



**GSA
NEWS &
INFORMATION**

Monthly Newsletter of
The Geological Society of America

VOLUME 8, NUMBER 11

NOVEMBER 1986

GSA Symposia Ins and Outs

by Sue Beggs
GSA Meetings Manager

Do you want to convene a symposium for a GSA Annual Meeting, or would you like to participate as a speaker? If so, read on to learn how symposia are determined.

The GSA Council has established a limit of 25 half-day symposia sessions for each Annual Meeting. Currently, eight associated societies and ten divisions are each awarded one half-day session. The seven remaining sessions may be sponsored on an at-large basis.

The Technical Program Chairman for the Annual Meeting invites all potential conveners to submit proposals by January 1 of the meeting year. The proposals are reviewed and a selection made by February 1. The list of symposia is printed in the April issue of *GSA News & Information*.

If you want to convene a symposium, the best way is to contact in advance the associated society or division with which you would most likely share interests (the spring prior to the meeting would be good timing). You are also welcome to call the Technical Program Chairman to find out what advance information is available. The chairman's name, address, and phone number are usually printed in the September and October issues of *GSA News & Information*.

Technical Program Chairmen for the 1987-1989 GSA Annual Meetings:

1987—Clement Chase, Dept. of Geosciences, University of Arizona, Tucson, AZ 85721; (602) 621-6024.

1988—William W. Hay, University Museum, University of Colorado, Boulder, CO 80309; (303) 492-7370.

1989—Robert F. Dymek, Dept. of Earth & Planetary Sciences, Washington University, St. Louis, MO 63130; (314) 889-5610.

GSA Divisions: Archaeology, Coal Geology, Engineering Geology, Geophysics, History of Geology, Hydrogeology, Planetary Geology, Quaternary Geology & Geomorphology, Sedimentary Geology, Structural Geology & Tectonics.

Associated societies: Cushman Foundation, Geochemical Society, Geoscience Information Society, Mineralogical Society of America, National Association of Geology Teachers, Paleontological Society, Society of Economic Geologists, Society of Vertebrate Paleontology.

The convener of a symposium usually has invited most of the speakers at the time the proposal is sent to the Technical Program Chairman. Because the speakers are for the most part predetermined, addresses and phone numbers for conveners are not published in the Call for Papers/First Announcement of the Annual Meeting which appears in the April issue of *GSA News & Information*. The call is just for volunteered papers, not for the symposia.

If you want to participate in a symposium, contact the appropriate associated society or GSA division. These organizations vary considerably in the methods of determining their programs for an Annual Meeting. It is best to contact the group directly, since we here in Boulder see the results but may not know the process. For specific names and addresses, call or write the GSA Meetings Department, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020.

1986 GSA ANNUAL MEETING SAN ANTONIO NOVEMBER 10-13

ON-SITE REGISTRATION OPENS SUNDAY, NOVEMBER 9, 10 A.M.

For last minute information: GSA Meetings Department, (303) 447-2020

Geological Society of America



CONGRESSIONAL SCIENCE FELLOWSHIP 1987-1988

The Geological Society of America invites applications for the 1987-1988 Congressional Science Fellowship. The Fellow selected will spend a year (September 1987-August 1988) on the staff of a member of Congress or a congressional committee advising on a wide range of scientific issues as they pertain to public questions. Guided by the American Association for the Advancement of Science, the Fellow selects a congressional staff position in which he or she can work on major legislative issues.

CRITERIA

Requirements for the Fellowship include a Ph.D and exceptional competence in some area of the earth sciences, cognizance of a broad range of matters outside the Fellow's particular area, and a strong interest in working on a range of public policy problems.

AWARD

The GSA Congressional Science Fellowship carries with it a \$25,000 stipend and a limited relocation and travel allowance.

TO APPLY

Procedures for application and detailed requirements are available in the geology departments of most colleges and universities in the United States or upon request from

Executive Director
Geological Society of America
P.O. Box 9140
Boulder, Colorado 80301
(303) 447-2020



Deadline for receipt of all application materials is March 31, 1987



CENTENNIAL NEWS

by Allison (Pete) Palmer

Special DNAG Neotectonics Poster Symposium at Fall AGU Meeting

At the fall AGU meeting in San Francisco, December 8-12, preliminary compilations for the four DNAG Neotectonics maps of North America (Thermal Aspects, Seismicity, Stress, and Neotectonics s.s.) will be featured in a major poster symposium organized by Burt Slemmons, John Dennis, Dave Blackwell, Bob Engdahl, Dave Schwartz, and Mark Zoback. The finished maps, at a scale of 1:5,000,000, will complement the Geologic and Tectonic maps and the Gravity and Magnetic Anomaly maps of the DNAG series on the same scale and projection, and they will provide the first integrated coverage of all of these data sets that has ever been attempted in a single map series for the continent and surrounding oceanic regions.

DNAG Honor Roll

Mid-September and early November marked the publication dates for the *Southeastern Section Centennial Field Guide*, edited by Tony Neathery, and *The Western North Atlantic Region*, edited by Peter Vogt and Brian Tucholke, the first volume of *The Geology of North America* to be completed. Although there is an outside chance that the Centennial Field Guide for the Northeastern Section will still be published in 1986 (we were still 3 texts short on September 22, when this was proofed), it appears that delays in all other books promised in 1986 have shifted them into early 1987. Several of these are almost completed and should be in production by the end of the year, however.

I want to take this opportunity to thank all those authors and editors whose efforts permitted their books to be published in the year they were promised, and those who have completed their parts in the books that are still in progress.

An effort of the magnitude of the DNAG Project requires a vast amount of dedication by a large number of individuals. I hope the authors are proud of their books and that those of you who have received copies are pleased with the quality of the products.

Listed below are all authors and co-authors of chapters in the two books published in 1986, as well as those who prepared chapters for *Geologists and Ideas: A History of North American Geology*, edited by Ellen Drake and Bill Jordan, and published in 1985, who have not previously been listed. These are your colleagues. Acknowledge their effort.

Geologists and Ideas: A History of North American Geology

Bruce A. Bolt
 Ross R. Brattain (deceased)
 William R. Brice
 C. K. Brooks

Preston Cloud
 Winston Crausaz
 Robert H. Dott, Jr.
 Ellen T. Drake

J. Thomas Dutro, Jr.
 Rodger T. Faill
 Carol Faul
 John T. Galey
 John A. Gifford
 William B. Hanson
 Kenneth J. Hsü
 William M. Jordan
 W. O. Kupsch
 Leo F. Laporte
 Paul D. Lowman, Jr.
 Dwight E. Mayo
 George Merk
 Carolyn F. Milligan
 Marie Morisawa

Southeastern Section Centennial Field Guide

Charlotte E. Abrams
 B. Steven Absher
 J. J. Alford
 David Allison
 Harold H. Arndt
 Whitney J. Autin
 Katharine Lee Avary
 Lance S. Barron
 Denny N. Bearce
 Henry Bell
 D. Joe Benson
 David E. Blake
 Ernest W. Blythe, Jr.
 Paulette Bond
 Ron Boyd
 George A. Brook
 William Randall Brown
 James Robert Butler
 Don W. Byerly
 Kenneth M. Campbell
 Robert E. Carver
 Timothy M. Chowns
 James C. Cobb
 Donald J. Colquhoun
 James F. Conley
 Charles W. Copeland
 John O. Costello
 Howard Ross Cramer
 R. A. Davis
 Stuart L. Dean
 Garland R. Dever, Jr.
 Richard J. Diecchio
 W. W. Diehl
 Donald T. Dockery III
 Arthur D. Donovan
 James A. Drahovzal
 Kenneth J. Englund
 Frank R. Etensohn

Barbara L. Narendra
 Gordon B. Oakeshott
 L. C. Pakiser
 Jean C. Prior
 George Rapp, Jr.
 Elizabeth N. Shor
 Brian J. Skinner
 Ruth Todd (deceased)
 Stanley M. Totten
 John Verhoogen
 Richard A. Watson
 William B. White
 George W. White (deceased)
 J. Tuzo Wilson
 Ellis L. Yochelson

Lynn Fichter
 Jonathan K. Filer
 Robert A. Gastaldo
 Thomas M. Gathright II
 Robert G. Gerdes
 M. Ghazizadeh
 William H. Gillespie
 Willard H. Grant
 Christopher A. Haas
 Donald C. Haney
 Thomas B. Hanley
 Kenneth O. Hasson
 Robert D. Hatcher, Jr.
 J. Wright Horton, Jr.
 Robert A. Hyatt
 R. E. Johnson
 Roy C. Kepferle
 John D. Kiefer
 D. T. King, Jr.
 Gary L. Kuhnhenh
 Byron R. Kulander
 Donald H. Kupfer
 Peter Lessing
 Aubrey L. Long
 M. T. Lukert
 C. T. Lutz
 John D. Marr, Jr.
 Joseph D. Martinez
 Gayle H. McColloch, Jr.
 J. S. McColloch
 Keith I. McConnell
 Harry Y. McSween, Jr.
 Robert C. Milici
 Bobby J. Miller
 Gautam Mitra
 Robert B. Mixon
 Thornton L. Neathery

(continued on p. 212)

Smithsonian Research Fellowship Applications Available

Smithsonian Institution research fellowships for 1987-1988 include the fields of history of science and technology and earth sciences.

