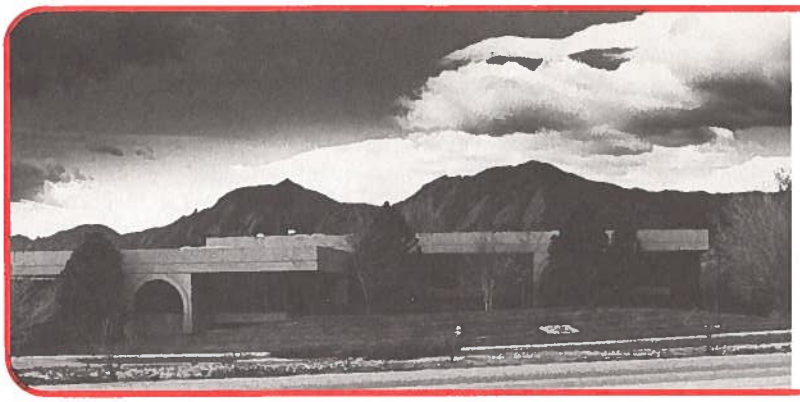

GSA
NEWS & INFORMATION

Monthly Newsletter of
The Geological Society of America

ISSN 0164-5854

VOLUME 10, NUMBER 3, March 1988

Meeting Costs: Why So High?

by Sue Beggs
GSA Meetings Manager

Recently, I came across the program for the 1965 GSA Annual Meeting (Kansas City) and was struck by the increase in costs since then. For example, housing rates in Kansas City in 1965 were as follows:

Room Commitments and Rates
The Geological Society of America
November 4–6, 1965

Hotels and Motels	Singles	Doubles	Twins	Suites
ALADDIN	$8.50–12.00	$10.50–18.00	$12.50–18.50	$19.00–28.00
1213 Wyandotte	Multiple Student Housing—4 rooms (3 and 4 each @ $4.50 per person)			
CONTINENTAL	7.00–14.00	9.00–17.00	12.00–20.00	35.00–60.00
11th and Baltimore				
DIXON	5.50–8.00	7.50–11.00	9.00–12.00	15.00–20.00
12th and Baltimore	Multiple Student Housing—6 pairs of connecting rooms (12 rooms) for 25 @ $3.50 per person			
MUEHLEBACH	9.00–12.00	12.00–17.00	14.00–20.00	28.00–100.00
12th and Baltimore				
PHILLIPS	7.75–11.00	10.75–14.00	12.00–14.50	21.50–36.00
12th and Baltimore				
PRESIDENT	8.00–11.00	11.00–13.00	13.00–20.00	35.00–44.00
14th and Baltimore				
STATE	6.00–8.00	8.00–12.00	10.00–14.00	
12th and Wyandotte	Multiple Student Housing—10 rooms (3 and 4 each @ $4.00 per person)			
DOWNTOWNER MOTOR INN	10.00–12.00	13.00–16.00	14.00–16.00	
1234 Central				

Ah, those were the days. A common complaint we receive is that the GSA Annual Meeting costs too much. This is a charge that we take seriously. Some comments, however, can be set aside. To condense a few of the unrealistic and inaccurate ones: "Why does it cost so much to stay in a hotel? GSA should be able to get much lower rates"; "GSA overcharges and makes a lot of money from the meeting"; "GSA is a nonprofit organization and is not charged by, or is geting big discounts from, suppliers."

There's no doubt that meeting costs are high. Allowing $400 for transportation, lodging for four nights at $65 per night, food and miscellaneous at $40 per day, and $90 in registration fees, the meeting runs approximately $1000 per person. It's certainly not 1965, when the meeting fee was $8, and a night at the Muehlebach Hotel cost between $9 and $17.

Even eight years ago, for the 1980 Atlanta meeting, the registration fee was only $60, and a room at the downtown Marriott cost between $44 and $56. Various estimates of 1988 hotel costs give a rate of between $90 and $125 per night as an average in major cities.

GSA Hotel Rate Comparison
1980–1987

Year	Site	Weighted avg.*	Range of rates	
			Single	Double
1980	Atlanta	$44.00	$20–57	$22–68
1981	Cincinnati	54.00	30–60	36–60
1982	New Orleans	71.50	15–75	22–95
1983	Indianapolis	45.67	18–63	25–78
1984	Reno	51.16	26–54	32–54
1985	Orlando	52.07	29–65	29–85
1986	San Antonio	72.19	35–89	42–104
1987	Phoenix	52.45	28–80	30–90

*Takes into account the number of rooms at each rate.

But does the meeting cost "too much"? We do have to deal with the reality of the cost of living in 1988. Meeting costs and fees are a function of inflation combined with the basic requirements of running an event for well-educated professionals with high standards. GSA does well by its registrants, given the economic climate. Perhaps the complaint of high costs means that there is insufficient support from employers and grants to cover reasonable costs—whatever they are.

As I read through the 1965 material, I was struck with the need for a type of convention apologia. Can one article answer the charges of excessive costs that come from an economically beleaguered progession? Probably not, but this is my opportunity to make some generalized, first-hand comments.

GIVENS

There are several inescapable facts about GSA's Annual Meeting. First, for better or for worse, the size of the meeting and requirements for 12 concurrent session rooms plus poster and

(continued on p. 58)

Why so high? (*continued from p. 57*)

exhibit space mean that GSA must meet in a major convention center. We do not fit on campuses or in small cities.

Second, we have elected to meet during mid-autumn, one of the most popular times of the year in convention cities. This makes rate negotiations much more difficult. The only other more popular time is mid-spring.

Third, our best attendance is at the more popular meeting sites, such as New Orleans, San Diego, Reno, Phoenix, and Denver. Again, this has made negotiations more difficult because hotels and services know they can exact a premium during peak seasons in high-demand locations. This is a catch-22. We can save money by going to secondary locations, but if we go to these locations, we will have lower attendance and will have to charge more in fees to cover fixed costs.

Fourth, fees from exhibits and registration are GSA's basic source of revenue for a meeting. The meeting is not underwritten by corporations nor by operating income from membership dues or publications, which have their own set of expenses.

Fifth, our budgeting is tight. The difference of 200 professional registrants can have a substantial impact. Registration fees are set to underwrite student attendance, so that over 26% of the attendees come at one-half the fee. The difference between a 4200- and a 4400-person meeting can be substantial, depending on the mix of registrants.

Occasionally, we have an unexpected turnout, such as the 6065 who went to Reno in 1984. Yes, that meeting produced an unexpected windfall. Most of our meetings fall in the 4400–4600 range, however, and are budgeted accordingly. Even the 1987 meeting in Phoenix (5201 attendees) did not produce much of a surplus, because of the mix of member and nonmember professionals.

Sixth, although we enjoy some benefit from educational rates and other negotiated discounts, the costs to us are much the same as for any other group.

EXPECTATIONS AND REALITY

We also receive complaints that events such as field trips and special events cost too much. In response, first understand that we welcome ideas. If you have a better, less expensive way to handle field trips and special events, please let me know. In the meantime, we deal with our field trip registrants, who need transportation, lodging, food, leaders, guidebooks, and—not to be forgotten—insurance.

In addition, we want the trips to go, in order that the expectations of registrants are met and that the months of work volunteered by the field trip leaders are not wasted. We budget trips so that even if a trip is only two-thirds subscribed, it can break even and not become a drain on the overall meeting budget. Continued losses on field trips can only result in an increase in registration fees or restriction of the field trip program. Our membership has indicated we should continue the field trip program, so we must make the trips financially stable. Beyond the two-thirds rule, however, there are no add-ons to the field trip fees. Everything is at cost.

Now let's take a look at Special Event Night. Since 1979 GSA has held one special evening event, attended by 800 to 1200 persons. The fee has been between $16 and $32. The events usually include some combination of entertainment, drinks, and a meal.

The Special Event Night in Phoenix included entertainment and a meal for $16. It was easily accessible and drew some 1000 party-goers. The event cost less than that of the year prior (San Antonio), which, at $28, included beverages and all the food you could eat, plus entertainment. Although most of the guests enjoyed the evening in Phoenix, we did receive the criticisms that it "cost too much" and there was "not enough."

Some commented that for $16 they could have gotten better. Perhaps. Keep in mind that this is a one-time event. All the costs are on a one-time basis. The $16 charge included

$10 for 8-oz beef barbecue buffet dinner and 16% mandatory service charge
$4 for space rental, decorations, staging, security, labor
$2 for entertainment
$1 for special outdoor electrical requirements

Not charged to the ticket were the costs for the extra night buses and the coordination fees. In other words, events such as this are not the same as evenings at a restaurant. We pay for much more than the meal. Yes, there are ways we can improve these events, but in many cases the solution results in higher cost.

Some groups have included meals, cocktail functions, and events in their registration fee, but many associations are moving toward frugality and away from free, hosted bars and meal functions. Believe me, these are not free. The costs are built into the registration fee. This benefits some because of the broader distribution of costs, but it is a disadvantage for those who do not participate in functions. We give registrants a choice, and it does place the burden on those who participate.

