Department of Geological Sciences, University of Texas, El Paso, TX 79968 (915/747-5275). Two and one-half days, Nov. 13-15.

The trip will concentrate on the truly outstanding and magnificently exposed stratigraphic sequence in the El Paso border region. The Franklin Mountains tilted fault

block, Cerro de Cristo Rey, and adjacent bolsons contain exposed Precambrian through Cenozoic stratigraphic sequences. Six Precambrian formations totaling 1,674 m in thickness in the Franklin Mountains will be examined. Cretaceous siliciclastics and carbonate rock sequences at Cerro de Cristo Rey will be examined and related to equivalent units of the Edwards Plateau. Late Cenozoic Fort Hancock and Camp Rice lacustrine-fluvial sequences will be examined. Trip terminates in El Paso.

Cost: \$190; includes 2 ON, 2 M, A—San Antonio to El Paso; \$125 without airfare. Limit 45.

17. *Upper Cretaceous Volcanic Centers of South and Central Texas*—Thomas E. Ewing, Frontera Exploration Services, 900 NE Loop 410, Suite D-303, San Antonio, TX 78209 (512/822-3133); S. Christopher Caran, Bureau of Economic Geology, Austin; L. Joy Hudson, San Antonio. Two days, Nov. 14–15.

In Late Cretaceous time, hundreds of volcanoes erupted on the chalky, open shelf of central and south Texas. Original magmatic compositions were mafic and alkalic, nephelinites being most common, with local phonolites and basalts. Eruptions produced tuff mounds of palagonite tuff and associated mudflows. Fringing reefs and shoal-water carbonates were constructed on the volcanoes' flanks and were deposited on a regional scale in the Uvalde area. This trip will visit the classic Austin exposures of palagonite tuff and overlying "beachrock" and shoal complexes. Distal and proximal tuff facies; mudflows; lagoonal, coral-bearing muds; and subaerial basanite flows will be visited. Participants will tour the Uvalde area to see fresh exposures of ultramafic and alkaline rocks. The Knippa Quarry exposes a lava-lake complex crosscut by subaerial vent-facies of nephelinite-bearing spinel-

peridotite nodules. The trip will finish by examining the asphalt-saturated, shoal-water carbonates of the Anacacho Mountains.

Cost: \$95; includes 2 ON, 2 M.

Limit 45.

18. *Platform Comanchean of Central Texas*—O. T. Hayward, Rena Bonem, and Robert Grayson, Department of Geology, Baylor University, Waco, TX 76703 (817/755-2361). Two and one-half days, Nov. 13–15.

The field trip will show the platform Comanchean section of central Texas in the type area of its many formations. It will emphasize the Trinity Group fluvial to marine transition, from fluvial conglomerates to carbonate bank deposits, the remarkable uniformity of the Fredericksburg and Washita shallow marine, and the Del Rio Clay unique pyritized dwarf fauna.

Cost: \$150; includes 2 ON, 2 M.

Limit 45.

SEG-SPONSORED FIELD TRIPS

Sediment-Hosted Pb-Zn-Ag-Ba Deposits of the Midcontinent—Richard Hagni, Department of Geology, University of Missouri, Rolla, MO 65401 (314/341-4657); Charles Stone, Arkansas Geological Commission, Little Rock; Tim Master, Consultant, Hot Springs, Arkansas; Heyward Wharton, Missouri Geological Survey, Rolla; Robert Dunn, Paul Gerdemann, and Jay Gregg, St. Joe Minerals Corp., Viburnum, Missouri; and Milton Bradley, Cominco American, Bixby, Missouri. Five days (plus previous evening), Nov. 3–8.

This trip will emphasize depositional and diagenetic environments as applied to origin of and exploration for Paleozoic shale- and carbonate-hosted ore deposits in northern Arkansas and southeastern Missouri. The first part of the trip will examine the Paleozoic siliciclastic strata of the Ouachita region in outcrops and cores taken during exploration for sedimentary exhalative Zn-Pb-Ag deposits.

Stratiform barite deposits with associated sulfides will be studied in open-pit exposures. Examine the Late Cambrian shelf carbonates in surface exposures and the associated ore deposits of southeastern Missouri. The group will visit a Viburnum Trend Pb-Zn mine and a Washington County residual barite deposit. Trip originates in Little Rock, Arkansas, the evening of Nov. 3, and ends in St. Louis the afternoon of Nov. 8.

For reservations, forward a \$100 deposit, payable to "Midcontinent Pb-Zn Excursion" by Sept. 1 to Richard Hagni, Department of Geology, University of Missouri, Rolla, MO 65401, (314/341-4657). Balance due by Oct. 1, 1986. Cost: \$325; includes 5 ON, 6 M, and guidebook. 40 participants.

Limestone-Replacement Pb-Zn-Ag Deposits of Northern Mexico—Kenneth Clark, Department of Geological Sciences, University of Texas, El Paso, TX 79912; Joaquin Ruiz and Peter Megaw, Department of Geosciences, University of Arizona, Tucson. Four and one-half days. Nov. 13–17.

Trip departs from San Antonio at noon, Nov. 13 and terminates in El Paso the evening of Nov. 17. The group will fly to Monterrey, Nuevo Leon, and drive to Torreon, Coahuila. On Friday the group will travel to Velardena, Durango, to examine the replacement Pb-Zn-Ag deposits within Cretaceous carbonate strata on the San Maria structural dome. Succeeding days include travel to Chihuahua to examine similar ores distributed in mantos and breccia pipes at Naica and at Santa Eulalia (east and west camps).

For reservations, forward a \$100 deposit payable to "Mexico Excursion, Fall, 1986" by Sept. 1, 1986, to PUBCO, P.O. Box 637, University of Texas, El Paso, TX 79968-0637, (915/533-1965). Balance due by Oct. 1, 1986. Cost: \$375; includes 4 ON, 12 M, guidebook, and airfare to Monterrey from San Antonio. (Price may vary depending on final logistics and fluctuating exchange rates.)

SPECIAL EVENTS

Burros & Burritos

Wednesday, November 12, 7:00 to 11:00 p.m.
La Villita

This is a special entertainment event where everyone is invited to celebrate San Antonio. The flavor of both Texas and Mexico is yours during this special evening of barbecue and tacos, country-western and mariachis, cowboys and Spanish dancers. An exclusive western hoe-down and Mexican fiesta will be presented for GSA in La Villita, the famous Mexican village across from the Convention Center in downtown San Antonio.

Your ticket will be a personal visa that will get you across the "border" between Mexico and Texas for all the Mex-Tex food and beverage you can hold. In addition to margaritas, beer, and wine, the Texas side will offer roast beef, chicken drumsticks, and barbecue sausage, and the Mexican side will offer homemade corn tortillas, fajitas, nachos grandes, and pan dulce.

Cloggers, square-dancers, and Mexican bands will provide the background for dancing and singing. Be on hand for President Ernst's "grand" entrance.

Fee: \$28

Welcoming Party

Sunday, November 9, 6:00 to 9:00 p.m.
Convention Center

Arrive by riverboat or walk over to the Society's reception to meet your friends and colleagues. This will also be the one opportunity to visit the technical and scientific exhibits unopposed by technical sessions. Registration will be open until 7:30 p.m. for your convenience.

GSA Presidential Address and Awards

Monday, November 10, 5:00 to 6:00 p.m.
Convention Center

Everyone is welcome to attend President Gary Ernst's address, which will be followed immediately by the GSA awards ceremonies for the Penrose and Day Medals. President Ernst's address is titled: "Status and Future of the Earth Sciences: How Bad, How Good?" In a

provocative address, he will focus on both the negative and the positive, emphasizing ways we can improve. His message is primarily for those in research and academic fields who want to dynamically affect the future.

After his address, President Ernst will present GSA's prestigious awards to 1986 Day Medalist E-an Zen and 1986 Penrose Medalist, Laurence L. Sloss.

All-GSA Awards Reception

Monday, November 10, 6:00 to 7:00 p.m.
Convention Center

A special reception honoring GSA's Penrose and Day Medalists will follow the awards ceremonies. Everyone is invited to meet the medalists and to celebrate in their honor. This one-hour reception will be held in the same ballroom as the alumni receptions, which begin immediately afterward. Every registrant and guest is welcome to attend the awards and reception.