Smithsonian fellowships are awarded to support independent research in residence at the Smithsonian in association with the research staff and using the Institution's resources. Predoctoral and postdoctoral fellowship appointments for six to twelve months, senior postdoctoral fellowship appointments for three to twelve months, and graduate student appointments for ten weeks are awarded.

Earth sciences proposals include sedimentology, planetary geology, mineralogy, petrology, meteoritics, volcanology, and paleobiology.

History of science and technology proposals include history of physical sciences, engineering, agriculture, and air and space, history of science in America, industrial archeology, and the social dimensions of science and technology.

Applications are due *January 15, 1987*. Stipends supporting these awards are \$25,000 per year plus allowances for senior postdoctoral fellows; \$18,000 per year plus allowances for postdoctoral fellows; \$11,000 per year plus allowances for predoctoral fellows; and \$2,500 for graduate students for the ten-week tenure period. Predoctoral, postdoctoral, and senior postdoctoral stipends are prorated on a monthly basis for periods less than one year.

Awards are based on merit. Smithsonian Fellowships are open to all qualified individuals without reference to race, color,

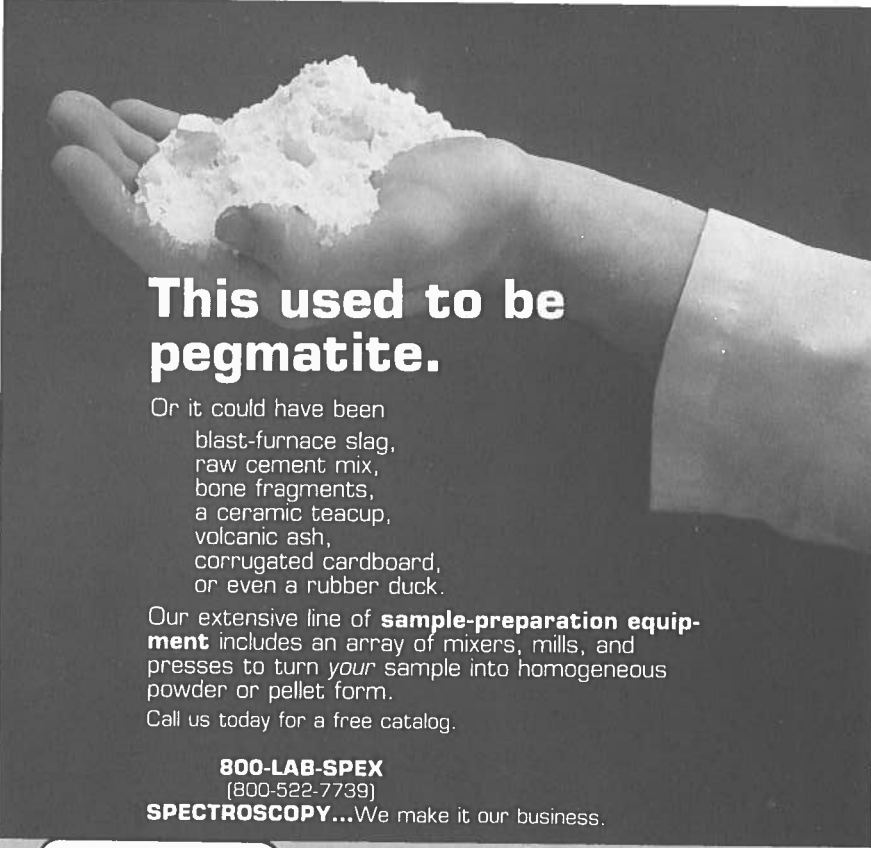
religion, sex, national origin, age, or condition of handicap of any applicant. For more information and application forms, write to Smithsonian Institution, Office of Fellowships and Grants, Desk F, 7300 L'Enfant Plaza, Washington, DC 20560. Indicate the particular area in which you propose to conduct research and give the dates of degrees received or expected.

Southeastern Section Offers Student Grants

GSA's Southeastern Section announces its sixth annual grants-in-aid program for student research. Grants may be for graduate or undergraduate research and are available for Student Associates of GSA who are attending colleges or universities within the geographical boundaries of the Southeastern Section. In 1986, 13 grants were awarded for up to \$500 each. Information and applications can be obtained from

Stephen H. Stow
Oak Ridge National Laboratory
P.O. Box X
Oak Ridge, TN 37830.

Completed applications are due by March 1, 1987. The final decision on awards will be made in late March 1987.



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Call for Nominations for 1987 Penrose and Day Medals

Nominations for GSA's two most prestigious awards, the Penrose and Day Medals, are due at headquarters by February 1, 1987. Members and Fellows of the Society are encouraged to participate in this important process by nominating candidates for these high honors.

Penrose Medal

The Penrose Medal was established in 1927 by R.A.F. Penrose, Jr., to be awarded in recognition of eminent research in pure geology, for outstanding original contributions or achievements which mark a major advance in the science of geology. The award is made only at such time as the Council may decide. Nominees are selected by the Council, may or may not be members of the Society, and may be from any nation. Penrose's sole object in making the gift was to encourage original work in purely scientific geology.

Day Medal

The Day Medal was established in 1948 by Arthur L. Day to be awarded annually, or less frequently, at the discretion of the Council, for outstanding distinction in contributing to geologic knowledge through the application of physics and chemistry to

the solution of geologic problems. Day's intent was to recognize outstanding achievement and inspire further effort, rather than to reward a distinguished career.

How to Nominate

To ensure thorough consideration by the respective subcommittees, submit for each candidate a brief biographical sketch, such as used in *American Men and Women of Science*, a summary of the candidate's scientific contributions to geology, and a selected bibliography of no more than 20 titles. In choosing candidates, scientific achievements should be considered rather than contributions in administration and service.

The form for submitting the name of a candidate for either the Penrose or Day Medal is on p. 215 and 216.

Each nomination **MUST BE SUPPORTED** by the signatures of five GSA members.

The names of unsuccessful candidates proposed to the Council will remain for consideration by the respective subcommittees for three years.

Recipients of the Penrose and Day Medals to date are listed below.

R.A.F. PENROSE, JR., MEDALISTS

1927	Thomas Chrowder Chamberlin	1947	Arthur Louis Day	1967	Herbert Harold Read
1928	Jakob Johannes Sederholm	1948	Hans Cloos	1968	J. Tuzo Wilson
1929	<i>No award given</i>	1949	Wendell P. Woodring	1969	Francis Birch
1930	François Alfred Antoine Lacroix	1950	Morley Evans Wilson	1970	Ralph Alger Bagnold
1931	William Morris Davis	1951	Pentti Eskola	1971	Marshall Kay
1932	Edward Oscar Ulrich	1952	George Gaylord Simpson	1972	Wilmot H. Bradley
1933	Waldemar Lindgren	1953	Esper S. Larsen, Jr.	1973	M. King Hubbert
1934	Charles Schuchert	1954	Arthur Francis Buddington	1974	William Maurice Ewing
1935	Reginald Aldworth Daly	1955	Maurice Gignoux	1975	Francis J. Pettijohn
1936	Arthur Philemon Coleman	1956	Arthur Holmes	1976	Preston Cloud
1937	<i>No award given</i>	1957	Bruno Sander	1977	Robert P. Sharp
1938	Andrew Cowper Lawson	1958	James Gilluly	1978	Robert M. Garrels
1939	William Berryman Scott	1959	Adolph Knopf	1979	J Harlen Bretz
1940	Nelson Horatio Darton	1960	Walter Herman Bucher	1980	Hollis D. Hedberg
1941	Norman Levi Bowen	1961	Philip Henry Kuenen	1981	John Rodgers
1942	Charles Kenneth Leith	1962	Alfred Sherwood Romer	1982	Aaron C. Waters
1943	<i>No award given</i>	1963	William Walden Rubey	1983	G. Arthur Cooper
1944	Bailey Willis	1964	Donnel Foster Hewett	1984	Donald E. White
1945	Felix Andries Vening-Meinesz	1965	Philip Burke King	1985	Rudolf Trümpy
1946	T. Wayland Vaughan	1966	Harry H. Hess	1986	Laurence L. Sloss

