GSA news & information

VOLUME 1, NUMBER 10 OCTOBER 1979

Dear annual meeting participant:

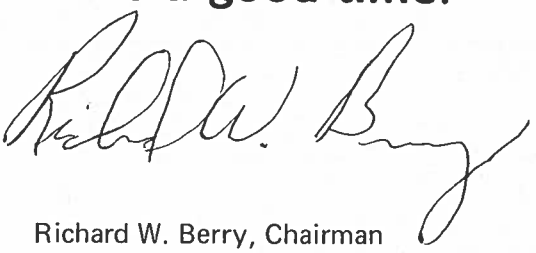
Glad to hear you are coming to San Diego. You will be coming in record-breaking numbers. You have submitted record-breaking numbers of abstracts. Sadly, this means that many good abstracts could not be included in this year's program. Happily, it also means that the overall quality of the papers that are presented should be higher than ever. It also means that many of the abstracts that could not be accepted here will add greatly to the significance and quality at the 1980 section meetings.

The Joint Technical Program Committee dealt with 1,200 volunteered abstracts in a way that was ethical, careful, equable, and above all, professional. An additional 200 symposia abstracts brought the total submitted to over 1,400—the largest number ever. In order to make maximum use of the meeting time, I have started the sessions at 0800 hours and scheduled only one hour for lunch. This allows you to select the papers to which you will listen from the largest possible assortment—even to choose between papers, sleep, and food. Somewhere in your registration packet (you may have to dig deeply), you will find a guide to fast- and not-so-fast-food restaurants on and around the convention grounds. At the time of writing this letter, plans are being made to have a luncheon (sandwich and beverage) bar set up adjoining the rooms in which the technical sessions will be held. The food won't be gourmet, but it should give you enough energy to get through to attitude adjustment hour.

The poster sessions are getting better every year. This year, there are enough poster booths available to allow authors of both morning and afternoon poster sessions to set up their presentations in the morning and leave them up all day. The authors will be in attendance as scheduled, but their presentations will be given a full day's exposure. The morning poster session booths are separated by afternoon poster session booths. (Unless I have gone totally out of my mind, this also means that the afternoon poster session booths are separated by the morning session booths.) Hopefully, this will separate authors sufficiently for you to hear only one at a time.

If all this gets to be too trying, remember the ad hoc mini-field trips along San Diego's beaches. I hope the meeting will be an appropriate mixture of science, business, and enjoyment for you.

Have a good time!



Richard W. Berry, Chairman
1979 Joint Technical Program Committee

P.S.

Poster sessions scheduled for Thursday, November 8, have been changed to the Council, Chamber, and Cabinet Rooms in the Convention Center of the Town and Country Hotel.

UPDATE

Articles in *Bulletin, Part II,* October 1979

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 ($6/month) as a special service to those users (members and nonmember 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. Paleogene sediment dispersal and paleotectonics in northern California, by William R. Dickinson, Raymond V. Ingersoll, and Stephan A. Graham. Doc. no. M90110. (On microfiche: 71 p., 9 figs., 6 tables)
2. Petrogenesis of the Mount Albert Ultramafic Massif, Quebec, by Ian D. MacGregor and Asish R. Basu. Doc. no. M90210. (On microfiche: 99 p., 34 figs., 9 tables)
3. Fluid inclusion evidence for Silurian evaporites in southeastern Vermont, by R. A. Rich. Doc. no. M90310. (On microfiche: 16 p., 4 figs., 2 tables)

In October *Geology*

1. Chemistry and provenance of detrital plagioclase, by A. S. Trevena and W. P. Nash.
2. Comparison of zircon and glass fission-track ages from tephra horizons, by Diane Seward.
3. Garnet granulite and associated xenoliths in minette and serpentinite diatremes of the Colorado Plateau, by S. N. Ehrenberg and W. L. Griffin.
4. Mount Johnson, Quebec—An example of silicate-liquid immiscibility?, by G. N. Eby.
5. Topsails igneous complex—Further evidence of middle Paleozoic epeirogeny and anorogenic magmatism in the northern Appalachians, by R. P. Taylor.
6. Alternative model for emplacement of the Papuan ophiolite, Papua New Guinea, by T. L. Johnson.
7. A variably veined suboceanic upper mantle—Genetic significance for mid-ocean ridge basalts from geochemical evidence, by D. A. Wood.
8. Evidence for spreading-center jumps from fine-scale bathymetry and magnetic anomalies near the Galapagos Islands, by Richard Hey.
9. Eolian sand deflation—A cause for gravel barrier islands in arctic Alaska?, by E. Reimnitz and D. K. Maurer.