Alumni Night

Monday, November 10, 7:00 to 9:30 p.m.
Convention Center

Alumni receptions begin at 7:00 p.m. simultaneously in the Convention Center and surrounding hotels. More than 50 alumni groups participate. If your university plans to hold an alumni reception, please notify the Events Coordinator at GSA by September 15.

Awards Luncheons and Other Ticketed Meal Functions

Associated societies and GSA divisions hold annual catered events. These events are used to honor medalists and to address important issues related to each group. The events are open to anyone wishing to attend. Check the registration form to determine the dates of each event and to register for tickets. On-site, the annual meeting program will list the locations and times for each event.

SPORTS EVENTS

Invitational Tennis

Sunday, November 9, 9:00 a.m. to 1:00 p.m.
McFarland Tennis Center

Pack your racket and tennis shoes for a light-hearted tournament with good players. Meet at 8:30 a.m. at the Convention Center for departure to the McFarland Tennis Center for a round-robin doubles tournament.

Partners will be drawn Sunday morning. No singles will be played. Entry will be limited to the first 40 persons registering. Awards will be given to the top three players. The fee includes transportation, beverage, balls, and court fees. *This event is by preregistration only.*

If you have questions on Sunday morning, call or visit the GSA Annual Meeting Office either at the Hyatt or the Convention Center anytime after 7:00 a.m.

Fee per person: \$15

San Antonio Stampede: 5K/10K Run

Wednesday, November 12, 7:30 a.m., start
Convention Center

Attention walkers, joggers, runners! Take a mid-week break to participate in the third annual 5K/10K races. November usually provides excellent weather for running in Hemisfair Exhibition Park near the Convention Center. The race will be professionally directed and timed. Water will be provided on the course, and refreshments and prizes will be at the finish line.

Finnigan MAT, Inc., has again graciously agreed to sponsor the race shirts for runners. Racers should select a T-shirt size on the registration form. Additional T-shirts may be purchased on-site. T-shirts and race maps may be picked up in the registration area beginning on Sunday, November 9.

Fee including T-shirt: \$7

PROFESSIONAL HORIZONS

GSA SHORT COURSES

All courses sponsored by GSA will be held in San Antonio immediately before and after the GSA Annual meeting. Receive twice the benefits of attending the GSA meeting by participating in one of GSA's professional instruction programs. The courses are designed for several different professional levels.

ENROLLMENT.

Course participation is open to GSA members and nonmembers. Registration for the Annual Meeting is not required.

PREREGISTRATION DEADLINE IS OCTOBER 10.

On-site registration is based on availability. The on-site fee will be \$15 additional.

CANCELLATION.

Fees will be refunded if we are notified by October 17. Substitutions may be made at any time. No refunds will be made after the course is completed. For more information, contact: Course Registrar, GSA Headquarters.

Computer Graphics for Geological Applications Saturday, November 8, and Sunday, November 9, 8:00 a.m. to 5:00 p.m., Hewlett Packard

This course is designed for those familiar with personal computers, for those who have used a mainframe, or for those with a need to use specialized graphic techniques to help solve geologic problems. The objective will be to provide the participant with an understanding of techniques for creating computer graphics to illustrate geologic information.

Faculty: *Richard G. Craig*, Department of Geology, Kent State University; Ph.D., Pennsylvania State University. Since joining the staff at Kent State in 1978, Craig has transformed a virtually noncomputer department into one of considerable strength in computer use. Well known in the field of computer graphics, Craig is listed in Marquis's *Who's Who in Frontier Science and Technology*. *Harlan P. Foote*, Battelle Memorial Institute, Pacific Northwest Labs. A specialist in the fields of computer graphics, remote sensing, and pattern recognition, Foote has worked for Battelle-Northwest since 1966. Most recently, Foote was selected by NASA as a Principal Investigator on the Landsat 4 project. *Barry L. Roberts*, M.S., Department of Geology, Kent State University. *Michael P. Singer*, URS Dalton, Cleveland; M.S., Department of Geology, Kent State University. Computer equipment provided courtesy of Hewlett-Packard. Travel arrangements for Foote provided by Battelle.

Fee includes course manual, lunch both days, and dinner Saturday evening. Limit: 24. Fee: \$270.

Glacial-Marine Sedimentation

Saturday, November 8, 1:00 to 6:00 p.m., continues 7:30 to 10:00 p.m.; Sunday, November 9, 8:00 a.m. to 5:00 p.m., Hilton Hotel

Intended for a broad spectrum of participants ranging from student to professional, this course will present an up-to-date summary of what is known about glacial-marine sedimentation. Emphasis will be on the diverse nature of modern depositional environments and their resulting facies and deposits. Other discussions will analyze the temporal and spatial distribution of glacial-marine sediment in the rock record. The course will also include introductory sections that provide basic information about marine and glacial depositional environments. Hands-on core and seismic profile workshops will enhance the presentation. An informal reception will be held in conjunction with the workshop on Saturday evening.

Faculty: *Bruce F. Molnia*, Polar Research Board, National Research Council, National Academy of Sciences; Ph.D., University of South Carolina. Chief Scientist on more than a dozen research cruises, Molnia's main areas of investigation include the Gulf of Alaska, the Bering Sea, the North Atlantic Ocean, Alaskan fiords, and Antarctica. *John B. Anderson*, Department of Geology, Rice University; Ph.D., Florida State University. Well known in the field of glaciomarine geology of Antarctic regions, Anderson is the author of *Sedimentation on the Antarctic Continental Slope* and recipient of the C. L. Herrick Fellowship in Paleontology.

Fee includes course manual and Saturday evening reception. Limit: 100. Fee: \$100.

Contaminant Hydrogeology

Saturday, November 8, and Sunday, November 9, 8:30 a.m. to 4:30 p.m., Convention Center

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

- fundamental concepts of physical mass transport, advection, dispersion, and diffusion,
- the most important geochemical processes that influence the spread of contaminants, including surface reactions, complexation, and mineral precipitation, and
- the mathematical formulation and solution of mass transport equations with an

emphasis on approaches and concepts rather than detailed mathematics.

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

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

Fee includes course manual. Limit: 85. Fee: \$100.

Seawater Chronostratigraphy Using Strontium Isotopes

Sunday, November 9, 1:00 to 5:00 p.m., Convention Center

Designed for upper-division undergraduates, graduate students, and professionals in the geosciences, this one-half day course will cover the theoretical basis and analytical methodology behind the application of the Sr isotopic evolution of seawater to the correlation and chronology of sedimentary marine carbonate sequences. Specific applications of the Sr isotopic chronostratigraphic method will be used to demonstrate the effectiveness and limitations of the technique. These include correlation of the Monterey Formation between coastal southern California basins, studies of brine migration, oil-source rock correlations, and paleoenvironmental analysis of uranium ore deposits in the San Juan Basin, New Mexico.

Faculty: *Richard W. Hurst*, Department of Geology, California State University; Ph.D., University of California, Los Angeles. Recently elected to the New York Academy of Sciences, Hurst has over ten years experience in the fields of isotope and trace element geochemistry, petrology, and environmental geochemistry and biogeochemistry. *Terry E. Davis*, Department of Geology, California State University; Ph.D., University of California, Santa Barbara. A consultant in geology and geochemistry since 1957, Davis is the author of more than fifty publications.

Fee includes course manual. Limit: 100. Fee: \$50.

An Introduction to the Geologic Use of Microcomputers

Sunday, November 9, 8:00 a.m. to 5:00 p.m., Marriott Hotel

Choosing the right hardware and software for use by today's geologists can be both time-consuming and expensive. Designed to shortcut your search, this course will provide an overview of comparable software and microcomputers available for purchase and how to apply this software for both geological and other practical uses. The course will cover geological data management, analysis, display, and communication. It also will cover the use of word processing in the preparation, editing, and revision of reports and manuscripts.

Faculty: *Peter G. Sutterlin*, Professor, Wichita State University; Ph.D., Northwestern University. Sutterlin was employed with Gulf Oil of Canada for 10 years and has over 20 years experience in the field of computer applications for the geologist. *Daniel F. Merriam*, Distinguished Endowment Professor of Natural Science, Wichita State University; Ph.D., University of Kansas, D.Sc., University of Leicester, England. Merriam is well known in the fields of geology and computers and is the author of *Computer Applications in Geology* and more than 155 articles. *Mark A. Sondergard*, B.S., Computer Science, Wichita State University.