THE BRIGHT SIDE

The tax code still recognizes attendance at professional meetings as a legitimate deduction, although reduced from the 1986 level. Also, in our 1986 registrant survey, over 78% replied that their employer, or grants, or both helped underwrite the costs of registration, travel, and lodging. Better yet, over 80% of the respondant group said that the GSA meeting is where they find the newest information and that they attend in order to meet their peers and colleagues, share information, and gain professional recognition on a national level.

We appreciate the financial constraints of many of our members. We are both aware of and concerned about individuals and the profession. We are dedicated to doing what we can to maintain quality at a reasonable cost in the 1980s and beyond.

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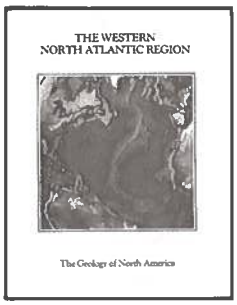
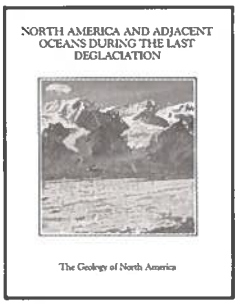
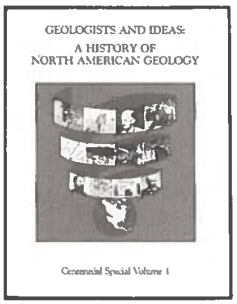
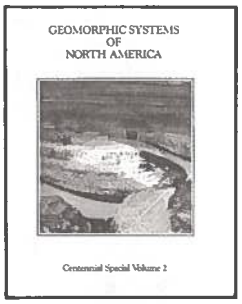
The Decade of North American Geology DNAG

VOLUMES









GEOLOGY OF NORTH AMERICA

The centerpiece of the DNAG project. When complete the series will contain 28 matched volumes, in two sets: 19 U.S. and Mexican volumes, and nine from Canada.

The Western North Atlantic

edited by P.R. Vogt and B. E. Tucholke, 1986

The award-winning first volume in this 28-volume series. Complete coverage of the geology and geophysics of the western North Atlantic Ocean basin in 41 chapters, organized into 8 sections: Introduction; Present Accretion Axis; Regional Geology and Geophysics; Plate Tectonic Evolution; Surficial Sedimentation; Biofacies; Paleoceanography; and Resources and Law of the Sea. The editors received the 1986 Alan Berman Research Publication Award for thisvolume. Includes 11 plates, several in color, in a separate, matching slipcase.

GNA-M, 720 p., 11 plates in slipcase, indexed, ISBN 0-8137-5202-7, CIP, hardbound, $47.50

North America and Adjacent Oceans during the Last Deglaciation

edited by W. F. Ruddiman and H. E. Wright, Jr., 1987

Most Quaternary sediments in North America north of 45°N postdate the last deglaciation. This volume looks at those extensive deposits from the standpoints of timing, cause, and mechanism of the wastage of North American ice during the last deglaciation and the accompanying environmental changes in the nonglaciated and deglaciated areas. It particularly examines the mechanisms by which a mass of ice equivalent to 100 m of global sea-level was returned to the the ocean within about 8,000 years. A truly comprehensive synthesis of marine and terrestrial information in 22 chapters grouped into five sections: Chronology of Disintegration of the North American Ice Sheets, Ice Core and Other Glaciological Data, the Nonglacial Physical Record on the Continent, Biological Record on the Continent, and Analysis and Summary. Includes two oversize pocket-plates in color showing time-series maps of pollen densities and vegetation changes since 18 ka.

GNA-K3, 509 p., 2 pocket plates, indexed, ISBN 0-8137-5203-5 hardbound, $43.50

The Atlantic Continental Margin: U.S.

edited by R.E. Sheridan and J.A. Grow, 1988

This synthesis covers stratigraphy, depositional processes, and geophysical interpretation of the major onshore and offshore marginal basins from Maine to the Bahamas, and includes an up-to-date review of thinking on regional tectonic history. Additional chapters discuss the theoretical aspects of thermal evolution, subsidence, and seismic stratigraphy as applied to this region. Geological resources including petroleum, water, sand and gravel, hard minerals, and heat flow are reviewed, and environmental hazards such as seismicity, coastal erosion, waste disposal and submarine instability as it relates to site of drilling platforms and mining are evaluated. A summary chapter reviews areas of controversy and suggests key topics for research.

GNA-I2, 632 p., 8 plates in slipcase, indexed, ISBN 0-8137-5204-3, hardbound, $49.50

CENTENNIAL SPECIAL VOLUMES

Four special, topical voumes prepared by four of GSA's Divisions as their contribution to the DNAG project.

Geologists and Ideas: A History of North American Geology

edited by Ellen T. Drake and William M. Jordan, 1985

An unusually coherent, well-written volume. Prepared for DNAG by the History of Geology Division of GSA. Spotlights events, ideas, and people, and sheds light on the history of North American geology as a whole. Thirty-four papers are organized into four categories: (1) The Evolution of Significant Ideas; (2) Contributions of Individuals; (3) Contributions of Organized Groups; and (4) Application of Significant Ideas. Excellent as a course-book or for additional reading for classed related to the history of geology or general science. Light blue spine.

CSV001, 520 p., indexed, ISBN 0-8137-5301-5, CIP, hardbound, $37.50

Geomorphic Systems of North America

edited by W. L. Graf, 1987

New ideas, new techniques, new data, even new access to extraterrestrial worlds—all these are in greater abundance now than ever, making this, the editor says, a marvelous time to be a geomorphologist! This 14-paper volume has been prepared by the Geomorphology Division of GSA as its contribution to DNAG. Subjects treated are Regional Geomorphology of N. America; Applachian Mountains and Plateaus; Atlantic and Gulf Coast Province; Central Lowlands; Canadian Shield; Great Plains; Rocky Mountains; Colorado Plateau; Basin and Range; Central America and the Caribbean; Columbia and Snake River Plains; Interior Mountains and Plateaus; Pacific Coast and Mountain Systems; and Arctic Lowlands. Yellow spine.

CSV002, 661 p., indexed, ISBN 0-8137-5302-3, CIP, hardbound, $48.50

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THE GEOLOGICAL SOCIETY OF AMERICA

DNAG NEWS

by Allison R. (Pete) Palmer

More Kudos

The set of Centennial Field Guides is now complete! By the end of this month the last one, for the South-Central Section, should be printed. This volume faced perhaps the toughest challenge because the South-Central Section includes only four states and a lot of flat terrain. The contributors to this volume are listed below. They bring the total number of contributors to the Centennial Field Guide series to 704! To all of these, to the group from the Northeastern Section that came up with the germ of the idea for the field guides in the spring of 1981, and to the volume editors and their regional leaders, congratulations for the tremendous effort to bring this valuable set of geologic localities to the attention of your colleagues throughout the world.

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(continued on p. 61)

South-Central Section Student Paper Awards

GSA's South-Central Section will recognize the best three student-written and student-presented papers at its meeting in Lawrence, Kansas, this month. The section awards $200 for first place, $100 for second place, and $50 for third place. To encourage attendance at the GSA Annual Meeting (this year in Denver, Colorado), the South-Central Section pays up to $300 of the travel expenses of the first-place winner.

Winners of the 1987 best student paper awards, given at the South-Central Section meeting in Waco, Texas, are Daniel R. Suchy, McGill University, first place, for "Sixth-Order Transgressive-Regressive Units in the Fort Scott Cyclothem of Southeast Kansas"; Tonia J. Clement, University of Texas, Austin, second place, for "Hydrochemical Facies of the Edwards Aquifer Bad Water Zone"; and Robert S. Hobbs, Baylor University, third place, for "Clastic Deltas, Analysis of Bedload Sedimentation Patterns and River Dynamics on the Brazos River, Central Texas."

South-Central Section Chair Rena Bonem presents a $300 check to Daniel R. Suchy for travel to the GSA 1987 Annual Meeting in Phoenix. Suchy received the first-place award for best student paper at the section's 1987 meeting.

Further DNAG Progress

Two new books available! On December 31, advance copies were received for the North-Central Centennial Field Guide, and on January 8, *North America and Adjacent Oceans During the Last Deglaciation* came off the presses. Two more books are at the printer as of this writing (early January), and more should be in hand and off to the printer by the time you read this.

Summary of DNAG Activity in 1987

Products of DNAG activity began to appear on a more or less steady basis in May. During the year, five books were printed, two more were completed and at the printer, and one was in the final paging stages by the end of the year. In addition, the first of the 1:5,000,000 scale maps of North America (the Magnetic Anomaly Map) became available.

The table below can be compared to a similar table in the March 1987 Centennial News column to see where significant progress has been made and where bottlenecks remain.