ARTHUR L. DAY MEDALISTS

1948	George W. Morey	1961	Willard F. Libby	1974	A. E. Ringwood
1949	William Maurice Ewing	1962	Hatten Schuyler Yoder	1975	Allan Cox
1950	Francis Birch	1963	Keith Edward Bullen	1976	Hans Ramberg
1951	Martin J. Buerger	1964	James Burleigh Thompson, Jr.	1977	Akiho Miyashiro
1952	Sterling Hendricks	1965	Walter H. Munk	1978	Samuel Epstein
1953	John F. Schairer	1966	Robert M. Garrels	1979	Walter M. Elsasser
1954	Marion King Hubbert	1967	O. Frank Tuttle	1980	Henry G. Thode
1955	Earl Ingerson	1968	Frederick J. Vine	1981	Donald L. Turcotte
1956	Alfred O. C. Nier	1969	Harold C. Urey	1982	Eugene M. Shoemaker
1957	Hugo Benioff	1970	Gerald J. Wasserburg	1983	Harmon Craig
1958	John Verhoogen	1971	Hans P. Eugster	1984	Wallace S. Broecker
1959	Sir Edward C. Bullard	1972	Frank Press	1985	Freeman Gilbert
1960	Konrad B. Krauskopf	1973	David T. Griggs	1986	E-an Zen

THE GEOLOGICAL SOCIETY OF AMERICA

Nomination for Penrose Medal, Day Medal, or Honorary Fellowship

(please circle one)

DEADLINE: Please return this form to headquarters by February 1.

NAME OF CANDIDATE:

ADDRESS:

BIOGRAPHICAL INFORMATION: (suggested sources)

American Men and Women of Science

Who's Who in America

GSA Service Record (obtainable from headquarters)

Other

SUMMARY OF SCIENTIFIC CONTRIBUTIONS TO GEOLOGY:

(not more than 200 words)

SELECTED BIBLIOGRAPHY:
(no more than 20 titles)

A nomination for the Penrose Medal or Day Medal must be supported by the signatures of five GSA Fellows or Members. Signed supporting letters from five GSA Fellows or Members may be attached to this form in lieu of the signatures. A nomination for Honorary Fellowship requires only this form with name, address, and signature of the person making the nomination (no other signatures required) and supporting letters, if any.

1. (Name of person making the nomination) _____
Address: _____
Date: _____ Signature: _____

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

RETURN TO: Executive Director
The Geological Society of America
P.O. Box 9140
Boulder, CO 80301
(303) 447-2020

DEADLINE: Please return this form to headquarters by February 1.

Call for Nominations for Honorary Fellows

Honorary Fellows of the Society are selected from geologists throughout the world who have distinguished themselves as geological investigators or who have rendered special service to the Society. The candidates are usually residents outside North America.

The following information is required for each candidate:

- Biographical data similar to that found in *American Men and Women of Science* and *Who's Who in America*

- 200-word-or-less summary of the candidate's contributions to geology

- Selected bibliography of no more than 20 titles

Deadline for receipt of nominations at headquarters: February 1, 1987.

The form for submitting the name of a candidate is on p. 215 and 216.

Current Honorary Fellows

Antonio Almela	Kingsley C. Dunham	Harold Jeffreys	P.G.K. Ramdohr	John Sutton
Neil Armstrong	Stanislaw Dzulynski	Teiichi Kobayashi	John G. Ramsay	Bernard P. Tissot
Jean A. Aubouin	William S. Fyfe	Dmitri S. Korzhinskii	Alfred Rittmann	Livio Trevisan
Ralph A. Bagnold	Augusto Gansser	Henno Martin	Alexander B. Ronov	Rudolf Trümpy
V. V. Beloussov	Martin F. Glaessner	Michael W. McElhinny	Hitoshi Sakai	Seitaro Tsuboi
Krzysztof L. Birkenmajer	Jean Goguel	Wallace S. Pitcher	Mircea Sandulescu	Tu Guangzhi
Roland Brinkmann	David H. Green	Jean Piveteau	Harrison H. Schmitt	Harry B. Whittington
S. Warren Carey	Dorothy Hill	Ferdinand Prantl	Eugen Seibold	Alwyn Williams
Michael Collins	Kenneth J. Hsü	Desmond A. Pretorius	Ahti J. Simonen	Quido Zaruba
William Compston	Huang Jiqing	Hans Ramberg	Boris S. Sokolov	
Douglas S. Coombs	Emilie Jager			

40 Students Receive AGI Minority Participation Program Scholarships

The American Geological Institute has awarded 40 Minority Participation Program scholarships for the 1986–1987 academic year. Awards given to Black, Hispanic, and Native American students ranged from \$500 to \$2000 each and totaled \$48,500. Contributions for the scholarships were pledged by geoscience societies (including GSA), more than a score of companies, and several individuals.

The AGI Minority Participation Program was formed to establish objectives and goals to attract students from those minorities under-represented in the geosciences. The scholarships are based upon academic achievement, financial need, and judged potential for future success in the geological profession.

For more information regarding the program, contact Andrew J. Verdon, Jr., AGI Director of Education, American Geological Institute, 4220 King Street, Alexandria, VA 22302, (703) 379-2480. The deadline for application for the 1987–1988 academic year is February 1, 1987.

Below is a list of the 1986–1987 AGI Minority Participation Program Scholarship recipients.

Graduate Students

Jannette Aquilar, University of Oklahoma; Edward A. Arias, University of New Orleans; George T. Basabilvazo, New Mexico State University—Las Cruces; Victor G. Carrillo, Baylor University; Jerry B. Coleman, Michigan State University; Frank R. Hall, University of Rhode Island; Jacquelyn E. Hams, California State University at Los Angeles; Susan E. Haycock, Baylor University; Walter J. Hinchman, Jr., Wichita State University; Michael W. Howell, University of South Carolina; Gerardo J. Iturrino, Purdue University; Luis E. Marin, Northern Illinois University; Gregory F. Martin, University of New Orleans; Reinaldo Mercado, Michigan Technological University; Claudia I. Mora, University of Wisconsin—Madison; Lauret E. Savoy, Syracuse University; Jill E. Tagudin, University of California—Santa Cruz; Ramon H. Trevino, University of Texas at Arlington; Audrey F. Williams, University of Pittsburgh; Ricardo L. Zepeda, University of California—Santa Barbara.

Undergraduate Students

Randy D. Bauer, New Mexico State University; Armando M. Burciaga, East Los Angeles College; Waylon G. Collins, Texas A&M University; Shirl D. Davis, Virginia State University; David A. Foiles, Adams State College; Dora M. Gallegos, Boise State University; J. Gavin Gonzalez, Stanford University; Joseph E. Lopez, California State University—Long Beach; Orinda M. Marquez, Colorado School of Mines; David A. Padgett, Western Kentucky University; Ian M. Palao, Florida State University; Tonia E. Rucker, Clemson University; Joseph A. Sanchez, Colorado School of Mines; Christopher C. Swank, Colorado School of Mines; Elizabeth A. Verduzco, Wellesley College; Kenneth J. Vernon, University of Southwestern Louisiana; Juanita M. Zuni, University of New Mexico; Karlo R. Zvonarek, Lyndon State College.

First-Year Students

Sheala Y. Durant, University of Michigan; Demetrice A. Gooden, Duke University.

HELP DIRECT GSA'S FUTURE

The GSA Committee on Nominations requests your help in compiling a list of GSA members qualified for service as officers and councilors of the Society. The committee requests that each nomination be accompanied by basic data and a description of the qualifications of the individual for the position recommended (vice-president, treasurer, councilor).

NOMINATIONS FOR 1988 OFFICERS AND COUNCILORS MUST BE RECEIVED at GSA headquarters no later than **FEBRUARY 16, 1987**.