Necrology

Notice has been received of the following deaths: Louis I. Briggs, Jr., Ann Arbor, Michigan; Carl Owen Dunbar, Dunedin, Florida; Thomas W. Mitcham, Tucson, Arizona; and James Spence, London, England.

Council lists nominations for 1980

For Councilor (1980–1981) and President (1980)
Laurence L. Sloss, Evanston, Illinois

For Councilor and Vice-President (1980)
Howard R. Gould, Houston, Texas

For Councilor and Treasurer (1980)
William B. Heroy, Jr., Dallas, Texas

For Councilors (1980–1982)
Robert E. Boyer, Austin, Texas
Frank E. Kottlowski, Socorro, New Mexico
Dallas L. Peck, Reston, Virginia
Peter R. Vail, Houston, Texas

Memorials Volume IX now available

Memorials Volume IX is now available, containing the following memorials:

Aaro Emil Aho, 1925–1977, by W. H. Mathews
Judson Lowell Anderson, 1902–1977, by S. L. Agron
George Brown Barbour, 1890–1977, by H. S. Barbour
Alfred Hannam Bell, 1895–1977, by G. V. Cohee and J. C. Frye
Wilbur Swett Burbank, 1898–1975, by R. G. Luedke
Lorin Delbert Clark, 1918–1977, by P. C. Bateman
Lincoln Dryden, 1903–1977, by W. C. Krumbein
Philip Geoffrey Britton Gilbert, 1893–1977, by T. L. Brock
Otto Heinrich Haas, 1887–1976, by J. Lintz, Jr.
John Robert Hayes, 1912–1977, by L. W. Leroy
John William James, 1921–1977, by N. P. Carroll
Verner Everett Jones, 1905–1977, by W. Sumner
John Lawrence Lester, 1914–1977, by G. W. Caylor
George Burke Maxey, 1917–1977, by D. A. Stephenson
Josie Winifred McGlamery, 1887–1977, by C. W. Copeland
Malcolm Christie Oakes, 1890–1977, by R. H. Dott
Nicolas Oulianoff, 1881–1977, by S. Ayrton
Alonzo Wallace Quinn, 1899–1977, by M. P. Billings
Edgar Paul Rothrock, 1889–1977, by D. P. Rothrock
Norman David Watkins, 1934–1977, by Tj. H. van Andel
Raymond Eugene Whitla, 1909–1977, by W. H. Stuart

Books may be purchased for $9.00 through the Publication Sales Department, GSA, 3300 Penrose Place, P.O. Box 9140, Boulder, CO 80301.

GSA News & Information
Vol. 1, no. 10 October 1979
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; Jo Fogelberg, Publications Manager; and June Thomas, Judy Hall, Barbara Patterson, and Ann Fogel, Production Assistants.

UPDATE

GSA announces medal and award winners for 1979

The 1979 medalists and award winners announced by the Council at its May 1979 meeting are as follows:

PENROSE MEDAL: *J Harlan Bretz,* 2114 Cedar Road, Homewood, IL 60430.

DAY MEDAL: *Walter M. Elsasser,* Department of Earth and Planetary Sciences, Johns Hopkins University, Baltimore, MD 21218.

KIRK BRYAN AWARD: *Stanley A. Schumm,* Department of Earth Resources, Colorado State University, Fort Collins, CO 80523.

MEINZER AWARD: Not available at press time.

BURWELL AWARD: *Evert Hoek and John W. Bray,* Rock Mechanics, Imperial College of Science and Technology, London, England.

CADY AWARD: *Peter A. Hacquebard,* Atlantic Geoscience Center, Bedford Institute, Dartmouth, Nova Scotia B2Y 4A2.

NATIONAL MEDAL OF SCIENCE: The Council named *Philip H. Abelson, M. King Hubbert,* and *Frank Press* as the Society's nominees for the National Medal of Science.

GSA announces honorary fellowships for 1979

The 1979 Honorary Fellows announced by the Council at its May 1979 meeting are as follows:

Samuel W. Carey, 24 Richardson Avenue, Dynnyrne, Tasmania 7005, Australia.

Kenneth J. Hsu, Geologisches Institut, E T H, Sonneggstrasse 5, CH-8006, Zurich, Switzerland.

Emilie Jaeger, KAW Labor, Abteilung fur Isotopengeologie der Universitat Bern, Erlachstrasse 9a, 3012 Bern, Switzerland.

Field trip guidebook for 1978 North-Central meeting available

The Guidebook for the 1978 North Central GSA Meeting in Ann Arbor, Michigan, is still available. It was prepared for three field trips: (1) Middle Devonian Silica Formation, (2) Pleistocene Geology of The Thumb Area, and (3) Silurian Carbonates of Michigan Basin.

