GSA 1990 ANNUAL MEETING
Dallas, Texas  October 29–November 1

CALL FOR PAPERS/FIRST ANNOUNCEMENT—See page 101
ABSTRACTS DUE JULY 11
PREREGRISTRATION DUE SEPTEMBER 28
REGISTRATION/FULL DETAILS: August GSA News & Information
Council Approves Two-Nominee Corporate Slate

Responding to a poll of voting members, the GSA Council has approved a two-nominee slate for the positions of vice-president and councilor.

A preference poll was included with the 1989 corporate ballot mailing to all voting members of GSA to ascertain whether they would prefer ballots consisting of more than one nominee for the vice-president and councilor positions. A total of 2740 members responded to the poll; 69% preferred a multi-nominee slate, 29% preferred the present system, and 1% had no preference.

Of those favoring a multi-nominee slate, most did not like the idea of three candidates per position because such a system might not result in a majority and could require a runoff election. Most preferred two candidates per position.

The Council accepted the results of the poll and approved a multiple slate, to include two candidates for the position of vice-president and two candidates for each councilor position. Beginning this fall, all voting members of the Society will receive a ballot that will list two candidates for each of these elected positions. Accompanying information will include biographical data and a photograph of each nominee.

The Council hopes that this new policy will encourage greater membership participation in the election process. Only you, the voting Members and Fellows of the Society, can make this happen. This fall, exercise your right to vote for GSA councilors and officers.

Report on Fibrous Minerals Available

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

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

PEOPLE

Fellow Don L. Anderson has been named the first Eleanor and John R. McMillan Professor of Geophysics at the California Institute of Technology.

The American Association for the Advancement of Science has given Fellow Robert D. Ballard, Woods Hole Oceanographic Institution, its Westinghouse Award for Public Understanding of Science and Technology.

Fellow Robert W. Decker has been appointed Distinguished Visiting Professor of Geophysics for 1990 at the newly established Center for the Study of Active Volcanoes, University of Hawaii at Hilo.

Member James E. Furr has been appointed a Geraghty and Miller, Inc., Associate; he is manager of the firm's Baton Rouge, Louisiana, office.

1991–1992 Advanced Research Fellowships in India

The Indo-U.S. Subcommission on Education and Culture is offering twelve long-term (6-10 months) and nine short-term (2-3 months) awards for 1991–1992 research in India. These grants will be available in all academic disciplines except clinical medicine. Applicants must be U.S. citizens at the postdoctoral or equivalent professional level. The fellowship program seeks to open new channels of communication between academic and professional groups in the United States and India and to encourage a wider range of research activity between the two countries than now exists. Therefore, scholars and professionals with limited or no prior experience in India are especially encouraged to apply.

Fellowship terms include: $1500 per month, of which $350 per month is payable in dollars and the balance in rupees; an allowance for books and study/travel in India; and international travel for the grantee. In addition, long-term fellows receive international travel for dependents; a dependent allowance of $100-$250 per month in rupees; and a supplementary research allowance up to 34,000 rupees. This program is sponsored by the Indo-U.S. Subcommission on Education and Culture and is funded by the United States Information Agency, the National Science Foundation, the Smithsonian Institution, and the Government of India.


GSA NEWS & INFORMATION (ISSN 0164-5854) is published monthly by The Geological Society of America, Inc., with offices at 3300 Penrose Place, Boulder, Colorado. Mailing address is P.O. Box 9140, Boulder, CO 80301-9140, U.S.A. Second-class postage paid at Boulder, Colorado, and at additional mailing offices. Postmaster: Send address changes to GSA News, Membership Services, P.O. Box 9140, Boulder, CO 80301-9140. Copyright © 1990, The Geological Society of America, Inc. Copyright is not claimed on content prepared by government employees within the scope of their employment. Limited permission is hereby given by GSA to photocopy any material appearing in GSA News & Information for the noncommercial purpose of scientific or educational advancement. GSA, a scholarly society, neither adopts nor supports positions of advocacy. We provide this and other forums for the presentation of diverse opinions and positions by scientists worldwide, regardless of their race, citizenship, gender, religion, or political viewpoint. Opinions presented in these publications do not reflect official positions of the Society.

Vol. 12, no. 4 April 1990

GSA News & Information

Subscriptions for 1990 calendar year: Society Members: GSA News & Information is provided as part of membership dues. Contact Membership Services at 800-472-1988 or (303) 447-2020 for membership requirements. Nonmembers & Institutions: $24 for U.S./Canada/Mexico and $34 elsewhere. Contact Subscriptions Services (same phone). Single copies may be requested from Publication Sales. Claims: For nonreceipt or damaged copies, members contact Membership Services; all others contact Subscription Services. Claims are honored for one year; please allow sufficient delivery time for overseas copies. Prepared from contributions from the GSA staff and membership. Executive Director: F. Michael Wahle, Ph.D.; Managing Editor: Faith Rogers; Associate Editor: Lee Gladsby; Production and Advertising Manager: James R. Clark; Advertising Coordinator: Ann H. Crawford; Production: Mona T. Gonzales and Joan E. Merly.


Published in U.S.A.
DNAG NEWS

by Allison R. (Pete) Palmer

First Canadian DNAG Volume Now Available

Quaternary Geology of Canada and Greenland (Volume K-1 of the DNAG set), edited by Bob Fulton, has just been received from the Geological Survey of Canada. This 839-page volume and the accompanying slipcase with five major four-color maps is a real bargain for those individuals with prepaid DNAG orders. The volume is also the first of nine projected volumes that will serve as the 1990s set of The Geology of Canada; it was published simultaneously in French in Canada. The 61 contributors listed below made this volume possible. Thanks to them for their contributions and for their patience while the French translation was being prepared.

D. F. Acton
J. T. Andrews
J. Bednarzski
M. J. Bovis
M. Boyko-Diakonow
M. A. Carson
J-Y. Chagnon
J. J. Clague
W. R. Cowan
P. P. David
T. J. Day
R.N.W. DiLabio
L. A. Dredge
A. S. Dyke
W.A.D. Edwards
P. A. Egginton
J. England
S. G. Evans
D. C. Ford
B. Fredskild
H. M. French
R. J. Fulton
S. Funder
J. S. Gardner
D. R. Grant
J. A. Heginbottom
K. Hewitt
D. A. Hodgson
O. L. Hughes
L. E. Jackson, Jr.
P. F. Karrow
R. A. Klassen
R. W. Klassen
R. M. Koerner
H. C. Larsen
J. Locat
G. M. MacDonald
R. W. Mathewes
W. H. Mathewes
J. V. Matthews, Jr.
J. H. McAndrews
S. R. Morison
R. J. Mott
S. Occhietti
W. R. Peltier
E. W. Presant
N. Reeh
P.J.H. Richard
J. C. Ritchie
N. W. Rutter
J. M. Ryder
C. E. Schweger
J. S. Scott
H. O. Slaymaker
M. W. Smith
C. Tarnocai
K.W.G. Valentine
J-S. Vincent
K. Webb
O. L. White

More Kudos

With the receipt of the final chapter for Surface Water Hydrology, we can now list the 35 patient contributors to this volume as well. These and the Canadian contributors listed above bring the total number of participants in finished DNAG volumes to 1423.

E. D. Andrews
J. T. Armbruster
J. P. Buchanan
M. Church
J. C. Day
T. J. Day
A. Demayo
M. Frenette
F. K. Hare
K. D. Harvey
J. D. Hem
R. M. Hirsch
R. Kallio
M. Lapointe
H. F. Lins
T. E. Lisle
H. F. Matthai
R. H. Meade
M. F. Meier
R. Newbury
R. Patrick
H. C. Riggs
J. D. Rogers
K. E. Saxton
S. Schumm
S. Y. Shaia
K. P. Singh
R. A. Smith
J. F. Walker
D. D. Williams
B. R. Winkley
T. C. Winter
M. G. Wolman
M-K. Woo
T. R. Yuzyk

Book Wrap-up Continuing

Final paging is underway for three volumes that are now all in our hands: Archaeological Geology of North America, Surface Water Hydrology, and The Arctic Ocean Region. These will probably appear, in that order, in late May or early June.

The final proofs for the final color plates for both the Appalachian/Ouachita and Caribbean volumes have now been checked by their respective authors. If there are no further problems, this will probably liberate the Appalachian/Ouachita volume by the time you read this; the text has already been printed, and the volume is awaiting only completion of the plates.

The Caribbean volume will move into the final production process as soon as the Shagam chapter (being revised by Case) is in our hands. All major plates for this volume are now under control.

Other Progress

The final revision of the Stewart and Crowell chapter on strike-slip faulting in the U.S. Cordillera is now in production. Otherwise, nothing has changed from the March listing of things needed.

Half of the volume Economic Geology of Mexico is now through translation, and these chapters are now in production.

For the volume Economic Geology: U.S., drop Tim Cross from the list of authors from whom we expect manuscripts. We have received no indication that the chapter he was to prepare on the geography of North American coal has even been started, and Tim is now in Europe until June, long past the time when we need the final chapters for this volume in hand.
A Pound of Cure: Earthquakes Are Simple, Oil Spills Are Not
by Daniel R. Sarewitz
1989–1990 GSA Congressional Science Fellow

Shortly before Christmas, I received my first gift from a lobbyist. I was willing to interpret this as a rite of passage: someone actually thought that my opinion was important enough to be worth influencing with an attractively packaged and tasty sampling of various fruit preserves. The accompanying note thanked me for remaining “proactive” on a certain issue of interest to the lobbyist and the group that he was representing.

“Proactive” was not a part of my working vocabulary prior to arriving in Washington, D.C., but I have now reluctantly incorporated it into my repertoire. Although it cannot be found in the 1933 compact edition of the Oxford English Dictionary (4116 pages), “proactive” turns up in American dictionaries published after about 1970. For example, the 1976 Webster’s New Collegiate Dictionary offers the following helpful definition: “involving modification by a factor which precedes that which is modified.” In other words: closing the barn door while the horse is still inside.

As a rule, the Congress of the United States is not proactive. There is often political risk involved in trying to anticipate future events, and the voting public tends to be unappreciative of expenditure or compromise associated with long-term goals. On the other hand, rapid response to a crisis can be an effective way for politicians to show sensitivity to the needs of the people. Crisis is the key word here, and crisis management is a specialty of the House (and Senate). What’s on the legislative agenda these days? The budget crisis, the savings and loan crisis, the health-care crisis, the education crisis, the housing crisis, the ozone crisis, the carbon dioxide crisis.

The government finds it more expedient to pay (in both the political and fiscal sense of the word) for cure than to pay for prevention. For example: as Congress struggled divisively last autumn to cut $14 billion out of the federal budget in order to comply with the Gramm–Rudman–Hollings deficit-reduction law, they were momentarily distracted by the magnitude 7.1 Loma Prieta earthquake. Within a week, Congress approved $3.4 billion in disaster assistance, with very little opposition. (This is what is known as an “off-budget” expenditure, which apparently means that even though the government spends it and the taxpayers pay for it, Congress and the President agree to pretend that it never existed.) The magnitude of this expenditure is particularly conspicuous in light of Congressional unwillingness to provide adequate funds for earthquake hazard mitigation. Last year’s appropriation of $67 million for mitigation programs was 50 times less than the federal cost of responding to the Loma Prieta event, and 150 times less than total estimated damages of about $10 billion resulting from the earthquake. Congress, they say, is “reactive.”

Earthquakes, however, are politically simple. Few would criticize Congress for providing aid to a region that has experienced a natural disaster, even if there has not been an adequate federal commitment to disaster preparedness. But some events may force Congress to make choices that are politically painful. An important example of this has been the 15-year struggle to develop federal legislation regarding oil spills.

From 1975 to 1989, legislators tried repeatedly but without success to pass a comprehensive bill governing liability and cleanup after oil spills. At present, there are at least eight federal statutes pertaining directly or indirectly to oil spills, as well as 24 individual state laws, many of which are in direct conflict with federal regulations. This rather formidable assemblage of laws has charitably been referred to as a “patchwork,” which is meant to imply that all of the separate laws somehow work together to form a coherent whole. “Hodgepodge” is probably a more precise term; indeed, most interested parties—the federal government, the states, the petroleum industry, and environmental groups—have long agreed that a single federal law is necessary to clear up the confusion. Such a law would mandate liability levels, increase preparedness and response capability, provide an immediate source of funds so that cleanup efforts are not delayed, and internalize the costs of the cleanup within the industry.

Prior to 1989, all attempts to forge comprehensive legislation foundered on a principle that is as old as the nation itself: states’ rights. Should federally mandated liability levels for oil spills supplant the levels set by individual states? On the one hand, the petroleum industry strongly supported federal preemption, because some state liability regulations were—and remain—much more stringent than national laws. They argued that state provisions establishing unlimited liability for some spills would make it impossible for oil carriers to get insurance. Environmental groups supported the opposite position, maintaining that individual states bore individual risks, so that each should be free to establish its own laws.