Fee includes course manual and lunch. Limit: 60. Fee: \$85.

Geologic Applications of Fossil Radiolaria

Sunday, November 9, 8:00 a.m. to 5:00 p.m., Hyatt Regency Hotel

This course is designed for academic and industry paleontologists as well as field-oriented geologists working on both onshore and offshore marine sedimentary rocks. The primary objective of the course is to demonstrate the geologic utility of fossil radiolarians. Topics will include discussions on the major Paleozoic, Mesozoic, and Cenozoic radiolarian groups and their biostratigraphic, paleogeographic, and paleoecologic importance, as well as the various approaches to radiolarian collection, acid extraction, and observation.

Faculty: *Charles D. Blome*, U.S. Geological Survey, Paleontology and Stratigraphy Branch, Denver; Ph.D., University of Texas at Dallas. Blome has worked for the U.S. Geological Survey for the past six years and is well known for his work in North American radiolarian biostratigraphy. *Richard M. Casey*, Marine Studies Program, University of San Diego; Ph.D., University of Southern California. Casey has taught for more than 20 years and is a leading authority in the fields of Cenozoic radiolarian biostratigraphy and paleoecology.

Patricia Whalen, Geoscience Department, University of Texas at Dallas; Ph.D., University of Texas at Dallas.

Fee includes course manual. Limit: 100. Fee: \$75.

Basic Principles of Rock Mechanics

Friday, November 14, and Saturday, November 15, 8:30 a.m. to 4:00 p.m. Texas A&M University, College Station

This course assumes attendees have no prior knowledge of rock mechanics; it is intended for geologists who need to either teach or apply this material. The course will cover the basic principles of rock mechanics and their applications, with special emphasis on applications in structural geology and tectonics. During the laboratory time, small groups will see

- an actual experiment, including sample preparation, jacketing, and gauging;
- deformed samples, including thin section; and
- a variety of experimental apparatus.

Organizers: *John H. Spang*, Head, Department of Geology, Texas A&M University; Ph.D., Brown University. *Winthrop D. Means*, State University of New York at Albany; Ph.D., University of California at Berkeley.

Primary faculty: *John Handin*, Ph.D., UCLA. Handin co-authored the classic papers on the effects of confining pressure, temperature, and pore pressure on the deformation of sedimentary rocks. He has served on numerous national and international panels on rock mechanics, waste isolation, and earthquakes. *John Logan*, Ph.D., University of Oklahoma. Logan is working on characterizing the constitutive relations and physical processes of frictional sliding and fault zones through experimental studies and field verification. *Neville Carter*, Ph.D., UCLA. Carter studies flow properties and dislocation-activated processes under mantle conditions and halite under repository conditions. Additional faculty: *Melvin Friedman*, Ph.D., Rice University. *Andreas Kronenberg*, Ph.D., Brown University. Handin, Logan, Carter, Friedman, and Kronenberg are Research Associates at the Center for Tectonophysics and teach in the Department of Geology and/or Geophysics, Texas A&M University, College Station, Texas. The course instructors represent a combined total of more than 100 years experience in the field of industry, university, and government rock mechanics labs.

Fee includes course manual, transportation from San Antonio to College Station on Thursday evening, and an informal dinner on Friday evening. Return transportation to San Antonio will be arranged at an additional fee. Information on lodging in College Station will be sent to registrants. Limit: 60. Fee: \$135.

OTHER COURSES AND WORKSHOPS

Exploration Geochemistry: Design and Interpretation of Soil Surveys

Thursday, November 6 through Sunday, November 9. Quality Inn Hotel. Sponsored by Society of Economic Geologists and Association of Exploration Geochemists.

The course is designed to update practicing exploration geologists on design, implementation, and interpretation of soil geochemical surveys, including choice of appropriate analytical and statistical methods. Case studies will be used to illustrate both the problems that can arise and the benefits of a systematic approach to anomaly definition and rating based on a sound understanding of geochemical processes in surficial media. Instructors will be W. K. Fletcher, S. Hoffman, M. B. Mehrtens, A. J. Sinclair, and I. Thomson.

Fee: \$375, includes double-occupancy lodging, lunches on meeting days, and Volume 3 of *Reviews in Economic Geology*. Enrollment is limited to 60 people on a first-come, first-served basis. Deadline for registration is September 26. For information/registration: Lois Elms, Western Experience, 2369 Carriage Circle, Oceanside, CA 92056; (619) 722-0027.

Fossil Land Plants

Sunday, November 9, 8:00 a.m. to 5:00 p.m. Hyatt Regency Hotel. Sponsored by the Paleontological Society.

The course will give an overview of the taphonomic constraints involved with the development of terrestrial-plant-bearing lithologies, the paleogeographic distribution of plant communities through time and their bearing on paleoclimatology, the diversity and paleoecology of megafossil communities in the context of their depositional environment, and their evolution. Participants include William Fritz, Georgia State University; Robert Spicer, Goldsmith's College, London; Robert Gastaldo, Auburn University; Andrew Knoll, Harvard University; Patricia Gensel, University of North Carolina, Chapel Hill; Steven Scheckler, Virginia Polytechnic Institute; William DiMichele, U.S. National Museum; Gene Mapes, Ohio University; Sergio Archangelsky, Museum of Natural Sciences, Buenos Aires; Sidney Ash, Weber State; Leo Hickey, Peabody Museum; and Jack Wolfe, USGS.

There is no fee. Course notes will be available at a nominal fee. For information: Robert A. Gastaldo, Department of Geology, Petrie Hall 210, Auburn University, Auburn, AL 36849-3501; (205) 826-4282.

GeoRef Workshop: Learn to Search the Geological Literature by Computer

Wednesday, November 12, 8:00 a.m. to 12:00 noon. Hilton Hotel. Sponsored by GIS and AGI.

Learn how to begin searching the American Geological Institute's GeoRef online database of over a million geological references from 1785 to the present. The 1986 speakers are: Barbara Pearson, Exxon Production Research Company, Houston; Marilyn Stark, Colorado School of Mines, Golden; and Sharon Tahirkheli, American Geological Institute, Alexandria, Virginia. Beginning and prospective searchers will learn about the GeoRef database and what it covers, Boolean logic, online search commands, and how to devise effective search strategies. Sample searches and the resulting geological information will be displayed, and use of the GeoRef Thesaurus and other online search aids will be discussed. General discussion and questions will follow.

There is no preregistration or fee. For information: Kay Yost, AGI, 4220 King Street, Alexandria, VA 22302; (800) 336-4764, outside Virginia, or (703) 379-2480; or Marilyn Stark, Colorado School of Mines, Golden, CO 80401; (303) 273-3687.

GeoRef Trainers Workshop

Thursday, November 13, 8:00 a.m. to 12:00 noon. Hilton Hotel. Sponsored by AGI and GIS.

The purpose of this workshop is to share experience with present and potential workshop trainers on GeoRef. The attendees must be people who are experienced GeoRef database searchers. The scope of the workshop will include discussion of the experience of expert trainers from the GeoRef Information System. Topics to be discussed: Who should be a trainer? What tools are needed for training? What are aims of training? What should be included in a training session? How long should the session be? The workshop will be conducted by G. N. Rassam and Sharon Tahirkheli of AGI.

There is no preregistration or fee. For information: Kay Yost, AGI, 4220 King Street, Alexandria, VA 22302; (800) 336-4764 outside Virginia, or (703) 379-2480; or Marilyn Stark,

Colorado School of Mines, Golden, CO 80401; (303) 273-3687.

FORUMS/PANELS

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

Monday, November 10, 1:00 to 3:00 p.m., Convention Center

Are you interested in salary scales, tips for successful interviews, and an overview of employment opportunities? What are the current trends in academia, government, industry, and consulting and the impact of federal legislation on job demand? Attend the GSA Employment Service Forum to hear from seven experts. Each panel member will speak briefly on the outlook in his or her special area and answer questions from the audience. The 1986 speakers are: Chairman Dick Paull, University of Wisconsin; J. D. Edwards, Pecten International Company; Penny Hanshaw, USGS; J. D. Mancuso, Chevron Resources Company; Charlie Mankin, Oklahoma Geological Survey; Dave Stephenson, Dames & Moore; and Steve Stow, Oak Ridge National Laboratory. For further information: Clara Hodgson, Membership Coordinator, GSA headquarters.

