GSA news & information

VOLUME 2, NUMBER 9 SEPTEMBER 1980

GSA's Centennial Development Program

The year 1988 will mark the completion of the first full century of activities for the Geological Society of America. The Council of the Society, by way of a specially appointed ad hoc committee, gave careful thought and consideration to appropriate activities in recognition of this significant milestone. It was the overwhelming consensus that self-serving celebrations were not appropriate but that the occasion should be used as the basis for developing activities that would promote and advance the science of geology in North America, which the charter of the Society states as GSA's prime objective.

A parallel recommendation of the Council's ad hoc Centennial Planning Committee was that the Society undertake a fund-raising program as part of the Centennial observance. The objectives of the campaign were to be twofold, namely to support several of the projects recommended for "The Decade of North American Geology" and to improve the general financial base of the Society for the support of on-going programs, such as Research Grants, that do not generate income.

During the fall meetings of the Executive Committee and Council in San Diego in 1979, it was decided that the best way to proceed was by appointment of a top-level committee of senior members of the Society who would serve to guide and direct the program. James Boyd agreed to serve as Chairman of the new Centennial Development Committee. The other members, appointed by President L. L. Sloss, are Kenneth H. Crandall, Robert E. Folinsbee, Robert L. Fuchs, George Grow, Jr., Michel T. Halbouty, Caswell Silver, and Leon T. Silver, ex officio member. Clarence E. Brehm, who was a member of the committee, died July 9, 1980.

The services of a professional advisory firm were authorized by Council, to aid and advise the committee. After interviewing several organizations, the firm of Gonser, Gerber, Tinker, Stuhr of Chicago was retained as advisor for the Development program. Mr. Charles P. Cushman is the member of the firm working with GSA.

(continued next page)

Win a set of memoirs on the regional geology of North America

D-NAG needs a logo!

What is D-NAG? As a part of its centennial celebration, GSA is sponsoring the coordination of a "Decade of North American Geology" (D-NAG). The geological community of the continent is being invited to participate in a grand synthesis of the regional geology and geophysics of North America and adjacent oceanic regions. As a stimulus for future research, this synthesis will bring into focus by means of maps, charts, transects, and regional memoirs—including summary volumes on the geology of North America—the wealth of new information about the North American Plate which has been acquired during the plate tectonic revolution.

A design is being sought for a logo which will tie together the many elements of the D-NAG program. The logo design selected will be used on all publications issued as part of the program.

Concept sketches are now being solicited for the logo design. The individual submitting the winning design will receive a set of D-NAG memoirs on the regional geology of North America, as they are published. The competition is open to all; GSA membership is not required.

To enter the competition, submit a concept sketch for a logo. Graphics and type matter may be included, and a brief explanatory text may accompany the design. Submissions should include some indication of the GSA Centennial and some representation of North America. Address submissions to A. R. Palmer, Centennial Science Program Coordinator, GSA, Box 9140, Boulder, CO 80301. The deadline for receipt of submissions at GSA is November 1, 1980.

GSA will prepare final artwork on the winning design. The winner will be announced and the winning entry will be displayed at the GSA booth at the annual meeting in Atlanta.

(continued from p. 129)

The new Development Committee held its first meeting at GSA headquarters in Boulder, Colorado, on January 31, 1980. The second meeting was held on May 1, 1980. The program is now launched and coordination will be maintained between the Development Committee and the Centennial Steering Committee.

A major recommendation of the Development Committee was that GSA establish a foundation for the receipt and management of contributions. After extensive discussion, the Council, at its May 1980 meeting, authorized the Executive Committee to proceed with the task of establishing the "Geological Society of America Foundation." The necessary work required to establish such an entity is well along, and it is anticipated that the Council, at its November 1980 meeting in Atlanta, will confirm the final structure of the foundation and will be asked to select the trustees for its governance. Following the Atlanta meeting, there will be an announcement of the action taken by Council.

UPDATE

Articles in *Bulletin, Part II,* August 1980

Articles in *Bulletin, Part II* are listed below. (Summaries only of these articles are in *Bulletin, Part I.*) Articles in *Part II* are not on the separates subscription.

Paper copies of *Part II* in its entirety are available at cost ($10/month) as a special service to those users (members and nonmembers subscribers) who request them. Any such order should be addressed to the Publication Sales Department and be accompanied by advance payment, and no discount can be offered for multiple orders or orders for a sequence of months.

1. Trace elements in continental-margin magmatism: Part II. Trace elements in Ben Ghnema batholith and nature of the Precambrian crust in central North Africa, by John J. W. Rogers, Kip V. Hodges, and Mohamed A. Ghuma, Doc. no. M00801. (On microfiche: 47 p., 5 figs., 3 tables)
2. Paleomagnetic studies of central North Pacific sediment cores: Stratigraphy, sedimentation rates, and the origin of magnetic instability, by Roger A. Prince, G. Ross Heath, and Michelle Kominz, Doc. no. M00802. (On microfiche: 47 p., 17 figs., 2 tables)
3. Early Proterozoic sedimentary basins of the Lake Superior region, by D. K. Larue and L. L. Sloss, Doc. no. M00803. (On microfiche: 39 p., 8 figs., 2 tables)

In August *Geology*

(separates not available)

1. Rb-Sr glauconite systematics and the uplift of the Cincinnati arch, by T. E. Laskowski, R. H. Fluegeman, N. K. Grant
2. 40Ar-39Ar ages of some pre-Tertiary plutonic and metamorphic rocks of eastern Oregon and their geologic relationships, by H. G. Avé Lallemant, D. W. Phelps, J. F. Sutter
3. Tectonic significance of early Oligocene plutonism on Adak Island, central Aleutian Islands, Alaska, by G. P. Citron, R. W. Kay, S. M. Kay, L. W. Snee, J. F. Sutter
4. Icelandite and aenigmatite-bearing pantellerite from the McDermitt caldera complex, Nevada-Oregon, by A. B. Wallace, J. W. Drexler, N. K. Grant, D. C. Noble
5. Upper Jurassic to Lower Cretaceous(?) synorogenic sedimentary rocks in the southern Spring Mountains, Nevada, by M. D. Carr
6. Morphological investigations of submarine volcanism: Henderson Seamount, by P. T. Taylor, C. A. Wood, T. J. O'Hearn
7. Interpretation of minimum-limiting radiocarbon dates for deglaciation of Mount Katahdin area, Maine, by P. T. Davis, R. B. Davis

Articles in *Bulletin, Part II,* September 1980

1. Lithostratigraphic classification of basement rocks of the Wichita province, Oklahoma, by Benjamin N. Powell, M. Charles Gilbert, and Joseph F. Fischer, Doc. no. M00901. (On microfiche: 120 p., 29 figs., 9 tables)
2. Late Cenozoic volcanic rocks of the southern Sierra Nevada, California: I. Geology and petrology, by James G. Moore and Franklin C. W. Dodge, Doc. no. M00902. (On microfiche: 44 p., 6 figs., 1 table)
3. Seismotectonic regionalization of the Great Basin, and comparison of moment rates computed from Holocene strain and historic seismicity, by Roger W. Greensfelder, Frederick C. Kintzer, and Malcolm R. Somerville, Doc. no. M00903. (On microfiche: 73 p., 18 figs., 3 tables)

In September *Geology*

1. Phanerozoic thrusting in Proterozoic belt rocks, northwestern United Sates, by J. E. Harrison, M. D. Kleinkopf, J. D. Wells
2. An inner Cordilleran belt of muscovite-bearing plutons, by C. F. Miller, L. J. Bradfish
3. Walvis Ridge, a piece of Africa?, by W.J.M. van der Linden
4. Lyellian curves in paleontology: Possibilities and limitations, by S. M. Stanley, W. O. Addicott, K. Chinzei
5. Late Miocene marine carbon-isotopic shift and synchroneity of some phytoplanktonic biostratigraphic events, by B. U. Haq, T. R. Worsley, L. H. Burckle, R. G. Douglas, L. D. Keigwin, Jr., N. D. Opdyke, S. M. Savin, M. A. Sommer II, E. Vincent, F. Woodruff

6. Role of submarine canyons in trench and trench-slope sedimentation, by M. B. Underwood, D. E. Karig
7. Contourites in Lake Superior, by T. C. Johnson, T. W. Carlson, J. E. Evans
9. Active tilting of the United States midcontinent: Geodetic and geomorphic evidence, by J. Adams
10. Moderate-temperature geothermal resource potential of the northern Atlantic Coastal Plain, by J. J. Lambiase, S. S. Dashevsky, J. K. Costain, R. J. Gleason, W. S. McClung
11. Geologic note: Nomogram for converting units common in the precious metals industry, by W. L. Campbell, J. C. Antweiler
12. Penrose Conference report: Granite I: Origin and evolution of granitic magmas, by D. L. Peck, D. R. Wones
13. Penrose Conference report: Mesozoic and Cenozoic microplate tectonics of western North America, by M. Beck, A. Cox, D. L. Jones

AGI minority participation program scholarships announced

The American Geological Institute will again offer scholarships for geoscience majors who are United States citizens and members of the following ethnic minority groups: American-born Blacks, American Indians, and Hispanics. Approximately 50 such awards (ranging from $500 to $1,250) were granted in 1980–1981. About the same number (and amounts) will be awarded for 1981–1982.