This was not a dispute that could be resolved on the basis of the merits of the arguments themselves. Neither was it a strictly partisan issue. The House of Representatives and the Senate found themselves in a difficult philosophical position. In resource disputes, the House often leans toward stronger environmental protection measures, while the Senate tends to support more aggressive programs of development. But the controversy about oil spill liability turned this trend upside down. Beneath the specific issue was a more fundamental question of the distribution of political power. The Constitution established the House and Senate as countervailing forces in order to prevent the outright dominance of one force over the other. As the seat of popular representation, the House is the natural advocate of federalism, whereas the Senate is (continued on p. 93)
the historical champion of states' rights. Thus, from the beginning, the House supported federal preemption of state laws in the case of oil spill liability, while the Senate supported the rights of states to do whatever they wanted. For 14 years there was no incentive to break the stalemate—the "hodgepodge" remained in effect.

When the 101st Congress convened in January of 1989, oil spills were not a legislative priority. Without a crisis, there was not much likelihood of achieving the Congressional compromise that would be required for passing legislation. Had OPEC nations managed to reassert their control over oil supplies and prices last year, oil spill legislation might have been pushed through Congress with federal preemption language intact, in order to safeguard the industry's ability to transport petroleum with the fewest possible restrictions. Instead, on March 24, 1989, the Exxon Valdez struck rocks off Bligh Island in Alaska's Prince William Sound, spilling more than 10 million gallons of crude oil. Since that time, both the House and Senate have passed oil spill legislation that preserves the rights of states to set their own liability limits, and it is likely that a final compromise version of these bills will be sent to the President for his signature by mid-1990.

The Exxon Valdez spill graphically demonstrated the weaknesses of existing legislation—weaknesses that were well understood beforehand. Cleanup and liability in this case were mostly covered under the jurisdiction of the 1973 Trans-Alaska Pipeline Authorization Act (TAPAA), although six other laws (including the Limitation on Liability Act, which was passed in 1981) were also relevant to some aspects of the spill. In all, 14 Federal agencies have been involved in the cleanup effort, including the Environmental Protection Agency (EPA) and agencies within the departments of Commerce, Justice, Transportation, and Interior.

A major provision of TAPAA was the creation of the Trans-Alaska Pipeline Liability Fund, which was initially financed by a five-cent-per-barrel fee on all oil that passed through the pipeline between 1977 and 1981 and is currently worth about $250 million. TAPAA established a liability limit of $100 million per spill; the first $14 million in costs were to be borne by the owner or operator of the vessel and the remaining costs—up to $86 million—were to be paid from the fund. In the event that costs exceeded the $100 million limit, the federal treasury would be forced to foot the remainder of the cleanup bill, and private damage claims would have to be recovered through the state courts.

Recent estimates suggest that the total cost of cleanup and damages from the Exxon Valdez spill may exceed $2 billion. Exxon waived legal technicalities and has shouldered most of these costs, but the magnitude of the problem shows that the liability levels established for TAPAA are completely inadequate. In addition, according to a "Report to the President" from the Secretary of Transportation and the head of EPA, "Government and industry plans, individually and collectively, proved to be wholly insufficient. . . . The various contingency plans did not refer to each other or establish a workable response command hierarchy. This resulted in confusion and delayed the cleanup."

Congress responded—reacted—like sharks to blood. In 1989, between early April and October, 27 separate hearings were conducted before five committees of the Senate and seven committees of the House. Nineteen bills were introduced in the Senate, and 46 bills in the House. The Senate passed the comprehensive Oil Pollution Liability and Compensation Act of 1989 on August 4, by a vote of 99 to 0. The state preemption debate was not resolved until November 8, when the House voted 279 to 143 to adopt amendments to their comprehensive bill that would leave individual states free to enforce their own liability limits. The next day, the bill itself passed in the House by a vote of 375 to 5.

Although there are some differences between the legislation passed by the Senate and House, the resolution of the state preemption dispute will probably allow a mutually agreeable law to emerge from House-Senate conference in 1990. The new law would establish a $1 billion oil spill compensation fund—financed by a 5-cent-per-barrel tax on oil—to pay for cleanup and damages from future spills and to support improved prevention and response capabilities. The law would also significantly increase liability levels for non-negligent spills, and it would establish full liability for "willful misconduct or gross negligence."

Congress reacts, but not in a vacuum. The Exxon Valdez spill broke a 15-year legislative deadlock, but the character of the Congressional response was dictated as much by the prevailing political climate as by the spill itself. Although the United States is more dependent than ever on foreign oil, fuel prices remain low, whereas Congressional and public concern over the environment has grown stronger. In this context, last year's oil spill resulted in legislation that favored environmental, rather than industrial, interests. The spill also widened the debate over oil production in the United States, stiffening Congressional resistance to proposed exploration and development in environmentally sensitive areas such as the Alaska National Wildlife Refuge, offshore California, and offshore Florida.

Several petroleum geologists have told me that, by allowing the oil spill to influence its position on exploration, Congress has confused the problem of oil transit with unrelated issues of oil exploration and development. While this may be correct in a very literal sense, it is also a good example of why Congress and scientists have trouble communicating with one another. At the moment, environmental considerations carry substantial weight in Congress. If resource development arguments are not framed within this broader political reality, they are unlikely to find an enthusiastic audience on Capitol Hill. This will probably be the case at least until the next oil crisis.

Daniel R. Sarewitz, GSA Congressional Science Fellow for 1989-1990, is working in the office of Congressman George E. Brown, Jr., 36th District of California, 2188 Rayburn House Office Building, Washington, DC 20515; (202) 225-6161. The fellowship, which is for a one-year term, is jointly sponsored by funds from GSA and a grant from the U.S. Geological Survey.

Memorial Preprints
The following memorial preprints are now available, free of charge, by writing to GSA, P.O. Box 9140, Boulder, CO 80301.
Eduin B. Eckel, by Ernest Dobrovolsky, Wallace Hansen, G. D. Robinson, W. S. Twenhofel, Ogden Tweto, David Varnes, and Robert Yates
Ralph Earl Grim, by Haydn H. Murray
Holly Dow Hedberg, by Timothy A. Anderson
Richard W. Smith, by Watson H. Monroe

In Memoriam

<table>
<thead>
<tr>
<th>Charles A. Anderson</th>
<th>Ronald T. Russell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pomona, California</td>
<td>Victoria, Australia</td>
</tr>
<tr>
<td>January 9, 1990</td>
<td>November 3, 1989</td>
</tr>
<tr>
<td>Guillermo Zuloaga</td>
<td></td>
</tr>
<tr>
<td>Caracas, Venezuela</td>
<td></td>
</tr>
</tbody>
</table>
Preparing for Partnering

Partnering in science education at the precollege level is catching on in many forms across the nation. Our effort, focused on the geoscience component of science education, will be another entry in the field. The problem is logistically immense—nearly every school in the country can use some partnering help. In order to make this project manageable and effective, we will have to do pilot runs to get some experience in the process of powerful partnering. Setting up pilots will be one of the goals of this spring’s activities for the Education Committee, and seeds for these will be planted at the spring section meetings.

One of our important targets should be elementary school science education. If we don’t get things started right at this level, the power of our efforts at the secondary school level may be diminished. In preparation for partnering at the elementary school level, I strongly recommend the recent report “Science and Technology Education for the Elementary Years: Frameworks for Curriculum and Instruction.” This report was prepared by the National Center for Improving Science Education, a partnership of The Network, Inc., and the Biological Sciences Curriculum Study Project (BSCS). One of its co-authors is Ed Buchwald, who was featured in this column earlier this year. This is a strong and sensible document and should be the basis for thinking about the way to present essential geoscience ideas at the elementary school level. It can be ordered from The Network, Inc., 290 South Main Street, Andover, MA 01810 as publication 301. The price is $12 plus $2.50 for postage and handling.

Another Way To Help

There is a need for volunteers to review published precollege science texts and also to serve as prepublication reviewers for publishers of precollege texts. The National Center for Science Education, Inc. (NCSE) at Berkeley, California is serving as a coordinator for publishers looking for reviewers; it also publishes a newsletter called Bookwatch Reviews, which is the only periodical dedicated to reviewing precollege science texts. NCSE needs to add to its pool of reviewers either before or after the fact. If you are interested in assisting as either a prepublication reviewer or a book reviewer for Bookwatch Reviews, please send me your name, address, fields of special knowledge, and current professional position, so that I can prepare a list of potential reviewers in either mode for NCSE. AGU has already received a good response from its members to a similar solicitation.

USGS Creates an Educational Tool

If you want to take advantage of the recent publicity caused by the Loma Prieta earthquake, Tau Rho Alpha, John C. Lahr, and Linda F. Wagner have created a simple paper model to illustrate the motion that occurred on the San Andreas fault during the earthquake. It is available as U.S. Geological Survey Open-File Report 89-640A. To learn more, contact one of the authors, at USGS, 345 Middlefield Rd., Menlo Park, CA 94025.

---

GSA HAT

The GSA hat comes in both a light blue cotton twill, embroidered with the GSA logo, and in dark blue corduroy, embroidered with the Society's name.

Clip and Mail to

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

Name ________________________________
Address ________________________________
Address ________________________________
City ________________________________
State/ZIP ________________________________
Phone ________________________________

Here is my order for the GSA HAT: $9.50 ea.
One size fits all

Light blue cotton twill with GSA logo Quantity ___
Dark blue corduroy with Society's name Quantity ___
Total hats @ $9.50 ea. $ ___
Add shipping & handling $ 1.50
TOTAL AMOUNT DUE: $ ___

Make checks payable to: Geological Society of America

Remit in U.S. funds only NO PHONE ORDERS ACCEPTED
Allow three weeks for delivery
GSA Bulletin and Geology Contents
April 1990

The Geological Society of America
BULLETIN
Volume 102, Number 4, April 1990

CONTENTS

409–416 The affinities and ecology of Triassic ichthyosaurs
    Judy A. Massare and Jack M. Callaway

417–427 Omissional faulting during Mesozoic regional contraction at Carlin Canyon, Nevada
    Pamela E. Jansa and Robert C. Speed

428–438 Pore pressure response during failure in soils
    Edwin L. Harp, Wade G. Wells II, and John G. Sarmiento

439–458 Geology, geochronology, and rift basin development in the central sector of the Main Ethiopia Rift
    Giday Woldegabriel, James L. Aronson, and Robert C. Walter

459–477 Lithostratigraphy, biostratigraphy, and geochronology of the Barstow Formation, Mojave Desert,
    southern California
    Michael O. Woodburne, Richard H. Tedford, and Carl C. Swisher III

478–493 Paleomagnetism, geochronology, and possible tectonic rotation of the middle Miocene Barstow
    Formation, Mojave Desert, southern California
    Bruce J. MacFadden, Carl C. Swisher III, Neil D. Opdyke, and Michael O. Woodburne

494–501 Interior ramp-supported uplifts: Implications for sediment provenance in foreland basins
    James G. Schmitt and James R. Steidtmann

502–515 Origin of Florida Canyon and the role of spring sapping on the formation of submarine box canyons
    Charles K. Paull, Fred N. Spiess, Joseph R. Curray, and David C. Twichell

516–528 Tectonic implications of 40Ar/39Ar hornblende ages from late Proterozoic–Cambrian plutons in the
    Avalon Composite Terrane, Nova Scotia, Canada
    J. Duncan Kepple, R. D. Dallmeyer, and J. Brendan Murphy

529–532 The mechanical paradox of large overthrusts: Alternative interpretation and reply
    Alternative interpretation: Paul A. Washington
    Reply: Raymond A. Price

533–534 Bulletin information

(continued on p. 96)
Magnetostratigraphy, Late Devonian iridium anomaly, and impact hypotheses .................................................. 29
Neil F. Hurley, Rob Van der Voo

Reading the Moon's volcanic record by ion microprobe analysis of Apollo 14 glass beads .................................................. 29
J. J. Papke, C. K. Shearer, K. C. Calibrath

Rotation of extension direction in the central Kenya Rift ......................................................................................... 29
M. R. Stecker, P. M Bilsniuk, G. H. Eisbacker

Sedimentological evidence for a limited separation between Armorica and Gondwana during the Early Orдовician .................................................. 30
Ch. Nobel, J. P. Lefort

Apparent isobaric cooling paths from granulites: Two counterexamples from British Columbia and New Hampshire .................................................. 30
Jane Silverstone, C. Page Chamberlain

Late Tertiary floral assemblage from upland gravel deposits of the southern Maryland Coastal Plain .................................................. 31
Lucy McCarran, Bruce H. Tifflne, Jack A. Wolfe, Thomas A. Ager, Scott L. Wing, Leslie A. Sirkin, Lauck W. Ward, James Brooks

Br-Cl-Na systematics in Illinois basin fluids: Constraints on fluid origin and evolution .................................................. 31
Lynn M. Walter, Alan M. Stueber, Ted J. Huston

Alpine Jurassic ophiolites resemble the modern central Atlantic basin ......................................................................................... 31
Yves Lagabrielle, Mathilde Cannat

Two-stage rifting of Pangea by two different mechanisms ......................................................................................... 32
Andrew Hynes

Generating melt during lithospheric extension: Pure shear vs. simple shear .................................................. 32
Dave Latini, Nicky White

U.S. west coast revisited: An aeromagnetic perspective ......................................................................................... 33
Peter R. Johnson, Isidore Zietz, Kevin R. Bond

Cathodoluminescence microscopy of myrmekite ......................................................................................... 33
R. Forrest Hopson, Karl Ramseyer