Of particular importance are two included papers dealing with the Silurian carbonates, one by D. F. Kahle on patch reef development and the other by L. I. Briggs, D. Z. Briggs, D. Elmore, and D. Gill on the facies of the Middle Silurian carbonate platform and basinal deposits of the Michigan Basin. These papers are of particular significance to those concerned with petroleum deposits related to patch reefs in Michigan.

The guidebook may be obtained at a cost of $6.50 plus 50 cents for mailing from The Department of Geology and Mineralogy, University of Michigan, 1006 C. C. Little Building, Ann Arbor, MI 48109.

Cross sections of continental margins—Ancient and modern

Within the past decade sufficient data have accumulated to convince a majority of geologists that the plate-tectonics hypothesis describes and predicts many phenomena related to present ocean basins and ocean margins. Because the data on which the plate-tectonics hypothesis is based are largely derived from the relatively youthful world oceans, it is hardly surprising that the hypothesis is less useful for reconstructing geologic events within the continents and particularly within ancient continental basement rocks. Nevertheless it is widely assumed that phenomena related to modern plate-tectonics activity must have also controlled the growth and development of ancient continents. It therefore is of utmost importance to understand the nature and course of events—structural, petrologic, geochemical, and sedimentologic—that have occurred at the boundary between oceans and continents, ancient and modern. With this in mind, the Plate Margins Working Group of the U.S. Geodynamics Committee invited a number of active workers to construct geological sections across the continental margin and young orogenic belts in Alaska and the western United States, and also across the ancient Ouachita-Marathon orogenic system.

The primary objective of the program is to demonstrate the status of geologic mapping and geophysical work in tectonically significant areas, by strip maps and one or more cross sections (in most cases at a scale of 1:250,000), including data on stratigraphy, structure, metamorphism, igneous activity, and geophysics. An important objective of this exercise is to indicate problems of interpretation resulting from gaps in data or inconclusiveness of existing data, to point out areas requiring additional work, and to recommend the types of geological, geophysical, or drilling activities required to solve remaining significant problems.

Eighteen sections, with supporting maps and commentary, are planned for Alaska and the western United States, and five for the Ouachita-Arbuckle-Marathon trend. They have been or are to be published by the Geological Society of America in the Society's Map and Chart series. Of the 23 planned, 10 sections have been published (MC-28A–J). Seven additional sections are in the final pre-publication stage. It is our hope that all 23 of the sections can be published by the end of 1981. Summaries of most of the cross sections are also published in the GSA *Bulletin*.

The Canadian Geodynamics Committee, under the leadership of R. A. Price, is preparing a similar series of sections across the Canadian Cordillera and Arctic islands, also to be published in the GSA Map and Chart series. Together the two groups of sections will allow sequential comparison of salient geological and geophysical data along major orogenic belts bordering the northern, western, and southern margins of North America.

(continued next page)

UPDATE

(continued from p. 147)

Sections across the Canadian and U.S. Appalachians are being prepared by members of Working Group 9 of the Interunion Commission on Geodynamics, under the chairmanship of Nicholas Rast. These sections will be on display during the International Geological Congress in Paris in August 1980 and will be published later (at a scale of 1:500,000) in a special volume of the journal *Tectonophysics*.

John C. Maxwell, Reporter
Plate Margins Working Group
U.S. Geodynamics Committee

GeoRef in San Diego

On-line searching of the GeoRef data base will be demonstrated at the AGI booth in San Diego. The process involves placing a phone call to a computer and typing searches on a terminal in a series of short, formatted statements to which the computer responds with typed messages and references. The entire process is a short one, requiring less than ten minutes, if the searcher knows the data base and has planned the search beforehand.

The demonstration will be conducted by geologists from AGI who normally spend their days working on the GeoRef data base. They will conduct searches at the booth on topics of your choosing.

GeoRef consists of indexed references to geologic literature. These references are published monthly in the *Bibliography and Index of Geology*. The typical on-line search involves asking the computer for any documents indexed with one or more index terms. The terms are listed and cross-referenced in the *GeoRef Thesaurus*. One can also search by author, publication year, language, and so forth.

On-line search costs are $75 per hour for computer connect time, prorated to the hundredth of an hour, $8 per hour, prorated, for long distance phone calls on a communications network, and $.20 for each reference printed off-line. A typical search will cost $20 to $30.

Questions on this demonstration or subject can be addressed to GeoRef, American Geological Institute, 5205 Leesburg Pike, Falls Church, VA 22041, or they will be answered on the spot at the AGI booth in San Diego.