The term "geoscience" is used broadly to include major study in the fields of geology, geochemistry, geophysics, hydrology, meteorology, oceanography, and space and planetary sciences.

Monies for support/funding of this program are administered by the Institute's Minority Participation Program Advisory Committee and have come from six member societies, more than 14 mining, petroleum, geological supply, and geophysical companies, and many individuals.

Request for application materials or nominations for scholarships should be addressed to William H. Matthews III, Director of Education, American Geological Institute, Box 10031, Lamar University Station, Beaumont, Texas 77710. The deadline for filing the completed application is February 1, 1981.

GSA News & Information

Vol. 2, No. 9 September 1980

GSA NEWS & INFORMATION (ISSN 0164-5854) is the monthly newsletter of The Geological Society of America, Inc., P.O. Box 9140, Boulder, Colorado 80301. Second-class postage rates paid at Boulder, Colorado, and at additional mailing office.

Prepared from contributions from the staff and membership by John C. Frye, Executive Director; James R. Clark, Publications Manager; and June Thomas, Judy Hall, and Ann Fogel, Production Assistants.

EFFECTIVE OCTOBER FIRST

payment in U.S. funds must accompany all orders for GSA publications for up to $50. Postage and handling charges will be waived on these orders.

GSA member discount (see reverse of membership card), of course, will still be allowed when claimed. The increase to a $50 limit before credit will be allowed is another step in your Society's ongoing efforts to reduce costs of operation.

New *Glossary of Geology* adds 3,000 terms

A major dictionary of the earth sciences—the *Glossary of Geology*—is now available in an expanded up-to-date edition. It includes 36,000 terms, compared to 33,000 in the 1972 edition, and it reflects changes in the geoscience vocabulary in the last decade.

Changes in the *Glossary* are particularly evident in such active fields as biostratigraphy, remote sensing, plate tectonics, caves and karst, igneous petrology, paleomagnetism, and seismic stratigraphy. The compilers added about 450 new mineral names, more than 100 abbreviations, such as GOR (Gas Oil Ratio), LVL, and PDB, and nearly 500 new references to the literature.

Aids to users abound. For example, users can learn how to pronounce such terms as "argille scagliose," how to distinguish between look-alikes such as "reinerite" and "renierite," the origin of the rock name "charnockite" (it was first described from the tombstone of Job Charnock, founder of Calcutta), the etymology of "lottal" (from a verse by Richard Armour), the date when many terms were first used, and the preferred term of synonyms.

The new work was edited by Robert L. Bates, who is widely known for his monthly column in *Geotimes,* and Julia A. Jackson of the American Geological Institute. The editors worked with the help of nearly 150 specialists who reviewed definitions, added new terms, and cited references.

Robert L. Bates is emeritus professor at Ohio State University, author of a textbook on geology of industrial rocks and minerals, and an honorary member of the Association of Earth Science Editors. Julia A. Jackson is editor of AGI's newsletter, *Geospectrum,* and a member of AESE.

Glossary of Geology, edited by Robert L. Bates and Julia A. Jackson. Second edition, American Geological Institute (1980). 749 pages, $60 from AGI.

Necrology

Notice has been received of the following deaths: Charles Ivan Alexander, Santa Fe, New Mexico; Edward Crisp Bullard, La Jolla, California; Milton B. Dobrin, Houston, Texas; James F. Fitzgerald, Jr., Moscow, Idaho; Robert J. Hackman, Oakton, Virginia; Frank R. Moulton, Spring, Texas; Lewis G. Weeks, Westport, Connecticut; Howell Williams, Berkeley, California.

REQUEST FOR NOMINATIONS FOR THE SOCIETY'S PRESTIGIOUS HONORS AND AWARDS

FEBRUARY 1, 1981, has been set as the deadline for receipt at headquarters of nominations for the Penrose Medal, Day Medal, Honorary Fellowship, and the National Medal of Science.

Please use this form ☛

To ensure thorough consideration by the appropriate subcommittee, the membership is asked to submit with each nomination a brief biographical sketch, such as used in *American Men and Women of Science,* a summary of the nominee's principal contributions to geology, and a *selected* bibliography of no more than 20 titles. In choosing nominees, scientific achievements should be considered, rather than contributions in administration and service.

The accompanying multi-purpose form may be used to submit nominations for any one of the four honors and awards. Completed forms should be sent to the Executive Director at headquarters.

Please keep in mind that although the automatic carryover of names of nominees is not permitted, headquarters retains the back-up material on each past nominee, and only updated information is necessary. If you resubmit a name, please ask headquarters to attach the back-up material to your nomination.

A brief description of each of the four honors and awards follows:

Penrose Medal

The Penrose Medal was established in 1927 by Dr. 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 to be made only at such time as the Council may decide. Nominees are to be selected by the Council, may or may not be members of the Society, and may be from any nation or any race of people. The sole object of Dr. Penrose in making the gift was to encourage original work in purely scientific geology.

Day Medal

The Day Medal was established in 1948 by Professor 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. It was the intent of Professor Day to recognize outstanding achievement and inspire further effort, rather than to reward a distinguished career.

Honorary Fellows

Honorary Fellows of the Society are selected from those geologists who have distinguished themselves as geological investigators or who have rendered special service to the Society. Only in very unusual cirumstances will nominees in North America be considered for election to Honorary Fellowship. The subcommittee will select for nomination to the spring Council a list of at least four candidates. Rarely are more than two Honorary Fellows elected in any one year. A majority vote of Council is required for election.

National Medal of Science

In 1959, Congress established a National Medal of Science to be awarded by the President of the United States to individuals "deserving of special recognition by reason of their outstanding contributions to knowledge in the physical, biological, mathematical, or engineering sciences." In addition, achievements of an unusually significant nature will be considered and judged in relation to the potential effects of such achievements on the development of scientific thought.

The GSA subcommittee normally nominates one candidate to the spring Council. The Council then submits the nomination to a committee composed of scientists and engineers which assists the President in identifying a limited number of distinguished candidates for these awards.

CHANGE OF ADDRESS,*

The Geological Society of America, P.O. Box 9140, Boulder, CO 80301

NAME _____
(Please print)

New Address _____

_____

_____

_____

_____
City State/Province Zip Code

_____
Country

Member Number _____

Former Address—Attach Mailing Label

_____
Effective Date of Change

*North American members should report address changes 6 weeks in advance; all others, 3 months, in advance.

THE GEOLOGICAL SOCIETY OF AMERICA

Nomination for Penrose Medal, Day Medal, Honorary Fellowship, or National Medal of Science

Name of nominee:

Address:

Biographical information:

Summary of principal contributions to geology:

(over)

Selected bibliography: (No more than 20 titles)

SUPPORTING LETTERS MAY BE ATTACHED.

Name of person making this nomination _____

Address _____

_____

Date _____ Signature _____

Return to: Executive Director
The Geological Society of America
P.O. Box 9140
Poulder, CO 80301
(303) 447-2020

The Significance and Petrogenesis of Mylonitic Rocks

A GSA Penrose Conference, "The Significance and Petrogenesis of Mylonitic Rocks," will be convened by A. W. Snoke, V. R. Todd, and J. A. Tullis at San Diego, California, April 28–May 2, 1981. The conference will be preceded by a three-day field trip through classic ductile to brittle, deformed terranes in southern California.

Zones of mylonitic rocks mark major tectonic boundaries and are associated with zones of maximum translation in the Earth's crust, for example, oceanic transform, continental strike-slip, and thrust faults. Accumulating studies indicate that mylonitic rocks are associated with a variety of petrotectonic settings ranging in age from Precambrian to Recent. Thus, these rocks provide unique evidence on the deformation history of the crust. In addition, interest has focused on zones of mylonitic rocks as loci for younger brittle faults. Recent developments in field, experimental, and theoretical aspects of the study of deformed rocks and terranes make a conference on mylonitic rocks timely. These developments include an increasing number of sophisticated geological and geophysical studies of fault zones; the use of transmission electron microscopy and chemical microanalysis techniques for the study of very fine grained rocks; and the development of experimental deformation equipment capable of producing deformation microstructures in silicates which are identical to features found in naturally deformed rocks. In spite of advances, there is confusion and controversy over the origin and significance of mylonitic rocks, as reflected in varying and conflicting usages in their nomenclature.