	Chapters in production	Chapters in review	Total chapters written	Chapters still due
The Geology of North America				
North America During Last Deglaciation	Finished (22 chapters)			
Atlantic Margin	Finished (32 chapters)			
Caribbean Region	12	6	18	1
Appalachian-Ouachita Region	22	7	29	1
Sedimentary Cover	14	2	16	2
Precambrian	2	-	2	5
Arctic Ocean Region	20	5	25	6
Nonglacial Quaternary	7	6	13	7
U.S. Cordillera	3	9	12	8
Eastern Pacific	16	9	25	9
Economic Geology	9	6	15	25
Surface Water Hydrology*	9	4	13	-
Groundwater Hydrogeology*	40	8	48	2
Gulf of Mexico Basin*	-	11	11	8
Alaska*	-	23	23	9
Change from Dec. 31, 1986	+112		+72	
Centennial Special Volumes				
Geomorphic Systems—PRINTED—July 1987				
Heritage of Engineering Geology*	12			14
Phanerozoic Evolution (transects)*	5			7
Centennial Field Guides				
Northeastern Section—PRINTED—May 1987				
Cordilleran Section—PRINTED—June 1987				
Rocky Mountain Section—PRINTED—August 1987				
North-Central Section—PRINTED—December 1987				
South-Central Section—Finished (100 chapters)				

*Editors for these volumes are handling the peer-review process, and texts come to GSA ready for copy editing.

SOLD OUT

Powell Revisited

GSA's Centennial Field Trip to the Grand Canyon

April 29–May 6, 1988

In a surprisingly enthusiastic response to GSA's first venture in vacation field trips, registrants filled the trip by December 31, 1987. Fifteen persons are on the reserve list. An additional 40 registrants had to be turned away.

For a variety of reasons, another such trip is not possible for 1988. The popularity of this trip shows that there is room for a repeat—probably in 1990. (It is unlikely that we will run this trip in 1989 because of the many Grand Canyon trips being sponsored by the International Geological Congress.)

We believe that the success of this trip is due to three key elements: (1) well-respected scientific leadership, (2) location, and (3) rate. In the future you can look for an expansion of such adventures emphasizing the same elements. Taking the suggestions of our members, we are currently pursuing trips to Alaska, Canada, and New Zealand.

If you are interested or have suggestions, please contact Sue Beggs (GSA's Meetings Manager), GSA, P.O. Box 9140, Boulder, CO 80301.

FOUNDATION NEWS

by Robert L. Fuchs

Mortality and Immortality

As human beings, we succumb easily to procrastination: Don't paint the bedroom this weekend, it will still be there next weekend. Don't go to the trouble of getting the car serviced tomorrow, it's running perfectly fine. As geologists we can be even more susceptible to this foible. After all, the Colorado River has been flowing through the Grand Canyon for a great many centuries. The geomorphological characteristics of the Appalachian Mountains haven't changed appreciably in the time span that humans have populated Earth.

But as we all learned in Geology 101, the only constant is change itself. Appearances of immortality are underlain by the harsh realism of mortality. While our life span may seem endless in the full bloom of early adulthood, our years are in fact a brief instant on the geologic time scale.

The point of this musing is that we must deal sooner or later in our personal lives with our own mortality. Although it is difficult and unpleasant to contemplate death, the knowledge that a proper estate plan is in place that will effectively and efficiently distribute the deceased person's assets can be a source of long-term personal comfort.

A will is essential to accomplishing proper distribution of your estate after death. Without a will, the state will distribute your property according to certain strict and impersonal laws. The result could violate your every wish. Not only is a will critical to the realization of your desires after death, but also it must be reviewed periodically and revised if necessary. Changes in federal and state laws, a new residence in another state, a beneficiary's altered circumstances—any of these events could require a new will.

Estate distribution through a will is accomplished by bequest. Various types of bequests, such as general, specific, residuary, contingent, absolute, and immediate, are available for the testator. Charitable bequests, such as to the GSA Foundation, provide tax savings to the estate because they are fully deductible for federal estate tax purposes. Thus, a $1,000,000 estate making a $100,000 gift to the GSA Foundation will save $39,000 in estate taxes, resulting in a net cost of the bequest to the estate of $61,000.

Further sophistication in estate distribution and bequests can be achieved through annuity trusts, unitrusts, and life insurance. We have a primer, Planning Your Bequests, that will introduce you to this entire field of wills, bequests, and estate planning. Mail in the accompanying coupon or call the Foundation office, (303) 447-2020; we will be happy to send you a free copy.

The financial health of GSA today and its ability to support publications and research for the benefit of members and the geoscience community stem in a very significant part from the $3,900,000 bequest to the Society in 1931 by member R.A.F. Penrose, Jr. The financial needs of geoscientists continue to increase, as does the GSA Foundation's role in filling these needs. The Penrose Endowment Fund cannot shoulder the entire burden. Estate planning by GSA members that includes bequests to the Foundation will provide future funds for research, publications, and scientific advancement.

GSA Foundation
3300 Penrose Place, P.O. Box 9140
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Century Challenge Report

At the end of December 1987, there were 382 gifts to the Century Challenge, totaling $54,175. Challenge Partners, those giving $250 or more, now number 28, or 7.5% of the total contributors. This is GSA's Centennial year—make certain that you send GSA your birthday gift. Don't miss out on the celebration!

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Kathleen K. Krohn
Edwin E. Larson
Charles R. Lewis
Karl E. Limper
Christer J. Loftenius
William W. Lomerson
Susan A. Longacre
Mitchell W. Lyle
Burton H. Marliave
Stephen Marshak
Jeffrey A. May
Ronald E. McAdams
Nancy A. McHone
Joseph M. McKniff
Robert J. McLaughlin
Brainerd Mears, Jr.
David L. Meyer
F. Stuart Miller
Leanne W. Milton
James P. Minard
Glenn L. Mooney
George E. Moore, Jr.
Wilbur J. Morin
James T. Neal
Henry F. Nelson
Scott L. Neville
Franklin Howard Olmsted
John K. Osmond
A. T. Ovenshine
Jeffry A. Parsons
Thomas L. Patton
Richard and Rachel Paull
Shane M. Pelecnaty
Paul Dean Proctor
George W. Putman
Douglas W. Rankin
William A. Ranson
Shirley A. Rawson
Stephen P. Reidel
Juergen Reinhardt
Philip W. Reinhart
Charles E. Reynolds
Scott J. Rhen
Peter Robinson
Jason B. Saleeby
Edward T. Schenk
Robert Schoen
Charles B. Sclar
Laura F. Serpa
Gerald I. Shiller
Caswell Silver
Jack A. Simon
George I. Smith
George C. Soronen
Mortimer H. Staatz
Ross A. Steenson
Jeffrey N. Sternfeld
Lee J. Suttner
Frederick W. Tabor
Texaco, Inc.
Charles H. Thorman
George R. Tilton
Joseph E. Upson II
Bradford B. Van Diver
Roland E. Von Huene
Clyde Wahrhaftig
Robert E. Wallace
Charles W. Welby
Michael J.P. Welland
Robert O. Wells
Russell L. Wheeler
Donald E. White
Bruce H. Wiley
Ronald Willden
John W. Williams
James E. Wilson
Don Winston
Garrett E. Zabel
E-an Zen
Frederick P. Zoerner

Century Challenge

Thomas H. Anderson
J. Kaspar Arbenz
Allan and Katherine Barrows
William K. Barry
M. J. Benham
Marion E. Bickford
Bruce J. Bilodeau
Bruce A. Blackerby
Blasland & Bouck Engineers
Alice M. Blount
Ygnacio Bonillas
Martin L. Bregman
Donald A. Brobst
F. Eyolf Bronner
James Bush
Wallace M. Cady
Richard J. Callaway
Christine Carlson
Stephen E. Clabaugh
Leonard L. Cumley
William H. Dennen
Kingsley Dunham
Walter F. Ebaugh
William J. Elliott
Irving S. Fisher
Robert E. Folinsbee
Kenneth J. Fulton
Hubert Gabrielse
Joseph S. Gates
Lynn Glover III
Richard E. Gray
Susan D. Halsey
William W. Hambleton
Mark P. Hassell
Robert D. Hatcher, Jr.
Lowell S. Hilpert
Richard K. Hose
John B. Ivey
David L. Jones
Richard David Kaiser
Marvin E. Kauffman
Mac L. Keith
James P. Kennett
Keith A. Kvenvolden
Phyllis M. Lawrence
Morris W. Leighton
Dave Leppert
Charles R. Lewis
Richard Liddicoat
Augustin Lombard
Neil Lundberg
J. A. MacDonell
Jerome F. Machamer
Richard F. Madole
Robert J. Malcuit
John F. Mann, Jr.
William B. Maze
J. H. McKeever
John B. McKeon
Brainerd Mears, Jr.
Kristian Meisling
Duane M. Moore
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Dorothy M. Palmer
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Forrest G. Poole
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Mary Savina
Julius Schlocker
Dwight L. Schmidt
Henry R. Schmoll
Allan F. Schneider
William E. Scott
F. Augustus Seamans
William D. Sevon
Dennis L. and Jean T. Shannon
Marie Siegrist
Dennis M. Sparks
D. B. Stone
Raymond T. Stotler, Jr.
Stephen H. Stow
John J. Thomas
James B. Thompson, Jr.
Robert J. Weimer
Leslie Ann White
Kemble Widmer
John R. Williams
J. E. Wilson
Eugene A. Yates
Lynn A. Yehle

Challenge Partners

Fred A. Donath
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Charles A. and June R.P. Ross
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Report from Washington

by James Evans
GSA Congressional Science Fellow

CONTAMINATED SEDIMENTS

In the 1970s, Congress developed legislation to address important concerns about air and water pollution. In the 1980s the concern has focused on issues relating to hazardous and nuclear wastes and global climate change. I suggest that the "issue of the decade" for the 1990s will be contaminated sediments. Currently I am serving as a Congressional liaison to a National Academy of Science panel that is addressing the magnitude of the problem and needed areas for research and development. Issues relating to contaminated sediments may require legislative initiatives, and this is a particular area in which geologists can perform a leadership role in educating the public and focusing the issue for public policy makers.