Precambrian time units and nomenclature—The geon concept ......................................................................................... 34
H. J. Holmman

Channel trenching and climatic change in the southern U.S. Great Plains ......................................................................................... 34
Stephen A. Hall

Discrimination of ophiolitic from nonophiolitic ultramafic-mafic allochthonus in orogenic belts by the Al/Ti ratio in clinopyroxene ......................................................................................... 34
Robert R. Loucks

Use of reaction space in depicting polymetamorphic histories ......................................................................................... 35
Jill S. Schneiderman

Episodic rapid uplift in the Himalaya revealed by ⁴⁰Ar/³⁹Ar analysis of detrital K-feldspar and muscovite, Beagol fan ......................................................................................... 35
Peter Copeland, I. M. Harrison

Angles of repose that exceed modern angles ......................................................................................... 35
C. John Mann, Sherman P. Kanagy II

Paleosols and the Cretaceous/Tertiary transition in the Big Bend region of Texas ......................................................................................... 36
Thomas M. Lehman

Yukon-Tanana Terrane: A partial acquittal ......................................................................................... 36
Vicki L. Hansen

New microtextural criterion for differentiation of compaction and early cementation in fine-grained limestones ......................................................................................... 37
Zakaria Lasemi, Philip A. Sandberg, Mark R. Boardman

Shear zones in the upper mantle—Relation between geochemical enrichment and deformation in mantle peridotites ......................................................................................... 37
H. Downes

Forum

Major Proterozoic basement features of the eastern midcontinent of North America revealed by recent COCORP profiling ......................................................................................... 37

Late Precambrian crustal extension preserved in Fries fault zone mylonites, southern Appalachians ......................................................................................... 37
Comment: James O. Eckert, Jr.; Reply: Carol Simpson, Theresa Kalaghan

Neogene extensional collapse in the western Mediterranean (Betic-Rif Alpine orogenic belt): Implications for the genesis of the Gibraltar Arc and magmatic activity ......................................................................................... 38
Comment: Dominique Frizon de Lamotte, Jean-Claude Guezou, Jean Andrieux, Marie-Anne Albertini, Michel Coulon, André Pission; Reply: Miguel Doblas, Roberto Oyarzun

Archean protoliths within Early Proterozoic granulitic crust of the west European Hercynian belt: Possible relics of the west African craton ......................................................................................... 38
Comment: R. P. Kuiper; Reply: C. Guerrot, J. J. Peucat, R. Capdevila, L. Dosso
More GSA Representatives Needed!

In the mid-1980s, GSA launched a new representative program, targeting companies, agencies, and consultants throughout the country. The purpose was to broaden GSA's representation to include all employment sectors. The program was modeled on the successful campus representative program that was begun in 1979 and now includes 523 representatives at colleges and universities throughout North America.

We now have 137 company, 79 agency, and 48 consultant GSA representatives. However, we need more volunteers. Our goal is to designate a representative at all major company offices and governmental agencies throughout the country. For example, we hope to have a GSA representative for the South Carolina Geological Survey in Columbia, for the Geological Survey of Canada in Vancouver, for the U.S. Geological Survey in Tucson, etc. We want to develop a similar liaison with GSA members who are self-employed and serve as consultants. They would also represent major cities and geographic regions.

Representatives serve as liaisons between GSA headquarters and their constituency in a particular city or region. They provide information on the programs and benefits of the Society to other members in the region and explain to prospective members the benefits of joining GSA. Each representative receives a notebook containing complete information on all programs, activities, publications, meetings, and other benefits that the Society provides its membership. Examples include:

- **GSA News & Information** every month
- **Reduced rates** on *Bulletin and Geology*
- **20% discount** on GSA books, maps, and charts
- **$30 discount for GSA’s Employment Service** (applicants)
- **$10 discount for registration fees** for Penrose Conferences

CURRENT GSA REPRESENTATIVES

**Cordilleran Section**

Alaska

Steven W. Nelson—U.S. Geological Survey, Anchorage

Arizona

David R. Annis—Arizona Department of Water Resources, Phoenix

Alvin L. Burch—U.S. Bureau of Land Management, Phoenix

Peter A. Drobeck—Kingman

Larry D. Fellows—Arizona Geological Survey, Tucson

Gordon B. Haxel—U.S. Geological Survey, Flagstaff

Frederic B. Loomis—Green Valley

Donald A. Parks—Parks Petroleum Company, Carefree

David A. Stephenson—Geoscience Review, Inc., Scottsdale

California

Richard T. Bachman—Naval Ocean Systems Center, San Diego

Kenneth S. Baldwin—U.S. Forest Service, Happy Camp

Robert J. Brenneman—Chevron, U.S.A., Inc., San Ramon

John L. Burnett—California Department of Conservation, Sacramento

David M. Burt—Waste Management of N.A., Inc., Irvine

Paul R. Carlson—U.S. Geological Survey, Menlo Park

Richard George Chalcraft—Chevron Oil Field Research, La Habra

Ray A. Eastman—Chino

Marc R. Egli—Brown and Caldwell, Irvine

Dorian Elder Mills—GEOCON, Inc., San Diego

G. Thomas Farmer, Jr.—Ecology & Environment, Inc., Los Angeles

John Ferguson—U.S. Army Corps of Engineers, Los Angeles


Michael Alan Fisher—Environmental Management Agency, Tustin

Michael E. Ford—Bureau of Land Management, Barstow

John H. Foster—Schaefer Dixon Associates, Santa Ana

John J. Francis—Earth Technology Corporation, Long Beach

S. Thomas Freeman—Woodward-Clyde Consultants, Santa Ana

Wilbert P. Gaston—ENSCO Environmental Services, Irvine

Mark D. Hamilton—Water Control Board, Sacramento

Robert G. Hickman—Union Oil Company of California, Brea

Christopher S. Johnson—Kleinfield and Associates, Fresno

David B. Kelley—California Central Valley, Davis

Franklyn G. Koch—Chevron, U.S.A., Inc., San Francisco

Elizabeth T. Lafferty—California Department of Health Services, Los Angeles

E. Dean B. Lauderman—Unocal Corporation, Los Angeles

George G. Linkletter—Hunting Lawson Associates, Tustin

Kenneth H. Lister—SCS Consultants, Long Beach


John D. Matthey—Terratech, Inc., San Jose


Eric McInerney—Roger Footh Associates, Inc., San Francisco

Mark P. Molinar—Dames & Moore, Goleba

Tal H. Nilsen—Applied Earth Technology, Inc., Redwood

William C. Paris, Jr.—EMCON, San Jose

David C. Pirol—Jet Propulsion Laboratory, Pasadena

Richard James Proctor—Richard J. Proctor, Inc., Arcadia

Glenn R. Roquemore—Leighton & Associates, Irvine

Donn C. Schwartzkopf—Leighton & Associates, Riverside

Grayce S. Seal—San Bernardino County Government, San Bernardino

Stephen M. Teets—Engineering Enterprises, Inc., Long Beach

James W. Tucker—ARCO International Oil & Gas Company, Los Angeles

Stephen P. Vonder Hara—Berkeley

C. Penny Webster-Scholten—Lawrence Livermore National Laboratory, Livermore

Chris J. Wills—California Division of Mines & Geology, Martinez

Mark R. Wood—ERT, Inc., Irvine

**Hawaii**

John P. Lockwood—U.S. Geological Survey, Hawaii National Park

(continued on p. 98)
North-Central Section

Illinois
Thomas A. Baillieu—U.S. Department of Energy, Argonne
Heinz H. Damberger—Illinois State Geological Survey, Champaign
Edward A. Need—Roy F. Weston, Inc., Chicago
Laura J. Powers-Couche—Manville Corporation, Waukegan
Michael L. Sargent—Illinois State Geological Survey, Champaign

Indiana

Iowa
Sherman R. Lundby—Basic Materials Corporation, Waterloo
Russell G. Shepherd—U.S. Soil Conservation Service, Des Moines

Minnesota
Sterling S. Cook—U.S. Bureau of Mines, Minneapolis
Gordon R. Hess—Sunde Engineering, Inc., Bloomington

Missouri
Eva B. Kivarsany—Missouri Geological Survey, Rolla

Nebraska
David S. Charlton—Nebraska Department of Environmental Control, Lincoln

Ohio
Richard J. Anderson—Columbus
Joan Brasaemele—Environmental Mitigation Group, Stow
David E. Harmon, Jr.—New Concord
David A. Lienhart—U.S. Army Corps of Engineers, Cincinnati

Wisconsin
Mark D. Millsop—STS Consultants, Ltd., Green Bay
Meredith Eggert Ostrom—Wisconsin Geological and Natural History Survey, Madison

South-Central Section

Kansas
Donald L. Baars—Kansas Geological Survey, Lawrence

Oklahoma
Mark W. Ballesteros—Hadson Petroleum International, Oklahoma City
Philip A. Chenoweth—Eastern Oklahoma
Charles B. John—U.S. Bureau of Land Management, Tulsa
Raymond W. Mitchell—Conoco, Inc., Ponca City
Patrick C. Strong—U.S. Department of Interior, Tulsa
Larry N. Stout—Oklahoma Geological Survey, Norman

Texas
Richard L. Anderson—Atlas Wireline Services, Houston
Bruce E. Archinal—Pogo Producing Company, Houston
Robert S. Barnard—Corpus Christi
Tori B. Barr—EXXON Company, U.S.A., Houston
Hughbert A. Collier—Abarre
Dan M. Cox—Marathon International Oil Company, Houston
Angel F. Curet—Mobil New Exploration Ventures, Dallas
William J. Devlin—EXXON Production Research Company, Houston
George J. Dillman—Ell Aquitaine Petroleum, Houston
F. L. Doyle—Brooks Air Force Base, San Antonio
Betsy J. Dransfield—Phillips Petroleum Company, Houston
Jules R. DuBar—Bureau of Economic Geology (University of Texas), Austin
Joseph T. Forrest, Jr.—Houston, Gulf Coast, central Texas
John J. Gallagher—ARCO Oil & Gas Company, Plano
Ronald L. Grubbs—DeGolyer & MacNaughton, Dallas
Frederick R. Haeberle—Dallas
Richard C. Hager—Mobil Exploration & Production, Inc., Midland
Bruce Handle—CONOCO, Inc., Houston
Diana K. T. Hansen—Halliburton Logging Service, Arlington
Lee Higgins—Mobil Exploration & Producing Services, Inc., Dallas
C. Lee Holt—Corpus Christi—south Texas
Peter J. Hutchinson—Primary Fuels, Inc., Houston
Don D. Irwin—Texaco Overseas Holdings, Inc., Bellaire
Donald L. Kelm—Seismographic International, Inc., Houston

(continued on p. 99)
GSA Representatives (continued from p. 98)

Michael B. Kendrick—EXXON Company, U.S.A., Midland
T. Matthew Larroche—Chevron U.S.A., Inc., Midland
David S. Mann—EXXON Company, International, Houston
Martin D. Matthews—Texaco E & P Technology Division, Houston
Allen F. Mattis—Amerada Hess Corporation, Houston
James A. McCarthy—Cavalla Energy Exploration Company, Houston
David L. McGee—MEMPUS, Houston
Charles L. McRulty, Jr.—Fl. Worth
Douglas E. Millman—EXXON Company, U.S.A., Houston
Adrienne N. Nunan—EXXON Company, U.S.A., Houston
Paul H. Pausé—Midland
Walter C. Pusey III—CONOCO, Inc., Houston
Harold P. Raveling—Champlin Petroleum Company, Ft. Worth
John R. Sans—NASA Johnson Space Center, Houston
Frank R. Scheubel—EXXON Company, U.S.A., Midland
Dietmar Schumacher—Pennzoll Company, Houston
Dallas B. Spear—ARCO Oil & Gas Company, Dallas
Larisa S. Streeter—Houston
Cindy A. Yeilding—Sohio Petroleum Company, Houston

Northeastern Section
Connecticut
Dennis G. McGrath—Morrison-Knudsen Engineers, Inc., Norwalk

Delaware
Martin J. Andrejko—Demes & Moore, Newark

District of Columbia
Michael Fred Weber—U.S. Nuclear Regulatory Commission

Maine
Lisa G. Taylor —Haley & Aldrich, Inc., Portland

Maryland
Jeffrey B. Cange—Booz, Allen & Hamilton, Inc., Bethesda
George H. Davis—Woodward-Clyde Consultants, Rockville
Eric J. Dougherty—Maryland Department of Health and Mental Hygiene, Baltimore
Nancy S. Stehle—U.S. Navy, Bethesda

Massachusetts
Thomas Barraso—NUS Corporation, Bedford
John H. Guswa—Geotrans, Inc., Harvard

New Hampshire
Danna B. Truslow—Portsmouth

New Jersey
Richard F. Bolich—Metcalf & Eddy Consulting Engineers, Somerville
James O. Brown—Langan Environmental Services, Elmwood Park
David E. Hassrick—Harding Lawson Associates, Princeton
Karl W. Muessig—New Jersey Geological Survey, Trenton
Kenneth C. Tyson—Roy F. Weston, Inc., Edison
Stephen J. Urbanik—New Jersey Department of Environmental Protection, Trenton
Richard B. Wice—EBASCO Services, Inc., Lyndhurst