The purpose of this conference is to consider mylonitic rocks as a multidisciplinary problem involving field geologists, petrologists, experimentalists, and theoreticians. The conference is designed specifically to bring together individuals of diverse research expertise but with a common interest in the petrogenesis and significance of mylonitic rocks in order to integrate current knowledge and to initiate new research approaches and collaborations.

The cost of the four-day conference is expected to be approximately $300–$325 per person, which includes the registration fee, meals, and lodging. Attendance will be limited to approximately 60 participants and will include international attendees and students. The pre-conference field trip will be optional with a separate additional fee, which at present is undetermined.

Those interested in further information or in attending the conference should write to Arthur W. Snoke, Department of Geology, University of South Carolina, Columbia, South Carolina 29208; Victoria R. Todd, U.S. Geological Survey (A-015), Scripps Institution of Oceanography, La Jolla, California 92093; or Jan A. Tullis, Department of Geological Sciences, Brown University, Providence, Rhode Island 02912.

Deadline for application is December 15, 1980.

Controls of Carbonate Platform Evolution

Announcing a Penrose Conference/Field Excursion, Sunday, September 6 through Monday, September 14, 1981, to examine the tectonic, sedimentary, and sea-level controls on carbonate platforms and basins, particularly those on continental margins.

Location: Isle of Capri in Naples Bay.

Conveners: *Bruno D'Argenio,* Geological Institute, University of Naples, 10 Largo San Marcellino, 80138 Napoli, Italia; *James Lee Wilson,* Department of Geological Sciences, University of Michigan, 1006 C.C. Little Bldg., Ann Arbor, Michigan 48109, USA.

The conference discussions are to be held the first five days on Capri at the Hotel Europa-Palace.

Projected discussion topics include:

a. An outline of regional Tethyan and Atlantic platforms.
b. Main facies belts associated with carbonate platforms.
c. Geophysical interpretations—plate tectonic controls.
d. Holocene continental margins in carbonates.
e. Ancient continental margins in carbonates.
f. Continental interior basins and platforms.
g. Processes and patterns of diagenesis and economic implications (petroleum and sedimentary ore bodies).
h. Interpretations and conclusions: Platform evolution. Variations in thickness and areal extent of sedimentary bodies in continental margins and in continental interiors. Crustal tectonic versus eustatic controls.

The program on Capri will be followed by a three-day field excursion in western Sicily to view parts of some deformed Mesozoic platforms described recently by D'Argenio and R. Catalano.

Cost of conference: Approximately $550 (which allows for expected inflation). Transportation from Naples; lodging and meals in Capri; transportation to Sicily; and meals, lodging, and transportation during the three-day field excursion are all covered in the above fee. The fee does *not* include air fare to Naples or any transportation after the end of the conference in Palermo.

The conference is projected to include a wide range of interests: oceanographers and geophysicists interested in both recent and ancient platforms, oil company personnel interested in regional exploration, academically oriented stratigraphers and paleontologists and tectonicists. By such a mix, considerable interdisciplinary

(continued next page)

GENERAL INFORMATION ABOUT THE GSA EMPLOYMENT SERVICE

Throughout the year, GSA maintains a computer file of geoscientists seeking jobs. The information on this file includes the applicant's areas of interest, years of experience, and educational background. When an employer submits a request form, we run a computer match between the job requirements and applicant's qualifications and send the employer a computer printout. Resumes for each applicant are available upon request at no additional charge. It is up to the employers to make contact with applicants they are interested in.

For 1980, the cost of a printout of applicants is $50 for two specialty listings and $14 for each additional specialty. The entire applicant file may be obtained for $135.

Applicant registration is $15 per year and includes participation in the Annual Meeting Interview Service. The GSA Employment Service is operated by the Membership Department as a benefit to the profession. You do not need to be a member of GSA to use this service.

JOIN US IN ATLANTA FOR THE ANNUAL MEETING EMPLOYMENT INTERVIEW SERVICE

Each fall, GSA holds an Employment Interview Service during its annual meeting. Recruiters may rent interview-booth space for a nominal charge, and GSA staff is available to schedule interviews. Prior to the meeting, many recruiters contact the applicants whom they wish to interview. It is also possible for those seeking employment to set up interviews during the meeting with many recruiters.

Additional information may be obtained by writing to:

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

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

NOTE TO APPLICANTS:

The deadline for application acceptance is September 30, 1980. Any application postmarked after that date will be accepted and put on file but will not appear on the computer printouts sent to employers participating in the Interview Service prior to the meeting.

(Penrose Conference, continued from p. 135)

communication could result and hopefully engender new ideas slanted toward prediction of occurrence and trends of carbonate platforms.

The conference will be held in 1981 only if sufficient funding is obtained during 1980 to partially subsidize its operation. A possibility exists for small subsidies for Eastern Europeans and for younger persons from the USA, Canada, and Mexico.

All letters expressing interest should be addressed to *Dr. James L. Wilson* (address above).

Persons in Europe may contact Dr. D'Argenio by telephone to answer any questions: Telephone numbers: 0039-81-204420 or 204645 and home:0039-81-400463.

Offers of papers for presentation should include title *plus a brief abstract* so that the conveners can organize a satisfactory program.

Invitees will be selected on the basis of applicability of their contributions to the planned program. Application deadline: December 30, 1980.

Council lists nominees for 1981

For Councilor (1981–82) and President (1981)
Howard R. Gould, Houston, Texas
For Councilor and Vice-President (1981)
Digby J. McLaren, Ottawa, Ontario
For Councilor and Treasurer (1981)
William B. Heroy, Jr., Dallas, Texas
For Councilors (1981–1983)
Hubert Gabrielse, Vancouver, British Columbia
Bruce B. Hanshaw, Reston, Virginia
John C. Harms, Littleton, Colorado
Robert D. Hatcher, Jr., Columbia, South Carolina

GSA announces medal and award winners for 1980

The 1980 medalists and award winners announced by the Council at its May 1980 meeting are as follows:

PENROSE MEDAL: *Hollis D. Hedberg,* Department of Geological and Geophysical Sciences, Princeton University, Princeton, NJ 08540.

DAY MEDAL: *H. G. Thode,* Department of Geology, McMaster University, 1280 Main Street West, Hamilton, Ontario L8S 4M1, Canada.

KIRK BRYAN AWARD: *James A. Clark,* 4732 Geological Technical Division, Sandia Laboratory, Albuquerque, NM 87185; *William E. Farrell,* Materials Science and Engineering, University of California, Berkeley, CA 94720; and *W. R. Petlier,* Department of Physics, University of Toronto, Toronto, Ontario M5S 1A5, Canada.

MEINZER AWARD: *Richard L. Cooley,* 575 South Coors Court, Lakewood, CO 80228.

BURWELL AWARD: Not available at press time.

CADY AWARD: No award given in 1980.

NATIONAL MEDAL OF SCIENCE: The Council named *Frank Press* as the Society's nominee for the National Medal of Science.

GSA announces honorary fellowship for 1980

Augusto Gansser, Geologisches Institut, University of Zurich, Sonneggstrasse 5, Zurich, Switzerland, has been named the 1980 Honorary Fellow by the Council at its May 1980 meeting.

THE GEOLOGICAL SOCIETY OF AMERICA
P.O. Box 9140, Boulder, Colorado 80301

APPLICATION FOR EMPLOYMENT MATCHING SERVICE

(Please type or print legibly with **Black Ink**)

A _ _ _ _ -1

Name _____ Date _____
(last name first)

Mailing address _____

A _ _ _ _ -2

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

Date available _____ If not U.S. citizen, list visa _____

TYPE OF POSITION DESIRED

Specialty Codes (see list below)
Choose as many as three that best describe your expertise in order of importance.
1. _____ 2. _____ 3. _____

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

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

Seeking
- ☐ Full-time
- ☐ Part-time
- ☐ Summer

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

A _ _ _ _ -3

EXPERIENCE

Present specialty (see Specialty Code list) _____ Years of experience in this specialty _____

Present employer _____ May he be contacted? Yes ☐ No ☐

If you do not wish to be listed for employment with a specific organization, check here ☐ and list organization on an attached sheet.

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

Administrative _____ Exploration/Production _____ Field _____ Research _____ Teaching _____ Total geological working experience _____

Foreign languages _____ Spoken (fluency) _____ Written _____

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
121. rock mechanics

150. Environmental Geology
151. public education and communication

200. General Geology

220. Geochemistry
221. organic
222. inorganic
223. stable isotopes
224. unstable isotopes

250. Geomorphology
251. Pleistocene geology

300. Geophysics
301. exploration
302. paleomagnetism
303. theoretical

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

550. Planetology

600. Regional Geology

620. Remote Sensing
621. photogeology
622. photogrammetry

630. Science Editing

650. Sedimentology

700. Seismology

720. Stratigraphy
721. Cenozoic
722. Mesozoic
723. Paleozoic
724. Precambrian

750. Structural Geology
751. tectonics
752. tectonophysics

800. Volcanology

Résumé must be attached. Only one page typewritten on one side will be accepted for reproduction to employers. Include concise detail of work experience and college majors and minors on degrees.