Issue

The discussion of contaminated sediments typically focuses on sediments from the oceans and the Great Lakes. The sources of sediment contamination include industrial and municipal point sources; atmospheric loading; runoff from farming and construction; direct dumping on shore or at sea; leaching from onshore hazardous waste disposal sites; and accidental spills onshore or at sea.

The significance of bottom sediment contamination is that it affects human activities in numerous ways. First, there is the interrelation between contaminated sediments and overlying water quality. Contaminants in the sediments can be chemically remobilized or resuspended by physical mixing (storms and tides) or biological mixing. Second, there is the damage to aquatic ecosystems that is caused by contaminants in sediments, especially the direct effect on benthic communities. Third, there is biomagnification of contaminants upward through aquatic food chains, and this has implications for human health issues and economic use of resources. Fourth, contaminated sediments may impose tremendous dilemmas regarding navigational dredging, harbor construction, and remediation efforts. A significant number of the harbors in the United States contain contaminated sediments, and this places economic constraints on development or even maintenance activities.

Questions that must be addressed illustrate the complexity of dealing with contaminated sediments. The most basic, yet surprisingly difficult, question to answer in each case is "Are these sediments contaminated?" There is no single, widely accepted criterion to apply to sediment contamination. The most commonly accepted approach, called the sediment-quality triad, uses a combination of chemical studies, bioassays, and in situ studies of community structure or histopathology. Although the species of chemicals and their concentrations can be readily determined, toxicity studies have not been completed for many contaminants. In addition, the additivity, or cumulative effect, of combinations of chemicals is rarely understood in this context, and synergistic effects are virtually unknown. Bioassays are laboratory tests that determine what concentrations of a contaminant cause a certain percentage of lethality in a test species (such as an LD50 value—when 50% mortality occurs), or some similar test. The applicability of laboratory results to actual field conditions can always be questioned. Finally, the in situ tests may involve a variety of measures of community structure (biomass, abundance, diversity, taxa/taxa ratios) or histopathology studies (e.g., occurrence of liver lesions in benthic fish species). These tests can require extensive field data and may be expensive, if precise taxonomic identifications are required. In the end, the sediment triad approach remains qualitative—i.e., there are no clear breakpoints that classify the sediment as contaminated or not. There are many other assessment methods. Some emphasize field bioassays (exposing organisms to sediments collected from the field), or monitor the abundance of specific indicator taxa, or measure contaminant concentrations of pore waters. Given the magnitude of the numbers of different known or potential contaminants, the variety of different aquatic environments (containing different organisms and communities), and the variety of human needs, it isn't surprising that confusion reigns. The last point may be the most important—whether a sediment is contaminated or not depends on whether or not it prevents us from using the area for some human purpose.

Besides contamination assessment, there are research gaps in issues such as sublethal, chronic effects of contaminants; effects of contaminants on phytoplankton; behavior of colloidal particles; and methods to fingerprint the sources of the contaminants that end up in the sediments. The public perception of risk, methods of cost-benefit analysis, and development of mitigation techniques are related public-policy questions in this debate.

Legislative Framework

A suite of existing laws address aspects of the contaminated sediments issue. The Clean Water Act (1972) has provisions for sewage (which may contain toxic substances), oil spills, dredging, and in-place toxic pollutants. In the past, the EPA has approached water-quality issues by emphasizing the drinking-water pathway of human exposure to the exclusion of the food-chain pathway. Since contaminated sediments (especially marine sediments) rarely threaten drinking-water supplies, they have not been a focus of water-quality efforts. This year, however, Congress passed the amendments to the Clean Water Act (the Water Quality Act of 1987), which has provisions that concern estuaries, the Great Lakes, nonpoint pollution sources, and toxic hot spots.

The Superfund law (Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also called CERCLA) established a ranking system for clean-up of toxic waste sites, but because of some of the assessment problems discussed above, only a handful of aquatic sites have been listed. The Superfund

(*continued on p. 65*)

Report from Washington (*continued from p. 64*)

Amendments and Reauthorization Act (SARA) of 1986 directed the EPA to consider the potential for contamination of natural resources in the human food chain, which clearly applies to contaminated sediments. SARA also contains provisions for action on abandoned hazardous wastes sites, or any sites where hazardous substances have come to be located, whether accidentally or intentionally.

Two other laws apply. The 1984 Resource Conservation and Recovery Act (RCRA) covers the generation, transport, handling, and disposal of hazardous wastes at any actively operated site. The Marine Protection, Research, and Sanctuaries Act (ocean dumping law) covers the transport of materials from a U.S. port for the purpose of dumping in ocean waters.

Potential legislative gaps might include a clear statement of national interest and intent; a calibration of sediment contaminant levels to water-quality standards; an assessment of liability issues (it may not be at all clear how liability should be assigned in cases of nonpoint sources); establishment of an information clearinghouse, an interagency coordination panel, and a technical support group; and authorization of funds. Some or all of these may become legislative initiatives in the future. Contaminated sediments represent a major environmental problem for this country, one that won't simply go away.

Editor's note: James Evans, GSA Congressional Science Fellow for 1987–1988, is working with Congressman Michael E. Lowry (D, Washington) and may be contacted through Lowry's office, House of Representatives, 2454 Rayburn House Building, Washington, DC 20515; phone (202) 225-3106.

1989 ANNUAL MEETING

November 6–9 St. Louis, Missouri

CALL FOR FIELD TRIP PROPOSALS

The theme for the 1989 meeting will be Frontiers in Geoscience. The emphasis of the field trips and the technical program will be on the future and on leading-edge technology. This is in keeping with St. Louis as the Gateway City site and with the beginning of GSA's second century.

The committee would like to structure field trips to complement the Frontiers in Geoscience theme and to coincide with topics of major symposia or theme sessions. Field trips that have this focus will be particularly welcomed.

Selection of trips will be made during July of 1988, leaving 15 months for preparing guidebooks and making arrangements.

To submit your proposal or for further information, contact the 1989 Field Trip Chairman

Jerry D. Vineyard
Dept. of Natural Resources
Div. of Geology and Land Survey
P.O. Box 250
Rolla, MO 65401

(314) 364-1752

Searching for a New Geoscientist?

When was the last time you hired a new employee? Did you waste time and effort in your search for a qualified geoscientist? Let the GSA computerized search file make your job easier.

How does it work? Complete the Employer's Request for Earth Science Applicants form on the following page. Remember to specify educational and professional experience requirements as well as the specialty area or areas of expertise your applicant should have. The GSA computer will take it from there.

You will receive a printout that includes the applicants' names, addresses, phone numbers, areas of specialty, type of employment desired, degrees held, years of professional experience, and current employment status. Resumés for each applicant are sent with each printout at no additional charge. In 1988, the cost of a printout of one or two specialty codes is $140. (For example, in a recent job search for an analyst of inorganic materials, the employer requested the specialty codes of geochemistry and petrology.) Each additional specialty is $55. A printout of the entire applicant listing in *all* specialties is available for $350. (Specialty codes printed in boldface type are considered major headings. If you select a specialty code printed in boldface type, your listing will contain applicants within the related subspecialties as well. If you request a listing of one of the subspecialties, applicants coded under the major category will be included but not those coded under the other related subspecialties.) If you have any questions about your personalized computerized search, GSA's Membership Department will assist you.

The GSA Employment Service is available year long. However, GSA also conducts the Employment Interview Service each fall in conjunction with the Society's Annual Meeting (this year in Denver, Colorado, Oct. 30–Nov. 3). You may rent interview space in half-day increments from GSA. Our staff will schedule all interviews with applicants for you, the recruiter. In addition, GSA offers a message service, complete listing of applicants, copies of resumés at no additional charge, and a posting of all job openings.