New York
James M. Gibson—Amerada Hess Corporation, New York
Earlen D. Gilligan—Syracuse, New York State
Andrew J. Kucserik—Empire Soils Investigations, Kenmore
Demetrios C. Pohl—American Museum of Natural History, New York
C. John Suen—Brookhaven National Laboratory, Upton
Walter S. Urbanski, Jr.—Intermagnetics General Corporation, Albany

Pennsylvania
Bruce Read Cushing—BCM Eastern, Inc., Plymouth Meeting
Clifford H. Dodge—Pennsylvania Geological Survey, Harrisburg
Sean E. Kane—Woodward-Clyde Consultants, Plymouth Meeting
Bruce R. Rogers—U.S. Army Corps of Engineers, Philadelphia
David M. Side—NUS Corporation, Wayne
John C.B. Simonson—Environmental Research Management, Exton
Ernest S. Siraki—Sun International E & P, Wayne
Kevin D. Svitana—Benatec Associates, Camp Hill
Daniel Threllfall—Cheminviron, Inc., Pittsburgh

Quebec
Pierre LaSalle—Quebec Department of Energy & Resources

(continued on p. 100)

APPLICATION FOR REPRESENTATIVE

I would like to represent GSA as a

☐ GSA Company/Corporate Representative  ☐ GSA Self-Employed/Consultant Representative

☐ GSA Government Agency Representative
(Federal, State, Province, or Local)

Name of the Company, Agency, or Group you wish to represent: ____________________________

City or Geographic Region: ____________________________

Name and Address: ____________________________________________

(Please print) ____________________________________________

__________________________________________

__________________________________________

Business Phone: ( ) ____________________________

Mail form to: T. Michael Moreland, Membership Services Manager,
Geological Society of America, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020
GSA Representatives (continued from p. 99)
Southeastern Section
Alabama
Richard B. Winston — Geological Survey of Alabama, Tuscaloosa

Florida
Vincent P. Amy — Geraghty & Miller, Inc., Palm Beach Gardens
Timothy B. Berge — ESSO Colombiana, Coral Gables
J. Stephen de Albuquerque — Camp Dresser & McKee, Inc., Gainesville
Victor Early — Keith and Schnars, P.A., Boca Raton
Patrick Gleason — James M. Montgomery, Consulting Engineers, Inc., Lake Worth
Theodore M. Gurr — Gurr & Associates, Lakeland
Robert J. Kinsley-Monberger — Environmental Science & Engineering, Inc., Gainesville
Dan G. Neary — University of Florida, Gainesville
Gerald G. Parker, Sr. — Parker & Associates, Tampa
Gregory D. Roesch — Westunghouse Environmental SVC, Altamonte Springs
Walter Schmidt — Florida Geological Survey, Tallahassee
John H. Weitz, Jr. — Handex of Florida, Inc., Mount Dora

Georgia
John O. Costello — Atlanta Testing and Engineering, Woodstock
Peter Clyde Johnston — Roy F. Weston, Inc., Atlanta
James F. Renner — Wapora, Inc., Atlanta
David J. Wingard — Dynamac Corporation, Atlanta

Kentucky
John D. Kiefer — Kentucky Geological Survey, Lexington
Reginald R. Muskett — Defense Mapping Agency, Louisville

Louisiana
B. Steven Absher — Mobil Oil Company, New Orleans
David M. Pitcher — EXXON Company, U.S.A., New Orleans
Larry J. Rava — Conoco, Inc., Lafayette
Scott C. Reeve — Shell Offshore, Inc., New Orleans

Mississippi
Wilbur H. Knight — Jackson
Stephen C. Knowles — U.S. Army Corps of Engineers, Vicksburg
Allen Lowrie — U.S. Naval Oceanographic Office, Picayune

North Carolina
M. L. Babuin — North Carolina Department of Human Resources, Raleigh

Lindsay A. Bethel — Delta Environmental Consultants, Inc., Charlotte
Ivan R. Gilmore — Texagulf, Inc., Aurora
C. Edward Howard — Research Triangle Institute, Research Triangle Park
Garry C. Muraith — Ebasco Services, Inc., Greensboro

Tennessee
Ranaye B. Dreier — Oak Ridge National Laboratory, Oak Ridge
Phyllis M. Garman — Garman Geologic Consulting, Nashville
Edward T. Luther — Tennessee Department of Conservation, Nashville

Virginia
Bruce Doe — U.S. Geological Survey, Reston
Wilson N. Felder — TRW Systems, Fairfax
John J. Hnai — Amherst
Jean D. Juiland — U.S. Bureau of Land Management, Vienna
Robert C. Milici — Virginia Division of Mineral Resources, Charlottesville
Jan M. Pickrel — Virginia Water Control Board, Alexandria
Robert Schneider — Arlington
Eileen M. Sullivan — Virginia Water Control Board, Richmond

West Virginia
Peter Lessing — West Virginia Geological Survey, Morgantown

Other
Argentina
Mary N. Gilzean — Minera Utah de Las Americas, Salta

Australia
Willard F. Coffin — Bureau of Mineral Resources, A.C.T.

Dominican Republic
Gerald M. Ellis — Dominican Directorate General of Mines, Santo Domingo

India
Ram N. Choudhary — Oil & Natural Gas Commission, Bombay

Puerto Rico
Pedro A. Gelbert — U.S. EPA, Guaynabo

Singapore
Glenn L. Shepherd — Southeast Asia Petroleum Exploration Society, Singapore

South Africa
Fred Brown — Freddie’s Mine, Odendaalsrus

The Appalachian-Ouachita Orogen in the United States

PREPAYMENT REQUIRED. MAJOR CREDIT CARDS ACCEPTED.
GSA Publication Sales, P.O. Box 9140, Boulder, CO 80301, 1-800-472-1988, (303) 447-2020

Volcanism and Tectonism in the Columbia River Flood-Basalt Province
edited by S.P. Seed and P.R. Hooper, 1990

The Columbia River basalt (CRB) in the Pacific Northwest is the youngest continental floodbasalt province on earth. Because of its pristine state and accessibility, it has become the most extensively studied area to have hosted continental flood-basalt volcanism. This volume contains 25 papers covering many aspects of what is known about the volcanic and tectonic evolution of the province.

SPE239, 400 p., 1 pocket plate, indexed, paperback, ISBN 0-8137-2239-X, paperback, $52.50

Glacial Lake Wisconsin
by Lee Clayton and John W. Atig, 1989

For more than a century it has been known that part of the state of Wisconsin was once occupied by proglacial Lake Wisconsin, and many of its large-scale features have been known for 70 years or so. Still, it has received little detailed attention until recently, and this is the first comprehensive report on the lake. The authors report recent findings and relate these to our modern understanding of the late Pleistocene history of the western Great Lakes region. Some fine, old photographs are included; so are several excellent topographic maps covering the area, some of which is known to scientists and tourists alike as the Wisconsin Dells.


Geophysical Framework of the Continental United States
edited by L.C. Pakiser and W.D. Mooney, 1990

A comprehensive review and evaluation of our knowledge of the structure of the crust and upper mantle of the continental United States, exclusive of Alaska, as determined from geophysical observations. A valuable background source for information needed for research on the structure, composition, and geologic evolution of the continental crust and upper mantle. This volume, with 840 pages and 3 foldout plates, makes an excellent coursebook.


The Appalachian-Ouachita Orogen in the United States

George W. Viele, 1989

Includes 14 chapters on the Appalachian orogen, 15 on the Ouachita orogen, and a chapter on the connection between them beneath the eastern Gulf Coastal Plain. The Appalachian chapters synthesize the geologic development of the orogen by tectonostratigraphic intervals (pre-orogenic, Taconic, Acadian, Alleghanian, and post-Alleghanian), and also treat Paleozoic paleotectonic control, regional geophysics, thermal history of the crystalline terrane, parts of the orogen buried beneath the Atlantic and eastern Gulf coastal plains, regional geomorphology, mineral and energy resources; an integration chapter also is included. The Ouachita chapters cover physical stratigraphy and biostratigraphy of the Paleozoic rocks, structural geology, a synthesis of the subsurface geology beneath the western Gulf Coastal Plain, a review of the mineral and energy resources, regional geophysics, and a tectonic synthesis. Twelve excellent plates provide four-color geologic maps, structural cross sections, tectonic synthesis, and geologic maps; a black-and-white synthesis of Appalachian mineral deposits, and a reflection seismic cross section.

GNA-F2, 781 p., 12 pocket plates in slipcase, indexed, ISBN 0-8137-5209-4, hardbound, $75.00
GEOLOGICAL SOCIETY OF AMERICA

1990 Annual Meeting

DALLAS

Dallas, Texas
October 29–November 1

ABSTRACTS DUE JULY 11
for abstract forms (303) 447-8850

PREREgISTRATION DUE SEPTEMBER 28
for meeting information (303) 447-2020 or 1-800-472-1988

ASSOCIATED SOCIETIES: Association of Geoscientists for International Development • Association for Women Geoscientists • Cushman Foundation • Geochemical Society • Geoscience Information Society • Mineralogical Society of America • National Association of Geology Teachers • National Earth Science Teachers Association • Paleontological Society • Sigma Gamma Epsilon • Society of Economic Geologists • Society of Vertebrate Paleontologists

REGISTRATION/FULL DETAILS: August GSA News & Information
Geology is alive and well in Dallas. Join us to experience the excitement of current, relevant science at the Dallas Annual Meeting. No longer just for the oil geologist, Dallas is a desirable destination for all geologists.

Dallas has a strong base in other areas besides geology. Beyond recognition for oil and cattle, Dallas is known as the Silicon Prairie; Dallas ranks among the top five cities in computer and microelectronic manufacturing employment in the United States. Dun and Bradstreet also reports that Dallas has one of the largest concentrations of million-dollar corporations, the nation's second leading fashion and apparel center, and the world's largest wholesale trading complex.

And when the business day ends, people don't ride off into the sunset, because Dallas lights up with night life dedicated to good times that go well beyond calico and cowboy boots. Today's Dallas lets you kick up your heels at the most sophisticated nightspots. Boasting more restaurants per capita than New York city, Dallas offers culinary delights ranging from French to Thai to Tex-Mex. Every night in Dallas over 100 live performances are staged including opera, ballet, and improvisational entertainment.

DALLAS: a prime destination for geologists open to the latest in science. And after a long day in sessions, these same geologists can be revived by the cuisine and night life offered with a warm Texas welcome.

from French to Thai to Tex-Mex. Every night in Dallas over 100 live performances are staged including opera, ballet, and improvisational entertainment.

DALLAS: a prime destination for geologists open to the latest in science. And after a long day in sessions, these same geologists can be revived by the cuisine and night life offered with a warm Texas welcome.

1990 Technical Program Chairmen
Richard M. Mitterer
Geosciences, MS FO 2.1
University of Texas at Dallas
P.O. Box 830668
Richardson, TX 75083-0688
(214) 690-2401 (dept.)
(214) 690-2462 (office direct)

Rodger E. (Tim) Denison
Mobil Research and Development Corp.
P.O. Box 819047
Dallas, TX 75381-9047
(214) 851-8172

Presentation Modes
Papers may be presented in one of two possible modes:

ORAL—This is a verbal presentation before a seated audience. The normal length of an oral presentation is 15 minutes, including time for discussion. Projection equipment consists of two 35-mm projectors, one overhead projector, and two screens.

POSTER—Approximately 40% of volunteered papers are presented in poster mode. Each poster session speaker is provided with three horizontal, free-standing display boards approximately 8' wide and 4' high. The speaker must be present for at least two of the four hours available for presentation.

Although papers for discipline sessions may be submitted in either oral or poster mode, symposia and theme sessions will be presented in oral mode only. The exceptions are theme sessions T20 and T32 (poster mode only) and T31 (both oral and poster).

Abstract Forms
All abstracts must be submitted on the 1990 Abstract Form, available from the Abstracts Coordinator at GSA headquarters, from the conveners of symposia, from the geoscience departments of major colleges and universities, and from the main survey offices. The abstract form will be used as camera-ready copy for publication of Abstracts with Programs.

Speaker/Author Limits
You may be designated speaker (presenter) for only one invited abstract and only one volunteered abstract, regardless of format or mode.

TECHNICAL PROGRAM
CALL FOR PAPERS AND ANNOUNCEMENT OF SYMPOSIA AND THEME SESSIONS

ABSTRACTS DEADLINE FOR INVITED AND VOLUNTEERED PAPERS WEDNESDAY, JULY 11, 1990

Technical sessions consist of both invited and volunteered papers organized in one of three presentation formats: symposia, theme sessions, and discipline sessions. All abstracts are due for review by July 11.

The Joint Technical Program Committee (JTPC) will select abstracts and determine the final session schedule. The JTPC consists of approximately 30 geoscientists representing each of the associated societies and GSA divisions participating in the technical program. The JTPC chairmen, nominated by the Dallas Local Committee and approved by the GSA Council, also serve a four-year term.

Abstract Forms & Information: [303] 447-2020 or 1-800-472-1988
INVITED PAPERS [SYMPOSIA]

This format includes only abstracts that have been invited by the convener of a symposium. Abstracts are sent directly to the convener by July 11. The convener is responsible for obtaining two independent reviews of each abstract, and for sending the reviews and the abstracts to GSA headquarters prior to the JTPC meeting.