Please send nominations and backup material to
Administrative Department
Geological Society of America
P.O. Box 9140
Boulder, CO 80301



Annual research awards program

1987

The Geological Society of America will continue its annual research awards program in 1987. Eligibility is not restricted to GSA members. New application forms for the current year and detailed requirements are available each fall in the geology departments of colleges and universities offering graduate degrees in earth sciences. Forms are mailed annually to GSA Campus Representatives and department secretaries and chairmen in the United States and Canada. They are also available upon request from the Research Grants Administrator, Geological Society of America, P.O. Box 9140, Boulder, Colorado 80301. PLEASE USE ONLY THE 1987 APPLICATION AND APPRAISAL FORMS.

The primary role of the research grant program is to provide partial support of master's and doctoral thesis research for graduate students at universities in the United States, Canada, Mexico, and Central America. If necessary, applications may be submitted in Spanish or French.

The Geological Society of America awarded \$146,000 in grants in 1986. The awards went to 168 students doing research for advanced degrees. The average amount awarded was \$871. The largest award was \$1,500, but there is no predetermined maximum amount.

Confidential evaluations from two faculty members are required from master's and doctoral candidates and must accompany applications submitted. PLEASE USE THE "APPRAISAL OF APPLICANT" FORMS, WHICH ACCOMPANY THE 1987 APPLICATION FORMS.

Applications will also be accepted for the Harold T. Stearns Fellowship(s). These grants are awarded periodically in support of research on one or more aspects of the geology of Pacific Islands and of the circum-Pacific region. They are distinct from the GSA Penrose research grants and are restricted in their use to the particular region. The awardee(s) will be selected by the Research Grants Committee. Applications must be postmarked by **February 15**. Application forms are the same as those used for the Penrose research grants.

The Committee on Research Grants will meet in April to evaluate applications and award grants. In April, all applicants for grants will be informed of the committee's actions by the Executive Director of the Geological Society of America.

**ALL APPLICATIONS MUST BE SUBMITTED ON THE 1987 FORMS
AND POSTMARKED BY FEBRUARY 15, 1987**

Field Trips Scheduled for 1987 GSA Annual Meeting

Final selection of field trips for the 1987 GSA Annual Meeting in Phoenix, Arizona, will be made early in 1987. More than 30 proposals have been received to date. If you would like to lead a trip, contact one of the chairmen immediately:

Field Trip Chairman
George H. Davis
Administrative Building
Rm. 512
University of Arizona
Tucson, AZ 85721
(602) 621-3592

Field Trip Co-Chairman
Jon E. Spencer
Bureau of Geology
& Mineral Technology
845 N. Park Ave.
Tucson, AZ 85719
(602) 621-7906

Premeeting Trips

Mesozoic Thrust Faults, Tertiary Detachment Faults, and Associated Rocks, Fabrics, and Mineralization, Whipple-Buckskin-Harcuvar Area, Western Arizona and Southeastern California (3 days). Jon Spencer, Stephen Reynolds, Gregory Davis, J. Lawford Anderson.

Terraces of the Lower Salt River Valley in Relation to the Late Cenozoic History of the Phoenix Basin, Arizona (1 day). Troy L. P  w  .

Lower Cretaceous Coral-Algal-Rudist Patch Reefs in Southeastern Arizona (3 days). Joseph F. Schrieber, Jr., Robert W. Scott.

Archaeological Geology of Paleo-Indian Sites in Southeastern Arizona (2 days). Michael R. Waters, C. Vance Haynes, Jr.

Paleoecology and Taphonomy of Recent to Pleistocene Intertidal Deposits, Gulf of California (3 days). Karl W. Flessa, A. A. Ekdale.

Late Paleozoic Depositional Systems, Sedona-Jerome Area, Central Arizona (2 days). Ronald C. Blakey, Larry T. Middleton.

Geomorphology and Structure of Colorado Plateau/Basin and Range Transition Zone, Arizona (3 days). Richard A. Young, H. Wesley Peirce, James E. Faulds.

Tectonic and Magmatic Contrasts across a Two-Province Proterozoic Boundary in Central Arizona (3 days). Clay M. Conway, Karl E. Karlstrom, Leon T. Silver.

Colorado River Float Trip—Geology of Eastern Grand Canyon, Arizona (6 days). Stanley S. Beus, Ivo Lucchitta.

Late Cenozoic Volcanism in the San Francisco and Mormon Volcanic Fields, Southern Colorado Plateau, Arizona (2 days). Richard F. Holm, George E. Ulrich.

Geology of the Grand Canyon (backpack; 3 days). Wayne Ranney, Ralph Hopkins.

Miocene Extension, Volcanism, and Sedimentation in the Eastern Basin and Range Province, Southern Nevada (3 days). Eugene I. Smith, R. Ernest Anderson, Robert J. Bohannon, Gary Axen.

Late Pleistocene Alluvium and Megafauna Dung Deposits of the Central Colorado Plateau (4 days). Larry D. Agenbroad, Jim I. Mead.

Cretaceous Tectonics of Southeastern California (3 days). Warren Hamilton, Gordon Haxel, Paul Stone, Richard Tosdal.

(continued on p. 220)

GSA REVIEWS IN ENGINEERING GEOLOGY VI MAN-INDUCED LAND SUBSIDENCE

Edited by Thomas L. Holzer

Every earth scientist should be keenly interested in the timely and important subject of this GSA volume. Land subsidence has been caused by man in at least 37 states of the U.S.A. It affects an aggregate area of more than

MAN-INDUCED LAND SUBSIDENCE



EDITED BY THOMAS L. HOLZER

40,000 km² and may cost the nation as much as \$100 million annually.

This review includes nine papers in three categories: (1) Fluid withdrawal from porous media; (2) Drainage of organic soil; and (3) Collapse into man-made and natural cavities.

Hardbound in 8½" x 11" format, 231 pages, in illustrated dust cover. ISBN 0-8137-4106-8. \$28.00

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1987 Field Trips (continued from p. 219)

Large-scale Silicic Volcanism of the Jemez Mountains and Geology of the Adjacent Rio Grande Rift, New Mexico (3 days). Stephen Self, Jamie Gardner, Fraser Goff, John Wolff.

Cretaceous of Black Mesa and Kaiparowits Basin (3 days). Dale Nations, James Kirkland, David Carr, Jeff Eaton.

Postmeeting Trips

Geology of the Lower Grand Canyon and Upper Lake Mead by Boat—An Overview (3 days). Frederick W. Bachhuber, Stephen Rowland.

A Geologic Reconnaissance into the Western Grand Canyon, Arizona (3 days). George H. Billingsley, John D. Hendricks, Ivo Lucchitta.

Metamorphic Core Complexes, Mesozoic Thrusts, and Cenozoic Detachments: Old Woman Mountains—Chemehuevi Mountains Transect, California-Arizona (4 days). Keith A. Howard, Barbara E. John, Calvin F. Miller, Calvin James.

Alkaline Rocks and Volcanic Structures of the Pinacate Volcanic Field, Sonora (3 days). Daniel J. Lynch, Peter Kresan, James T. Gutmann.

Land Subsidence and Earth Fissure Formation in Eastern Maricopa and Northern Pinal Counties, Arizona (1 day). Troy L. Péwé, Herbert Schumann, Richard H. Raymond.

Late Cenozoic Mammal Faunas and Magnetostratigraphy, Southeastern Arizona (2 days). Everett Lindsay, Neil D. Opdyke, Noye M. Johnson.

Geology of Porphyry Copper Ores in the Globe-Miami District (1 day). Spencer R. Titley.

Ductile to Brittle Evolution of the South Mountains Metamorphic Core Complex (1 day). Stephen J. Reynolds.

Structural Geology of the Rincon and Pinaleno Metamorphic Core Complexes, Southeast Arizona (2 days). George H. Davis, Stephen J. Naruk, Charles H. Thorman.

Tectonic Setting and Sedimentological Features of Upper Mesozoic Strata in Southeastern Arizona (3 days). William R. Dickinson, Margaret A. Klute, William L. Bilodeau.

Massive Sulfide Ores at Jerome, Arizona (1 day). Paul Lindberg.

Late Holocene Alluvial Processes, Southern Colorado Plateau (3 days). Richard Hereford.

Mesquite Mine (2 days). Eric Frost, Stanley Watowich.