Fee—$15.00. Payment must accompany form. Make check payable to the **Geological Society of America.**

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 guarantee 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)

This application will be active for 1 year.

1/80

THE
GEOLOGICAL SOCIETY
OF AMERICA
P.O. Box 9140, Boulder, Colorado 80301

EMPLOYER'S REQUEST FOR EARTH SCIENCE APPLICANTS

(Please type or print legibly with **Black Ink**)

R _ _ _ _ -1

Name _____ Date _____

Organization _____

Mailing address _____

R _ _ _ _ -2

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.** _____

SPECIALTY CODES

100. Economic Geology
101. coal geology
102. geothermal, etc.
103. metallic deposits
104. nonmetallic deposits
105. mining geology

120. Engineering Geology
121. rock mechanics

150. Environmental Geology
151. public education and communication

200. General Geology

220. Geochemistry
221. organic
222. inorganic
223. stable isotopes
224. unstable isotopes

250. Geomorphology
251. Pleistocene geology

300. Geophysics
301. exploration
302. paleomagnetism
303. theoretical

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

550. Planetology

600. Regional Geology

620. Remote Sensing
621. photogeology
622. photogrammetry

630. Science Editing

650. Sedimentology

700. Seismology

720. Stratigraphy
721. Cenozoic
722. Mesozoic
723. Paleozoic
724. Precambrian

750. Structural Geology
751. tectonics
752. tectonophysics

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	☐	☐	☐

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

See page 36 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)

THE GEOLOGICAL SOCIETY OF AMERICA

Annual research awards program 1981

The Geological Society of America will continue its annual research awards program in 1981. Eligibility is not restricted to GSA members. New application forms for 1981 and detailed requirements are available in the geology departments of most colleges and universities in the United States or upon request from the Executive Director, the Geological Society of America, P.O. Box 9140, Boulder, Colorado, 80301. Please use the 1981 forms.

The grants are intended to aid in research projects, not to sustain their entire cost. Applications by graduate students who will use the grants in support of research for advanced degrees will be considered.

The Geological Society of America awarded $81,000 for grants in 1980. The grants went to 192 students doing research for advanced degrees. The average amount granted was $422.00. The highest grant was $1,000, but there is no predetermined maximum amount.

Applications must be postmarked by **February 15.** Letters of support from two sponsors are required for M.S. and Ph.D. candidates. **These two letters must accompany applications.**

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 soon after February 15 to evaluate applications and to award grants. All applicants for grants will be informed promptly of the committee's actions by the Executive Director of the Geological Society of America.

APPLICATIONS MUST BE POSTMARKED BY FEBRUARY 15, 1981.

[PLEASE POST]

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

SOUTHEASTERN SECTION, GSA, 30th Annual Meeting
Hattiesburg, Mississippi, March 18–20, 1981

THE SOUTHEASTERN SECTION of the Geological Society of America and the National Association of Geology Teachers (Southeastern Section) will hold their annual meeting at Hattiesburg, Mississippi, March 18-20, 1981. The meeting is sponsored by the Department of Geology, University of Southern Mississippi, Hattiesburg, and the Department of Conferences and Workshops, University of Southern Mississippi, Hattiesburg.

CALL FOR PAPERS. Papers are invited for presentation at the symposia and technical sessions. Uninvited papers will be allowed 15 minutes for presentation and 5 minutes for discussion. Time limitations will be adhered to by the session chairmen. Symposia and technical session themes are listed below. **Deadline for abstracts is October 28, 1980.**

SYMPOSIA. Geology of the Talladega Slate Belt. Coordinators: James F. Tull, Department of Geology and Geography, University of Alabama, Tuscaloosa, AL 35486, and Denny N. Bearce, Earth Science Department, University of Alabama, Birmingham, AL 35294. Salt Dome Structure and Genesis. Coordinator: Joseph D. Martinez, Director, Institute for Environmental Studies, Atkinson Hall, Room 42, Louisiana State University, Baton Rouge, LA 70893.

TECHNICAL SESSIONS. General topics: Sedimentation, Economic Geology, Geochemistry, Mineralogy, Geophysics, Structural Geology, Geomorphology, Hydrology, Geological Education, Stratigraphy, Petrology, Paleontology, Environmental Geology. Specific topics: Appalachian Structure and Geology beneath the Coastal Plain Overlap; Neogene Geology of the Northeastern Gulf Region; Marine Geology and Geophysics of the Gulf, Caribbean, and Atlantic Offshore.

FIELD TRIPS. Neogene Geology of Southeastern Mississippi and Southwestern Alabama; "Lignites" of Central Mississippi and Alabama; Detailed Mid-Tertiary Stratigraphy along the Chickasawhay River, East-Central Mississippi; General Overview of the Economic Geology and Stratigraphy of Central and East-Central Mississippi; Teaching Hardrock and Softrock Geology in the Gulf Coastal Plain; Miocene(?) Geology of Hattiesburg District.

David M. Patrick, Field Trip Chairman
Waterways Experiment Station
P.O. Box 631
Vicksburg, MS 39201
(601) 634-2125

EMPLOYMENT SERVICE. GSA plans to conduct an employment interview service. Booths are provided for employers to hold in-person interviews with applicants who are registered with the service.

DETAILED INFORMATION concerning registration, accommodations, and activities will appear in a later issue of *GSA News & Information* and as a part of the *Abstracts with Programs* for 1981.

ABSTRACTS, which are limited to 250 words, must be submitted camera-ready on official abstract forms available from

Maurice A. Meylan, Program Committee Chairman
Department of Geology
University of Southern Mississippi
Southern Station Box 9247
Hattiesburg, MS 39401
(601) 266-7196

OR

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

ABSTRACTS ARE DUE OCTOBER 28, 1980

Contributiors to the symposia should submit their abstracts to the appropriate symposium coordinator. Technical session abstracts (one original and four copies) should be submitted to

Maurice A. Meylan, Program Committee Chairman
Department of Geology
University of Southern Mississippi
Southern Station, Box 9247
Hattiesburg, MS 39401

CAROUSEL PROJECTION EQUIPMENT will be provided for 2" x 2" slides and single projectors only. Please bring your own loaded carousel trays, if possible.

SPOUSES' ACTIVITIES. A full schedule of activities is being organized.

EXHIBITS representing all segments of earth science education, research and industry will be displayed in the University Coliseum.

Additional inquiries or suggestions should be directed to

Daniel A. Sundeen, Local Committee Chairman
Department of Geology
University of Southern Mississippi
Hattiesburg, MS 39401
(601) 266-7195

OR

Maurice A. Meylan, Program Committee Chairman
Department of Geology
University of Southern Mississippi
Hattiesburg, MS 39401
(601) 266-7196

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

CORDILLERAN SECTION, GSA, International Meeting,
77th Annual Meeting, Hermosillo, Sonora, Mexico, March 25–27, 1981

In March 1981, the Cordilleran Section will hold its first meeting in Mexico. It will be co-sponsored by the Departamento de Geología, Universidad de Sonora, and by the Instituto de Geología, Universidad Nacional Autónoma de México, in Hermosillo, Sonora.

TECHNICAL SESSIONS will be held on Wednesday, March 25, through Friday, March 27, at the Valle Grande and other nearby hotels. Although emphasis will be placed on Sonoran geology, abstracts reflecting all geologic subjects of the cordillera are welcome.

SYMPOSIA. Geology of the Mar of Cortez, Mexico (Jose Guerrero, Eduardo Aguayo); Porphyry copper-molybdenum deposits of Northern Sonora (John Gilbert, Ruben Velasco, J. Islas); Geochemical prospecting in the Southern Basin and Range Province (Jose Luis Lee Moreno, Ramon Farias); Precambrian of Western North America (Leon Silver, Thomas Anderson, Marco Gonzalez); Hydrology of Arizona and Sonora (Stanley Davis and Jesus Najera); Tectonics of the southern Cordillera (Peter Coney, Maria F. Campa); Geology and mineral resources of the Sierra Madre Occidental (Kenneth F. Clark, Paul Damon); Tectonics of the Gulf of California and Peninsular California (Gordon Ness); Laminated sediments in the Gulf of California; Their distribution and origin and the economical and paleoclimatological importance (Hans Schrader, Adolfo Molina-Cruz); Neogene paleoclimate and paleoecology and early man in American Southwest and Northern Mexico (J. Platt Bradbury).