Tide- Versus Storm-Dominated Shelves: Their Modern and Ancient Oceanographic Settings and Deposits

Tuesday, November 11, 7:30 to 10:00 p.m. Hyatt Regency Hotel. Sponsored by the Sedimentary Geology Division

Rudy Slingerland and William Duke, organizers of the symposium being presented on Monday, November 10, will be the leaders of the panel discussion. This program is intended to emphasize basin-wide sedimentologic relationships; thus, styles of shelf sedimentation will be addressed from a broad-scale, multidisciplinary viewpoint. The panel discussion will open with some outlandish comments by George deV. Klein which may be difficult for some to swallow. In anticipation of this potential problem, soft drinks and beer will be available to be administered as needed!

Special Student Forum

Wednesday, November 12, 5:30 to 7:00 p.m. Convention Center

The Geological Record of the Causes and Consequences of Massive Extinctions

Eugene M. Shoemaker, USGS, Flagstaff; Steven Stanley, Johns Hopkins University

For students only! The first contentious contact forum is a unique program provided to honor GSA's student registrants.

Discussion by two distinguished geologists of their differing interpretations of the geological, geochemical, paleontological, and other sources of evidence for the causes of massive extinctions.

Did the collision of Earth with an object from space result in the extinction of the dinosaurs? What was the source of the thin layer with an unusually high iridium content which occurs at the contact of the Cretaceous and Tertiary? Do massive extinctions occur on a periodic basis?

These questions and others will be debated in an informal setting where student participation will be welcome. **Only those with student badges may attend.**

SCIENCE THEATER

New film series will highlight the 1986 Science Theater. Featured will be the remarkable seven-part Planet Earth series; the 1986 release of six films entitled "Understanding Reefs" filmed off south Florida by Julia Hubbard, King's College, London; and two series on energy from the BBC/British Open University Forum and the Altschul Group. Also shown will be recent films from the Encyclopedia Britannica Corporation including "Geologic Time," produced at the Grand Canyon, "Flood Forecasting," made on location in flood-plain regions, and AAPG's "Arid Carbonate Coastlines," shot on location in the Persian Gulf. A host of other new films related to climate, Great Lakes research, landslides, plate tectonics, and the environment will keep you abreast of the latest developments.

EXHIBITS

Exhibits open at 6:00 p.m. Sunday, November 9, at the Convention Center and remain open throughout the Welcoming Party until 9:00 p.m. Hours Monday and Tuesday will be 9:00 a.m. to 5:00 p.m., and Wednesday, 9:00 a.m. to 2:00 p.m.

Exhibit space MAY still be available at this time. Please contact Kathy Ohmie, Exhibits Coordinator at GSA headquarters.

Exhibitors as we go to press:

AAPG Bookstore
AAPG Visiting Petroleum Geologists Program
Academic Press, Inc.
ADAMAS
Allen & Unwin, Inc.
American Geological Institute
American Geophysical Union
American Institute of Professional Geologists
Association of Engineering Geologists
Bausch & Lomb
Blackwell Scientific Publications
Blake Industries, Inc.
William C. Brown Publishers
Buehler Ltd.
Bujak Davies Group
Bureau of Economic Geology—
University of Texas
Burgess Publishing Company
Bushwalker/Plateau Design
Cambridge University Press
Cameca Instruments, Inc.
Canadian Society of Petroleum Geologists
Carolina Biological Supply Company
Chapman & Hall
Chemex Labs Ltd.
Chemical Abstracts Service
ChemPet Research
Circum-Pacific Council
Circum-Pacific Map Project
Cushman Foundation
Dapple Systems
Daryl Howard, Inc.
Delsi, Inc.
Digital Image, Inc.

Earth Enterprises, Inc.
Earth Observation Satellite Company
Economic Geology Publishing Company
Edax International
E G & G Ortec
Elsevier Science Publishing Company, Inc.
EMTEK
Encyclopaedia Britannica USA
Finnigan MAT
W. H. Freeman & Company
GBL Electronics
General Supply Corporation
Geological Association of Canada
Geologic Times
Geoscience Information Society
Geoscience Resources, Inc.
Gisco Geophysical Instrument Company
GSA Bookstore
GSA Combined Publishers Display
GSA Decade Project—DNAG
GSA Sections
GSA 1987 Annual Meeting—Phoenix
GSA 1986 Annual Meeting:
University of Texas—San Antonio
University of Texas—Austin
Hillquist, Inc.
International Association for
Mathematical Geology
International Union of Geological Sciences
JCPDS
Jena/Distributor Seiler Instrument Company
JEOL USA, Inc.
KDI Electro-Tec Corporation
Kendall/Hunt Publishing Company
Kevox Corporation
Krueger Enterprises, Inc.
E. Leitz, Inc.
Logitech, Inc.
Louisiana State University—Dept. of Geology
Lubrecht & Cramer Ltd.
Ben Meadows Company
Charles E. Merrill Publishing Company
Mineralogical Society of America
National Association of Geology Teachers
National Science Foundation
Nature's Own

New Mexico Bureau of Mines
& Mineral Resources
Nicolet X-Ray Instruments
Nikon, Inc., Instrument Group
Ocean Drilling Project—
Texas A & M University
Oklahoma Geological Survey
Olympus Corporation
Oxford University Press
Paleoceanographic Mapping Project
Paleontological Society
Pennsylvania Geological Survey
Pergamon Press, Inc.
Philips Electronic Instruments
Plenum Publishing Corporation
Prentice-Hall
Princeton University Press
Raiders of Lost Continents
Rice University
Rigaku/USA, Inc.
Rocklabs
RockWare, Inc.
Rocky Mountain Association of Geologists
SEPM
San Antonio Independent School District
Saunders College Publishing
Schonstedt Instrument Company
Scintag, Inc.
Siemens
Sigma Gamma Epsilon
Spectrex Corporation
Spex Industries, Inc.
Springer-Verlag New York, Inc.
Thrustbelt Systems Ltd.
Touchstones
Tracor Northern
University of Arkansas—Monticello
U.S. Geological Survey
Van Nostrand Reinhold Company, Inc.
VG Instruments, Inc.
Washington State University—
Department of Geology
Wildlife Supply Company
John Wiley & Sons
Williams & Heintz Map Company
X-Ray Assay Labs Ltd.

GUEST PROGRAM

The San Antonio Guest Committee presents a program that highlights the attractions of the area. The activities offer a look into San Antonio's rich history and scenic beauty.

Please note that registration as a guest at the Annual Meeting is a prerequisite for participation in the Guest Program and for use of the Hospitality Room. However, guest registration does not include admission to the technical program.

The Hospitality Room is in the Medina Room of the Hyatt. Hours are from noon to 5:00 p.m. on Sunday and from 8:00 a.m. to 4:30 p.m., Monday through Thursday. Light refreshments and a place to relax will be provided to those registered as guests. Please wear your badge. Each registered guest who visits the Hospitality Room will receive a gift. Hostesses will be in the Hospitality Room to help you in any way they can. The Guest Committee welcomes you to San Antonio and hopes that you enjoy your visit.

NONTECHNICAL PROGRAM

Antique Business of Antique Jewelry
Wednesday, November 12, 10:00 to 11:00 a.m.
Hyatt Regency.

Since 1894, the Hammond family has been involved in jewels. Hall Hammond will share with us the secrets of estate jewelry—how to shop and how to buy! Guests will have a chance to see the glitter and to get a basic understanding of this fascinating business.

TOURS

All tours depart from and return to the Hyatt. Tours will depart as scheduled. All tours are escorted and narrated by professional guides. Reservations for these tours will be accepted on a first-come, first-served basis. Please make note of registration and cancellation deadlines.

What To Buy and Where To Find It!
Monday, November 10, 9:00 to 10:00 a.m.

A delightful orientation to San Antonio and the marvelous hodge-podge called El Mercado. Historical facts and figures along with examples of good and unusual buys, found in the market, will be displayed and explained. The Historic Tour starts after the orientation.

Fee: \$7

Historic San Antonio
Monday, November 10, 10:00 a.m. to 3:00 p.m.