Cross-bedding and Other Eolian Structures in the Navajo and Entrada Sandstones (3 days). David M. Rubin, Ralph E. Hunter.

**1987 GSA Annual Meeting
October 26–29
Phoenix, Arizona**

**SYMPOSIA PROPOSALS DUE JANUARY 1,
1987**

The Technical Program Chairmen for the 1987 GSA Annual Meeting have announced a theme statement, which follows. Persons planning symposia or other technical program activities should keep this theme in mind as they look ahead to the Phoenix program.

The Southern Cordillera: Insights and Problems

The geologic wonderland of the Southern Cordillera includes the southern Rocky Mountains, the Colorado Plateau, much of the Basin and Range province, the Cordilleras of Mexico, and the Rio Grande rift. Recent research efforts have gained fresh insights and raised new questions about crustal origins and structure, ore provinces, regional facies, magmatism and volcanism, intracontinental deformation, plateau uplift, extensional nonmarine basins, and landscape evolution within this fascinating region. The Phoenix meeting of the Geological Society of America provides an ideal forum to air these and related topics from all standpoints of our science. Symposia and contributions directed toward this theme are especially encouraged.

1987 Annual Meeting Technical Program Information

<i>Technical Program Chairman</i> Clement G. Chase Department of Geosciences University of Arizona Tucson, AZ 85721 (602) 621-2417	<i>Technical Program Co-Chairman</i> J. Dale Nations Department of Geology Northern Arizona University Flagstaff, AZ 86011 (602) 523-2931
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or

General Chairman
William R. Dickinson
Department of Geosciences
University of Arizona
Tucson, AZ 85721
(602) 621-4051

For general information on symposia participation, please contact

Sue Beggs, Meetings Manager
GSA, P.O. Box 9140, Boulder, CO 80301

In Memoriam

Gerardo Botero-Arango
Medellín, Colombia
July 22, 1986

Paul C. Henshaw
Walnut Creek, California

Maxwell M. Knechtel
San Rafael, California

John E. Powell
Huron, South Dakota
January 1986

Ben Bowyer
Grand Junction, Colorado

Eugene Jablonski
Vienna, Austria

Carl A. Lamey
Columbus, Ohio
December 24, 1985

Robert C. Redfield
Austin, Texas
January 30, 1986

Florian J. Frank
Gresham, Oregon
June 19, 1986

Robert M. Kleinpell
Goleta, California
March 18, 1986

Kenneth Lautenschlager
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A-2: Kodiak to Kuskokwim, Alaska

R. von Huene, S. Box, B. Detterman, M. Fisher, C. Moore, H. Pulpan, 1985. One sheet in color each 55" x 41"

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B-1: Intermontane Belt (Skeena Mountains) to Insular Belt (Queen Charlotte Islands)

C.J. Yorath, G.J. Woodsworth, R.P. Riddihough, R.G. Currie, R.D. Hyndman, C.G. Rogers, D.A. Seemann, A.D. Collins, 1985. Two sheets in color, each 52" x 39"

TRA B-1 Rolled \$17.00; folded \$15.00

B-2: Juan de Fuca Plate to Alberta Plains

J.W.H. Monger, R.M. Clowes, R.A. Price, P.S. Simony, R.P. Riddihough, G.J. Woodsworth, 1985. Two sheets in color, each 55" x 40"

TRA B-2 Rolled \$17.00; folded \$15.00

B-3: Juan de Fuca Spreading Ridge to Montana Thrust Belt

D.S. Cowan, 1985. Three sheets in color, each 50" x 40"

TRA B-3 Rolled \$24.50; folded \$22.50

C-3: Pacific Abyssal Plain to the Rio Grande Rift

D.G. Howell, J.D. Gibson, G.S. Fuis, J.H. Knapp, G.B. Haxel, B.R. Keller, L.T. Silver, J.G. Vedder, 1985. Three sheets in color, each 54½" x 41"

TRA C-3 Rolled \$24.50; folded \$22.50

D-1: Northern Appalachian: (West sheet) Grenville Province, Quebec, to Newfoundland. (East sheet) Rifted Margin Offshore Northeast Newfoundland

R.T. Haworth, H. Williams, C.E. Keen, 1985. Two sheets in color, each 56½" x 41"

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D-3: Rifted Continental Margin Off Nova Scotia: Offshore Eastern Canada

C.E. Keen, R.T. Haworth, 1985. One sheet in color, 38" x 57"

TRA D-3 Rolled \$ 9.50; folded \$ 7.50

D-4: Rifted Continental Margin Off Labrador

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MEETINGS

(Asterisk indicates new or changed information)

1986

17th Annual Underwater Mining Institute, November 2-5, 1986, Biloxi, Mississippi. Information: Underwater Mining Institute, University of Wisconsin Sea Grant Institute, 1800 University Ave., Madison, WI 53705.

International Conference on Coastal Engineering, November 9-14, 1986, Taipei, Taiwan. Information: Billy L. Edge, Cubit Engineering Limited, 207 East Bay St., Suite 311, Charleston, SC 29401.

Geological Society of America Annual Meeting, November 10-13, 1986, San Antonio, Texas. Information: Meetings Dept., GSA, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020.

Society of Economic Paleontologists and Mineralogists Gulf Coast Section 7th Annual Research Conference, Shelf Sedimentation, Shelf Sequences, and Related Hydrocarbon Accumulation, December 7-10, Corpus Christi, Texas. Information: Susan Conger Morris, 1422 Hornbrook Dr., Houston, TX 77099; (713) 495-6071.

American Geophysical Union Fall Meeting, December 8-12, San Francisco, California. Information: American Geophysical Union, 2000 Florida Ave., N.W., Washington, DC 20009.

National Symposium on Surface Mining, Hydrology, Sedimentology, and Reclamation, December 8-12, 1986, Lexington, Kentucky. Information: Donald H. Graves, T.P. Cooper Building, University of Kentucky, Lexington, KY 40546-0073; (606) 257-2906.

International Society for Reef Studies Annual Meeting, December 12-14, 1986, Marburg, West Germany. Information: Heinrich L. Zankl, Dept. of Geology, Inst. für Geologie und Palaontologie, Lahnberg, D-3550, Marburg, West Germany.

GSA 1986

Annual Meeting, November 10-13, 1986, San Antonio, Texas

Penrose Conference

Archaeological Geology: Environmental Siting and Material Usage, December 6-11, 1986, Saint Simons Island, Georgia. Information: Charles J. Vitaliano, Dept. Geology, Indiana University, 1005 East Tenth Street, Bloomington, IN 47405; (812) 335-1407.

1987

American Current Research on Fluid Inclusions, January 5-7, 1987, Socorro, New Mexico. Information: David I. Norman, Dept. of Geoscience, New Mexico Institute of Mining and Technology, Socorro, NM 87801; (505) 835-5404.

Palaeoenvironment of East Asia—2nd International Conference, January 9-14, 1987, Hong Kong. Information: E.K.Y. Chen, Centre of Asian Studies, University of Hong Kong, Hong Kong.

Hawaii Symposium on How Volcanoes Work, January 19-23, 1987, Hilo, Hawaii. Information: Robert Decker, U.S. Geological Survey, MS 910, 345 Middlefield Rd., Menlo Park, CA 94025.

International Symposium on Granites and Associated Mineralizations, January 21-31, 1987, Salvador, Brazil. Information: Augusto J. Pedreira, ISGAM, SME-CPM, Rua Ceara, 3-Pituba, 40.000, Salvador, Bahia, Brazil.

Canadian Reef Research Symposium, January 27-30, 1987,

Banff, Alberta, Canada. Information: Canadian Reef Research Symposium, University of Calgary, Conference Office, 2500 University Dr. N.W., Calgary, Alberta T2N 1N4, Canada.

Sinkholes and the Environmental Impacts of Karst—2nd Multidisciplinary Conference, February 9-11, 1987, Orlando, Florida. Information: Barry F. Beck, College of Engineering, University of Central Florida, Orlando, FL 32816.

Energy-sources Technology Conference, February 15-19, 1987, Dallas, Texas. Information: American Society of Mechanical Engineers, Meetings Dept., 345 E. 47th St., New York, NY 10017; (212) 705-7057.

Prospectors and Developers Association of Canada 55th Annual Convention, March 8-11, 1987, Toronto, Ontario. Information: Susan Sikala, Prospectors and Developers Association, Suite 420, 74 Victoria St., Toronto, Ontario M5C 2A5, Canada; (416) 362-1969.