FIELD TRIPS. Premeeting. Economic geology of Santa Rosalia, Baja California Sur (B. Colletta); Coastal geology of the region of Puerto Penasco, Sonora (J. Schreiber); Metamorphic core complexes in Sonora and Arizona (T. Anderson, G. Davis); Economic geology of Cananea and La Caridad copper deposits (J. Gilbert); Mesozoic geology of southwestern Arizona (G. Haxel); **Postmeeting.** Geology of the Sonoran Coast (Puerto Libertad to Bahia Kino) (G. Gastil); Precambrian to Mesozoic geology of Northwestern Sonora (L. Silver); Evaporitic deposits of the Guerrero Negro area (W. Holser, B. Javor); Hydrogeology of the Hermosillo Bahia Kino region (J. Najera); 1867 fault scarp in Sonora and Arizona (W. Bull); Mesozoic-Laramide tectonics of south Arizona and northeastern Sonora (S. Keith).

SOCIAL EVENTS. Special events are in the early planning stages.

HOUSING. Housing will be in local hotels and motels. Most are within easy walking distance of the meeting rooms, and arrangements will be handled by a central housing bureau. Arrangements are being made to provide low cost student camping facilities at the University of Sonora.

DETAILED INFORMATION concerning travel, registration, transportation, motel/hotel accommodations, field trips, and other activities will appear in a later issue of *GSA News & Information* and as part of the *Abstracts with Programs* for 1981.

ABSTRACTS. Abstracts are limited to 250 words and must be submitted on current GSA section abstract forms available from

Peter K. Coney
Program Committe, Co-Chairman
Department of Geosciences
University of Arizona
Tucson, AZ 85721

OR

Francisco Longoria
Program Committee,
Co-chairman
Apdo Postal 1182
Hermosillo, Sonora, México

OR

Abstracts Coordinator, GSA
P.O. Box 9140, Boulder, CO 80301
(303) 447-8850

ABSTRACTS MUST BE RECEIVED BY OCTOBER 15, 1980. **Submit one original and 5 copies.**

Abstracts from the United States and countries other than Mexico, should be sent to

Peter K. Coney, Program Committee, Co-Chairman
Department of Geosciences
University of Arizona
Tucson, AZ 85721

Abstracts from Mexico should be sent to:

Francisco Longoria, Program Committee Co-Chairman
Apdo Postal 1182
Hermosillo, Sonora, México

All abstracts will be reviewed by the Cordilleran Section Abstract Review Committee and/or Symposia organizers. Notification regarding acceptance or rejection should be received prior to January 1, 1981.

PROJECTION EQUIPMENT. All slides must be 2" x 2" and must fit a standard 35 mm carousel projector. Due to limited facilities, no dual projectors will be employed—plan talks accordingly. Please bring your own loaded carousel tray if possible.

Inquiries, additional information, requests, or suggestions should be directed to

Jaime Roldan
Instituto de Geología, UNAM
Campoy 904 Col. Pitic
Hermosillo, Sonora, México
Phone: Hermosillo 4-79-95

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

NORTHEASTERN SECTION, GSA, 16th ANNUAL MEETING
Bangor, Maine, April 9–11, 1981

The Northeastern Section of the Geological Society of America will meet April 9 to 11, 1981, at the Bangor Civic Center in Bangor, together with the Northeastern Section of the Paleontological Society and the Eastern Section of SEPM. The meeting is sponsored by the Maine Geological Survey and the University of Maine at Orono.

TECHNICAL SESSIONS will be held Thursday, Friday, and Saturday, April 9, 10, and 11, 1981.

SYMPOSIA. Several symposia have been arranged or are in the planning stages. These include: (1) Geochronology of Northern Appalachians: New England and Maritime Canada (Henri Gaudette, University of New Hampshire; and William Poole, Geological Survey of Canada); (2) Economic Geology of the Northern Appalachians (Bruce Bouley, Callahan Mining Co., 6245 No. 24th St., Phoenix, AZ 85016; and Richard Potter, New Brunswick Department of Mines); (3) Geological Framework of the New England and Maritime Canada Continental Margin (John Schlee, U.S. Geological Survey, Woods Hole); (4) Tectonics of the Northern Appalachians: Maine and Maritime Canada; sponsored jointly by the Geological Society of Maine and the Atlantic Geoscience Society (David Westerman, University of Maine, Orono; and Howard Donohoe, Nova Scotia Department of Mines); (5) Neotectonics of Maine (Patrick Barosh, Weston Observatory, Weston, Massachusetts; and Harold Borns, University of Maine, Orono); (6) New England Seismotectonic Studies (Patrick Barosh, Weston Observatory, Weston, Massachusetts); (7) Sediment Transport in Sand-dominated Estuaries; sponsored by the Eastern Section, SEPM (Barry Timson, 145 State Street, Augusta, Maine 04330; and Jon Boothroyd, University of Rhode Island); (8) Late Wisconsinan Deglaciation of Maine, Quebec, and New Brunswick (Harold Borns, University of Maine, Orono; Woodrow Thompson, Maine Geological Survey, Augusta; and Pierre La Salle, Ministere des Richesses Naturelles, Quebec, P.Q.); (9) The Adaptive Potential of Bivalved Shells: Comparative Assessments of Brachiopods, Molluscs, and Ostracodes, sponsored by the Northeastern Section, Paleontological Society (Roger Thomas, Franklin and Marshall College); (10) Problems of Waste Disposal; sponsored by the Engineering Geology Division (Alan Hatheway, Haley & Aldrich, Inc., 238 Main St., Cambridge, Massachusetts 02143).

CALL FOR PAPERS. Papers are invited for presentation at the technical sessions, poster sessions, and symposia. Fifteen minutes for presentation and five minutes for discussion will be allowed in the technical sessions and symposia. Papers of general geologic interest as well as those of regional scope will be considered. Deadline for receipt of abstracts for technical sessions is October 31, 1980; **this deadline is firm and will be strictly adhered to.** All persons planning a presentation for one of the symposia must submit their abstracts to the convener by October 15, 1980.*

*SEPM Symposium abstracts should be submitted to Barry Timson by October 1, 1980.

Early preparation and submission of abstracts would be appreciated.

ABSTRACTS, which are limited to 250 words, must be submitted camera ready, on official 1981 abstract forms available from

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

OR

Arthur M. Hussey II
Program Committee Chairman
Department of Geology
Bowdoin College
Brunswick, ME 04011
(207) 725-8731, Ext. 219

ABSTRACTS ARE DUE October 31, 1980.

Send one original and four copies to Arthur M. Hussey II
Department of Geology
Bowdoin College
Brunswick, Maine 04011

Acceptance or rejection of an abstract will be based on review by the Technical Program Committee. Abstracts will be judged on informative content, readability, originality, and northeastern section geographic coverage.

STUDENT PAPERS. Three awards ($100, $50, and $25) will be made for the best student papers presented on a research problem. To be eligible, the abstracts must be by a single author and must be designated on the abstract form as a student paper.

PROJECTION EQUIPMENT will be available for 2" x 2" slides in carousels. Only one projector will be used in each room. Please bring your own loaded carousel trays, if possible.

EXHIBIT SPACE will be available adjacent to the session area. Individual booths will be a standard size, but double booths will be available. The cost of a booth for educational institutions will be reduced. For additional information, contact Irwin Novak, 112 B Bailey Hall, University of Southern Maine, Gorham, ME 04038; Tel. (207) 780-5350.

DETAILED INFORMATION concerning registration, accommodations, and other activities will appear in a later issue of *GSA News & Information* and as part of the *Abstracts with Programs* for 1981.

ADDITIONAL INFORMATION, REQUESTS, OR SUGGESTIONS should be directed to the General Co-Chairmen:

Walter A. Anderson
Maine Geological Survey
State House Station No. 22
Augusta, Maine 04333

Philip H. Osberg
Department of Geological Sciences
110 Boardman Hall
University of Maine at Orono
Orono, Maine 04469

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

ROCKY MOUNTAIN SECTION, GSA, ANNUAL MEETING
Rapid City, South Dakota, April 15–17, 1981

The Rocky Mountain Section of the Geological Society of America will hold its annual meeting at the Rushmore Plaza Civic Center in Rapid City, South Dakota, on April 15-17, 1981. The host will be the Department of Geology and Geological Engineering, South Dakota School of Mines and Technology, Rapid City, South Dakota.

TECHNICAL SESSIONS AND FIELD TRIPS. Two days of technical sessions will be held on April 16 and 17, with premeeting and postmeeting field trips on April 14, 15 and 18, 19, respectively. On-site registration will begin the evening of April 15 at the Rushmore Plaza Civic Center. Technical and poster sessions will be arranged after abstracts of proposed papers have been reviewd by the Program Committee. Advanced registration for field trips may be completed using the preregistration forms available in the January issue of *GSA News & Information.*

FIELD TRIPS. Specific field trips will be announced at a later date. Topics may include Precambrian geology of the northern Black Hills, Tertiary intrusions and geology of northern Black Hills, Tertiary paleontology of the Badlands area, Mesozoic stratigraphy and paleontology of the region, pegmatites of the Black Hills, geology of the Homestake Gold Mine, geological engineering problems of the Black Hills area, and geology, hydrology, and petroleum resources of Harding County and the Williston Basin, South Dakota.