Beginning with a drive through one of the most elegant neighborhoods of the 1890s, the King William district, the first stop is the beautifully restored Steves' Homestead. Next we will visit the historic Mission San Jose. Built in 1720 and known as the "Queen of the Missions," it houses the famous Rosa's Window. The next stop is the Spanish Governor's Palace, which was completed in 1749. Lunch will be served at Mi Tierra, located in the heart of the Mexican Market. A fashion show will be presented by the Tequila Tree Specialty Shop. The tour will conclude with a shopping trip to El

Mercado (the Mexican Market). Forty shops for fantastic shopping!

Fee: \$29

San Antonio Culture
Tuesday, November 11, 1:00 to 5:00 p.m.

While en route to the McNay Art Museum, the tour passes the San Antonio Museum of Art complex and the Terrell Hills area, noted for its beautiful homes. At the McNay Art Museum, there is a fine collection of French Impressionist art. Next, the tour visits the city's newest treasure, the San Antonio Botanical Center, featuring the varied terraces of Texas, along with a biblical garden, a garden for the blind, and a rose garden. Wine and soft drinks will be served before the tour proceeds to the Institute of Texas Cultures, where contributions from 26 different ethnic groups are displayed.

Fee: \$17

Natural Bridge Caverns
Wednesday, November 12, 9:00 a.m. to 3:00 p.m.

Only a short drive north, the Natural Bridge Caverns offer incredible surprises and awesome natural phenomena every inch of the way. Wear comfortable shoes (rubber soles recommended) and bring your camera! Back in San Antonio, lunch will be served in the gardenlike atmosphere of Los Patios, along the banks of Salado Creek. Quaint boutiques allow the visitor time to relax and shop.

Fee: \$32

EMPLOYMENT INTERVIEWS

Do you need qualified earth scientists to fill staff needs? Are you looking for employment in the earth-sciences fields? Organizations seeking qualified earth scientists to fill staff needs and persons seeking employment in the earth-sciences fields are invited to participate in the GSA Employment Interview Service. The service will be conducted in the Convention Center.

All interested organizations are urged to submit notices of their vacancies and their requests for computer listings of applicants. The minimum fee for a printout of two specialty listings is \$125. A specialty code narrows the field of your search. For example, a geologist with background in geochemistry will be listed

under the "geochemistry" specialty code.

Interview booths at the meeting may be rented for a nominal fee in half-day increments from Monday through Wednesday, November 10-12, 1986. GSA staff will handle all interview scheduling with Employment Service applicants. Request forms are in the March and July issues of *GSA News & Information*, sent to all GSA members, or they may be obtained by contacting Clara Hodgson, Membership Coordinator, GSA headquarters.

Job seekers have found the Employment Interview Service critical to their successful search for positions. The one-year registration fee is \$25 for GSA Members and Student Associates

in good standing and \$50 for nonmembers. This applicant fee includes the interview service at the annual meeting. Employment Service forms are in the March and July issues of *GSA News & Information* or may be obtained by contacting the Membership Department, GSA headquarters.

Note to Applicants: If we receive your materials by **August 25, 1986**, your record will be included in the information that employers receive prior to the meeting. Submit your forms early to receive maximum exposure! Don't forget to indicate on your application form that you would like to interview in November.

TRANSPORTATION

AIR TRANSPORTATION

GSA has designated the Cain Travel Group of Boulder, Colorado, as the official airline reservation agent for the San Antonio meeting. United and Delta airlines are the official co-airlines.

Cain has been GSA's official agency for five years and is a proven resource for those who want to work with a travel agent in determining the best possible airfares. The agency service is free, and it can save you both time and money.

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

All participants booking through Cain Travel will automatically become eligible for inclusion in a drawing for two roundtrip tickets to anywhere in the continental United States prior to August 31, 1987, subject to certain restrictions. In addition, clients will be eligible for a second drawing for \$500 in travel credits.

Reservation Procedures:

1. Book early. Understand and write down the restrictions, if any.
2. Call Cain Travel at (800) 346-4747 (toll free) or (303) 443-2246, Monday-Friday, 7:30 a.m. to 5:30 p.m. MST.
3. Identify yourself as a GSA traveler.

4. The agent will quote you the discounted fare for your itinerary and confirm your reservation.
5. Payment options: Check payable to Cain Travel Group; major credit card; invoice to your firm.
6. All payment must reach Cain no later than seven days prior to departure. No reservations can be accepted by Cain after this deadline, which allows adequate mailing time.
7. Tickets will be sent to you via *certified mail* upon receipt of payment or credit card authorization.
8. In the event of a decrease in your airfare after the ticket has been issued, call Cain Travel and they will re-ticket you at the lower fare.

The Cain Travel Group will provide a customer service desk at the Convention Center.

GROUND TRANSPORTATION

GSA will not provide a shuttle service in San Antonio. Most GSA hotels are within walking distance from the Convention Center. The city offers convenient and reliable service to and from the airport and for getting around downtown. Below is information to help plan your trip.

Airport Transportation. Routes from the airport to hotels are serviced by 40-passenger buses, VIA Limousine Service. They will stop at all GSA hotel properties upon request. Hours are

6:30 a.m. to 11:55 p.m. 7 days a week, departing from the airport every 30 minutes. Cost is currently \$5.

VIA Limousine Service will also take you back to the airport. However, hotel pick-ups are not automatic. You must make your reservation by calling VIA at 227-5251. Service runs every 30 minutes. Cost is currently \$5.

Cab fare is approximately \$12 each way per carload. Service is available 24 hours.

Downtown Transportation. VIA Streetcar services the downtown area and major sightseeing attractions. Service is available from 7:00 a.m. to 9:00 p.m. on Saturday and 7:00 a.m. to either 8:00 p.m. or 9:00 p.m. Sunday through Friday, depending on the route. Stops are made every 10 to 20 minutes. Route maps will be available in your registration packet. Cost is 10 cents per ride.

Car Rental. For those desiring the convenience of a rental car, special low rates are offered by National, which is the official GSA car rental agency. Sample daily/weekly rates: Economy \$29/\$144; compact \$32/\$159; mid-size \$34/\$169; full-size (two-door) \$36/\$179, (four-door) \$37/\$184. Mileage is unlimited, but vehicles must be returned to the same rental location to avoid drop charges. Advance reservations are recommended. Call National at (800)-328-7949. In San Antonio call: (512) 824-8141.

HOUSING

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

TO MAKE YOUR HOTEL RESERVATION

Complete IN FULL the attached Official Housing Request Form and return it immediately. The Housing Bureau will accept reservations submitted on this form ONLY.

Your request must be postmarked NO LATER THAN OCTOBER 10. AFTER OCTOBER 10, reservations must be made directly with the hotel. Because many hotels will be filled by this time, you can expect to make several phone calls.

NOTE: You MUST include the hotel code on the Housing Request Form. Codes are identified in parentheses on the hotel description page.

ASSIGNMENT

Hotel rooms will be assigned on a first-come, first-served basis as they are received by the Housing Bureau. Acknowledgment will be sent to you from the Housing Bureau once your form has been processed. Confirmation will be sent from the hotel to which you have been assigned. You should receive both within three weeks of your mailing date. Please check to be sure all information is correct.

ROOM DEPOSITS

Your room will be held until 6:00 p.m. on your date of arrival unless you send one night's room deposit. Due to the possibility of unforeseen delays in your arrival time, we strongly recommend that you send in a deposit regardless of your current schedule.

To make a deposit on your room, either (1) send a check or credit card number with your housing form payable to GSA Housing

Bureau (and it will be forwarded to the appropriate hotel) OR (2) wait until you have received your hotel confirmation and mail a check directly to the hotel or call the hotel with your credit card number.

CHARGES AND CANCELLATIONS

If you must CHANGE your hotel reservation, simply write or call the hotel directly and indicate the change desired.

If you must CANCEL your reservation BEFORE OCTOBER 10, write to the Housing Bureau immediately so that other reservations can be accommodated. AFTER OCTOBER 10, please cancel directly with the hotel. Your notice of cancellation must be received **within 48 hours** of your scheduled arrival or your deposit will not be refunded.

NOTE: All rooms will be taxed 10%. Remember... DON'T BE A NO-SHOW!