The list of 1990 symposia appears below. A preliminary schedule will be available by May 15. Please call the GSA Meetings Department for information.


S3. The Origin of Animals. Paleontological Society. Philip W. Signor, University of California-Davis; Stanley M. Awramik, University of California—Santa Barbara.


S9. Transient Responses to Global Change: The Geomorphic and Hydrologic Record. Hydrogeology and Quaternary Geology and Geomorphology Divisions. Steven Wells, University of New Mexico; Jack Hess, Desert Research Institute; Richard Craig, Kent State University.


S14. Salt Tectonics. Structural Geology and Tectonics Division. Mark Cloos and Martin Jackson, University of Texas, Austin.


VOLUNTEERED PAPERS

This format includes all abstracts that are not specifically invited for a symposium. Each paper will have a minimum of three reviews. Two types of sessions are available:

1. Discipline Sessions

   Papers are submitted to one scientific category (discipline). The JTPC representatives select and schedule the papers in sessions focused on this one discipline, e.g., hydrogeology, geochemistry.

2. Theme Sessions

   Papers are submitted to a specific pre-announced title AND to ONE scientific category. Theme sessions are interdisciplinary; each theme may have as many as three categories from which authors may choose. After each theme description below, the categories are identified by name and number as they appear on the 1990 Abstract Form. Theme submissions must include the theme number (T1, T4, T20...), the first five key words of the theme title, and ONE discipline.

   Each theme session has been proposed by an advocate. Advocates may not invite speakers. Advocates may encourage colleagues to submit abstracts, however, with the understanding that there is no guarantee of acceptance. Each theme advocate evaluates abstracts initially only on the basis of topical relevance.

   All abstracts then will be evaluated by three appropriate JTPC reviewers in the discipline for which they are submitted; a fourth review will be provided by the theme advocate.

   If an abstract is submitted to, but not accepted for, a theme session, it will continue through the evaluation process to be considered for the appropriate discipline session.

   During the August 10–11 meeting, the designated JTPC representative (in consultation with the theme advocate), will organize theme sessions from the abstracts approved for presentation.

   Schedules for theme sessions will be available immediately after the JTPC meeting and will appear in the September issue of GSA News & Information.

THEME TOPICS

T1. Strontium Isotopes and Sedimentary Geology. Richard Koepnick, Mobil Research & Development Corp.

   Strontium isotope analysis is recognized as a powerful tool in sedimentary geologic studies and in basin analysis. Applications are many and include dating of sedimentary sequences, especially evaporitic, marginal marine, and high-latitude deposits; providing insights into paleoecological, paleoclimatic, and tectonic processes; and characterizing depositional environments, provenance, diagenetic reactions, and rock-water interactions. Contributions are solicited from all fields of geosciences that further the appreciation of this technique in sedimentary geology.

   Geochemistry (7), Global Geoscience (12), Paleoclimatology (18)

T2. Mesozoic Tectonic Evolution of Mexico and the Gulf of Mexico. Jose Longoria, University of Texas at Dallas; Richard Buffler, University of Texas, Austin.

   Although Mesozoic paleogeographic reconstructions of the Gulf of Mexico incorporate Mexico as an integral component in the tectonic development of the region, conflicts exist between data obtained inland and data from the Gulf. Aspects of circum-Gulf regional Mesozoic geology that need to be addressed include paleogeography, pre-Laramide tectonic events, stratigraphic hiatuses, metamorphic rocks and metamorphic histories of western Mexico, juxtaposition of petrographic assemblages, and existence of tecnon-stratigraphic terranes. Contributions are solicited from all fields of geosciences that will shed light on these problems.

   Geophysics (10), Stratigraphy (30), Tectonics (32)

Ground-water flow in carbonate rocks is radically different from flow in porous media. This theme session, which has the formal endorsement of the Hydrogeology Division, will address both real-world and conceptual problems in environmental monitoring in karst terranes. Contributors are invited to share practical, experience-based insights into solving these problems.

Environmental Geology (6), Hydrogeology (14), Petrology, Sedimentary (24)

T4. Cretaceous/Tertiary Boundary Sections in the Southern United States. Gert Keller, Princeton University; Stefan Gartner, Texas A&M University. This theme session will focus on all aspects of the Cretaceous/Tertiary boundary in the southern United States in order to illuminate the events that imprinted the physical, geochemical and biological signatures on the geologic record; to identify evidence of geologically instantaneous or catastrophic events and long-term environmental changes at and across the K/T boundary; and to investigate the proximity of the southern United States to a possible impact location. Contributions are solicited on all aspects of the K/T boundary including geochemistry, isotopic and trace element geochemistry, melt rock and shock features, paleontology, stratigraphy, sedimentology, climate, and sea-level changes.

Geochemistry (7), Global Geoscience (12), Paleontology (19)

T5. Hydrogeology of Arid Regions. Hydrogeology Division. Bridget Scanlon, University of Texas, Austin.

A detailed understanding of the mechanisms and rates of ground-water recharge in arid regions is necessary for predicting potential contaminant migration from radioactive waste disposal sites and for estimating future water supplies. Because long-term predictions are required, information on paleoclimatic and paleogeomorphologic variations and their effect on ground-water recharge are needed. Contributions are solicited for this theme, which has the formal endorsement of the Hydrogeology Division, to address these problems.

Hydrogeology (14)

T6. Erosional Landscapes of the South-Central United States. David L. Amsbury, NASA; T. T. Hayward, Baylor University. Evidence exists for and against broad-scale, episodic erosional events and processes that formed the landscapes of the United States south of the glacial limits, west of the Mississippi Embayment, and east of the Rocky Mountains. Because this region has not been glaciated or affected by widespread volcanism or severe tectonic activity, extensive preserved surfaces and their distinctive paleosols allow the erosional record to be unraveled more easily than in areas where relatively violent processes have been active.

Contributions are solicited that utilize space imagery, modern dating techniques, stream processes, soil formation, and climatic history to understand episodic erosional events in this region.

Geomorphology (9), Palaeoclimatology (18), Remote Sensing (28)


Stable isotope stratigraphies provide a foundation for understanding Earth's history and systems. Excellent progress has been made in the last five years to develop a Paleozoic and early Mesozoic isotope stratigraphy, but the resolution and level of verification do not equal that for the Cretaceous and Tertiary. Contributions are solicited for this theme, which has the formal endorsement of the Geochemical Society and is intended to complement the Society's symposium on this topic, to establish a level of communication and understanding that will insure rapid development of an accurate isotope stratigraphy for this important period in the history of Earth and its biota.

Geochemistry (7), Global Geoscience (12), Stratigraphy (30)


Hurricane Hugo's path from the U.S. Virgin Islands, across Puerto Rico, and into the Carolinas provided an unprecedented opportunity to study and describe the varied geologic effects of a powerful storm under different climatic and geologic conditions. Contributions are solicited that address geologic aspects of this event as well as environmental damage and recovery, including reef damage, mass movements, wind shear effects, sediment dispersal, and remobilization of pollutants by flood scour.

Environmental Geology (6), Remote Sensing (28), Sedimentology (29)


Safe, long-term underground storage of radioactive wastes poses a major problem that is rapidly approaching a crisis. Detailed geological knowledge of possible repositories is crucial. Contributions are solicited for this theme session, which has the formal endorsement of the Engineering Geology Division, that are pertinent to waste isolation, including rock mechanics, hydrology of permeable and very impermeable materials, environmental aspects, depositional systems, and engineering geophysical aspects.

Engineering Geology (5), Environmental Geology (6), Hydrogeology (14)


This session, which has the formal endorsement of the Engineering Geology Division, will focus on predictions of damage and effects from an earthquake in the San Francisco Bay area, and how these predictions differed from the damage done by the Loma Prieta earthquake of October 17, 1989.

Contributions are solicited that will relate damage and effects to site-specific or local geologic conditions as well as contributions that demonstrate no obvious relation between damage and subsurface factors.

Engineering Geology (5), Environmental Geology (6), Geophysics (10)

T11. Amino Acid Geochemistry; Applications in Stratigraphy and Geochronology. John F. Wehmiller, University of Delaware.

The amino acid racemization method has become a widely applied technique in the study of Quaternary stratigraphic sequences. Contributions are solicited that provide insights into kinetic modeling of diagenetic racemization; developing analytical and geological criteria for evaluating integrity of fossilized amino acid mixtures; establishing local and regional aminostratigraphic data sets; and integrating amino acid racemization data with independent stratigraphic and geochronologic information.

Geochemistry (7), Quaternary Geology (27), Stratigraphy (30)
Metagéology: Expanding Geologic Awareness. Raymond Pestrang, San Francisco State University; Garry McMenzie, Ohio State University.

The geosciences have played an increasingly integral role in many aspects of society, of which the arts are but one. The concept of "metagéology" is introduced to provide a forum for those seeking to express ideas that fall outside one or more of the traditional disciplinary areas or that cross disciplinary boundaries to include geosciences and the arts, environmental issues, or social, political, or psychological concerns as well as those of the humanities. Contributions are solicited that will address the important impact of the geosciences on all aspects of society.

Environmental Geology (6), Geology Education (8), Other (34)

The Late Proterozoic Evolution of Organisms and Environments. Andrew H. Knoll, Harvard University; David DesMarais, NASA; Robert J. Stern, University of Texas at Dallas.

Paleontological, geological, and geochemical data indicate that the Late Proterozoic (ca. 850–550 Ma) was an interval of marked biological, tectonic, and environmental change. This theme session will focus on data illuminating Late Proterozoic history, advances in stratigraphy that can improve our ability to correlate different events, and ideas about how different processes may have interacted to produce the unique record of the Late Proterozoic and, in the end, usher in the Phanerzoic world.

Contributions are solicited in all aspects of late Precambrian geology including paleontology, tectonics, magmatism, climatology, and isotopic geochemistry that offer a global perspective on this part of earth history.

Global Geoscience (12), Palaeontology (19), Precambrian Geology (26)


Geologists concerned with regulating or licensing solid and liquid waste disposal systems and facilities of all types (e.g., deep geologic, shallow burial) frequently encounter geological uncertainties. The emphasis of this theme session will be on cases or examples of evaluating waste disposal or storage sites, designs, and performance to specified standards in the face of geological uncertainty.

Contributions are solicited from presenters who can share lessons from successes and failures of regulatory geologists responsible for developing, implementing, or complying with laws and regulations that rely on assessments of geological behavior of a site.

Engineering Geology (5), Environmental Geology (6), Hydrogeology (14)

Salt Domes: Geotechnology, Energy, and Economic Significance. James T. Neal, Sandia National Laboratories; Martin Jackson, University of Texas, Austin.

Salt domes have a high level of economic interest both as storage repositories and as features associated with energy and mineral resources. Contributions are solicited on the economic aspects of salt domes, including their use for cavern storage of oil and gas, compressed air, and chemical waste, and on topics related to sulfur, salt, and brine extraction.

Economic Geology (4), Engineering Geology (5), Environmental Geology (6)

Paleosols and Subaerial Exposure Surfaces in Carbonate Sequences. Annabelle Foos, University of Akron.

Paleosols and subaerial exposure surfaces yield significant paleoenvironmental and stratigraphic information in carbonate sequences. Exposure surfaces at major unconformities are often associated with paleokarst and petroleum reservoirs; paleosols also cap cycles within carbonate sequences and can be related to the depositional processes and meteoric diagenesis of the underlying sediments. Contributions are solicited that consider petrography, sedimentology, pedogenesis, stratigraphy, geochemistry, and petroleum geology of paleosols and exposure surfaces from a variety of carbonate environments and time scales.

Geochemistry (7), Petrology, Sedimentary (24), Stratigraphy (30)

Upper Cretaceous Stratigraphy and Paleontology, U.S. Gulf Coastal Plain and Adjacent Regions. David T. King, Jr., Auburn University.

The Gulf Coastal Plain is a key region for study of relative sea-level changes and passive margin sequence stratigraphy. Contributions are solicited that focus on all aspects of the Upper Cretaceous of this region including facies analysis, sequence stratigraphy, sea-level analysis, biostratigraphy, invertebrate and vertebrate paleontology, paleoclimatology, and depositional environments. Presentations are also solicited on similar topics from adjacent regions (i.e., Mississippi Embayment, eastern margin of Western Interior Seaway, and Atlantic Coastal Plain) especially relevant to Upper Cretaceous geology of the Gulf Coast.

Palaeontology/Paleobotany (19), Sedimentology (29), Stratigraphy (30)

Isotope Fractionations in Organic Matter: Biosynthetic and Diagenetic Processes. Stephen A. Macko, Memorial University.

Fractionations of the stable isotopes of H, C, N, and S in organic matter in geologic settings provide information about paleoenvironments, depositional conditions, and thermal histories. Contributions are solicited on aspects of stable isotope fractionation of these elements in organic matter that reflect the biosynthetic sources of these components and the diagenetic processes altering them.

Geochemistry (7), Paleoceanography (19), Sedimentology (23)

Calibration of Controls on Stratigraphic Sequences. Sedimentary Geology Division. John P. Grotzinger, Massachusetts Institute of Technology.