Most trips will be one or two days in length and inexpensive due to the accessibility of the Black Hills and surrounding areas during any season.

SYMPOSIA. Four symposia will be conducted. Topics include Energy and Ore Deposits of the Northern Great Plains and Black Hills Regions; Studies of the Pierre Shale; Structural Evolution of the Northern Great Plains and Black Hills Regions; and Groundwater Studies of the Northern Great Plains Region. Solicited and unsolicited papers will be selected by the Program Committee.

ABSTRACTS ARE DUE NOVEMBER 17, 1980

Send one original and four copies to
Philip R. Bjork, Program Chairman
Department of Geology and Geological Engineering
South Dakota School of Mines & Technology
Rapid City, SD 57701
(605) 394-2467 or 2461

All papers in ordinary sessions will be 15 minutes, plus 5 minutes for discussion.

Acceptance or rejection of an abstract will be based on the abstract as submitted by the author. Authors will be notified of acceptance well in advance of the meeting.

Carousel projection equipment will be provided for 2" x 2" (35 mm) slides only (duel projectors by prior request only). Please bring your own loaded carousel trays if possible.

ABSTRACT FORMS may be obtained from the following person:

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

GUIDEBOOK. The American Geological Institute will publish the Rocky Mountain Section GSA Meeting Guidebook. This will include complete roadlogs and detailed geological descriptions of all the field trips plus 15 to 17 invited papers pertaining to the geology of the Greater Black Hills and Northern Great Plains Regions (including the Williston Basin and Eastern Powder River Basin). For more information contact

Fredrick J. Rich, Guidebook Chairman
Department of Geology
South Dakota School of Mines & Technology
Rapid City, SD 57701
(605) 394-2496 or 2461

STUDENT AWARDS. Student papers are encouraged, and awards will be made to students presenting the most outstanding papers. Student papers should be clearly identified as such and should be authored exclusively by students.

EXHIBITS. There will be an exhibit hall available. Exhibitors will be charged an appropriate fee for display space. For more information contact

Bill Roggenthen, Exhibits Chairman
Department of Geology
South Dakota School of Mines & Technology
Rapid City, SD 57701
(605) 394-5714 or 2461

ANNOUNCEMENTS concerning registration, motel accommodations, and events for guests will appear in a later issue of *GSA News & Information* and as part of the *Abstracts with Programs* for 1981. Rapid City, South Dakota, is easily accessible by air via Western, Frontier, and Republic airlines with non-stop or one-stop connections through Salt Lake City, Denver, Casper, Minneapolis, Bismark, and Minot, or by automobile via I-90 (east-west) or U.S. 85 & 18/I-25 (north-south). Mt. Rushmore National Memorial, Badlands and Wind Cave National Parks, Devil's Tower and Jewel Cave National Monuments, Custer and Bear Butte State Parks and Spearfish Canyon are open and easily accessible during April. The South Dakota School of Mines and Technology Museum of Geology, located on campus, will be open for public viewing.

Additional information, requests, or suggestions should be directed to

Kenneth E. Kolm
Department of Geology
South Dakota School of Mines and Technology
Rapid City, SD 57701
(605) 394-5114 or 2461

AUGUST BULLETIN SEPARATES

Summaries

At the request of members, the Summaries section may be ordered as one separate by those who have purchased the separates option. To order, write "August Summaries" on coupon.

• S00801—Trace elements in continental-margin magmatism: Part II. Trace elements in Ben Ghnema batholith and nature of the Precambrian crust in central North Africa: Summary.

John J. W. Rogers, Department of Geology, University of North Carolina at Chapel Hill, Mitchell Hall 029A, Chapel Hill, North Carolina 27514; Kip V. Hodges, Mohamed A. Ghuma, Department of Geology, Faculty of Science, Al Fateh University, P.O. Box 13258, Tripoli, Libyan Arab People's Socialist Jamahiriya (present address, Hodges: Dept. of Earth and Planetary Science, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139). (3 p., 3 figs.)

• S00802—Paleomagnetic studies of central North Pacific sediment cores: Stratigraphy, sedimentation rates, and the origin of magnetic instability: Summary.

Roger A. Prince, Graduate School of Oceanography, University of Rhode Island, Narragansett, Rhode Island 02882 (present address: Department of Geology, Brown University, Providence, Rhode Island 02912.); G. Ross Heath, School of Oceanography, Oregon State University, Corvallis, Oregon 97331; Michelle Kominz, Graduate School of Oceanography, University of Rhode Island, Narragansett, Rhode Island 02882. (3 p., 1 fig.)

• S00803—Early Proterozoic sedimentary basins of the Lake Superior region: Summary.

D. K. Larue, L. L. Sloss, Department of Geological Sciences, Northwestern University, Evanston, Illinois 60201 (present address, Larue: Department of Geology, Stanford University, Stanford, California 94305). (3 p., 2 figs.)

Bulletin Briefs

Titles and abstracts of conventional articles in the August 1980 GSA Bulletin, Part I *are provided on the following pages to aid members who have purchased the separates option to select* Bulletin, Part I *separates of their choice. See instructions for ordering on page 147.*

• 00804—Devonian metamorphic event in the northeastern Klamath Mountains, California.

Susan M. Cashman, Department of Geology, Humboldt State University, Arcata, California 95521. (7 p., 4 figs., 1 tbl.)

Shared characteristics including parental rock types, lithologic associations, isoclinal folding accompanied by greenschist to lower amphibolite facies metamorphism, parallel structural trends, and Devonian metamorphic age support a correlation between metamorphic rock units previously assigned to the Duzel Formation ("Eastern Klamath belt") and Grouse Ridge Formation (Central Metamorphic belt) in northern California. Contact relations and mineral assemblages suggest that Devonian metamorphism and deformation occurred during juxtaposition of the Central Metamorphic belt and ultramafic rocks from the Trinity mafic-ultramafic complex, perhaps during eastward subduction. Ages and contact relations of two unmetamorphosed Eastern Klamath belt units (the Gazelle Formation and the Moffett Creek Formation) suggest that these units were faulted into their present positions subsequent to the Devonian metamorphic event.

• 00805—Regional tilt patterns of late Cenozoic basin-range fault blocks, western United States.

John H. Stewart, U.S. Geological Survey, Menlo Park, California 94025. (5 p., 5 figs.)

Large regions in which major late Cenozoic basin-range fault blocks are consistently tilted are recognized in the western United States. The pattern of tilt domains is characterized by transverse zones or boundaries, parallel to the extension direction, and by antiformal (tilts away from) and synformal (tilts toward) boundaries at right angles to the extension direction. Tilting of ranges averages about 15° to 20° in Nevada and Utah and indicates extension of about 20% to 30% for the entire Great Basin region, using the model proposed by Morton and Black (1975) that relates dip of beds and extension. The regional tilt pattern may be related to stress relief extending outward from antiformal boundaries that are interpreted as initial sites of rupture during late Cenozoic extension.

• 00806—Paleoenvironment of a late Quaternary mammoth-bearing sinkhole deposit, Hot Springs, South Dakota.

Robert L. Laury, Department of Geological Sciences, Southern Methodist University, Dallas, Texas 75275. (11 p., 11 figs., 2 tbls.)

Mammoth-bearing laminated sediments fill a steep-walled sinkhole which formed ~26,000 yr ago in the southern Black Hills of South Dakota. The depression formed as a collapse feature over a solution breccia pipe. Artesian water issuing principally from one marginal spring quickly established a lake in the sink and thereafter maintained an energy gradient which affected sediment dispersal. Sediments were supplied to the pond by storm runoff from proximal uplands and by spring erosion of sinkhole walls. Three successive and gradational phases of sedimentation are recognized in the sinkhole: (1) relatively rapid deposition of poorly sorted gravels and sands as predominantly subaqueous talus accumulations adjacent to near-vertical sinkhole walls, and concomitant sedimentation of micrograded sands and silts in the central pond area; (2) slowing of sedimentation rates and widespread deposition of finer grained,

rhythmically laminated, but not varved, sands and clayey silts; and (3) progressive and fairly rapid reduction in spring discharge and water depth, ending pond sedimentation. Renewed downcutting of major streams in the area and synchronous decline of regional ground-water tables terminated spring discharge to the sinkhole.

Paleontological and other indirect evidence strongly suggest that the sinkhole pond was fed by heated springs which maintained a year-round temperature of at least 35 °C (95 °F). Although warm water may have attracted a variety of megafauna to the sinkhole, only mammoths were trapped there. When in the water, mammoths deformed pond strata and generated several types of sedimentation events. Pond depths probably did not exceed 4 to 5 m except in the spring conduit area.

• 00807—Franciscan Complex limestone deposited at 17° South paleolatitude.