1987 SURVEY WINNER!

James F. Quinlan of Mammoth Cave, Kentucky, is the 1987 winner of a round-trip airfare for two anywhere in the continental United States. Quinlan responded to the Exhibit Attendees Survey taken at the GSA Annual Meeting in Phoenix. All survey participants were eligible in a drawing. Thanks to all for you who responded.

Watch for the survey at the 1988 Meeting, in Denver. You may be the next winner!

Looking for a New Job?

Are you looking for a new position in the field of geology? The GSA Employment Service offers an economical way to find one. Potential employers use the service to find the qualified individuals they need.

You may register any time throughout the year. Your name will be provided to all participating employers who seek individuals with your qualifications. If possible, take advantage of GSA's Employment Interview Service, which is conducted each fall in conjunction with the Society's Annual Meeting. The service brings potential employers and employees together for face-to-face interviews. Mark your calendar for Oct. 30–Nov. 3 for the 1988 GSA Annual Meeting in Denver, Colorado—GSA's Centennial Celebration!

To register, complete the application form on the following page, prepare a one- to two-page resumé, and mail it with your payment to the address given below. One-year listing for GSA Members and Student Associates in good standing: $30, nonmembers: $60.

NOTE: If you plan to interview at the GSA Annual Meeting, GSA *must* receive your material **no later than August 12, 1988.** If we receive your materials by August 12, your record will be included in the information the *employers* receive prior to the meeting. Submit your forms early to receive maximum exposure! Don't forget to indicate on your application form that you would like to interview in October–November. Good luck with your job search!

APPLICANT AND EMPLOYER FORMS ARE BACK-TO-BACK ON THE FOLLOWING PAGES

For additional information and submission of forms, please contact
Clara Hodgson, Membership Coordinator
Geological Society of America
P.O. Box 9140
Boulder, CO 80301 (303) 447-2020

In Memoriam

James Boyd
Carmel, California

Charles Meyer
Sedona, Arizona
November 15, 1987

Anthony J. Lee
Sterling, Virginia
March 1987

Ronald R. Dilamarter
Bowling Green, Kentucky
December 5, 1987

William D. Thornbury
Bloomington, Indiana
November 12, 1986

George Wong
San Francisco, California

Memorial Preprints

The following memorial preprints are now available, free of charge, by writing to GSA, P.O. Box 9140, Boulder, CO 80301.

Kenneth William Barr, by John B. Saunders
Edward Crisp Bullard, by J. Tuzo Wilson
George E. Carver, Jr., by Wendell S. Moore
Benjamin B. Cox, by M.R.J. Wyllie
Harold W. Hoots, by Ted L. Bear
William Watt Hutchison, by Rick Nelson
Ralph W. Marsden, by P. K. Sims
Raymond Lee Nace, by Ralph C. Heath

THE GEOLOGICAL SOCIETY OF AMERICA

3300 Penrose Place, P.O. Box 9140
Boulder, Colorado 80301
(303) 447-2020

N&I 0388
FOR ACCTG. USE ONLY
Rec. $30 $60
Ck # _____
Ltr. _____
GSA _____
Add. _____

APPLICATION FOR EMPLOYMENT MATCHING SERVICE (Please type or print legibly with **black ink**)

NAME (Mr. ☐) (Miss ☐) (Mrs. ☐) (Ms. ☐) (Dr. ☐) _____ (last name first) **Date** _____

Mailing Address _____

City _____ **State** _____ **Zip Code** _____

Date Available _____ **Telephone** ( ) _____ **Visa** _____
area code Business Home If not U.S. citizen, list visa

Members of GSA ONLY: Check here if you **DO NOT WISH** to have this number included in the Membership Directory ☐

EXPERIENCE

Must use specialty codes listed below. Choose three that best describe your expertise in order of importance.

* 1._____ 2._____ 3._____

Interested in
- ☐ Academic
- ☐ Government
- ☐ Industry
- ☐ Other

TYPE OF POSITION DESIRED

Specific interest
- ☐ Administration
- ☐ Exploration/Production
- ☐ Field
- ☐ Research
- ☐ Teaching

Will accept employment in
- ☐ U.S. only
- ☐ U.S. with foreign assignments
- ☐ Either

* **PRESENT SPECIALTY**
Choose one from codes listed below _____ **YEARS EXPERIENCE IN THIS SPECIALTY** _____

PRESENT EMPLOYER _____

Give number of years experience for any of the following that are applicable:

Administrative_____ Exploration/Production_____ Field_____ Research_____ Teaching_____ Total geological working experience_____

KNOWLEDGE OF FOREIGN LANGUAGES: French_____ ; German_____ ; Russian_____ ; Spanish_____ ; Other_____

ACADEMIC TRAINING

College or University	Degree (rec'd or expected)	Year	Major	Minor

Postgraduate work beyond highest degree in (field) _____ **Number of years** _____

SPECIALTY CODES

Select those that best describe your ability. Use codes in bold face only when other breakdowns are inadequate.

100. Economic Geology
101. coal geology
102. geothermal, etc.
103. metallic deposits
104. nonmetallic deposits
105. mining geology
120. Engineering Geology
150. Environmental Geology
160. Public Education & Communication
200. General Geology
220. Geochemistry
221. organic
222. high temperature
223. low temperature
224. stable isotopes
225. geochronology
250. Geomorphology
300. Geophysics
301. seismic
302. gravity/magnetics
303. seismicity
304. paleomagnetism
320. Hydrogeology
321. hydrochemistry
322. ground water
323. surface water
330. Library
350. Mathematical Geology
351. computer science
352. statistical geology
400. Mineralogy
401. crystallography
402. clay mineralogy
410. Museum (curator)
420. Oceanography
421. marine geology
422. coastal geology
450. Paleontology
451. invertebrate
452. vertebrate
453. micropaleontology
454. paleobotany
455. paleoecology
500. Petroleum Geology
501. exploration
502. subsurface stratigraphy
520. Petrology
521. igneous
522. metamorphic
523. sedimentary (clastic)
524. sedimentary (carbonate)
525. experimental
550. Planetology
575. Quaternary Geology
600. Regional Geology
620. Remote Sensing
621. photogeology
622. photogrammetry
630. Science Editing
650. Sedimentology
651. sedimentary processes
652. sedimentary environments
720. Stratigraphy
750. Structural Geology
751. tectonics
752. tectonophysics
753. rock mechanics
800. Volcanology

* **Résumé must be attached, LIMITED TO TWO PAGES, typewritten on one side only, to be acceptable for reproduction to employers. Include your name, address, and phone number; concise details of work experience; and majors/minors on degrees.**

* **Fee: $30 if you are a Member or Student Associate of GSA in good standing (Member #_____) $60 if you are not a member of GSA. Payment in U.S. funds (check, money order, or charge information MUST ACCOMPANY FORM). MAKE CHECK PAYABLE TO THE GEOLOGICAL SOCIETY OF AMERICA.**

☐ Check or Money Order
☐ MasterCard ☐VISA
☐ American Exp. ☐Diners Club
☐ CHOICE ☐ Carte Bleue
☐ Barclay Card ☐ Access
☐ EuroCard ☐ Standard Bank Card

Card Expires Mo Yr ☐☐

Card Number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Signature _____
(Required for credit card payment)

I agree to release GSA or their representatives from responsibility for errors that may occur in processing or distributing this data. I understand that GSA makes **no guarantees** of contact by an employer in this service. I agree to notify GSA Employment Service immediately of (1) change of address, (2) acceptance of a position.

_____ I will attend the 19_____ GSA Annual Meeting in _____

*** SIGNATURE (required)**

*** THESE ITEMS ARE ABSOLUTELY NECESSARY TO PROCESS THIS APPLICATION** **This application will be active for 1 year** 1/88

THE GEOLOGICAL SOCIETY OF AMERICA

3300 Penrose Place, P.O. Box 9140
Boulder, Colorado 80301
(303) 447-2020

EMPLOYER'S REQUEST FOR EARTH SCIENCE APPLICANTS

(Please type or print legibly)

Name _____ Date _____

Organization _____

Mailing address _____

City _____ State _____ Zip code _____ Telephone number _____ (Area code) Number

SPECIALTY CODES (see list below)

List the specialty code numbers that you wish to order, or ☐ check here if you want entire file of applicants in ALL specialties.