AGI Minority Participation Program awards scholarships

The Advisory Committee for the American Geological Institute's Minority Participation Program, during its March 1979 meeting, awarded 59 scholarships for the 1979–1980 academic year, amounting to a total of $48,300. A total of 84 scholarship applications were received and the awards ranged between $250 and $1,500.

The AGI Minority Participation Program was formed to establish objectives and goals for attracting science-oriented students of Black, Hispanic, and American Indian ethnic origin into one of the geoscience disciplines. The scholarships are based on academic achievement to date, financial need, and judged potential for future professional geoscience success. This program was started in January 1975 and has helped more than 200 minority students achieve their goals for a particular academic year.

The scholarship program is dependent upon funds contributed by industrial firms, member professional societies, and individuals. Those contributing for the 1979–1980 academic year (excluding individual contributions) include Amax Foundation, Inc.; American Geophysical Union; Anadarko Production Company; The Analysts, Inc.; Cities Service Company; Dowell Division of Dow Chemical Company, Inc.; Foote Mineral Company; Exxon Company, U.S.A.; members of the Geological Society of America; General Crude Oil Company; Houston Oil and Minerals Company; Hunt Oil Company; Kennecott Copper Corporation; Kinemetrics, Inc.; Marathon Oil Company; Mobil Oil Corporation; members of the National Association of Geology Teachers; Natural Gas Pipeline Company; members of the Seismological Society of America; Society of Economic Geologists; Society of Economic Paleontologists and Mineralogists; St. Joe Minerals Company; Standard Oil Company of California; Sun Production Company; Teledyne Exploration Company; Tenneco Oil; Texas Oil and Gas Corporation; Union Oil Company of California; Union Texas Petroleum Division of Allied Chemical Company; and Utah International, Inc.

The AGI Advisory Committee would like to broaden its base of financial support for this minority scholarship program. Inquiries would be welcomed by contacting Earl H. Bescher, Jr.; Chairman, AGI-MPP; c/o Exxon Company, U.S.A.; P.O. Box 2180; Houston, Texas 77001. Telephone (713) 656-3323.

Individuals desiring to be considered for this program should apply in September 1979. All applications for the 1980–1981 academic year must be received by February 1, 1980. Requests for applications and all completed applications should be directed to William H. Matthews, Director of Education, American Geological Institute, Box 10031, Lamar University Station, Beaumont, Texas 77710.

1979–1980 AGI SCHOLARSHIP RECIPIENTS

Toby E. Archuleta — Hispanic geology undergraduate at New Mexico Highlands University
Jarvis E. Bailey — Black oceanography undergraduate at Hampton Institute
David M. Bernal — Hispanic geology graduate at the University of California, Santa Barbara
Rena Gail Boggs — Black geology undergraduate at Columbus College
Maria T. Bolden — Black geology undergraduate at Howard University
Randolph Boone — Black geology undergraduate at Virginia State College
James A. Braddock — Black geology graduate at SUNY, Binghamton
David A. Castillo — Hispanic geology undergraduate at the University of California, Santa Barbara