Walter, Alvarez, Department of Geology and Geophysics, University of California, Berkeley, California 94720; Dennis V. Kent, Lamont-Doherty Geological Observatory, Palisades, New York, 10964; Isabella Premoli Silva, Istituto di Paleontologia, Piazza Gorini, 15, Milano, Italy; Richard A. Schweickert, Roger A. Larson, Lamont-Doherty Geological Observatory, Palisades, New York 10964. (9 p., 7 figs., 3 tbls.)

At Laytonville, California, about 230 km north-northwest of San Francisco, three blocks of pelagic limestone, each a few tens of metres long, are incorporated in the Franciscan melange. Bedding is well defined, but top indicators are lacking. Paleomagnetic study of two of the blocks (16 samples, 52 specimens) yielded directions of D: 183.9°, I: −22.6°, α_{95}: 21.6° (block 1), and D: 229.5°, I: −31.8°, α_{95}: 10.7° (block 2) relative to the present orientation of bedding. Inclinations were not significantly different, but the difference in declinations shows that magnetization preceded emplacement of the blocks in the melange. Study of foraminifera showed that the blocks are of Albian and Cenomanian age and were deposited during the Cretaceous Long Normal Polarity Interval. Details of the foraminiferal zonation show that both blocks are right side up. The observed inclinations imply deposition on the Farallon plate at 17° ± 7° *South* paleolatitude at about 96 m.y. B.P. (block 2; block 1 data agree but are less definitive). Consideration of reasonable paleolongitudes and possible times of incorporation of the blocks in the melange indicates a Farallon–North America convergence rate significantly higher than any observed today. The most commonly accepted emplacement time (latest Cretaceous) indicates convergence at about 38 cm/yr (range: 24 to 60 cm/yr). An alternate interpretation, that emplacement occurred at 30 ± 15 m.y. B.P., would indicate convergence at about 15 cm/yr (range: 9 to 24 cm/yr). The convergence rates obtained in the first case are astonishingly high, and they suggest that perhaps current ideas on the Franciscan should be re-evaluated, with consideration given to the possibility that tectonic mixing continued until the middle or late Tertiary. Even so, the Farallon–North American convergence rate was apparently higher than any convergence rate observed today. This rapid convergence coincides with the Cretaceous rapid spreading pulse, and it may be responsible for such features as the large volumes of Late Cretaceous batholiths and subduction complexes in western North America.

• 00808—Structural behavior of fracture zones symmetric and asymmetric about a spreading axis: Mid-Atlantic Ridge (latitude 23°N to 27°N).

Peter A. Rona, National Oceanic and Atmospheric Administration, Atlantic Oceanographic and Meteorological Laboratories, 15 Rickenbacker Causeway, Miami, Florida 33149; Dale F. Gray, Department of Earth and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139. (10 p., 9 figs., 1 tbl.)

Two classes of fracture zones are distinguished on the basis of their orientations with respect to a spreading axis and length of associated ridge-ridge transform offset. (1) Minor fracture zones associated with transform faults of short offset (<30 km; minitransforms); the minor fracture zones may exhibit an asymmetric V-shaped configuration with respect to a spreading axis at variance with small circles about poles of plate rotation. (2) Major fracture zones associated with transform faults of long offset (>50 km); the major fracture zones exhibit a symmetric configuration with respect to a spreading axis following small circles about poles of plate rotation. Recognition of the coexistence of the two classes of fracture zones with different orientations on a slow-spreading oceanic ridge raises questions regarding the significance of the different orientations and nature of the intervening structural transition.

A systematic narrow-beam bathymetric and magnetic investigation was performed to answer these questions in an area encompassing the change from minor fracture zones asymmetric with respect to the axis of the rift valley of the Mid-Atlantic Ridge at lat 26°N between major fracture zones, and a major fracture zone, the Kane, symmetric with resepct to the axis of the rift valley at lat 24°N. The investigation delineated an intervening transitional region where structural features have continuously undergone geometric adjustments that have accommodated the discrepancy in orientation between the two classes of fracture zones for at least the past 6 m.y.

A hypothesis of differential structural stability determined by thickness of lithosphere within transform offsets is advanced to explain the observed differences in behavior of the two classes of fracture zones. The orientation of a major fracture zone is constrained to follow small circles along a trajectory of relative plate motion by a long section of thick lithosphere in the associated transform fault. The orientation of a minor fracture zone is susceptible to reorientation in the short section of thin lithosphere in the associated transform fault; the reorientation reflects response to intra-plate and interplate stresses. The geometric adjustments that occur as a consequence of differential structural stability continuously accommodate any discrepancy in orientation that may develop between coexistent major and minor fracture zones, so that an ocean basin such as the Atlantic can open symmetrically.

• 00809—Upper Precambrian (Eocambrian) Mineral Fork Tillite of Utah: A continental glacial and glaciomarine sequence.

Richard W. Ojakangas, Charles L. Matsch, Department of Geology, University of Minnesota, Duluth, Duluth, Minnesota 55812. (7 p., 14 figs.)

A glacial origin for the Mineral Fork Tillite in the Big Cottonwood Canyon area of the Wasatch Range in Utah is reaffirmed. The formation consists of two members: a lower sequence of thick, massive diamictites, with minor lensoid beds of shale-siltstone, sandstone, and conglomerate, and an upper sequence of more abundant shale-siltstone and siltstone that displays prominent bedding. The lower member is interpreted to be a sedimentary pile of tills and outwash deposited by multiple advances of continental glaciers. A grooved, polished, and striated surface marks the basal contact with the Big Cottonwood Formation. The upper member is considered to be of glaciomarine origin, mainly sediments released from icebergs and/or a floating ice shelf, along with rock flour washed from marine-based glacier margins. One major continental to marine cycle of environmental change is indicated as a result of slow but steady subsidence along a continental margin. Evidence cited here strengthens the case for a major glacial event during late Precambrian (Eocambrian) time in western North America.

• 00810—Regional gravity survey, northern Marysvale volcanic field, south-central Utah.

Mark E. Halliday, Kenneth L. Cook, Department of Geology and Geophysics, University of Utah, Salt Lake City, Utah 84112. (7 p., 9 figs.)

New gravity data in south-central Utah reveal anomalies over major structural and volcanic features in the northern Marysvale volcanic field. Gravity lows are associated with the Mount Belknap and Big John calderas in the Tushar Mountains, and with the Red Hills caldera in the Antelope Range. Steep gravity gradients mark the locations of the Sevier, Elsinore, Dry Wash, and Tushar faults; gravity lows are observed over the grabens dropped down between these major normal faults. The steep gravity gradient across the Basin and Range–Colorado Plateau transition zone is not necessarily the result of deepening of the Moho, but may simply reflect the thick low-density volcanics in the Marysvale field as well as changes in the density of sedimentary rocks across the Cordilleran hingeline. East-northeast–trending gravity contours follow closely the northern edge of a series of Tertiary intrusive bodies and are generally aligned with the trend of the Wah Wah–Tushar mineral belt of southwestern Utah.

SEPTEMBER BULLETIN SEPARATES

Summaries

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• S00901—Lithostratigraphic classification of basement rocks of the Wichita province, Oklahoma: Summary.

Benjamin N. Powell, Department of Geology, Rice University, Houston, Texas 77001 (present address: Phillips Petroleum Company, Bartlesville, Oklahoma 74004); M. Charles Gilbert, Department of Geological Sciences, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061; and Joseph F. Fischer, Resource Associates of Alaska, 5926 McIntyre Street, Golden, Colorado 80401 (present address: Occidental Minerals Corporation, Irongate Building 4, 777 South Wadsworth Boulevard, Lakewood, Colorado 80226). (6 p., 9 figs., 1 tbl.)

• S00902—Late Cenozoic volcanic rocks of the southern Sierra Nevada, California: I. Geology and petrology: Summary.

James G. Moore and Franklin C. W. Dodge, U.S. Geological Survey, Menlo Park, California 94025. (4 p., 4 figs.)

• S00903—Seismotectonic regionalization of the Great Basin, and comparison of moment rates computed from Holocene strain and historic seismicity: Summary.

Roger W. Greensfelder, Department of Geophysics, Stanford University, Stanford, California '94305; Frederick C. Kintzer, URS/John A. Blume & Associates, Engineers, 130 Jessie Street, San Francisco, California 94105; and Malcolm R. Somerville, Seismological Laboratory, Mackay School of Mines, University of Nevada, Reno, Nevada 89557. (6 p., 3 figs., 1 tbl.)

Bulletin Briefs

Titles and abstracts of conventional articles in the September 1980 GSA Bulletin, Part I *are provided on the following pages to aid members who have purchased the separates option to select* Bulletin, Part I *separates of their choice. See instructions for ordering on page 147.*

• 00904—Twentieth-century crustal deformation in the Garlock fault–Slate Range area, southeastern California.