The application of concepts of sequence stratigraphy has become widespread. Contributions are solicited for this theme, which has the formal endorsement of the Sedimentary Geology Division, that quantitatively examines which factors control sequences (and parasequences), including sea level, subsidence, and sedimentation. Emphases might include application of numerical models to understanding facies development, unconformities, and stratigraphic geometry; documentation of relevant field or subsurface examples; and techniques for reduction of stratigraphic data (e.g., backstripping, time series analysis, and error analysis).

Global Geoscience (12), Sedimentology (29), Stratigraphy (30)


The Global Geoscience Transsects (GGT) Project of the International Lithosphere Program (ILP) actively promotes preparation of geologic and geophysical strip maps and crustal cross sections, with tectonic interpretations, for key lithospheric transsects throughout continental regions of the world. Contributions are solicited for a poster session, formally endorsed by the Geophysics Division, from teams with significant progress in North American transsects as well as from any other groups that have constructed geoscience transsects as part of their research.

Geophysics (10), Structural Geology (31), Tectonics (32)

The suite of organic matter biomarker compounds in sedimentary rocks and oils provides information about the nature of the source organisms and about the diagenetic conditions that affected chemical modifications of the compounds. These results are important in understanding the processes of oil generation and sedimentary ore formation and in interpreting paleo-environments. Contributions are solicited that will emphasize the application of biomarker geochemistry in these examples.

Geochemistry (7), Paleocenography (18), Sedimentology (29)

T22. Salt Tectonics. Structural Geology and Tectonics Division. Mark Cloos and Martin Jackson, University of Texas, Austin.

Salt has played an important role in the development of structures in the Gulf Coast region and elsewhere. Contributions are solicited that will advance our understanding of salt tectonics in these regions or that will describe results of experimental and numerical studies; the scale of these contributions on salt behavior may range from microscopic to crustal. This theme session, which is formally endorsed by the Structural Geology and Tectonics Division, complements the division's symposium of the same title.

Structural Geology (31), Tectonics (32)

T23. Tectonostratigraphic Correlation of Late Cretaceous-Early Tertiary Island-Arc Rocks in the Caribbean Region. International Division. Paul Mann, University of Texas, Austin; Burke Burkart, University of Texas, Arlington.

A number of conflicting hypotheses exist for the origin of the island arc rocks fringing the Caribbean. One set of reconstructions calls for one or more arcs that were swept in from the Pacific and were accreted to North and South America; another set proposes that one or more arcs formed in situ. Contributions are solicited for this session, which is formally endorsed by the International Division, that will enable these hypotheses to be tested by integration of stratigraphic, geochemical, and structural data from different geographic regions.

Geochemistry (7), Structural Geology (31), Tectonics (32)


Geoscientists have major roles in efforts to improve hazard warning systems and mitigation and to increase resource availability in an environmentally responsible manner. Both tasks become increasingly difficult as population increases. Contributions are solicited that will explore the present and future relations between resources, hazards, and population; that will address the research needs in this area; and that will offer suggestions for actions and policies needed to mitigate these problems.

Engineering Geology (5), Environmental Geology (6), Geomorphology (9)


Friction melts of several varieties have been described from numerous geologic settings, and recently artificially generated melts have been studied. While friction melts, especially pseudotachylites, have been investigated, few studies have addressed either the source material or the actual mechanisms of melting. Contributions are solicited that address the nature of the source material (what actually melted?) and the mechanisms of melting (how did melting occur?), and that seek to provide quantitative constraints on the conditions (pressure, temperature, strain rate, finite strain, etc.) accompanying melting, in either natural or artificially generated friction melts.

Engineering Geology (5), Petrology, Igneous (22), Structural Geology (31)


Writing assignments in both lower- and upper-level geoscience classes enhance learning, as demonstrated by Writing Across the Curriculum programs. Contributions are solicited for this theme session, which has the formal endorsement of the National Association of Geology Teachers, on any aspect of writing assignments in geoscience classes ranging from specific assignment descriptions to pedagogical implications of writing, teaching, and learning.

Geology Education (8)


Global climate change resulted from perturbations in the dynamic interaction of the biosphere, atmosphere, hydrosphere, and lithosphere, all of which are linked by Earth's carbon cycle. An understanding of the ecological and environmental implications of these perturbations is crucial in modeling potential global changes. Contributions are solicited that address geochemical aspects of global change, including climate; atmospheric/oceanic interactions, especially the carbon cycle gases methane and carbon dioxide; acid rain; volcanic gases; and other geochemical factors relating to past, present, and future global changes.

Geochemistry (7), Global Geoscience (12), Paleocenography/Paleoclimatology (18)


Databases in petrology and geochemistry have traditionally been stored in large computers, but recent advances in microcomputer technology have made available a variety of databases management systems appropriate for handling such data. Different software and hardware combinations have been used to address similar problems. Contributions are solicited that will evaluate particular hardware/software combinations as applied to efficient management of this type of geological information.

Computers (3), Geochemistry (7), Petrology, Igneous (22)


Coal geology has made important practical contributions to the energy industry. Geologic concepts and research have been used to make coal utilization more economical, efficient, and environmentally acceptable. Contributions are solicited for this theme session, which is formally endorsed by the Coal Geology Division and designed to complement the division's symposium on this topic, to highlight the practical applications of coal geology research.

Coal Geology (2), Environmental Geology (6), Hydrogeology (14)


Silicic magmas reaching the upper crust (near-surface and surface) undergo a myriad of rapid changes during final stages of ascent, emplacement, and crystallization. Contributions are solicited that document any aspect of the physical or chemical conditions under which the plutons, dikes, sills, and tuffs formed or that document any properties of these
bodies that constrain their formative processes.
Geochemistry (7), Petrology, Experimental (21), Petrology, Igneous (22)

T31. Water and Volcanoes (Both Poster and Oral Mode), Grant Heiken, Los Alamos National Laboratory.

On Earth, nearly all aspects of volcanism, throughout the history of a volcanic field, are affected by meteoric water. A volcano is the focus for elevated rainfall, has a unique hydrologic system, is the focus for magma-water interaction, and serves as a framework for hydrothermal systems. Contributions are solicited for both poster and oral sessions from contributors in hydrology, volcanology, sedimentology, and hydrothermal geochemistry relating to all aspects of interaction of water with volcanoes.
Geochemistry (7), Hydrogeology (4), Volcanology (33)

T32. Transient Responses to Global Change: The Geomorphic and Hydrologic Record (Poster Mode Only), Quaternary Geology and Geomorphology Division, Steven Wells, University of New Mexico; Jack Hess, Desert Research Institute; Richard Craig, Kent State University.

While the topic of global change and the concomitant responses at the regional and local levels are important today, it is generally recognized that many of these changes will be transient. Earth systems do not always adjust immediately and completely to external forcings.
Contributions are solicited for this poster session, which is formally endorsed by the Quaternary Geology and Geomorphology Division and complements the Division's symposium of the same title.
Environmental Geology (6), Geomorphology (9), Hydrogeology (14)

T33. Opportunities for Scientific Drilling in the Continental Crust: Shallow to Intermediate-Depth Projects, Earl Hoskins, Texas A&M University; James J. Papke, South Dakota School of Mines and Technology.

There are many opportunities to further the understanding of geologic processes in the continental crust by careful sampling through core drilling at relatively shallow depths, i.e., 100 m to 1 km. Examples include, but are not limited to, mass wasting problems, extended outcrop penetration for unweathered samples for paleomagnetic and geochemical studies, detailed stratigraphy of critical zones such as the K/T boundary, and hydrological and environmental problems. Contributions are solicited in all aspects of these problems or others that could benefit from relatively simple and cost-effective drilling.
Geochemistry (7), Geophysics (10), Sedimentology (29)


Archaeological Geology of the Upper Trinity River Drainage Basin, Texas. C. Reid Ferring, Institute of Applied Sciences, University of North Texas, P.O. Box 13078, Denton, TX 76203, (817) 565-2694. Sponsored by the Archaeological Geology Division. October 28. Cost: $40.


FIELD TRIPS

Big "D" has been a crossroads for travel in North America for many years. The field trips planned for the 1990 Annual Meeting in Dallas do likewise and use the city as a hub from which to venture forth and visit geologic outcrops in Texas, adjoining states, Mexico, and Guatemala. GSA hopes that this listing of proposed trips for the 1990 meeting will pique your interest and that you will make plans to attend one or more of them.
Trips begin and end in Dallas unless otherwise noted. Further details will be given when registration for the trips begins in August 1990. Costs are preliminary estimates.
For further information contact either of the 1990 Field Trip Chairmen, Robert T. Clarke, Mobil Research and Development Corp.—DRL, P.O. Box 819047, Dallas, TX 75381-9047, (214) 851-8481, fax 214-851-8185, or Kent C. Nielsen, Dept. of Geosciences, MS 5021, University of Texas at Dallas, P.O. Box 830688, Richardson, TX 75083-0688, (214) 690-2448, fax 214-690-2537.

PREMEETING


REGISTRATION/HOUSING: AUGUST GSA NEWS & INFORMATION

GSA NEWS & INFORMATION, APRIL 1990

107
POSTMEETING


Structure and Stratigraphy of the Arbuckle Mountains, Southern Oklahoma. Rodger E. Danison, Mobil Research and Development Corp.—DRL, P.O. Box 819047, Dallas, TX 75381-9047, (214) 851-8172, and Nowell Donovan, November 1 (evening)-3. Cost: $125.


The Lampasas Cut Plain—Evidence for the Cyclic Evolution of a Regional Landscape, Central Texas. O. T. Hayward, Dept. of Geology, Baylor University, Waco, TX 76798-7354, (817) 755-2361, Peter Allen, and David Amsbury, November 2-3. Cost: $150.


SEG-SPONSORED FIELD TRIP


Site Selection for Critical Facilities—The Earth Science Perspective. October 27. Cosponsored by the Engineering Geology Division. Norman R. Tillford, Texas A&M University. (Note: GSA Field Trip, "Geology, Hydrogeology, and Engineering Aspects of the Superconducting Super Collider Site, Ellis County, Texas" is being offered on Sunday, October 28.)


Seismic Expression of Structural Styles. October 27-28. Cosponsored by the Structural Geology and Tectonics Division. Albert W. Bally, Rice University; Martha Oliver Wiltjacks, Mobil Research and Development Corp.; Kristian E. Meiling and David A. Fisher, ARCO Oil and Gas Co.


Recent Sediments of the Northwest Gulf Coast Region. October 28. Rufus J. LeBlanc, Sr., Rufe LeBlanc School of Clastic Sediments.

FORUM

Geology and Public Policy Forum: The Future for Fossil Fuels. October 30, 5:30 to 7 p.m. For information, contact the Meetings Department, GSA headquarters.
exhibitors each year? This endorsement is repeated on hundreds of comment cards and letters that are sent to GSA. Come see for yourself in the Dallas Convention Center’s West Hall, October 28 through 31.

The 1990 Exhibits kick off with the Welcoming Party Sunday evening, an exclusive opportunity that’s popular with exhibitors and attendees. “We do a lot of business on Sunday at the Welcoming Party,” say key exhibitors. The 4000 geologists who attend the opening party enjoy this first chance to visit the exhibits. The show remains open daily through Wednesday.

Exhibitors display and demonstrate computer hardware and software, X-ray diffraction and measurement equipment, powder diffraction equipment, camera equipment, isotope ratio mass spectrometers, microanalyses equipment, publications, maps, gems and jewelry, mineral and fossil specimens, field supplies, and camping equipment. Many universities and educational organizations have booths as well.

GSA welcomes repeat exhibitors who return to the exhibit hall each year. Their combined efforts have made the exhibits what they are today—a growing success! GSA also encourages participation by new, innovative companies, organizations, and universities with products and services that appeal to geologists. If you are interested in participating or if you would like to see a particular exhibitor in Dallas, please contact Kathy Omhne Lynch, Exhibits Manager, GSA headquarters.

**EMPLOYMENT SERVICE**

Once again, GSA will be offering its Employment Interview Service. The popularity of this program continues to rise—at last year’s meeting in St. Louis, 49 employers conducted 650 interviews with more than 300 applicants seeking employment.

As in the past, booths will be provided for employers to interview applicants registered with the Employment Service, and GSA staff will be available to assist in scheduling interviews.

See the February issue of GSA News & Information for forms and further information, or contact T. Michael Moreland, Employment Service Manager, GSA headquarters.

**HIGHLIGHTS**

Sunday, October 28

Tennis buffs unite! Warm up for the week at the Sunday morning Tennis Tournament. Courts have been reserved for round-robin doubles at Samuel Grand Park near beautiful White Rock Lake. Come with a partner, or we’ll pair you with one on Sunday. Entry will be limited; first-come, first-served.

Sunday, October 28

The Dallas Welcoming Party will be on Sunday evening, 6 to 9 p.m. at the Dallas
Convention Center in conjunction with the opening of the 250-booth scientific and technical exhibits. Showing the city's multifaceted character, both jazz and country-western bands will entertain.

Monday, October 29

The Effects of Past Global Change on Life, a symposium on Monday morning, will be cosponsored by the 1990 Annual Meeting Committee and the National Academy of Sciences/National Research Council.