UPDATE

Rufus D. Catchings — Black geology graduate at MIT
Angel F. Curet — Hispanic geology graduate at the University of California, Santa Barbara
Joe C. Faulkerson — Black geology undergraduate at Tennessee Technological University
Richard J. Flores — Hispanic geology undergraduate at Hunter College (CUNY)
Debra Ford — Black geology undergraduate at Spelman College
Patricia Ford — Black geology undergraduate at the University of New Orleans
Diane H. Gomez — Hispanic geological engineering undergraduate at Colorado School of Mines
Eduardo Gonzales — Hispanic geology graduate at Texas Tech University
Emilio Gonzalez — Hispanic geology graduate at the University of Washington
Gary J. Gonzalez — Hispanic geology undergraduate at the University of New Mexico
John F. Guadagnoli — Hispanic geology graduate at Colorado School of Mines
Juan A. Guerrero — Hispanic geology graduate at California State University, Long Beach
Humberto A. Guzman — Hispanic geology undergraduate at Texas A&I University
Clarence R. Hairston — Black geology undergraduate at Elizabeth City State University
Joseph M. Hayden — Black geophysics graduate at the University of Oklahoma
Raul Huerta — Hispanic geology graduate at The University of Texas at Austin
Steven M. Hunter — Hispanic meteorology undergraduate at the University of Wisconsin, Madison
Joseph L. Islas — American Indian geology undergraduate at Austin Peay State University
Howard B. John — Black geology undergraduate at Queens College
Anthony G. Johnson — Black geology graduate at the University of New Orleans
Clair A. Johnson — Black geology undergraduate at the University of New Orleans
Diane E. Johnson — Black geology graduate at Ball State University
Germaine P. Johnson — Black geology undergraduate at the University of New Orleans
Randall C. Knight — Black geology undergraduate at Elizabeth City State University
Edward Magdaleno — Hispanic geology undergraduate at the University of Southern California
Paul E. Martinez — Hispanic geology undergraduate at New Mexico Highlands University
Daniel J. Melendez — Hispanic meteorology undergraduate at Florida State University
Gary M. Mercado — Hispanic geophysics undergraduate at Northern Arizona University
Eddie R. Mignardot — Hispanic geology undergraduate at New Mexico State University
Henry Mignardot — Hispanic geology undergraduate at New Mexico State University
Marvin E. Mullins — Black geology undergraduate at Elizabeth City State University
Jose E. Nevarez — Hispanic geology undergraduate at Louisiana Tech University
Steve R. Ordonez — Hispanic geology graduate at Northern Arizona University
Edwin Pinero — Hispanic geology undergraduate at SUNY, Brockport
Marisa Quinones — Hispanic geology undergraduate at Hunter College (CUNY)
Adolfo G. Requejo — Hispanic oceanography graduate at the University of Rhode Island
Brian D. Rodriquez — Hispanic geophysics undergraduate at the University of California, Berkeley
David A. Sanchez — Hispanic geology undergraduate at the University of New Mexico
Ned Stevenson — Black geology graduate at the University of New Orleans
Helen Swing — Black geology undergraduate at the University of New Orleans
David M. Trujillo — Hispanic geology undergraduate at New Mexico Highlands University
Davy W. Trujillo — Hispanic geology undergraduate at New Mexico Highlands University
Harvey O. Vick — Black geology undergraduate at Tennessee Technological University
Barbara L. Wall — American Indian geological engineering undergraduate at Michigan Tech University
Elijah White — Black geology undergraduate at Elizabeth City State University
Twila B. Wood — American Indian geology undergraduate at San Francisco State University
John S. Zuker — Hispanic geology undergraduate at California State Polytechnic University

LETTER

Dear GSA Members:

As a member of the American Geological Institute's Minority Scholarship Advisory Committee, I would like to take this opportunity to thank you for the generosity shown in your recent funding to cover the scholarship program for the 1979–1980 academic year. Your involvement, and that of other industrial organizations, professional societies, and individuals, will ensure that some minority students will be able to successfully continue their studies and not abandon them due to lack of money.

I want to assure you that these monies will be used wisely to encourage qualified science-oriented minority students to achieve their academic goals and eventually enter into the geoscience profession. Each member of the Advisory Committee has personally been involved in the various financial programs that are associated with minority students in the academic world. Each committee member has the knowledge required to accomplish the goals of the AGI minority program. The input of the minority students into the geosciences is still relatively new, but we are beginning to see a large output of qualified students entering professional careers who have accomplished this with the help given by groups such as yours.

Again, my personal thanks and that of the Advisory Committee. We have made some progress in defining the success of some of our scholars. This information has previously been passed to you. I feel sure that each of us is pleased to have had a part in their success story.

Sincerely,
Earl H. Bescher, Jr.
Chairman, AGI Minority Participation Committee

COUNCIL ACTIONS, SPRING 1979

The following actions were taken by the Council at its spring meeting in Boulder:

1. Discussed ways and means of preparing for the GSA centennial in 1988 and of participating in the 1979 USGS centennial.
2. Received an interim report from the GSA Program Review Committee.
3. Approved three Penrose Conference proposals.
4. Approved certain financial resolutions.
5. Adopted a 1980 dues structure and various member and nonmember subscription prices.
6. Discussed the 1978 audit report and accompanying management letter.
7. Ratified the actions of the Investments Committee taken during its February 2, 1979, meeting in Boulder, Colorado, involving the various funds in the portfolio of the Society.
8. Approved the San Diego Annual Meeting budget, including the supporting registration fees.
9. Confirmed Norman C. Hester as JTPC Chairman for the 1981 Cincinnati Annual Meeting.
10. Amended the charge to the Geology and Public Policy Committee.
11. Received a report covering the May 7, 1979, meeting between the section treasurers and the GSA controller.
12. Selected a slate of nominees for officers and councilors for 1980 and selected a firm of certified public accountants to perform an audit for the year ending December 31, 1979, both to be presented by ballot to the membership in November for election.
13. Selected Penrose and Day medalists and three Honorary Fellows; approved the award winners from two divisions; selected three nominees for the 1979 National Medal of Science and one for the next Texas Instruments Foundation Founders' Award.
14. Approved 154 research grants totaling $84,692 for 1979; noted the recommendation to the Budget Committee that the funding level of research grants be raised to $100,000 for 1980; named the recipients of the Stearns Fellowship; noted the contributions received from industry, from past grant recipients, and from the membership.
15. Ratified the North-Central Section, Coal Geology Division, and Hydrogeology Division bylaw amendments.
16. Advanced 9 Members to Fellowship; ratified the election of 566 candidates to Membership; approved certain modifications concerning Student Associate sponsorship; referred to the Membership Committee the task of evaluating the present minimum qualifications for GSA membership to determine if they meet the aims of the Society.
17. Accepted reports from standing committees, sections, divisions, and representatives to non-GSA groups.
18. Discussed the *Bulletin* format, manuscript flow, pricing, and member education.
19. Set November 4 and 7, 1979, for the fall meetings of the Council in San Diego, California; set November 6, 1979, 9:00–10:00 a.m., for the corporate meeting in San Diego.
20. Designated three proxy holders and three tellers and inspectors of election for the November corporate meeting.
21. Took other minor actions, records of which are on file at headquarters.