1
HYATT REGENCY—HEADQUARTERS (H Y R)

123 Losoya Street, San Antonio, TX 78205
512-222-1234 (526 rooms)

Single: \$83 Double: \$93
Suite range: \$200-\$520

Located on Riverwalk; 3 restaurants; lounge with concert pianist;
lounge with jazz; lounge with DJ; rooftop swimming pool, spa,
health facilities overlooking the Alamo; gift shop with newsstand; concierge;
in-room movies; inside paid parking

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

2
CROCKETT (C R O)

320 Bonham, San Antonio, TX 78205
512-225-6500 (100 rooms)

Single/Double/Double-Double: \$69
Suite range: \$150-\$350

3 restaurants; swimming pool; rooftop spa;
across street from Alamo; minutes from Convention Center

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

3
EL TROPICANO (E L T)

110 Lexington, San Antonio, TX 78205
512-223-9461 (100 rooms)

Single/Double: \$49 Double-Double/Triple: \$59
Suite range: \$125-\$404

2 restaurants; Olympic-size pool; lounge with entertainment

Check-in: 6:00 p.m. Check-out: 12:00 noon CC: AX, V, MC, CB, D

4
EMILY MORGAN (T E M)

705 East Houston Street, San Antonio, TX 78205
512-225-8486 (125 rooms)

Single/Double: \$65-\$80

Complimentary full breakfast in bed and evening wine social;
most rooms with Jacuzzis, refrigerators, remote-control TV;
exercise room & sauna, whirlpool; outdoor pool; 1 restaurant

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

5
HILTON PALACIO DEL RIO (H P R)

200 South Alamo, San Antonio, TX 78205
512-222-1400 (350 rooms)

Single: \$85 Double: \$94
Suite range: \$275-\$540

Located on Riverwalk; lounges with entertainment; sing-a-long pub, piano bar;
2 restaurants; swimming pool, hot tub; inside parking;
concierge; bathroom phones

Check-in: 3:00 p.m. Check-out: 11:00 a.m. CC: AX, V, MC, D

6
HOLIDAY INN—DOWNTOWN (H I D)

318 West Durango, San Antonio, TX 78204
512-225-3211 (200 rooms)

Single: \$43 Double: \$53
Suite: \$119

Pool and patio; free in-room movies; one restaurant; one lounge

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

7
LaQUINTA—CONVENTION CENTER (L Q C)

1001 East Commerce Street, San Antonio, TX 78201
512-222-9181 (100 rooms)

Single: \$35 Double: \$42 Double/Double: \$42
(No suites available)

Free parking; free local calls, free HBO and Showtime; 1 restaurant;
1 cocktail lounge; outdoor pool

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

8
LaQUINTA—MARKET SQUARE (L Q M)

900 Dolorosa Street, San Antonio, TX 78207
512-271-0001 (100 rooms)

Single: \$35 Double: \$40 Double/Double: \$45
(No suites available)

24-hour restaurant nearby; near El Mercado Market Place; free Showtime;
free coffee in lobby

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

9
MARRIOTT (S A M)

711 East Riverwalk, San Antonio, TX 78205
512-224-4555 (300 rooms)

Single: \$89 Double: \$104
Suite range: \$260-\$435

1 restaurant; 2 cocktail lounges; in-house first-aid; airline ticket counter;
information desk; newsstand; sundry shop; bottle shop; children's rec center;
indoor & outdoor swimming pool; concierge; 50% rooms with balconies

Check-in: 4:00 p.m. Check-out: 12:00 noon CC: AX, V, MC, CB, D

10
MENGER (M E N)

204 Alamo Plaza, San Antonio, TX 78205
512-223-4361 (200 rooms)

Single: \$44 Double: \$54
Suite range: \$85-\$144

Free in-room movies; 2 restaurants; 2 cocktail lounges;
choose antique-furnished or Texas-size rooms; outdoor swimming pool

Check-in: 6:00 p.m. Check-out: 1:00 p.m. CC: AX, V, MC, CB, D

11
ST. ANTHONY INTERCONTINENTAL (S A I)

300 East Travis, San Antonio, TX 78205
512-227-4392 (100 rooms)

Single/Double: \$75
Suite range: \$175-\$450

Traditional accommodations with antiques; 3 restaurants;
2 cocktail lounges with entertainment; health facilities;
morning newspaper; in-house movies; paid parking

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

12
TRAVELODGE ON THE RIVER (T R R)

100 Villita Street, San Antonio, TX 78205
512-226-2271 (100 rooms)

(Suggested for Student Housing)

Single: \$40 Double: \$45 Double/Double: \$51
Suite: \$135

Free in-house movies; free coffee and pot in room; free local calls

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

DOWNTOWN SAN ANTONIO

HOTEL NAME

HOTEL CODE

- 1. HYATT REGENCY—HDQS
- 2. CROCKETT
- 3. EL TROPICANO
- 4. EMILY MORGAN
- 5. HILTON PALACIO DEL RIO
- 6. HOLIDAY INN—DOWNTOWN
- 7. LaQUINTA—CONVENTION CENTER
- 8. LaQUINTA—MARKET SQUARE
- 9. MARRIOTT
- 10. MENDER
- 11. ST. ANTHONY INTERCONT'L
- 12. TRAVELODGE ON THE RIVER

- HYR
- CRO
- ELT
- TEM
- HPR
- HID
- LQC
- LQM
- SAM
- MEN
- SAI
- TRR



TO AIRPORT

NORTH
DOWNTOWN
SAN ANTONIO

CONVENTION CENTER

TOWER OF THE AMERICAS

INSTITUTE OF TEXAN CULTURES

OFFICIAL HOUSING REQUEST FORM

PLEASE READ CAREFULLY AND COPY FOR YOUR RECORDS

FOR HOUSING BUREAU USE ONLY

MAIL TO:

HOUSING
SAN ANTONIO CONVENTION
& VISITORS BUREAU
P.O. BOX 2277
SAN ANTONIO, TEXAS 78298

- PLEASE PRINT OR TYPE ALL ITEMS TO ASSURE ACCURACY.
- COMPLETE EACH PART BELOW IN DETAIL FOR CORRECT AND RAPID COMPUTER PROCESSING.
- SHOULD MORE THAN TWO (2) ROOMS BE NEEDED, SUPPLEMENTAL ROOM LIST **MUST** BE ATTACHED USING SAME FORMAT AS IN PART III.
- ALL ACKNOWLEDGEMENTS WILL BE SENT TO INDIVIDUAL INDICATED IN PART I. ACTUAL CONFIRMATION WILL FOLLOW FROM HOTEL.

PART I

INSTRUCTIONS: Complete requested data using abbreviations as necessary.
(NAME OF PERSON REQUESTING ROOMS)

(LAST NAME)	(FIRST)	
(NAME OF COMPANY OR FIRM)		
(STREET ADDRESS OR P.O. BOX NUMBER)		
(CITY)	(STATE)	(ZIP — USA)
(COUNTRY)	(AREA CODE)	(PHONE NUMBER)

PART II

INSTRUCTIONS: Select SIX Hotel/Motels of your choice. No request will be processed without SIX choices.

FIRST CHOICE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (HOTEL CODE)	SECOND CHOICE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (HOTEL CODE)	THIRD CHOICE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (HOTEL CODE)
FOURTH CHOICE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (HOTEL CODE)	FIFTH CHOICE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (HOTEL CODE)	SIXTH CHOICE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> (HOTEL CODE)

PART III

- INSTRUCTIONS: 1. PRINT OR TYPE NAMES OF ALL PERSONS OCCUPYING EACH ROOM.
2. SELECT TYPE ROOM DESIRED WITH ARRIVAL AND DEPARTURE DATES.
3. SUPPLEMENTAL LIST FOR ADDITIONAL ROOM **MUST** USE SAME FORMAT.
4. PRINT OR TYPE LAST NAME FIRST.