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____

POSITION DATA: What position(s) do you expect to fill? _____

In what area(s)? _____

Degree requirements _____ Number of positions available _____

SPECIALTY CODES

100. Economic Geology
101. coal geology
102. geothermal, etc.
103. metallic deposits
104. nonmetallic deposits
105. mining geology
120. Engineering Geology
150. Environmental Geology
160. Public Education & Communication
200. General Geology
220. Geochemistry
221. organic
222. high temperature
223. low temperature
224. stable isotopes
225. geochronology
250. Geomorphology
300. Geophysics
301. seismic
302. gravity/magnetics
303. seismicity
304. paleomagnetism
320. Hydrogeology
321. hydrochemistry
322. ground water
323. surface water
330. Library
350. Mathematical Geology
351. computer science
352. statistical geology
400. Mineralogy
401. crystallography
402. clay mineralogy
410. Museum (curator)
420. Oceanography
421. marine geology
422. coastal geology
450. Paleontology
451. invertebrate
452. vertebrate
453. micropaleontology
454. paleobotany
455. paleoecology
500. Petroleum Geology
501. exploration
502. subsurface stratigraphy
520. Petrology
521. igneous
522. metamorphic
523. sedimentary (clastic)
524. sedimentary (carbonate)
525. experimental
550. Planetology
575. Quaternary Geology
600. Regional Geology
620. Remote Sensing
621. photogeology
622. photogrammetry
630. Science Editing
650. Sedimentology
651. sedimentary processes
652. sedimentary environments
720. Stratigraphy
750. Structural Geology
751. tectonics
752. tectonophysics
753. rock mechanics
800. Volcanology

Applicants seeking employment in:
☐ Academic
☐ Government
☐ Industry
☐ Other _____

Minimum degree required
☐ None
☐ B.A. or B.S.
☐ M.A. or M.S.
☐ Ph.D

Minimum professional experience
☐ None
☐ 1-5 yrs.
☐ 6-plus

Experience desired (yrs.)

	None	1-5	6-plus
Administrative	☐	☐	☐
Exploration/Production	☐	☐	☐
Field	☐	☐	☐
Research	☐	☐	☐
Teaching	☐	☐	☐

Employment in: ☐ U.S. only ☐ U.S. with foreign assignments ☐ Either

Foreign Languages: ☐ French ☐ German ☐ Russian ☐ Other _____ ☐ Not required

I am interested in interviewing applicants through the GSA Employment Service at the 19_____ Annual Meeting in _____.

See attached sheet for current fee schedule.

1. I agree to use this service for valid recruiting purposes.
2. I agree that no placement charges will be assessed to any applicant participating in the GSA Employment Matching Service.

Total fee enclosed .....$_____

or invoice requested .....$_____

_____
Signature (required)

1/86

More GSA Representatives Needed!

Three years ago, 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 455 representatives at colleges and universities throughout North America.

We now have 83 company, 53 agency, and 43 consultant GSA representatives. However, we need more volunteers. Our goal is to designate a representative at all major company offices and governmental agencies througout the country. For example, we hope to have a GSA representative for Exxon in Midland, for Chevron in La Habra, for the Geological Survey of Alabama in Tuscaloosa, 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

- *Bulletin*, *Geology*, and *News & Information* every month
- 20% discount on GSA books, maps, and charts
- $30 discount for GSA's Employment Service (applicants)
- $10 discount for registration fees for Penrose Conferences
- $20 reduction in Student Associate registration fees for GSA's Annual Meeting
- $40 reduction on Member/Fellow registration fees for GSA's Annual Meeting
- Reduced registration fees for many GSA section meetings
- Reduced dues for GSA spouse members
- 25% discount on Member Standing Order Plan
- Special discounts on Decade of North American Geology publications
- Group term life insurance plan at reduced member rates
- Opportunity to participate in GSA's specialized divisions and to receive their newsletters
- Opportunity to apply for student grants-in-aid in the Southeastern Section and the North-Central Section
- Discount for subscriptions to *Engineering Geology Abstracts* for Engineering Geology Division affiliates
- Discount for National car rentals
- 25% discount on many Geological Society of London publications
- Reduced subscription rate for publications of the American Institute of Physics
- Discount on subscriptions to *Geoarchaeology* or *Neotectonics* for GSA Division affiliates
- Discount on subscriptions to *Geological Magazine*

We need your help to continue this communications link between GSA headquarters and the membership of the Society. If you are a Member or Fellow (not Student Associate) and are interested in serving GSA as a representative for your company, agency, or group of the employment sector, please complete and return the form below. Play an active role in the affairs of your Society and be the first in your area to represent GSA!

We thank the following GSA representatives now serving to keep the program growing.

CURRENT GSA REPRESENTATIVES

Cordilleran Section

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

Arizona
Peter A. Drobeck—Kingman
Donald A. Parks—Parks Petroleum Company, Carefree

(*continued on p. 70*)

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:
Clara Hodgson, Membership Coordinator, Geological Society of America, P.O. Box 9140, Boulder, CO 80301, (303) 447-2020

GSA Representatives (*continued from p. 69*)

California
Richard T. Bachman—Naval Ocean Systems Center, San Diego
John L. Burnett—California Department of Conservation, Sacramento
David M. Burt—Intellus Corporation, Irvine
Paul R. Carlson—U.S. Geological Survey, Menlo Park
Ray A. Eastman—Anaheim
Dorian Elder-Mills—J. H. Kleinfelder & Associates, San Diego
G. Thomas Farmer, Jr.—Ecology & Environment, Inc., Los Angeles
Michael A. Fisher—U.S. Geological Survey, Menlo Park
Gerard M. Flaherty—Chevron, U.S.A., San Ramon
John J. Francis—Earth Technology Corporation, Long Beach
S. Thomas Freeman—Woodward-Clyde Consultants, Santa Ana
Wilbert P. Gaston—Alton Geoscience, Irvine
Robert G. Hickman—Union Oil Company of California, Brea
Don D. Irwin—Texaco U.S.A., Los Angeles
David B. Kelley—California Central Valley
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Elizabeth T. Lafferty—California Department of Health Services, Los Angeles
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Peter N. Gabby—U.S. Bureau of Mines, Spokane
Richard W. Galster—Seattle
Rand D. Miller—Everett, Puget Sound area
William H. Price—Rockwell Hanford Operations, Richland

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Robert F. Gerath—North Vancouver area

(*continued on p. 71*)

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(*continued on p. 72*)

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(*continued on p. 73*)

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This is not a salaried position, but GSA pays expenses for secretarial assistance, mail, telephone, and copying and for travel to meetings of the GSA Publications Committee twice each year. The GSA headquarters staff handles copyediting and production of books from accepted manuscripts.

Interested persons should submit a vita, a list of publications, and a letter describing relevant qualifications, experience, and objectives. Nominations should include a letter and the nominee's written permission, vita, and publications list. Applications and nominations should be sent BEFORE MARCH 15, 1988, to:

F. Michael Wahl, Executive Director
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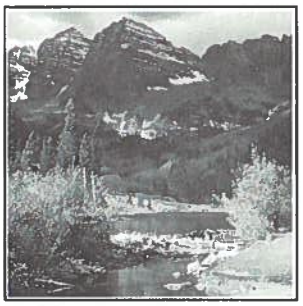

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MEETINGS

(Asterisk indicates new or changed information)

1988

Fourth Annual V. E. McKelvey Forum on Mineral and Energy Resources: Roles of Geological Research in Assessment of Energy Resources, March 1-2, 1988, Denver, Colorado. Information: Buhler and Abraham, Inc., 8700 First Ave., Silver Spring, MD 20910; (301) 588-4177.

Prospectors and Developers Association of Canada 56th Annual Convention, March 6-9, 1988, Toronto, Ontario. Information: Susan Sikala, Suite 1002, 74 Victoria St., Toronto, Ontario M5C 2A5, Canada; (416) 362-1969.

Second International Symposium on Geotechnical Applications of Ground-Penetrating Radar, March 6-10, 1988, Gainesville, Florida. Information: Gregg Schellengrager, U.S.D.A.-SCS, 701 SE First Ave. Gainesville, FL 32601; (904) 377-1092.

Environment '88 seminar and exhibition, March 8-9, 1988, Milwaukee, Wisconsin. Information: Federation of Environmental Technologists, P.O. Box 185, Milwaukee, WI 53201; (414) 251-8163.

American Association of Petroleum Geologists Annual Meeting, March 20-23, 1988, Houston, Texas. Information: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101; (918) 584-2555.

European Geophysical Society XIII General Assembly, March 21-25, 1988, Bologna, Italy. Information: A. K. Richter, MPI für Aeronomie, D-3411 Katlenburg-Lindau, Federal Republic of Germany, or A. Speranza, Dipartimento di Fisica, Via Irnerio 46, I-40126 Bologna, Italia.

Symposium on Application of Geophysics to Engineering and Environmental Problems, March 28-31, 1988, Golden and Lakewood, Colorado. Information: Jack Corbett, 4045 Niagara Way, Denver, CO 80237; (303) 759-9747.

Anadarko Basin Symposium, April 5-6, 1988, Norman, Oklahoma. Information: Kenneth S. Johnson, Oklahoma Geological Survey, University of Oklahoma, Norman, OK 73019; (405) 325-3031.

American Association of Petroleum Geologists Pacific Section, April 17-19, 1988, Santa Barbara, California. Information: Jack Cunningham, Celeron Oil & Gas, 111 West Micheltorena, Santa Barbara, CA 93101-3018; (805) 966-0831.