COCORP southern Appalachian data now available

The data packages for 348 km of seismic lines in the Georgia-Tennessee area of the southern Appalachian region are now available for the cost of reproduction and shipping. These data were obtained by the Consortium for Continental Reflection Profiling (COCORP), which is applying sophisticated continuous seismic reflection techniques to the solution of geologic problems of the Earth's crust and upper mantle. The operation is part of the U.S. Geodynamics Project and is funded by the National Science Foundation. The executive committee of the consortium consists of members from Cornell University, University of Houston, Princeton University, University of Texas at Austin, University of Wisconsin, and Shell Oil Company. Cornell University has the operational responsibility.

The procedure to obtain the data, either the sections or the magnetic tapes listed below, is as follows: (1) Indicate in writing which items are desired. Address your letter to Professor S. Kaufman, Department of Geological Sciences, Cornell University, Ithaca, NY 14853. Do *not* send payment. (2) In response to your letter a formal "Authorization for Purchase" will be sent to you. (3) Forward the Authorization to the contractor in the manner indicated on the Authorization together with the payment.

I. Basic display package of 28 prints for $90, consisting of location maps, isovelocity plots, and CDP stacked prints of six lines at each of two scales: (a) horizontally 5.6 cm = 3 km, and vertically 5.6 cm = 1 s of two-way traveltime; (b) horizontally 2.8 cm = 3 km, and vertically 2.8 cm = 1 s of two-way traveltime.

II. The number of reels of digital tapes available at $35 each, including the ½" X 2,400' copy reel, is given in the following table:

	Field	Correlated	Stack (1)	Stack (2)
Line 1 Georgia	82	36	3	3
Line 2 Georgia	4	2	1	1
Line 3 Georgia	9	3	1	1
Line 4 Georgia	16	5	1	1
Line 1 Tennessee	34	14	1	1
Line 2 Tennessee	9	4	1	1

Stack (1) is a true amplitude stack with no automatic residual statics or AGC applied; Stack (2) has automatic residual statics and AGC applied. Writing density is 1,600 bpi. The format for the field tapes is SEG-B; the other processed tapes are SEG-X. Data values are in IBM (short) floating point notation.

REPORT OF THE GSA COMMITTEE ON GEOLOGY AND PUBLIC POLICY

Geological Information—Problems in Transfer from Scientist to Policy Maker

At the Society's 1978 meeting in Toronto, the Committee on Geology and Public Policy sponsored a symposium on "Geological Information—Problems in Transfer from Scientist to Policy Maker." Experts from the United States and Canada were invited to present papers on their experiences. Three categories were included: methods of presenting geological information, the role and experience of scientific advisory groups, and the decision maker's requirements for geological information. The seven papers presented showed a striking diversity of ideas on the methods and problems of data presentation and clearly demonstrated the requirement for geological information in policy formulation in a broad range of contemporary issues.

E. G. Wermund (Bureau of Economic Geology, University of Texas): "Texas Land Resources Mapping for Public Policy Transfer"
J. D. Mollard (J. D. Mollard and Associates Limited): "Examples of Different Approaches Taken When Presenting Geological Information to Different Groups of Policy Makers"
G. A. Robbins, L. A. White, and T. J. Bennett (U.S. Nuclear Regulatory Commission): "Seismic and Geologic Siting Regulations and Guidelines Formulated for Critical Structures by U.S. Federal Agencies"
W. O. Kupsch (University of Saskatchewan): "A Message Garbled"
F. A. Donath (University of Illinois): "The Role of Scientific Advisory Groups: Disposal of High-Level Nuclear Waste"
A. F. Agnew (U.S. Library of Congress): "Decision Making in the U.S. Congress"
H. R. Wynne-Edwards (Alcan International): "Geoscientists in the Decision-Making Process"

Condensed versions of these papers are now available as a Report of the Committee on Geology and Public Policy. Members may receive a complimentary copy by returning the order form below.