	GUEST NAME/S (PRINT LAST NAME FIRST)	P + 1 — Parlor & one bedroom	P + 2 — Parlor & two bedrooms
ROOM NO. 1	1. _____ 2. _____ 3. _____ 4. _____	CHECK ONE <input type="checkbox"/> Single <input type="checkbox"/> Triple <input type="checkbox"/> Double <input type="checkbox"/> Quad <input type="checkbox"/> Twin <input type="checkbox"/> P + 1 <input type="checkbox"/> DbI/DbI <input type="checkbox"/> P + 2	ARR. DATE _____ DEP. DATE _____ ARR. TIME _____ <input type="checkbox"/> AM <input type="checkbox"/> PM (Check one) NOTE: Reservation will be held only until 6 p.m. unless special arrangements are made directly with hotel. The hotel may request a deposit.
ROOM NO. 2	1. _____ 2. _____ 3. _____ 4. _____	CHECK ONE <input type="checkbox"/> Single <input type="checkbox"/> Triple <input type="checkbox"/> Double <input type="checkbox"/> Quad <input type="checkbox"/> Twin <input type="checkbox"/> P + 1 <input type="checkbox"/> DbI/DbI <input type="checkbox"/> P + 2	ARR. DATE _____ DEP. DATE _____ ARR. TIME _____ <input type="checkbox"/> AM <input type="checkbox"/> PM (Check one) NOTE: Reservation will be held only until 6 p.m. unless special arrangements are made directly with hotel. The hotel may request a deposit.

DEPOSIT

Remit in U.S. funds. Make checks payable to GSA Housing Bureau or charge:

Amer Exp MasterCard Choice VISA Diners Club/ Carte Blanche
 Card Number _____ Expires ____/____

NOTE: PLEASE RECHECK ALL ITEMS FOR CORRECT INFORMATION

CONVENIENCE INFORMATION

INFORMATION/MESSAGES

GSA information and message desks will be located at both the Convention Center and the Hyatt Regency, Friday, November 7, through Thursday, November 13. The desks will be staffed to answer your questions about the GSA meeting as well as the San Antonio area.

Please leave the exact name and phone number of your hotel with both your home and office. Other phone numbers to use are:

Convention Center:

GSA Information (512) 224-2541

Convention Center:

GSA Message Desk (512) 224-0578

FOREIGN VISTORS

Assistance with housing and other information is available to foreign visitors by contacting: Alan P. Morris, Div. Earth and Physical Sciences, University of Texas at San Antonio, San Antonio, TX 78285. Phone (512) 691-4455.

CHILD CARE SERVICE

GSA does not make arrangements for babysitting services. Please contact the Housekeeping Department or the Front Desk Manager in your hotel for information.

Parents who are willing to take part in cooperative child care should send name, address, and phone number to the Events Coordinator, GSA headquarters. **NO LATER THAN OCTOBER 24, 1986.** Optional: You may send the name of the hotel and phone of where you will stay in San Antonio, and the names and ages of your children. A list of information will be sent by October 30 to those who have expressed interest in the program. Parents can then contact others on the list to set up an exchange of services.

ABSTRACTS WITH PROGRAMS

If not previously purchased, *Abstracts with Programs* for the 1986 Annual Meeting is available four ways:

1. **Advance Mailing:** If you complete the order form below and mail it to be RECEIVED at GSA by September 1, 1986, copies sent to U. S. mailing addresses should arrive on or before October 18, 1986, providing excessive delays in the postal system are not encountered. Price for nonmembers is \$15; for GSA members \$12.

2. **Reserved On-Site in San Antonio:** If you would like a copy reserved for pickup at the Annual Meeting or for extra copies, purchase from **ABSTRACTS WITH PROGRAMS** line on the Preregistration Form. Pick up your copy in the Registration Area, Convention Center. Price: \$18. (If you have already ordered a copy on your 1986 GSA dues form, this will give you a duplicate copy. Please check your records prior to ordering.)

3. **Open On-Site:** Purchase on-site, Registration Area, Convention Center, from a limited quantity available. Price: \$18.

4. **GSA Membership Dues Form:** You may have already ordered a copy when you paid your dues. If so, placing an order under option 1 or 2 will give you a duplicate copy.

**USE THIS FORM FOR OPTION 1
ADVANCE MAILING ONLY.**

ABSTRACTS WITH PROGRAMS 1986 ANNUAL MEETING

MAIL SEPARATELY TO: GSA Publication Sales, P.O. Box 9140, Boulder, CO 80301.

Ship _____ advance copies of *Abstracts with Programs* 1986 at \$15 per copy. (\$12 for GSA member; write your membership number here _____)

_____ Enclosed is check/money order in U.S. funds for \$_____.* (make checks payable to GSA Publication Sales)

Charge to: American Express Diners/Carte Blanche Choice MasterCard Visa (check one)

Account # _____ Exp. Date _____

Telephone (work) _____ (home) _____

Signature _____

Name _____

Address _____

City/State _____ Zip/Country _____

NOTE: Order should be RECEIVED by September 1, 1986 to guarantee arrival (domestic mail only) by October 18, 1986.

*Colorado residents add sales tax.

REGISTRATION

**PREREGISTRATION DEADLINE:
MUST BE RECEIVED NO LATER
THAN OCTOBER 10.**

1. There is a 15% savings in registration fees if you register before October 10! Advance registration is suggested for many of the special activities because of participation limits. Use the preregistration form provided in this announcement.
2. Registration is required for all attendees, including field trip participants and guests. Badges will be required for ALL activities 10:00 a.m. Sunday through 5:00 p.m. Thursday. There will be a fee charged for all lost badges.
3. Registration discounts are given to GSA and Associated Society members. Associated Societies that qualify for this discount are indicated on the registration form. Please indicate your affiliation(s) and member number, and register using the member rates.
4. Full payment **MUST** accompany registration. Unpaid purchase orders are not accepted as valid registration. Credit cards are accepted as indicated on preregistration form. If using a credit card, please recheck the card number given—errors will delay your registration.
5. Register one professional or student per form. Copy the form for your records. One day registrants **MUST** indicate the day they plan to attend on the registration form.
6. Guest registration is required for guests attending guest activities, special events, and luncheons. The registration fee does not include admission to the technical sessions. Guest registrants **MUST** be accompanied by either a professional or student registrant.
7. **CURRENT** student ID is required to obtain student rates at both the on-site and preregistration counters.

REGISTRATION FEES

	Advance*	On-Site	One-Day
Professional—Member	85.00	100.00	50.00
Professional—Nonmember	125.00	140.00	70.00
Student—Member	42.00	50.00	25.00
Student—Nonmember	62.00	70.00	35.00
Guest	30.00	45.00	N/A

*Registration fees received before October 10, 1986.

ON-SITE REGISTRATION SCHEDULE

Convention Center, Arcade Area

Sunday, November 9	10:00 a.m. to 7:30 p.m.
Monday, November 10	7:30 a.m. to 5:00 p.m.
Tuesday, November 11	7:30 a.m. to 5:00 p.m.
Wednesday, November 12	7:30 a.m. to 2:00 p.m.
Thursday, November 13	7:30 a.m. to 2:00 p.m.

CANCELLATIONS AND REFUNDS

GSA will refund advance registration fees for cancellations received in writing by **OCTOBER 17. NO REFUNDS WILL BE MADE ON CANCELLATION NOTICES RECEIVED AFTER THIS DATE.** Refunds will be mailed from GSA after the meeting; a \$10 processing fee will be charged. Refunds for fees paid by credit card will be credited according to the card number on the preregistration form. **NO** refunds for on-site registration and ticket sales.

NEW MEMBERSHIP DISCOUNTS

A \$40 member discount on registration applies to any professional member of GSA or an Associated Society. The Associated Societies that qualify are listed on the registration form. Professional registrants who paid the nonmember

registration fee and apply for GSA membership by March 31, 1987, will be entitled to a \$40 reduction in the 1987 membership fee. Students will receive a \$15 discount from the 1987 Student Associate membership fee. Only **ONE** discount will apply per person. In order to receive the reduction, a copy of the meeting registration form **MUST** be attached to the membership application. Membership applications are available from GSA headquarters. During the meeting, you can pick up applications at the GSA Bookstore (Exhibit Hall, Booth #328), GSA Employment Service, or Membership Desk, Registration area, Convention Center.