18th Annual Lunar and Planetary Science Conference, March 16-20, 1987, Houston, Texas. Information: Pamela Jones, 3303 NASA Rd. 1, Houston, TX 77058; (713) 486-2150.

7th Biannual Petroleum Conference of Turkey, April 6-10, 1987, Ankara, Turkey. Information: Necdet Pamir Türkiye, Petrolleri A.O. Üretim Grubu Müdafaa Cad. No: 22 Bakanlıklar, Ankara, Turkey; telephone 17 91 60/453-553.

Phanerozoic Ironstones and Related Deposits, April 7-8, 1987, Sheffield, England. Information: Gordon Taylor, Dept. of Science, Luton CHE, Park Square, Luton LU1 3JU, England.

Mathematical Geologists of the United States 1987 Conference, Emerging Concepts, April 13-15, 1987, Redwood City,

(continued on p. 223)

Public Television To Air Series on North American Geology

The Making of a Continent, about the formation and development of North America, will be shown weekly on public television stations beginning November 5, 1986 (check local listings for time).

The 6-part series, produced by WTTW/Chicago, is based on the book of the same title, by author-photographer Ron Redfern.

The first episode, "Collision Courses," goes back 4 Ga to look at the cataclysmic explosions, volcanic eruptions, and other forces that built North America's mountain ranges. "Rich High Desert" examines how winds, glaciers, and seas formed the North American continent, from the Great Lakes and Nebraska's sand hills to the sands of New Mexico. "The Great River" travels along the banks of the Mississippi to discover why this river is both a blessing and curse to humans as they try to reap the rewards of the river's geologic heritage. "Corridors of Time" goes back to the time of Pangea, tracing its development into today's recognizable continents as reflected in the evolution of a wide variety of animals. "The Land of Sleeping Mountains" tells about sea-floor spreading and its effects on the western edge of the North American continent. "The Price of Gold" recounts how earth movement deposited gold in the streams and mountains of California and how this same movement will result in the state's devastation.

MEETINGS (continued from p. 222)

California. Information: Harry M. Parker, Fluor Engineering, Inc., 10 Twin Dolphin Dr., Redwood City, CA 94065.

Analysis of Naturally Fractured Reservoirs, May 4-8, 1987, Snowbird, Utah. Information: Jane Rider, AAPG Education Dept., P.O. Box 979, Tulsa, OK 74101-0979; (918) 584-2555.

Coastal Sediments '87, May 12-14, 1987, New Orleans, Louisiana. Information: Nicholas C. Kraus, USAE Waterways Experiment Station, Coastal Engineering Research Center, P.O. Box 631, Attn. WESCR-P, Vicksburg, MS 39180-0631.

***International Geoscience and Remote Sensing Symposium**, May 18-21, 1987, Ann Arbor, Michigan. Information: Joan Eadie, Secretariat, University of Michigan Extension Service, Dept. of Conferences and Institutes, 200 Hill St., Ann Arbor, MI 48104-3297. (Abstracts due December 1, 1986.)

Coastal Lowlands Symposium: Geology and Geotechnology, May 25-27, 1987, The Hague, Netherlands. Information: Coastal Lowlands Symposium, c/o CONGREX, Keizersgracht 610, 1017 EP Amsterdam, The Netherlands; Telex NL-14527.

Geological Association of Canada-Mineralogical Association of Canada Annual Meeting, May 25-27, 1987, Saskatoon, Saskatchewan. Information: W. O. Kupsch, Dept. of Geological Sciences, University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0, Canada; (306) 966-5696.

28th U.S. Symposium on Rock Mechanics, June 29-July 1, 1987, Tucson, Arizona. Information: 28th U.S. Symposium on Rock Mechanics, Special Professional Education, Box 9, Harvill

Bldg., University of Arizona, Tucson, AZ 85721; (602) 621-5104 or 621-3054.

***First International Congress, Geochemistry and Cosmochemistry**, June 30-July 6, 1987, Paris, France. Information: C. J. Allegre, Lab. de Géochimie et Cosmochimie, 4 place Jussieu, Tour 14, 3 étage, 75252 Paris Cedex, France; telephone 43.54.84.63.

Second Symposium on the South Atlantic Evolution, July 23-25, 1987, Rio de Janeiro, Brazil. Information: Dimas Dias-Brito, PETROBRAS/CENPES, Ilha do Fundão, Quadra 7, Rio de Janeiro - 21.910 - Brazil; and P. Y. Berthou, Lab. de Géologie des Bassins Sédimentaires, Tour 14-15, 4 étage, 4 place Jussieu, 75252 Paris Cedex 05, France.

***Tectonic Setting of Layered Intrusives**, July 27-28, 1987, Pretoria, South Africa. Information: Secretary, Indaba Organising Committee, Dept. of Geology, University of Pretoria, Pretoria, South Africa.

4th International Congress of the Regional Committee on Pacific Neogene Stratigraphy (affiliated with IUGS) and joint meeting of **IGCP Project 246**, July 29-31, 1987, Berkeley, California. Information: Charlotte Brunner, Chairperson of Organizing Committee, Dept. of Paleontology, University of California, Berkeley, CA 94720.

***5th Magmatic Sulphide Field Conference**, August 3-13, 1987, Zimbabwe. Information: A. Martin, Geological Society of Zimbabwe, P.O. Box 8427, Causeway, Harare, Zimbabwe.

(continued on p. 224)

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MEETINGS (continued from p. 223)

International Symposium on Erosion and Sedimentation in the Pacific Rim, August 3-7, 1987, Corvallis, Oregon. Information: 1987 Corvallis Symposium, Conference Coordinator, College of Forestry, Oregon State University, Corvallis, OR 97331; (503) 754-2004.

***7th International Conference on Basement Tectonics**, August 17-21, 1987, Kingston, Ontario, Canada. Information: Bob Mason, c/o Events Management Inc., 4 Catarauqui St., Suite 209, Kingston, Ontario K7K 1Z7, Canada; (613) 547-5093.

***XVI Pacific Science Congress**, August 20-30, 1987, Seoul, Korea. Information: Choon Ho Park, XVI Pacific Science Congress, K.P.O. Box 1008, Seoul 110, Korea; telephone (2) 733-4478; Telex ILSKOR 23881. (Abstracts due December 31, 1986.)

International Congress on Geology, Structure, Mineralization, and Economics of the Pacific Rim, August 26-29, 1987, Queensland, Australia. Information: C/-Aus. IMM Congress Secretariat, P.O. Box 731, Toowong 4066, Queensland, Australia.

Sixth International Congress on Rock Mechanics, August 31-September 3, 1987, Montreal, Quebec, Canada. Information: J. Franklin, Dept. of Earth Sciences, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada.

XI International Congress of Carboniferous Stratigraphy and Geology, September 7-11, 1987, Beijing, China. Information: Yang Jingzhi, Nanjing Institute of Geology and Paleontology, Academia Sinica, Nanjing, China.

International Workshop on Computerized Basin Analysis, September 7-12, 1987, Szeged, Hungary. Information: Laszlo Somos, Geological Survey of Hungary, Pf. 106, H-1442, Budapest, Hungary; telephone (36-1) 634 431; Telex 225 220 mafi h.

Society of Economic Paleontologists and Mineralogists Fourth Annual Midyear Meeting, September 11-14, 1987, Austin, Texas. Information: SEPM, P.O. Box 4756, Tulsa, OK 74159; (918) 743-9765.

18th Annual Geomorphology Symposium on Catastrophic Flooding, September 26-28, 1987, Oxford, Ohio. Information: Larry Mayer, Dept. of Geology, Miami University, Oxford, OH 45056; (513) 529-3218.

International Conference on Geophysical and Geochemical Exploration for Minerals and Groundwater, September 27-October 1, 1987, Toronto, Ontario. Information: Exploration '87, c/o 222 Snidercroft Rd., Concord, Ontario L4K 1B5, Canada; (416) 669-2280; Telex 06-964570.

Fifth International Flint Symposium, September 27-October 2, 1987, Bordeaux, France. Information: 5th International Flint Symposium, Secrétaire General, c/o Michel Lenoir, Institut du Quaternaire, Batiment de Géologie, Avenue des Facultés, Université de Bordeaux I, 33405 Talence Cedex, France.