"Major transitions from one set of environmental conditions to another have had important impacts on the biosphere. These changes have entailed not only extinction but also shifts in the distribution and abundance of species and origins of new species in response to opening of new environmental opportunities. Topics will range from the build-up of atmospheric oxygen and biotic diversity in the latest Precambrian to the impact of the last Ice Age on human evolution."—Thomas M. Uselman, NAS/NRC, Convener.

Monday, October 29

The well-known Alumni Receptions reunite friends and colleagues. More than 60 universities and colleges will hold alumni reunions at the Hyatt Regency, Dallas from 7 to 9:30 p.m. If you would like to schedule an alumni function, have your department chairman contact Vanessa George, GSA headquarters.

Wednesday, October 31

Train now for the popular 5K/10K Fun Run to be held on Wednesday morning. Breathe hard. Break into a sweat. Enjoy the colorful sunrise along the pathways encircling peaceful Bachman Lake in the heart of Dallas.

Wednesday, October 31

Come for some true Texas hospitality at the Wednesday evening Wild West Barbecue and Dance at the Texas-sized Longhorn Ballroom, close to downtown Dallas. This low-cost, informal event will feature a lip-smacking beef and chicken barbecue served chuckwagon style in a saloon setting, a country-western band for dancing and listening pleasure, and a variety of entertainers guaranteed to bring back the Old West.

Thursday, November 1

The Dallas meeting starts and ends with a party. Speakers giving papers after 3:00 p.m. on Thursday will be invited to a T.A.C. (Thursday Afternoon Club) free beer and music celebration. Each speaker will receive the highly prized "I Survived" button. Supporters of survivors will be encouraged to join the fun.

GSA 1990 ANNUAL MEETING

Dallas, Texas  October 29–November 1

DALLAS

ABSTRACT FORMS & INFORMATION: (303) 447-2020 or 1-800-472-1988

GSA NEWS & INFORMATION, April 1990
GSA Goes Kiwi
New Zealand: North and South Islands

Dates: March 3 to March 23, 1991; 21 days

Itinerary: Our trip starts on March 3 in Auckland, from which we will travel south, through Rotorua toward Wellington. The primary geological focus will be volcanological and geothermal features, including the Wairakei geothermal area, Lake Taupo, and the mighty volcanic trio of Mounts Tongariro, Ngauruhoe, and Ruapehu. The insight of interpretive specialists will help us to explore the unique cultural and biological story of New Zealand.

We will cross to South Island to visit the spectacular Banks Peninsula volcanics, Fiordland National Park, Milford Sound, Fox Glacier, Te Anau, Mount Cook, and the “Scottish” city of Dunedin. In addition to glacial areas, the trip focuses on metamorphic facies, gold mineralization, alpine faulting, and the features of the mountain high country. This fascinating trip will end in Christchurch on March 8 for the return trip home.

Leader: Douglas S. Coombs, University of Otago, Dunedin, South Island, will coordinate the scientific leaders. He is a GSA Honorary Fellow and was elected Foreign and Commonwealth Member of the Geological Society of London “in recognition of... outstanding contributions in the fields of mineralogy, and igneous and metamorphic petrology.” He has led an impressive number of field trips in New Zealand, and has been known to play a mean game of cricket.

Lodging: A range of accommodations, including hotels, inns, bed and breakfast establishments, and occasionally field stations.

Transportation: Bus and van; ferry between North and South Islands.

Land cost: $2525 for 21 days; $125 special discount for GSA members. There is also an advance registration discount. Airfare to and from New Zealand is additional.

Included: Island transportation by bus, van, and ferry; lodging (double occupancy); most meals (except those enjoyed during free time); entrance fees and applicable taxes; transfers and tours; luggage handling; and educational materials. There will be a small additional charge for those wanting single accommodations. If they wish, solo travelers may be paired to share accommodations.

Not included: Airfare to and from New Zealand; meals during free time; optional activities such as overflights of glaciers or to White Island, raft trips, or visits to sheep farms (to name a few of the possibilities); personal items such as laundry, liquor, gifts, excess baggage fees, or other items not specifically listed in the final brochure; side trips to places such as Tahiti, Samoa, or Australia.

Limit: 36 persons plus leaders. The trip will fill quickly, so register as soon as you can. Your $200 deposit will be refunded through November 14, 1990 (less $25), so you can secure a place on the trip early with almost no risk.

Registration: Registration is open to everyone, but GSA members will be given preference during the advance registration period up to June 30, 1990. Registrants should be in good health. Although there will be no mountaineering or first ascents, this trip will include moderate activity, especially because tramping (hiking) is a national pastime in New Zealand.

Airfares: The current 1990 roundtrip airfare on United Airlines from Los Angeles is $1101 (plus tax). Air reservations are not included in the GSA trip price. We are making arrangements for a group fare, and we will keep Kiwi-trippers posted. A GSA travel agent will be designated to help with questions and concerns about travel to New Zealand and to other areas of the South Pacific.

If you would like to discuss the trip, call Sue Beggs, GSA Meetings Manager, or Delores Jones, Registration Coordinator.

New Zealand: 1991
Note: This trip has already filled!

If you wish to be put on the waiting list, call Sue Beggs, GSA Meetings Manager, (303) 447-2020 or write to GSA Meetings Dept. P.O. Box 9140, Boulder, CO 80301
Small Funds Get Larger (in more than one way)

During 1989 and early 1990 there has been steady (in some cases spectacular) growth in several of the Foundation’s special-purpose funds, as indicated in the following table.

<table>
<thead>
<tr>
<th>Fund</th>
<th>January 1989</th>
<th>January 1990</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. V. Cox Student Research</td>
<td>$4,794</td>
<td>$6,514</td>
<td>36%</td>
</tr>
<tr>
<td>J. T. Dillon Alaska Research</td>
<td>$8,244</td>
<td>$13,499</td>
<td>63%</td>
</tr>
<tr>
<td>A. Lierman Medlin Award</td>
<td>$17,838</td>
<td>$23,912</td>
<td>34%</td>
</tr>
<tr>
<td>Minority</td>
<td>$5,553</td>
<td>$9,381</td>
<td>69%</td>
</tr>
<tr>
<td>Women in Science</td>
<td>$104</td>
<td>$1,032</td>
<td>892%</td>
</tr>
</tbody>
</table>

These increases are net of distributions for grants and scholarships during the year; if that money were added back in, the performance would have been even better!

Several of GSA’s larger designated funds also showed very significant growth during the year. Fred and Mavis Donath made an additional gift to the Young Scientist Award Fund which they initiated with a gift of $100,000 in 1988. In January 1990 the balance stood at $217,000, a 117% increase. The Gladys W. Cole Memorial Research Award Fund received a bequest of $40,000 from the W. Storrs Cole estate, increasing that fund 58%, to $117,000.

While the size of these funds may appear small in comparison to massive federal and industry grants or large university endowments, their importance to individual scientists and specific sectors of the science is not insignificant. In fact, the amount of leverage that can occur from effective use by the recipient of the income from these funds is startling at times.

Richard A. Young, a professor with the Department of Geological Sciences, SUNY, College at Geneseo, New York, received the 1988 Gladys W. Cole Award of $3,000 for geomorphic work in the Colorado Plateau/Grand Canyon area. Among the general accomplishments were six weeks in the field; support of a field assistant, a SUNY undergrad; a 239-page guidebook (co-editor); participation in two IGC symposia; invitations to present three graduate seminars; and new scientific contacts leading to NSF and Penrose Conference proposals.

Richard Young also listed seven specific accomplishments ranging from locating a previously undescribed series of Tertiary outcrops to the siting of two water wells for the Havasupai Indians. In expressing his appreciation for the award, he stated, "...a relatively modest amount of funding can have a significant impact on research or problems of interest to a variety of individuals or organizations. It has become obvious that such modest funding for field projects is becoming...difficult to obtain. Yet I believe it can often be more important than some of the large amounts of money that seem to vanish into overhead, fringe benefits, supplies, and miscellaneous expense associated with a research project. The fallout and professional interactions generated by such relatively small projects can be considerable, especially if individuals are willing to find ways of cooperating with colleagues and making the most of related opportunities."

The ripple effect of a small amount of research money, carefully spent, is far reaching. Whether the source of the money is a special-purpose, named fund or GSA’s unrestricted endowment, a modest award in the hands of a dedicated geologist can generate results well beyond normal expectations. Scientific leverage is giving us more bang for the buck.

Donors to the Foundation, January 1990

DNAG
Texaco Services, Inc.

Century Challenge
William A. Bassett
Raymond Burke
Margaret J. Guccione
Frank R. Luther
Richard C. Nolen-Hoeksema

Bernard Wallace Pipkin
Donald B. Potter
Richard Rezak
Jeff L. Ward

GEOSTAR FUNDS
Antoinette Lierman Medlin Scholarship
Penn Virginia Corporation

Allan V. Cox Student Research Award
James N. Gunderson

GEOSTAR
Bari S. Brown
John Huner, Jr.*
Richard F. Madole

John P. Lockwood
David A. Stephenson*
Anthony K. Yeo

Minority
Frederic H. Wilson

Research
John T. Andrews
Sterling S. Cook
John Thad Dubernas, Jr.
Kenneth D. Ehman*

Donald G. Hadley
Stephen F. Lintner
Paul C. Manega

(continued on p. 113)

*Second Century Club (gifts of $100 or more)
1990 GSA Committees and Representatives

Committees are the key to GSA's accomplishments in promoting the science of geology. Committee members and representatives contribute their expertise and experience to all areas of GSA endeavor. Listed here are those currently serving the Society and the science as committee members and as GSA representatives to other scientific groups.

Executive Committee
Raymond A. Price—President and Chairman; Doris M. Curtis—Vice-President; Randolph W. Bromery—Past President; Robert L. Fuchs—Treasurer; Priscilla C. Grew—Council Member at Large

Audit Committee

Committee on Committees
Haydn H. Murray—Chairman; Kevin Burke; Richard A. Davis, Jr.; James D. Lowell; Anthony J. Naldrett; Leigh H. Royden

Committee on the Arthur L. Day Medal Award

Committee on Education
David A. Stephenson—Chairman, 1989-1991; John R. Carpenter, 1989-1990; Betty Wade Jones, 1989-1990; Sharon Stroud, 1989-1991; Ross Iversen, 1989-1991; Shirley M. Brown, 1990-1992; E-an Zen, 1990-1992; Section Representatives: Dorothy L. Stout (Cordilleran); Monte D. Wilson (Rocky Mountain); John S. Klasner (North-Central); George R. Clark II (South-Central); Arthur M. Hussey II (Northeastern); Stephen H. Stow (Southeastern); A. R. (Pete) Palmer, Conferree, GSA Coordinator of Education Programs; Doris M. Curtis, Ex Officio, Vice-President

Committee on Geology & Public Policy

Committee on Honorary Fellows

Committee on Investments

Committee on Long-Range Planning

Committee on Membership

Committee on Nominations
James F. Hays—Chairman; Richard J. Bottjer; Robert J. Fulton; Fernando Ortega-Gutiérrez; Thomas L. Holzer; Leigh H. Royden

Committee on Penrose Conferences

Committee on the Penrose Medal Award

Program Committee

Donors to the Foundation (continued from p. 112)

Research (continued)
Burdette A. Ogles
Lisa M. Pratt
Leon T. Silver* David P. Stewart
Brian P. Wernicke
William E. Wertz

Unrestricted
Yngacio Bonillas
David S. Bowing
Dennis A. Clark, Jr.
H. Grady Collier, Jr.
Lindthord Cordell
Bruce Ehleringer
Nicholas B. Harris
E. Dean Laudeman
Harley C. Lee
Mitchell W. Lyle
Camille I. Mancuso
Elizabeth Johnston Oliver
Thomas L. Patton
Lee R. Russell
Nathaniel McLean Sage, Jr.
R. Shagam
Julian Soren
Lee J. Suttner
Matt S. Walton
James A. Woodhead

Women in Science
Valerie-Ann K. Eagen
Holly L.O. Huyck

*Second Century Club (gifts of $100 or more)
GSA Committees and Representatives
(continued from p. 113)

Committee on Publications

Committee on Research Grants

Committee on Short Courses

Treatise on Invertebrate Paleontology Advisory Committee

Committee on the Young Scientist Award (Donath Medal)

Ad Hoc Committee on Minorities in the Geosciences
A. Wesley Ward, Jr.—Chairman, 1990-1992; Charles A. Baskerville; Louis A. Fernandez; David A. Lopez; Elisabeth C. Schwarzman; Ravindra P. Sinha

GSA Member of the AGI Member Society Council
Doris M. Curtis, GSA Vice-President, 1990

GSA Representative to the AGI Education Advisory Committee
Albert W. Bally (October 28, 1987-1990)

GSA Representatives to American Association for the Advancement of Science (AAAS)
Section E—Geology & Geography
J. Thomas Dutro, Jr. (February 16, 1988-February 15, 1991)
Section W—Atmospheric & Hydrospheric Sciences
John G. Weinbauer (July 1988-February 15, 1991)

GSA Delegate to Circum-Pacific Council
Robert L. Fuchs (May 2, 1984—)

GSA Representatives to North American Commission on Stratigraphic Nomenclature (NACSN)

GSA Designees to Joint ASCE-GSA-AEG Committee on Engineering Geology (American Society of Civil Engineers)

GSA Representative to U.S. National Committee on Tunneling Technology
Richard E. Gray, July 1, 1989—June 30, 1992

GEOPHYSICAL FRAMEWORK OF THE CONTINENTAL UNITED STATES

edited by L.C. Pakiser and Walter D. Mooney, 1990

A comprehensive review and evaluation of our knowledge of the structure of the crust and upper mantle of the continental United States, exclusive of Alaska, as determined from geophysical observations. A valuable background source for information needed for research on the structure, composition, and geologic evolution of the continental crust and upper mantle. This volume, with 840 pages and 3 foldout plates, makes an excellent coursebook presenting: the geophysical methods of studying the crust and upper mantle; a region-by-region review of crustal and upper-mantle structure; continental overviews based on the different geophysical methods; and geologic and petrologic syntheses based largely on the geophysical results. The authors are from universities, government agencies, and research institutions.