***Geology of Industrial Minerals**, 24th annual meeting, May 2-5, 1988, Greenville, South Carolina. Information: Alan-Jon Zupan, South Carolina Geological Survey, Harbison Forest Rd., Columbia, SC 29210; (803) 737-9440.

First Catamarca International Mining Exposition and Fair, May 7-15, 1988, Catamarca, Argentina. Information: FEMICA, Uruguay 435, 3° piso, Of. E, Buenos Aires (1015), Argentina; Telex 17808 ANCYA-AR.

***Canadian Institute of Mining and Metallurgy 90th Annual General Meeting**, May 8-12, 1988, Edmonton, Alberta. Information: Ivana Savic, CIM, 1130 Sherbrooke St. W., Suite 400, Montreal, Quebec H3A 2M8, Canada: (514) 842-3461.

V. M. Goldschmidt Conference for geochemistry, May 11-13, 1988, Baltimore, Maryland. Information: Goldschmidt Conference Coordinator, Pennsylvania State University, 410 Keller Bldg., University Park, PA 16802.

Evolutionary Innovations: Patterns and Processes, Spring Systematics Symposium, May 14, 1988, Chicago, Illinois. Information: Matthew H. Nitecki, Field Museum of Natural History, Roosevelt Rd. at Lake Shore Dr., Chicago, IL 60605-2496; (312) 922-9410.

International Conference on Fluid Flow in Fractured Rocks, May 15-18, 1988, Atlanta, Georgia. Information: Ram Arora, Dept. of Geology, Georgia State University, University Plaza, Atlanta, GA 30303; (404) 651-2272.

Sixth Thematic Conference on Remote Sensing for Exploration Geology, May 16-19, 1988, Houston, Texas. Information: Thematic Conference, Environmental Research Institute of Michigan, P.O. Box 8618, Ann Arbor, MI 48107; (313) 994-1200, ext. 3382; Telex 4940991 ERIMARB.

American Geophysical Union Spring Meeting, May 16-20, 1988, Baltimore, Maryland. Information: Ann E. Singer, American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009; (202) 462-6903.

Bicentennial Gold 88, May 16-20, 1988, Melbourne, Australia. Information: R. R. Keays, Dept. of Geology, University of Melbourne, Parkville, Victoria 3052, Australia; phone (03) 345 1844; Telex AA35185.

(*continued on p. 77*)

Symposium Slated on Seismic Verification of Nuclear Tests

A symposium, Seismic Verification of Nuclear Tests, will be held **April 7, 1988**, in New Haven, Connecticut. Sponsors are Dana Club, International Security and Arms Control Program, and Department of Geology and Geophysics, all at Yale University.

This conference will examine the political and scientific aspects of a comprehensive test ban and of a threshold limitation treaty on underground nuclear testing. Presentations by leading experts will focus on the historical and political contexts of test limitation treaties, their impact on the national security of the United States, technical issues related to the seismic verification of underground tests, and the relevance and use of seismological expertise and data in the political debate on nuclear testing. A presymposium seminar on April 6 will present an overview of the theory and applications of seismic monitoring at the introductory level.

Deadline for free preregistration is March 15, 1988. For more information, contact Philippe Van Cappellen, Dept. Geology and Geophysics, Yale University, P.O. Box 6666, New Haven, CT 06511-8310; (203) 432-3136.

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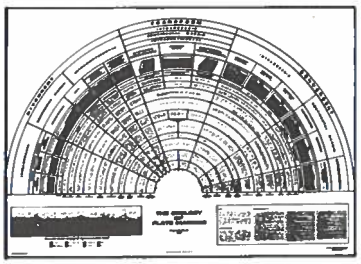

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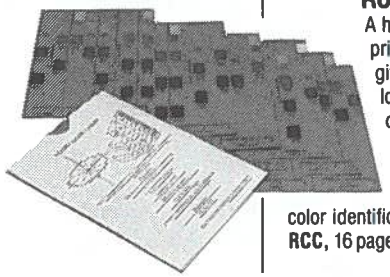

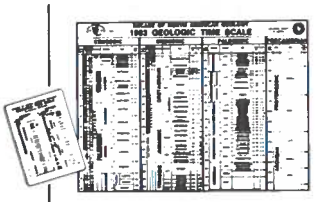

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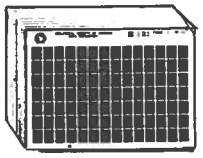

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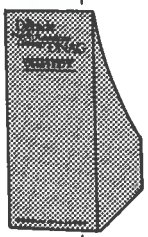

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MEETINGS (*continued from p. 75*)

Geological Association of Canada–Mineralogical Association of Canada–Canadian Society of Petroleum Geologists Joint Annual Meeting, May 23–25, 1988, St. John's, Newfoundland. Information: John Fleming, St. John's '88, P.O. Box 13577, Postal Station A, St. John's, Newfoundland A1B 4B8, Canada; (709) 576-2768.

Society for the Preservation of Natural History Collections Annual Meeting, May 30–June 3, 1988, Pittsburgh, Pennsylvania. Information: Duane A. Schlitter or Stephen L. Williams, Carnegie Museum of Natural History, 5800 Baum Blvd., Pittsburgh, PA 15206; (412) 665-2611.

Radon in the Northeast: Perspectives and Geologic Research, May 31–June 2, 1988, Troy and Albany, New York. Information: Gerald M. Friedman, Northeastern Science Foundation, 15 Third St., P.O. Box 746, Troy, NY 12180-0746; (518) 273-3247.

Case Histories in Geotechnical Engineering 2nd International Conference, June 1–5, 1988, St. Louis, Missouri. Information: Shamsher Prakash, Room 308, Dept. of Civil Engineering, University of Missouri, Rolla, MO 65401; (314) 341-4461.

WaterTech China '88, International exposition and congress of water technologies, June 3–8, 1988, Beijing, China. Information: Management Committee, WaterTech China '88, c/o MartLink Communications Group, GPO Box 13477, Hong Kong; phone 5-225705; Telex 72091 HX.

Second International Symposium on Rockbursts and Seismicity in Mines, June 8–10, 1988, Minneapolis, Minnesota. Information: Charles Fairhurst, Dept. Civil and Mineral Engineering, University of Minnesota, 500 Pillsbury Dr. S.E., Minneapolis, MN 55455-0220.

29th U.S. Symposium on Rock Mechanics, June 13–16, 1988, Minneapolis, Minnesota. Information: Jan Becker, Dept. Professional Development, University of Minnesota, 315 Pillsbury Dr. S.E., Minneapolis, MN 55455; (612) 626-1358.

Fourth Symposium on the Geology of the Bahamas, June 17–22, 1988, San Salvador Island, Bahamas. Information: Donald T. Gerace, CCFL Bahamian Field Station, 270 Southwest 34th St., Fort Lauderdale, FL 33315.

Shelf Sedimentation: Events and Rhythms (SEPM research conference), June 26–July 1, 1988, Santa Cruz, California. Information: M. Field or E. Clifton, USGS, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 354-3088 or 3112.

Seismic Probing of the Continents and Their Margins International Symposium, July 6–8, 1988, Canberra, Australia. Information: Jim Leven, Bureau of Mineral Resources, P.O. Box 378, Canberra, ACT 2601, Australia; phone (062) 499 111; Telex AA62109.

International Working Meeting on Soil Micromorphology (meeting of Subcommission B of the International Society of Soil Science), July 10–15, 1988, San Antonio, Texas. Information: L. P. Wilding, Dept. of Soil and Crop Sciences, Texas A&M University, College Station, TX 77843-2474; (409) 845-3604.

First International Conference on Radiolaria, July 18–20, 1988, Marburg, Federal Republic of Germany. Information: Joyce R. Blueford, U.S. Geological Survey, MS 144, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 329-4004, or R. Schmidt-Effing, Interrad Conference, Dept. of Geosciences, Philipps-Universität, Lahnberge, D-3550 Marburg, Federal Republic of Germany.

5th International Symposium on Fossil Cnidaria, including Archaeocyatha and spongiomorphs, July 25–29, 1987, Brisbane, Australia. Information: John Jell, Uniquest Ltd., University of Queensland, St. Lucia, QLD 4067, Australia; phone (07) 344 2733.

Permafrost 5th International Conference, August 2–5, 1988, Trondheim, Norway. Information: V International Conference on Permafrost, Norwegian Institute of Technology, Studies Administration, N-7034 Trondheim-NTH, Norway.

Fifth International Symposium on the Ordovician System, August 9–12, 1988, St. John's, Newfoundland. Information: Chris R. Barnes, ISOS, Dept. of Earth Sciences, Memorial University, St. John's, Newfoundland A1B 3X5, Canada; (709) 737-8143.

***Mineralogy of Precious Metal Deposits**, August 12–15, 1988, Golden, Colorado. Information: James A. McGlasson, 7387 South Flower St., Littleton, CO 80123; (303) 972-0376; or James F. Hurlbut, 2240 So. Adams, Denver, CO 80401; (303) 279-7796.