Nathaniel W. Rutter
Professor of Geology
Department of Geology, University of Alberta
Edmonton, Alberta T6G 2E3, Canada

Please complete this coupon as your order for the Report of the Committee on Geology and Public Policy entitled *Geological Information—Problems in Transfer from Scientist to Policy Maker.*

From:
Separates Division
Geological Society of America
P.O. Box 9140
Boulder, Colorado 80301

Name _____
please print

Address _____

_____

_____

Enclosed: _____ *Geological Information—Problems in Transfer from Scientist to Policy Maker*
no. of copies

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

NORTH-CENTRAL SECTION, GSA, 14th Annual Meeting
Bloomington, Indiana, April 10–11, 1980

The Department of Geology of Indiana University and the Indiana Geological Survey will host the 14th Annual Meeting of the North-Central Section of the Geological Society of America concurrently with meetings of the East-Central Section of the National Association of Geology Teachers, North-Central Section of the Paleontological Society, and the Pander Society on April 10 and 11, 1980.

TECHNICAL SESSIONS on Thursday (April 10) and Friday (April 11) will include the following: paleontology, paleoecology, stratigraphy, sedimentology, economic geology, geomorphology, hydrogeology, Quaternary geology, mineralogy and petrology, geochemistry, structural geology, geophysics, environmental geology, and general geology. Papers on these and other areas are solicited. Other sessions may be arranged after abstracts have been received by the Program Committee.

SYMPOSIA (April 10, 11):

(1) Trace Occurrences of Economic Minerals in the Midwest (Nelson R. Shaffer and Edward Ripley)
(2) Interrelationships of Hydrogeology and Quaternary Geology (Robert V. Ruhe and Noel Krothe)
(3) Synecology and Antecology of Midwestern Paleozoic Fossils (N. Garry Lane and J. Robert Dodd)
(4) Progress and Problems in the Pre-Wisconsinan Pleistocene Stratigraphy of the Midwest (Ned K. Bleuer)
(5) Pleistocene and Holocene Sedimentation (Gordon S. Fraser)
(6) Industrial Minerals of the Upper Midwest (Donald D. Carr and Haydn H. Murray)

WORKSHOP (April 12). The East-Central Section of the National Association of Geology Teachers is planning an all-day workshop entitled, "Guided Design Problem Solving," which will follow a short evening symposium (April 11) on the same subject. Participants are required to preregister for the workshop.

FIELD TRIPS: All field trips will be scheduled for Saturday, April 12. Field-trip coordinator is Robert H. Shaver.

(1) Quarrying and Milling of the Salem Limestone in the Bloomington-Bedford District (Donald D. Carr and John B. Patton)
(2) Platform Communities and Rocks of the Borden Siltstone Delta (Mississippian) along the South Shore of Lake Monroe, Monroe County, Indiana (William I. Ausich and N. Gary Lane)
(3) Silurian Conodont Biostratigraphy, Southeastern Indiana and Adjacent Kentucky (Carl B. Rexroad)
(4) A Mechanism for the Origin of "Terra Rossa" in the Karst Area of Southern Indiana (Carolyn G. Olson and Robert V. Ruhe)

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

Donald E. Hattin
Program Committee Chairman
Department of Geology
Indiana University
Bloomington, IN 47401
(812) 332-1157

or

Abstracts Coordinator
Geological Society of America
3300 Penrose Place
Boulder, CO 80301
(303) 447-2020

Abstracts are due November 23, 1979. Acceptance or rejection of an abstract will be based on the abstract as submitted by the author.

Send one original and four copies to:

Donald E. Hattin
Department of Geology
Indiana University
Bloomington, IN 47405

PROJECTION EQUIPMENT. All slides must be 2" x 2" and fit a standard 35-mm carousel projector. Only one projector will be available in each meeting room.

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. Prizes awarded for student papers with more than one author will be divided among the authors.

SOCIAL EVENTS. A welcoming party will be held on Wednesday evening, April 9, and the annual banquet will be held on Thursday evening, April 10. A spouse/guest program is planned.

DETAILED INFORMATION concerning registration, motel and hotel accommodations, and other activities will appear in a later issue of *GSA News & Information* and as a part of the *Abstracts with Programs* for 1979.