Great Classroom Text!
Order 6 or more copies for classroom use and save 25%
Call for details on this special offer!
Order Your Copy Today! Call Toll-Free 1-800-472-1988
GSA Publication Sales, P.O. Box 9140, Boulder, CO 80301-9140
303-447-2020, fax 303-447-1133
Prepayment Required. Major Credit Cards Accepted.
MEETINGS
(Asterisk indicates new or changed information)

1990

Engineering Geology and Geotechnical Engineering 26th Symposium, April 4-6, 1990, Pocatello, Idaho. Information: Lee Robinson, Engineering Geology Symposium, Box 8371, Idaho State University, Pocatello, ID 83209; (208) 236-3273.

GSA Southeastern Section, April 5-6, Tuscaloosa, Alabama. Information: William A. Thomas or C. Michael Lesher, SE-GSA, Dept. of Geology, University of Alabama, Tuscaloosa, AL 35487.

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

International Conference on High-Level Radioactive Waste Management, April 8-12, 1990, Las Vegas, Nevada. Information: American Society of Civil Engineers, 345 East 47th St., New York, NY 10017; (212) 705-7543; fax 212-421-1826; telex 422847 ASCUE UI.


Conference on Subsurface Contamination by Immiscible Fluids, April 18-20, 1990, Calgary, Alberta. Information: K. Udo Weyer, Weyer Corp., Inc., 4827 Vienna Dr. N.W., Calgary, Alberta T3A 0W7, Canada; (403) 286-3777; fax 403-247-6074.


European Geophysical Society XV General Assembly, April 23-27, 1990, Copenhagen, Denmark. Information: EGS Office, Postfach 49, D-3411 Katlenburg Lindau, Federal Republic of Germany; phone 49 5555-1140; fax 49 5555-4790; telex 965564 zil d.

GSA North-Central Section, April 26-27, 1990, Macomb, Illinois. Information: John Klasner, Dept. of Geology, Western Illinois University, Macomb, IL 61455.

V. M. Goldschmidt Conference (international conference for the advancement of geochemistry), May 2-4, 1990, Baltimore, Maryland. Information: Donna Ricketts, 409 Keller Conference Center, Pennsylvania State University, University Park, PA 16802.

Pacific Rim Congress, May 6-12, 1990, Gold Coast, Queensland, Australia. Information: AusIMM PACRIM 90, P.O. Box 731, Toowong, Queensland 4066, Australia; 61-7-371-7900.


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

Midwest Friends of the Pleistocene Field Trip, May 11-13, 1990, Council Bluffs, Iowa. Information: Art Bettis, Iowa Dept. of Natural Resources-Geological Survey Bureau, 123 N. Capitol St., Iowa City, IA 52242; (319) 335-1578.

13th Annual Spring Systematics Symposium: Evolutionary Ethics, May 12, 1990, Chicago, Illinois. Information: Symposium Coordinator, Dept. of Geology, Field Museum of Natural History, Roosevelt Rd. at Lakeshore Dr., Chicago, IL 60605-2496; (312) 922-9410, ext. 298.


American Association of Petroleum Geologists Annual Convention, June 3-6, 1990, San Francisco, California. Information: Jim Baroffio, Chevron Canada Resources Ltd., 500 5th Ave., SW, Calgary, Alberta T2P 0L7, Canada.

(continued on p. 116)
MEETINGS (continued from p. 115)

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


USA/USSR Joint Conference on Global Environmental Hydrology and Hydrogeology, June 18-21, 1990, Leningrad, USSR. Information: Helen Klose, American Institute of Hydrology, 3416 University Ave., S.E., Minneapolis, MN 55414; (612) 379-1030.


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

9th International Conference on Basement Tectonics, July 2-6, 1990, Canberra, Australia. Information: I.BT9 ACTS, GPO Box 2200, Canberra, A.C.T. 2601, Australia; phone 062-49-8015; fax 062-573256.


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


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

*Society for Organic Petrology Annual Meeting, September 9-14, 1990, Calgary, Alberta, Canada. Information: Wolfgang Kalmeruth, Institute of Petroleum and Sedimentary Geology, 3303 33 St., N.W., Calgary, Alberta T2L 2A7, Canada; (403) 292-7119; fax 403-292-5377.

GOLDTech 4, September 10-12, 1990, Reno, Nevada. Information: Meetings Department, Society for Mining, Metallurgy, and Exploration, P.O. Box 625002, Littleton, CO 80162-5002; (303) 973-9550; fax 303-973-3845; telex 881988.


3rd International Archaean Symposium, September 17-21, 1990, Perth, Western Australia. Information: Susan E. Ho, P.O. Box 435, Neeldlands, Western Australia 6009, Australia.

7th International Conference on Geochronology, Cosmochronology and Isotope Geology, September 24-29, 1990, Canberra, Australia. Information: Organizing Committee, ICOG 7, Research School of Earth Sciences, Australian National University, G.P.O. Box 4, Canberra, A.C.T. 2601, Australia; phone 062-49-3406; fax 61-62-490 738; telex 62693.


CALL FOR APPLICATIONS & NOMINATIONS

FOR

GEOLOGY CO-EDITOR

GSA solicits applications and nominations for the position of co-editor of Geology, to serve with current Editor H. T. Mullins for a three-year term, beginning in December 1990, as one of a two-editor team. Desirable characteristics for the successful candidate include:

1. Broad interest and experience in geology
2. Iconoclastic
3. International stature
4. Willing to take risks and try innovations
5. Sense of humor
6. Sense of perspective
7. Organized and productive
8. Willing to work closely with GSA headquarters staff.

This is not a salaried position, but GSA pays the expenses for secretarial assistance, mail, telephone, and travel to GSA headquarters.

If you wish to be considered, please submit a resume and a brief letter describing why you should be chosen. If you wish to nominate another, submit a letter of nomination and the individual's written permission and resume. Send nominations and applications to F. Michael Wahl, Executive Director, Geological Society of America, P. O. Box 9140, Boulder, CO 80301, by July 1, 1990.

THE GEOLOGICAL SOCIETY OF AMERICA
MEETINGS (continued from p. 116)

Information: Peter L.K. Kneupfer, Dept. of Geological Sciences, SUNY, Binghamton, NY 13901; (607) 777-2389; Leslie D. McFadden, Dept. of Geology, University of New Mexico, Albuquerque, NM 87131; (505) 277-2307. (Abstracts deadline: August 1, 1990.)


5th Australasian Remote Sensing Conference, October 8-12, 1990, Perth, Western Australia. Information: Golden West Conventions, P.O. Box 411, West Perth, W.A. 6005. Australia; phone 619-3227922; telex AA 95380; fax 619-4814029.


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

Geological Society of America Annual Meeting, October 29-November 1, 1990, Dallas, Texas. Information: GSA, Meetings Department, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020. (Abstracts deadline: July 11, 1990.)

Supercomputing '90, November 12-16, 1990, New York, New York. Information: Joanne L. Martin, IBM T. J. Watson Research Center, P.O. Box 218, Rte. 134, Yorktown Heights, NY 10598; (914) 945-3285.

Penrose Conferences 1990


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

New Methods for Dating of Geomorphic Surfaces, October 12-17, 1990, Mammoth Lakes, California. Information: Fred M. Phillips, Dept. of Geoscience, New Mexico Tech, Socorro, NM 87801; (505) 835-5540 (direct), (505) 835-5634 (dept.).

1991


Send notices of meetings of general interest, in format above, to Editor, GSA News & Information, P.O. Box 9140, Boulder, CO 80301.

GSA NEWS & INFORMATION, April 1990

25% classroom discount offered

When you purchase 6 or more copies of the same book(s) for classroom use, GSA will give you a 25% discount off the list price. Contact GSA Publication Sales, 1-800-472-1988, P.O. Box 9140, Boulder, CO 80301.

Purchase must be for 6 or more copies of the same book(s). Offer is good on GSA book(s) only. Videos and other special products are excluded from this offer. Prepayment is required on all purchases and major credit cards are accepted.
ENGINEERING GEOLOGIST / PETROLEUM GEOLOGIST
LOUISIANA TECH UNIVERSITY
Applications are invited for two tenure-track positions in geology at the Assistant or Associate Professor level at Louisiana Tech University. The successful candidate should have a Ph.D. with expertise in one or more of the following areas: engineering geology, geomorphology, sedimentology, environmental geology, computer applications, geohydrology, low-temperature geochemistry, structural geology, petroleum geology, subsurface geology, and stratigraphy, and is expected to develop a strong teaching and research program. Salary will be competitive and commensurate with experience. Position will begin September 1, 1990.

At Louisiana Tech, the geology program is part of the Department of Petroleum Engineering and Geosciences of the College of Engineering. Available in the department are: well-equipped petrology, sedimentology, and advanced IBM microcomputer labs, plus an XRD, SEM, and EDS lab. A letter of application discussing the areas of expertise from the above list, a statement of present and future research interests and goals, vita, and three letters of recommendation should be sent to: Dr. Robert M. Caruthers, Head, Dept. of Petroleum Engineering and Geosciences, Louisiana Tech University, Ruston, Louisiana 71272.

Louisiana Tech is an equal-opportunity/affirmative employer and encourages applications from qualified women and minority candidates.

SENIOR MINERALOGIST. Resp. for development & implementation of laboratory analytical methods for analyses of asbestos in building materials by Transmission Electron Microscopy, Polarized Light Microscopy, & Phase Contrast Microscopy; & development of a related data base computer system for the processing and interpretation of laboratory analytical data. Reqs. Ph.D. in Geology or Geophysics & 2 yrs. exp. in job offered or in independent laboratory research relating to analysis of physical properties of rocks & minerals. Also reqs. expertise in mineralogic analysis through Transmission Electron Microscopy & Polarized Light Microscopy; research exp. in development of data base systems for processing laboratory analytical data; & research exp. in development & implementation of analytical methods for analysis of physical properties of rocks & minerals. Salary: $35,000/yr. Position of employment & interview, Emeryville, CA. Send this ad and a resume to Job #TC121189, P.O. Box 9560, Sacramento, CA 95823-0560 not later than May 15, 1990.

SENIOR GEOLOGIST OPENING
CEG or RG. Will be responsible for all geology work in our LA office. Will manage staff of 2-3 staff engineers. Must be organized and a good communicator. Salary $55,000-$60,000 plus performance bonus. Full benefits. Send resume to: Mr. Gary Dow, American Geotechnical, 1259 North Lakeview Ave, Suite T, Anaheim, CA 92807.

Services & Supplies
U.S.G.S. MAPS. U.S.G.S. map products OVERNIGHT for the maps your business needs yesterday! MAP EXPRESS offers U.S.G.S. topographic, Geologic and World maps by mail or 1-Day Service. Phone orders via MC or VISA 1-800-827-0039 or write for FREE catalog/pricelist—MAP EXPRESS, P.O. Box 280445, Lakewood, CO 80226. Personal Service for the Professional

LEATHER FIELD CASES. Free brochure. SHERER CUSTOM SADDLES, INC., P.O. Box 385, Dept. GN, Franktown, CO 80116.

GEOLICAL LIBRARY AVAILABLE FOR PURCHASE. Paleontologist's working library, over 4,000 items, various geological topics, emphasis on Invertebrate Paleontology, Litho Stratigraphy, Petroleum Geology. Broad regional coverage, focus on northern and western U.S., western and Arctic Canada. Many scarce out of print items, 1852 to date. For further information contact G.C. Raasch, No. 5, 2009, 90 Avenue, S.W., Calgary, AB, Canada, T2V 0X4, 1-403-251-8634.

Mt. Eden Books & Bindery
Specializing in out-of-print and rare books in the GEOLOGICAL SCIENCES. Including USGS publications, general geology, mining, paleontology, geophysics, hydrology, mineralogy, etc.

Free Search Service
For free catalog contact us at:
P.O. Box 421
Mt. Eden, CA 94557
(415) 782-7723
Abstract Forms Available Now

DALLAS

OCTOBER 29—NOVEMBER 1, 1990
DALLAS, TEXAS

ABSTRACTS DEADLINE: JULY 11
Abstracts must be typed on 1990 abstract forms, available from the Abstracts Coordinator, Geological Society of America, P.O. Box 9140, Boulder, CO 80301, or call (303) 447-8850. Volunteered abstracts must be mailed to the same address in time to arrive on or before July 11, 1990.