Paleozoic Biogeography and Paleogeography, August 14–19, 1988, Oxford, England. Information: C. R. Scotese, Shell Development Co., P.O. Box 481, Houston, TX 77001, (713) 663-2688, or W. S. McKerrow, Dept. Earth Sciences, Parks Rd., Oxford OX1 3PR, England.

39th Annual Highway Geology Symposium, August 15–17, 1988, Park City, Utah. Information: Highway Geology Symposium, T. Leslie Youd, 368 Clyde Bldg., Dept. Civil Engineering, Brigham Young University, Provo UT 84602; (801) 378-6327.

American Association of Petroleum Geologists Rocky Mountain Section, August 21–24, 1988, Bismarck, North Dakota. Information: Roger N. Borchert, Box 5006, Bismarck, ND 58501; (701) 223-3588.

Society of Economic Paleontologists and Mineralogists Fifth Midyear Meeting, August 21–24, 1988, Columbus, Ohio. Information: SEPM, P.O. Box 4756, Tulsa, OK 74159-0756; (918) 743-9765.

6th International Fission Track Dating Workshop, September 5–9, 1988, Besançon, France. Information: J.-L. Janier-Dubry, Lab. de Microanalyses Nucléaires, U.F.R. des Sciences et Techniques, 16 Route de Gray, 25030 Besançon cedex, France; phone 81-53-81-22.

International Symposium on Geochemistry and Mineralization of Proterozoic Mobile Belts, September 6–10, 1988, Beijing, China. Information: Proterozoic Geochemistry Symposium, c/o Prof. Sun Dazhong, Tianjin Inst. Geology and Mineral Resources, CAGS No. 4, 8th Rd., Dazhigu, Tianjin 300170, People's Republic of China.

International Symposium on Rock Mechanics and Power Plants, September 12–16, 1988, Madrid, Spain. Information: ISRM Symposium, Sociedad Española de Mecánica de las Rocas, Paseo Bajo de la Virgen del Puerto, 3, 28005 Madrid, Spain.

ECORS Program: International Meeting on a Deep Seismic Line with Field Trip across the Pyrenees, September 19–22, 1988, Toulouse, France, to Balaguer, Spain. Information: Société Géologique de France, 77 rue Claude Bernard, 75005 Paris, France; phone 331-43-31-77-35.

International Symposium on Engineering Geology: Study, Preservation and Protection of Ancient Works, Monuments and Historical Sites, September 19–23, 1988, Athens, Greece.

(*continued on p. 78*)

MEETINGS (*continued from p. 77*)

Information: Paul G. Marinos, Greek Committee of Engineering Geology, 1988 Symposium Secretariat, P.O. Box 19140, GR-117 10 Athens, Greece; Telex 45 4312 POLX.

Fourth International Tectonostratigraphic Terrane Conference, September 23–October 7, 1988, Nanjing University, Nanjing, People's Republic of China. Information: Tom Wiley, U.S. Geological Survey, MS 999, 345 Middlefield Road, Menlo Park, CA 94025; (415) 354-3067.

Mediterranean Basins Conference, September 25-28, 1988, Nice, France. Information: AAPG Convention Dept., P.O. Box 979, Tulsa, OK 74101-0979; (918) 584-2555.

***Mars: Evolution of Volcanism, Tectonism and Volatiles**, October 5–7, 1988, Washington, D.C. Information: Projects Office, Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058-4399; (713) 486-2150.

Geological Association of New Jersey Annual Meeting, October 7–9, 1988, Lawrenceville, New Jersey. Information: Jonathan Husch, Dept. of Geosciences, Rider College, 2083 Lawrenceville Rd., Lawrenceville, NJ 08648; (609) 896-5330.

New York State Geological Association Annual Field Trip Meeting, October 7–9, 1988, Plattsburgh, New York. Information: Tom Wolosz, Center for Earth and Environmental Science, SUNY College, Plattsburgh, NY 12901; (518) 564-4031.

***Global Catastrophes in Earth History**: An Interdisciplinary Conference on Impacts, Volcanism and Mass Mortality, October 20–23, 1988, Snowbird, Utah. Information: Global Catastrophes Conference, Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058-4399; (713) 486-2150.

***Advances in Ground-Water Hydrology**, November 16–18, 1988, Tampa, Florida. Information: American Institute of Hydrology, 3416 University Ave. S.E., Suite 200, Minneapolis, MN 55414; (612) 379-1030.

Symposium on Hot Spots in the South Pacific, November 21, 1988, Paris, France. Information: Société Géologique de France, 77 rue Claude Bernard, 75005 Paris, France; phone 331-43-31-77-35.

***Geochemistry of Gulf Coast Oils and Gases**, December 4–7, 1988, New Orleans, Louisiana. Information: Dietmar Schumacher, Pennzoil Co., P.O. Box 2967, Houston, TX 77252; (713) 546-4028; or Mahlon C. Kennicutt, Geochemical and Environmental Research Group, Texas A&M University, Ten South Graham Rd., College Station, TX 77840; (409) 690-0095.

American Geophysical Union Fall Meeting, December 5–9, 1988, San Francisco, California. Information: Ann E. Singer, American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009; (202) 462-6903.

ECORS Program: Deep Seismic Line across the Western Alps, joint meeting of French, Swiss, and Italian geological societies, December 12–13, 1988, Paris, France. Information: François Roure, Inst. Français du Pétrole, 1-4 ave. du Bois Préau, 92506 Rueil-Malmaison, France.

GSA 1988

Northeastern Section, March 10–12, Portland, Maine
South-Central Section, March 14–15, Lawrence, Kansas
Cordilleran Section, March 29–31, Las Vegas, Nevada
Southeastern Section, April 6–8, Columbia, South Carolina
North-Central Section, April 21–22, Akron, Ohio
Rocky Mountain Section, May 16–18, Sun Valley, Idaho
Annual Meeting, October 31–November 3, Denver, Colorado

PENROSE CONFERENCES

Paleozoic and Early Mesozoic Paleogeographic Relations Between the Klamath Mountains, the Northern Sierra Nevada, and North America, June 5–10, 1988, Redding, California. Information: David S. Harwood, U.S. Geological Survey, MS 975, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 329-4932.

Origin of Massif Anorthosites and Related Rocks, August 14–19, 1988, Chugwater, Wyoming. Information: B. Ronald Frost, Dept. of Geology and Geophysics, University of Wyoming, Laramie, WY 82071; (307) 766-4290.

***Marine Evaporites: Genesis, Alteration, Associated Deposits**, August 28–September 2, 1988, Detroit, Michigan, and Windsor, Ontario. Information: Peter Sonnenfeld, Dept. of Geology, University of Windsor, Windsor, Ontario N9B 3P4, Canada; (519) 253-4232, ext. 2490.

Volcanic Influences on Terrestrial Sedimentation, August 28–September 3, 1988, Crystal Mountain, Washington. Information: Gary A. Smith, Dept. of Geology, University of New Mexico, Albuquerque, NM 87131; (505) 277-4204.

Criteria for Establishing the Relative Timing of Pluton Emplacement and Regional Deformations, September 10–15, 1988, California. Information: Scott R. Paterson, Earth Science Board, University of California, Santa Cruz, CA 95064; (408) 429-3251.

1989

Society of Mining Engineers Annual Meeting, February 27–March 2, 1989, Las Vegas, Nevada. Information: Society of Mining Engineers, Meetings Dept., P.O. Box 625002, Littleton, CO 80162.

European Geophysical Society XIV General Assembly, March 13–17, 1989, Barcelona, Spain. Information: EGS Office, c/o MPI für Aeronomie, D-3411 Katlenaburg-Lindau, Federal Republic of Germany. (*Abstracts due December 15, 1988.*)

International Symposium on the Silurian System (Murchison Symposium), March 28–April 9, 1988, Keele, England. Information: M. G. Bassett, Dept. of Geology, National Museum of Wales, Cardiff CF1 3NP, Wales; phone 02222-397951.

American Association of Petroleum Geologists Annual Meeting, April 23–26, 1989, San Antonio, Texas. Information: AAPG, P.O. Box 979, Tulsa, OK 74101; (918) 584-2555.

American Geophysical Union Spring Meeting, May 8–12, 1989, Baltimore, Maryland. Information: AGU, Convention Director, 2000 Florida Ave., N.W., Washington, DC 20009; (202) 462-6903.

Engineering Geology in Tropical Terrains, June 26–29, 1989, Selangor Darul Ehsan, Malaysia. Information: Organising Secretary, Conference on Engineering Geology in Tropical Terrains, Dept. of Geology, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor Darul Ehsan, Malaysia.

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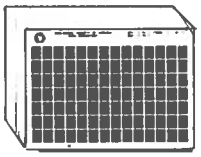

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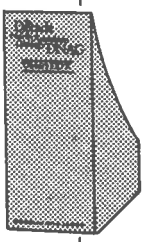

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