***Society of Economic Paleontologists and Mineralogists Gulf Coast Section 8th Annual Research Conference**, Paleontological Applications in Petroleum Exploration, December 6-9, 1987, Houston, Texas. Information: Charles L. McNulty, Dept. of Geology, University of Texas, UTA Box 19049, Arlington, TX 76019; (817) 273-2979.

GSA 1987

Section Meetings

Northeastern Section, March 4-7, Pittsburgh, Pennsylvania
Southeastern Section, March 26-27, 1987, Norfolk, Virginia
South-Central Section, March 30-31, 1987, Waco, Texas
North-Central Section, April 30-May 1, 1987, St. Paul, Minnesota
Rocky Mountain Section, May 2-4, 1987, Boulder, Colorado
Cordilleran Section, May 20-22, 1987, Hilo, Hawaii

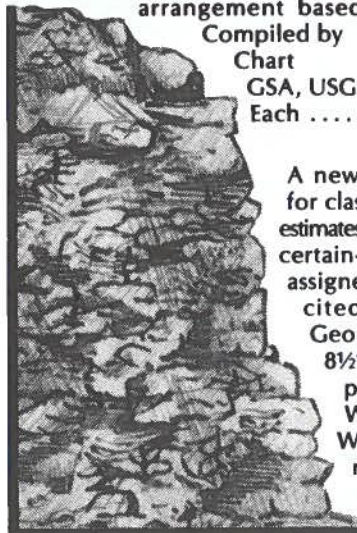
Penrose Conferences

Geochemistry of Waters in Deep Sedimentary Basins, March 16-20, 1987, Oxnard, California. Information: Yousif K. Kharaka, U.S. Geological Survey, Water Resources Division, M.S. 427, 345 Middlefield Rd., Menlo Park, CA 94025; (415) 323-8111, ext. 2523.

(continued on p. 225)

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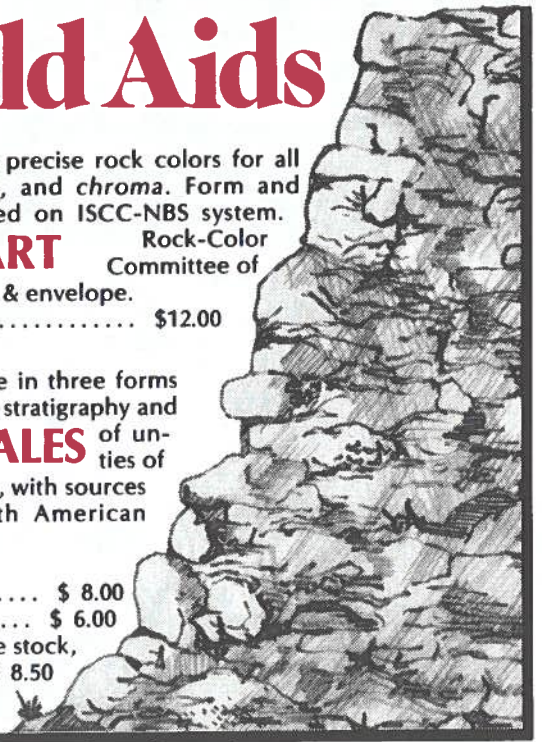
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MEETINGS (continued from p. 224)

Late Quaternary Sea Level: The Marine and Terrestrial Record, April 6-12, 1987, Ferry Reach, Bermuda. Information: James L. Carew, Dept. of Geology, College of Charleston, Charleston, SC 29424; (803) 792-5589.

The Construction of Geological Cross Sections: Techniques, Assumptions, and Methods, May 3-8, 1987, Rosendale, New York. Information: Peter A. Geiser, Dept. of Geology and Geophysics, University of Connecticut, Storrs, CT 06268; (203) 486-4432 or 4433.

Glacial Facies Models, May 3-8, 1987, Manitoulin Island, Ontario. Information: Nicholas Eyles, Dept. of Geology, Scarborough Campus, University of Toronto, Scarborough, Ontario M1C 1A4, Canada; (416) 284-3336.

Paleoenvironmental Interpretation of Paleosols, September 11-17, 1987, Warm Springs Indian Reservation, central Oregon. Information: Gregory R. Retallack, Dept. of Geology, University of Oregon, Eugene, OR 97403-1271; (503) 686-4573.

Cordilleran Metamorphic Core Complexes, Revisited: Implications for Crustal Extension and Shortening in the North American Cordillera, September 13-18, 1987, Elko, Nevada. Information: Arthur W. Snoke, Dept. of Geology and Geophysics, University of Wyoming, P.O. Box 3006, Laramie, WY 82071; (307) 766-5457.

Exposed Cross Sections of the Continental Crust, September 28-October 2, 1987, southeastern Ontario. Information: David M. Fountain, Dept. of Geology and Geophysics, University of Wyoming, Laramie, WY 82071; (307) 766-6299.

Annual Meeting, October 26-29, Phoenix, Arizona

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Going to the Cordilleran Section Meeting?

Please Note These Date Changes and Symposia Additions

Two symposia, in addition to those listed in the preliminary announcement (October 1986 *GSA News & Information*), will be held at the 83rd annual Cordilleran Section meeting in Hilo, Hawaii, May 20-22, 1987:

- 1. **Structure and Stratigraphy of the Brooks Range, Alaska.** Wes Wallace, University of Alaska.
- 2. **Seismotectonics of Offshore and Onshore Areas, Central California.** Burt Slemmons, Mackay School of Mines, and Lloyd Cluff, Pacific Gas and Electric Co.

Note also that the meeting dates have been changed from May 18-20 (as stated on the 1987 abstract forms) to **May 20-22**. Abstract deadlines remain the same. Send abstracts to Richard W. Hazlett at the address given on the 1987 forms. The abstract deadline for the 1987 Cordilleran Section meeting is *December 29, 1986*. Abstract forms for 1987 are available from Abstracts Coordinator, Geological Society of America, P.O. Box 9140, Boulder, CO 80301; or call (303) 447-8850.

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GEOLOGIST, BS, male, some graduate experience. Strong background in theoretical petrology-metamorphic and metasomatic; hydrothermal geochemistry, tectonics, structural analysis. Currently employed in management/supervisory capacity. I seek employment/experience in metallic minerals industry. Excellent verbal/written communication skills, driven worker. Willing to relocate. Excellent resume + refs upon request. Reply code #1036.

Positions Open

BUREAU OF ECONOMIC GEOLOGY

The Bureau of Economic Geology, The University of Texas at Austin, is recruiting two Ph.D. research scientists with specializations in Structural Geology.

One position requires experience with mechanics of brittle failure, analytical modeling of fracture systems and interpretations of natural fractures and faults. Preference will be given applicants with experience analyzing fractures in core and analyzing progressive and finite strain.

The second position requires experience in numerical, regional tectonic and basin modeling and use of geophysical logs, porosity and heat flow data to derive compaction and subsidence histories. Preference will be given applicants with experience interpreting reflection seismic results, analyzing stress history of basins and work with wrench and extensional tectonics.

A proven publication record is preferred for all applicants.

Interested applicants should send a resume to: E.G. Wermund, Bureau of Economic Geology, The University of Texas at Austin, University Station, Box X, Austin, TX 78713. The advertiser is an equal opportunity/affirmative action employer.

The U.S. Geological Survey (USGS), Branch of Coal Geology, announces two senior research geologist vacancies:

— an **inorganic geochemist**, with wide experience in coal geochemistry and coal geology, specializing in geochemical interpretation of the origins of mineral matter in coal and the effects of the inorganic constituents on coal mining and utilization, and

— a **sedimentologist**, specializing in sedimentary facies analysis with focus on basin analysis as well as micro-environments of deposition and interpretation of sedimentary structures, all with regard to coal.

Positions will be located either in Denver or

Reston, Virginia. Candidates for both positions should have the Ph.D. degree or equivalent experience, and be senior level, field-oriented, highly motivated scientists with extensive, significant publication records in their respective fields and demonstrated expertise in directing and focusing coal science. It is anticipated that the positions will be at the GS-13 to GS-14 level (\$37,599-57,759 per annum), dependent upon qualifications. For further information, contact John O. Maberry, Chair, Search Committee, Branch of Coal Geology, 956 USGS National Center, Reston, VA 22092, telephone 703-648-6448. Applications must be made by Standard Form 171 'Application for Federal Employment,' available from the above address or from any Federal Personnel Office. Applications must be received by November 30, 1986. USGS is an equal-employment employer; the positions are limited to United States citizens.