ASSOCIATED SOCIETIES MEETING WITH GSA

Cushman Foundation
 Geochemical Society
 Geoscience Information Society
 Mineralogical Society of America
 National Association of Geology Teachers
 Paleontological Society
 Society of Economic Geologists

PREREGISTRATION FORM

1986 GSA ANNUAL MEETING • NOV. 10-13 • SAN ANTONIO

PREREGISTRATION must be RECEIVED by October 10. FULL payment and form MUST accompany all preregistration requests. Unpaid purchase orders NOT accepted as valid registration. One form per registrant. Participants in all events, short courses excluded, must pay a preregistration fee. CANCELLATION deadline: October 17. No refunds on cancellations received after this date. Confirmation card will be your receipt.

Type or print ** Copy for your records

Name (Last) _____ (First) _____

Institution/Employer _____ Nickname for badge _____

Mailing Address _____

City _____ State _____ Zip code _____

Country _____ Business phone _____ Home phone _____

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

City _____ State/Country _____

Member Affiliations: (1)GSA _____ (2)CF _____ (3)GS _____ (4)GIS _____ (5)MSA _____
(6)NAGT _____ (7)PS _____ (8)SEG _____ Member # _____

PREREGISTRATION FEES	(registration required for participation in all events)		Column A	
		Price	Qty	Amount
Professional Member (member affiliation checked above)	(1)	\$ 85	_____	\$ _____
Member One-Day (circle day S M T W T)	(2)	\$ 50	_____	\$ _____
Professional Nonmember	(3)	\$125	_____	\$ _____
Nonmember One-Day (circle day S M T W T)	(4)	\$ 70	_____	\$ _____
Student Member (member affiliation checked above)	(5)	\$ 42	_____	\$ _____
Member One-Day (circle day S M T W T)	(6)	\$ 25	_____	\$ _____
Student Nonmember	(7)	\$ 62	_____	\$ _____
Nonmember One-Day (circle day S M T W T)	(8)	\$ 35	_____	\$ _____
Guest (fill in name above for badge)	(9)	\$ 30	_____	\$ _____

GUEST ACTIVITIES			Column A	
		Price	Qty	Amount
What to Buy & Where	Nov 10 (10)	\$ 7	_____	\$ _____
Historic San Antonio & Luncheon	Nov 10 (11)	\$ 29	_____	\$ _____
San Antonio Culture	Nov 11 (12)	\$ 17	_____	\$ _____
Natural Bridge Caverns & Luncheon	Nov 12 (13)	\$ 32	_____	\$ _____

SPECIAL EVENTS			Column A	
		Price	Qty	Amount
Burros & Burritos	Nov 12 (14)	\$ 28	_____	\$ _____
Invitational Tennis	Nov 9 (15)	\$ 15	_____	\$ _____
10K Run (circle T-shirt size: S M L)	Nov 12 (16)	\$ 7	_____	\$ _____
5K Run (circle T-shirt size: S M L)	Nov 12 (17)	\$ 7	_____	\$ _____
Total of Column A			_____	\$ _____

Remit in U.S. funds, payable To GSA Annual Meeting
or charge: American Express Choice Diners Club/Carte Blanche MasterCard VISA

Card expires: ____/____/____ card number _____

Signature _____

TICKETED MEAL FUNCTIONS			Column B	
		Price	Qty	Amount
Engineering Geology	Nov 11 (18)	\$ 15	_____	\$ _____
Geoscience Information Society	Nov 11 (19)	\$ 15	_____	\$ _____
History of Geology Division	Nov 11 (20)	\$ 15	_____	\$ _____
Hydrogeology Division	Nov 11 (21)	\$ 15	_____	\$ _____
Mineralogical Society	Nov 11 (22)	\$ 15	_____	\$ _____
National Association of Geology Teachers	Nov 11 (23)	\$ 15	_____	\$ _____
Paleontological Society	Nov 11 (24)	\$ 15	_____	\$ _____
Sedimentary Geology Breakfast	Nov 11 (25)	\$ 10	_____	\$ _____
Women Geoscientists Breakfast	Nov 11 (26)	\$ 10	_____	\$ _____
Coal Geology Division	Nov 12 (27)	\$ 15	_____	\$ _____
Geochemical Society	Nov 12 (28)	\$ 15	_____	\$ _____
Quaternary Geology & Geomorphology Division	Nov 12 (29)	\$ 15	_____	\$ _____
Society of Economic Geologists	Nov 12 (30)	\$ 15	_____	\$ _____

FIELD TRIPS			Column B	
		Price	Qty	Amount
Premeeting				
1 Geomorphology of Texas Panhandle	Nov 7-9 (31)	\$235	_____	\$ _____
1a Geomorphology #1 without airfare	Nov 7-9 (32)	\$155	_____	\$ _____
2 Archaeological Geology, S. High Plains	Nov 7-9 (33)	\$235	_____	\$ _____
2a Archaeological #2 without airfare	Nov 7-9 (34)	\$155	_____	\$ _____
3 Igneous Geology, Trans-Pecos Texas	Nov 6-9 (35)	\$250	_____	\$ _____
4 Ouachita Mountain Geology	Nov 6-9 (36)	\$315	_____	\$ _____
4a Ouachita Mountain #4 without airfare	Nov 6-9 (37)	\$236	_____	\$ _____
5 Engineering Geology of San Antonio	Nov 9 (38)	\$ 45	_____	\$ _____
6 Stratigraphy & Structure, Maverick Basin	Nov 7-9 (39)	\$265	_____	\$ _____
7 Cambrian Wichita Mountains Igneous	Nov 7-9 (40)	\$326	_____	\$ _____
7a Cambrian Wichita #7 without airfare	Nov 7-9 (41)	\$235	_____	\$ _____
8 Edwards Aquifer Hydrology, San Antonio	Nov 8 (42)	\$ 55	_____	\$ _____
9 Late Pennsylvanian Paleoenvironments	Nov 7-8 (43)	\$140	_____	\$ _____
10 Gulf Coast Lignites	Nov 6-9 (44)	\$265	_____	\$ _____
11 Geology & Mineral Resources—Salt Domes	Nov 9 (45)	\$ 70	_____	\$ _____
12 Southern Oklahoma Sedimentation	Nov 7-9 (46)	\$326	_____	\$ _____
12a Southern Oklahoma #12 without airfare	Nov 7-9 (47)	\$235	_____	\$ _____

SHORT COURSES			Column B	
		Price	Qty	Amount
Postmeeting				
13 Precambrian Granites, Central Texas	Nov 14-15 (48)	\$150	_____	\$ _____
14 Edwards Limestone Aquifer History	Nov 14 (49)	\$ 60	_____	\$ _____
15 South Texas Modern Depositional System	Nov 14-16 (50)	\$200	_____	\$ _____
16 Stratigraphy of El Paso Borderland	Nov 13-15 (51)	\$190	_____	\$ _____
16a Stratigraphy #16 without airfare	Nov 13-15 (52)	\$125	_____	\$ _____
17 Texas Cretaceous Volcanic Centers	Nov 14-15 (53)	\$ 95	_____	\$ _____
18 Platform Comanchean, Central Texas	Nov 13-15 (54)	\$150	_____	\$ _____

SHORT COURSES			Column B	
		Price	Qty	Amount
(meeting registration not required)				
Computer Graphics	Nov 8-9 (55)	\$270	_____	\$ _____
Glacial-Marine Sedimentation	Nov 8-9 (56)	\$100	_____	\$ _____
Contaminant Hydrogeology	Nov 8-9 (57)	\$100	_____	\$ _____
Seawater Chronostratigraphy	Nov 9 (58)	\$ 50	_____	\$ _____
Geologic Use of Microcomputers	Nov 9 (59)	\$ 85	_____	\$ _____
Fossil Radiolaria	Nov 9 (60)	\$ 75	_____	\$ _____
Principles of Rock Mechanics	Nov 14-15 (61)	\$135	_____	\$ _____

ABSTRACTS WITH PROGRAMS —
Reserved (on-site pickup) _____ (62) \$ 18 _____ \$ _____

Total Column B \$ _____
Total Column A \$ _____
Column A + B = Total Remittance \$ _____

FOR OFFICE USE ONLY

Deposit Date _____ Comment _____
Balance Due \$ _____ A/R _____
Refund \$ _____ A/P _____
Refund Ck # _____
Refund Date _____

MAIL TO: 1986 GSA ANNUAL MEETING, P.O. BOX 9140, BOULDER, CO 80301.



Mineralogical Society of America
1625 I Street N.W., Suite 414
Washington, D.C. 20006

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