George I. Smith, Jack P. Church, U.S. Geological Survey, Menlo Park, California 94025 (present address, Church: 13542 Paseo Terrano, Salinas, California 93908). (11 p., 7 figs., 4 tbls.)

The Garlock fault–Slate Range area in southeastern California is known from geologic evidence to have been tectonically active during very late Cenozoic time. Historic fault scarps have not been observed, but comparisons of successive surveys along five bench-mark lines in the area indicate systematic elevation changes that can be explained as continued tectonic activity along known geological structures. The Garlock fault displays no vertical creep southeast of the Slate Range, but creep may be occurring west of that area. North of the fault, in the southwest corner of the Great Basin, the north-northwest–trending Slate Range anticline and Argus–Slate Range syncline appear to be active where bench mark lines cross them. South of the fault, the east-northeast–trending Dome Mountain anticline and Pilot Knob Valley syncline appear active. Maximum rates of ele-

vation change were 3.56 cm in 2 mo and 12.70 cm over 4 yr; surveys made decades apart, however, show rates that range from 0.07 to 0.27 cm/yr. Short periods of rapid change appear to be separated by long periods of no change (or reversals). The four bench-mark lines that were resurveyed 29 to 41 yr later had maximum elevation change rates of 0.01 to 0.02 $cm \cdot km^{-1} \cdot yr^{-1}$; this would result in 45°of tilting along a 1-km line in 5 to 10 m.y.

The axial trends of the two pairs of anticlines and synclines are nearly normal to each other. However, the stresses causing them do not appear to be decoupled along the Garlock fault inasmuch as east-northeast folding is apparently also occurring just north of it. Two stress patterns, either alternating or reflecting deformation in differing crustal horizons, appear required to explain the observed folding plus left slip on the fault. Neither stress pattern is compatible with extension tectonic theories of the Great Basin, and this region appears to be an anomalous block restricted to the southwest corner of the province.

• 00905—Emplacement of the Butler Hill Granite, a shallow pluton within the St. Francois Mountains batholith, southeastern Missouri.

J. Ronald Sides, Department of Geology, University of Texas at Arlington, Arlington, Texas 76019. (6 p., 6 figs., 2 tbls.)

The St. Francois Mountains batholith of southeastern Missouri appears to be a shallow composite batholith that has intruded a roof of its own volcanic ejecta. The complex is composed mostly of silicic intrusive units and rhyolitic pyroclastic rocks that are mostly about 1,500 m.y. old. Field, petrographic, and chemical data suggest that the batholith has been tilted to the southwest and beveled by erosion, thus exposing a 6-km stratigraphic section of the volcanic roof and a 4-km cross section of the underlying intrusive units.

The Butler Hill Granite is the largest single intrusive unit in the St. Francois Mountains batholith and probably controlled the development of most of the batholith. The Butler Hill Granite is characterized by small but systematic chemical variations, with SiO_2 and K_2O most abundant in the southwest and Fe_2O_3, TiO_2, MgO, and CaO most abundant in the northeast. Moreover, the pluton is characterized by striking gradational changes in mineralogy, with plagioclase and perthitic orthoclase most abundant in the northeast and southwest, respectively. These modal and chemical changes support the tilted-batholith hypothesis, which predicts that the Butler Hill Granite should be structurally highest and most differentiated to the southwest and deeper and less differentiated to the northeast. The large increase in plagioclase to the northeast is due to increased fluid pressure resulting from the greater original depth of this magma. High fluid pressure (about 3 kb) has resulted in partial elimination of the one-feldspar field, so that albite to sodic oligoclase formed rather than a mixed feldspar. These modal data, along with volcanic stratigraphic evidence and chemical relationships expressed in the quartz-albite-orthoclase-water system, suggest that the depth of crystallization of Butler Hill Granite now exposed in the northeasternmost part of the pluton was about 10 km.

• 00906—Displacement of inert mineral grains by growing porphyroblasts: A volume balance constraint.

C. C. Ferguson, Department of Geology, University of Nottingham, Nottingham NG7 2RD, United Kingdom. (4 p., 2 figs., 2 tbls.)

Although the nature of the mechanical interactions between growing porphyroblasts and their surrounding matrix is poorly understood, it is widely believed that mechanical displacement of matrix grains due to prophyroblast growth is unlikely or impossible. The presence of an increased concentration of inert (nonreacting) grains in the matrix immediately surrounding a porphyroblast suggests the possibility of this concentration being due to mechanical expulsion of grains from the volume now occupied by the porphyroblast. This model implies a strict relationship between the volume of the porphyroblast, the volume of the zone of increased concentration adjacent to it, and the volume fraction of the inert material in both.

A recently published study of relict zircons in feldspar-porphyroblastic gneisses from Colorado demonstrates zircon enrichment (relative to normal matrix) in "shells" immediately surrounding the porphyroblasts, and zircon depletion (relative to normal matrix) within the porphyroblasts. Volume fractions of zircon in these different sub-volumes, however, do not satisfy the volume balance constraint implied by the proposed mechanical displacement model.

In hornfelsed metagraywackes from the Black Hills, South Dakota, distinctive accumulations of muscovite and graphite are found adjacent to the faces of euhedral garnet porphyroblasts. Detailed quantitative petrography shows that these accumulations do satisfy the volume balance equation implied by a mechanical displacement model; this provides strong (if not conclusive) evidence that growing porphyroblasts can physically displace matrix grains and, in so doing, produce distinctive matrix microstructures.

• 00907—Hyaloclastite and lava flows on young seamounts examined with a submersible.

Peter Lonsdale, University of California, San Diego, Marine Physical Laboratory of Scripps Institution of Oceanography, La Jolla, California 92093; R. Batiza, Department of Earth and Planetary Sciences and McDonnell Center for Space Sciences, Washington University, St. Louis, Missouri 63130. (10 p., 7 figs., 2 tbls.)

Four small seamounts that rise 800 to 1,200 m above the flanks of the East Pacific Rise at the Pacific-Rivera plate

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boundary were examined and sampled during four dives of DSV-3 *Turtle*. They are all volcanic cones, at least two of them with summit craters. Samples from three of the volcanos are tholeiitic basalt that chemically resembles the basalt erupted at the rise crest, although they are less fractionated. One of the cones within 15 km of the spreading axis has very young flows of sheet and pillow lava on its summit, including some en echelon pillow walls. The other seamounts, farther from the plate boundary, appear extinct and generally have more weathered lava with thicker ferromanganese crusts. They also have extensive flows of hyaloclastite that probably formed in deep-water phreatomagmatic eruptions. Typical hyaloclastite landforms are stone streams of rocks that have moved down side slopes of volcanos and been stabilized by precipitation of volcanogenic ferromanganese cements.

• 00908—Immature plate boundary zones studied with a submersible in the Gulf of California.

Peter Lonsdale, L. A. Lawver, University of California, San Diego, Marine Physical Laboratory of Scripps Institution of Oceanography, La Jolla, California 92093 (present address, Lawver: U.S. Geological Survey, Menlo Park, California 94025). (15 p., 9 figs.)

The two spreading axes and a marginal transform fault in Guaymas Basin were examined during six dives to depths of 1,900 to 2,000 m in the submersible *Sea Cliff*. The plate boundary zones differ from those at mid-ocean ridges because of their youth: they are buried by thick sediment, partly derived from the adjacent continents whose rifted edges are still at the plate boundary along some transform faults. The accretionary margins have rift valleys bounded by normal fault scarps of diatomaceous mud; they are true grabens, not regenerating axial troughs like those at some mid-ocean ridges. The rifts are the main sites of turbidite deposition, igneous intrusion, and extensional faulting, processes that compete to level, buckle, and fracture the rift floors. Intrusion is by emplacement of sills and thicker bysmalith-like bodies, which episodically raise hills of folded and faulted semiconsolidated turbidites. Some of the fault scarps bounding the hills have very fresh, near-vertical faces, while others are cavernously weathered. A small hill within the Northern Trough has extensive young hydrothermal deposits of talc and sulfides on its crest and at a dissecting fault scarp. No extrusive volcanic rocks were found in the axial rift valleys nor at a marginal transform fault, where a belt of obliquely faulted sediments probably overlies the strike-slip axis. The transform-fault shear zone lies in a very asymmetric graben, with a sag at the edge of the basin floor and a fresh fault scarp truncating lithified sandstones on the continental side.

• 00909dr—Distributional model for marine isopod crustaceans and its bearing on early Paleozoic paleozoogeography and continental drift: Discussion and reply. (3 p. 1 fig.)

Discussion: *Clive F. Burrett, Geology Department, University of Tasmania, G.P.O. Box 252C, Hobart, Tasmania 7001, Australia.*

Reply: *Michael E. Taylor and Richard M. Forester, U.S. Geological Survey, Denver Federal Center, Colorado 80225.*

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