PETROLOGIST/SUNY-BINGHAMTON

The Department of Geological Sciences and Environmental Studies invites applications for a tenure-track position in the areas of igneous or metamorphic petrology starting September, 1987. Petrologists with field-oriented research are particularly encouraged to apply. The department is well equipped and staffed for routine analyses of rocks (microprobe, SEM, XRD, XRF, thin section lab). Teaching at both the undergraduate and graduate level is also required. Rank and salary are open and negotiable depending on the experience of the applicant. A Ph.D. is required; post-doctoral experience is preferred. Please submit by December 15, 1986, a curriculum vita, list of publications, a brief statement of research interests, and the names and addresses of three personal references to: Dr. David Jenkins, Petrology Search Committee, Geology, SUNY-Binghamton, Binghamton, New York 13901. S.U.N.Y. is an equal opportunity affirmative action employer.

ENGINEER, Senior: Perform engineering analysis, design, laboratory and field work related to high and low-level radioactive waste disposal, hazardous waste disposal and petroleum and geothermal reservoirs. Develop and use finite element, finite difference and integrated finite difference numerical models for simulation of single and multiple phase flow, heat transport, chemical transport and stress with varying degrees of coupling in porous and fractured media, etc. Min. Ph.D. geological engineering or related field and 1-2 yrs. geological/research experience. Demonstration of ability to develop original large scale hydrologic numerical models required as well as experience in laboratory testing and conducting of field drilling and test programs. \$3,000.00/mo. Job site/Interview: Berkeley, CA. Applicants send ad with resume to Job #AW 6486, P.O. Box 9560, Sacramento, CA 95823-0560 not later than 30 calendar days after the date of release of this issue.

UNIVERSITY OF MASSACHUSETTS AT AMHERST ANNOUNCES THREE TENURE-TRACK OPENINGS IN THE BROADLY DEFINED FIELDS OF STRUCTURAL GEOLOGY SOFT ROCK GEOLOGY GLACIAL GEOLOGY

Strong supplementary interests are desired in each field. Illustrative examples include tectonics, metamorphism, geophysics, Precambrian geology, Appalachian geology, organic geochemistry, low-mass isotopic geochemistry, fluid flow, stratigraphy, petroleum geology, modern ocean sediments, groundwater and remote sensing.

Appointments are expected to be made at junior faculty levels; outstanding exceptions will be considered. Appointments will be reserved to those with Ph.D. in hand. The Department is known for its strong field interests and seeks to support them with research excellence in new

appointments. Salary commensurate with qualifications and experience. Applicants should make clear reference to the specific position sought and they should describe potential research and teaching interests. Applications and inquiries should be directed by December 15, 1986, to: Geology Search (Strx., Softr., or Glac.), Department of Geology and Geography, University of Massachusetts, Amherst, MA 01003 USA.

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MASSEY UNIVERSITY NEW ZEALAND

Department of Soil Science UGC POST-DOCTORAL FELLOWSHIP Lahar and Volcanic Avalanche Studies

A UGC Post-Doctoral fellowship is available for research work into New Zealand lahar and volcanic debris avalanche deposits. Massey University research at Mt Egmont and Ruapehu has mapped extensive and numerous Quaternary volcanoclastic deposits of mass flow origin and the research programme aims to continue in depth studies into the emplacement of these fragmental deposits. Applicants should have some practical experience of studies into the genesis of volcanoclastics.

Application forms and conditions of appointment are available from the undersigned. Tenure is for up to two years with a salary level equivalent to the first step of the Lecturers scale (currently NZ\$30,500). Applications close on 30th November 1986. BRH Monks, Registrar.

FLORIDA INTERNATIONAL UNIVERSITY GEOPHYSICS

The Department of Geology at Florida International University invites applications for one full-time tenure-earning position at the Assistant or Associate Professor level in Geophysics. The successful applicant will be expected to teach at the undergraduate and graduate levels, and must have demonstrated an ability to conduct high quality teaching and the potential to establish a vigorous research program. A completed Ph.D. is required.

Deadline for application: January 1, 1987. Appointment will begin in August, 1987.

Send a resume, brief description of teaching and research interest, transcripts and three letters of recommendation to Dr. Florentin Maurasse, Department of Geology, Florida International University, Tamiami Campus, Miami, FL 33199. Florida International University is a member of the state university system and an affirmative action/equal opportunity employer.

FACULTY POSITION—GEOLOGY. Applications are invited for a tenure-track Assistant Professorship to begin August 1987. The applicant must specialize in one of the following areas: 1) Surficial Geology/Groundwater; 2) Geotechnical Geology/Geophysics; 3) Hard Rock Geochemistry/Mineralogy; 4) Marine Sedimentary Geology. The successful candidate will be an effective lecturer in introductory geology, teach upper level courses in his or her own specialty, and will develop a vigorous research program. A Ph.D. is required. The department currently has over \$4 million in external research funding; it will soon move into a new \$11 million building. Excellent research and computing facilities are available. Applicants should forward a resume and the names of three references before January 15, 1987 to: Dr. Michael Bevis, Search Committee Chairman; Dept. of Marine, Earth and Atmospheric Sciences, North Carolina State University, Raleigh, NC 27695-8208. AA/EOE.

STRUCTURAL GEOLOGIST—STRATIGRAPHER ASSISTANT PROFESSOR

Tufts University has a full-time, tenure-track position as an Assistant Professor of Geology available beginning September 1, 1987. Qualifications of applicants should include the Ph.D. or equivalent degree. Preference will be given to those with teaching experience at the college level and demonstrated research potential. The applicant should be able to fit into a small, well-equipped, undergraduate teaching department where research is expected. The person hired will be expected to teach structural geology, stratigraphy, and related courses, to assist in teaching the elementary courses, to develop his/her own research program, to seek outside funding for that research, and to work with other members of the faculty. Preferred research specialty will be structural geology related to sedimentary terrains but applicants in other related areas will be considered. Applications, including references from three qualified persons, transcripts, and resume, should be sent to Robert L. Reuss, Department of Geology, Tufts University, Medford, MA 02155. Applications will be considered starting December 1986. Tufts University is an OEA/AA employer.

BUREAU OF MINES, PHYSICAL SCIENTIST GS-1301-11/12, WASHINGTON, DC

Starting Salary GS-11 \$26,381/yr; GS-12 \$31,619/yr (salary dependent on individual's qualification)

Incumbent is responsible for special studies on the minerals industry of China. He/she provides economic and technical evaluations and quantitative and qualitative analysis of mineral resources; evaluates political and economic factors that impact development of mineral resources; assesses the internal and external market conditions which would influence the Chinese mineral industry as a competitor of the United States, supplier of mineral products to the United States economy, and to present opportunities for U.S. investment, technology transfer, equipment and services.

Applicants must have a bachelor's or higher degree in an appropriate physical science or engineering discipline from an accredited college or a combination of education and experience which demonstrates knowledge and understanding of the fundamental principles and techniques of the physical sciences or engineering fields required to perform the duties of the position. In addition, candidates must also have at least three years of progressively responsible professional, scientific, or engineering experience appropriate to the position which demonstrates

extensive knowledge and experience in international mineral industry activities and the factors influencing minerals production, consumption, and trade. Fluent reading and speaking knowledge of the Chinese national language is required.

Additional information and the appropriate application forms may be obtained by calling (202) 634-4719. Resumes will not be accepted. Applications may be sent to: U.S. Bureau of Mines, Division of Personnel, 2401 E St., N.W., Washington, DC 20241. All applications must be received in this office on or before December 17, 1986. U.S. citizenship required; civil service status not required. Equal opportunity employer.

Consultants

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MEMOIR 162

The Caribbean- South American Plate Boundary and Regional Tectonics

The fact that the debate continues on the evolution of the Caribbean plate and its borderlands is reflected in the 28 papers included in this volume. Some authors postulate a distant Pacific source for Caribbean crust; others consider the geometry, timing, and effects of collision; still others view the process of evolution from the vantage point of the craton, from the time prior to collision, through the ensuing orogeny caused by collision, to the youngest phases of Plio-Pleistocene time.

Surprising to the editors is the accumulating evidence for increasingly radical, large-scale rotations and translations in the heretofore sacrosanct cratonic "autochthon." Most evidence is for such occurrence prior to the earliest Cretaceous, but there is also evidence that such movement is continuing today.

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EDITED BY WILLIAM E. BONINI,
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