ADDITIONAL INFORMATION, REQUESTS, OR SUGGESTIONS SHOULD BE DIRECTED TO:

Haydn H. Murray, Local Committee Chairman
Department of Geology, Indiana University
Bloomington, IN 47405
(812) 337-5582

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

ROCKY MOUNTAIN SECTION, GSA
33rd Annual Meeting
Ogden, Utah, May 16–17, 1980

The Department of Geology-Geography of Weber State College will host the 33rd Annual Meeting of the Rocky Mountain Section of the Geological Society of America at Ogden, Utah, May 16-17, 1980.

CALL FOR PAPERS. Technical sessions on Friday (May 16) and Saturday (May 17) will include the following: tectonics, structural geology, geomorphology, stratigraphy, sedimentology, geophysics, mineralogy, geochemistry, environmental geology, and general geology. Papers on paleontology are particularly desired.

SYMPOSIA:

(1) Phosphate Mining in the Arid West—An Environmental Geologic Appraisal (Dick Van Horn)
(2) Precambrian of Northern Utah (Max Crittenden)
(3) Paleoecology of Continental Formations of the Western United States (Lee Stokes)
(4) Interactions of Landsliding and Land Uses (Jerome V. DeGraff)

FIELD TRIPS

(1) Geology of Wellsville Mountain and Southern Cache Valley, Utah (R. Q. Oaks, Jr., and C. T. Hardy)
(2) Geomorphic Features of Lake Bonneville (Walter R. Buss)
(3) Environmental Geology of the Wasatch Front
(4) Precambrian Geology of North-Central Utah (Max Crittenden)
(5) Geology of the Albion-Raft River-Grouse Creek Mountains Area, Northwestern Utah and Vicinity (D. M. Miller).
(6) Economic Geology of the Bingham Canyon and Carr Fork Copper Deposits (L. P. James)

SOCIAL EVENTS. A no-host welcoming party will be held on Thursday evening, May 15, and the annual banquet will be held on Friday evening, May 16.

HOUSING. Housing will be in local motels.

DETAILED INFORMATION concerning registration, transportation, motel accommodations, field trips, and other activities will appear in a later issue of *GSA News & Information* and as a part of the *Abstracts with Programs* for 1980.

ABSTRACTS. Abstracts, which are limited to 250 words, must be submitted ready for photographic reproduction on official abstract forms available from:

Richard W. Moyle
Program Committee Chairman
Department of Geology-Geography
Weber State College
Ogden, UT 84408
(801) 626-6942

or

Abstracts Coordinator
Geological Society of America
3300 Penrose Place
Boulder, CO 80301
(303) 447-2020

Abstracts must be received by December 21, 1979.

Send one original and four copies to:

Richard W. Moyle
Program Committee Chairman
Department of Geology-Geography
Weber State College
Ogden, UT 84408
(801) 626-6942

PROJECTION EQUIPMENT. All slides must be 2" x 2" and must fit a standard 35 mm carousel projector. Dual projectors by prior request only. Please bring your own loaded carousel trays, if possible.

INQUIRIES, ADDITIONAL INFORMATION, REQUESTS, OR SUGGESTIONS SHOULD BE DIRECTED TO:

Sidney R. Ash, Local Committee Chairman
Department of Geology-Geography
Weber State College
Ogden, UT 84408
(801) 626-6908

THE GEOLOGICAL SOCIETY OF AMERICA

Annual research awards program 1980

The Geological Society of America will continue its annual research awards program in 1980. Eligibility is not restricted to GSA members. New application forms for 1980 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 1980 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 $85,000 for grants in 1979. The grants went to 154 students doing research for advanced degrees. The average amount granted was $551.00. The highest grant was $1,200, but there is no predetermined maximum amount.

February 15 is the deadline for the receipt of applications. 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 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. The deadline date for filing applications is **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.

DEADLINE FOR RECEIPT OF APPLICATIONS IS FEBRUARY 15, 1980.
PLEASE WRITE FOR NEW FORMS. THE GUIDELINES HAVE BEEN REVISED.

[PLEASE POST]

GSA PUBLICATIONS

MC-25—Geophysical Atlas of the East and Southeast Asian Seas

MC-25 — *Geophysical Atlas of the East and Southeast Asian Seas.* Compiled under the direction of Dennis E. Hayes. 1978. Six maps (5 in color), 42″ × 47″ each. Scale, 1:6,442,194 at latitude 0°, with an eight-page text.
Folded: $22.00; rolled: $24.00*

Six maps, each on the same planimetric base, comprise this comprehensive geophysical atlas of the East and Southeast Asian Seas. The maps cover the vast sea and island-arc area between 15°S to 45°N lat, and 90° to 150°E long.

The most prominent features in the mapped area are the submarine trenches, particularly the Java, Palau, Yap, Bonin-Japan, Nankai, Ryukyu, Manila, and Philippine trenches; and the related island ridges.

The tectonics map, by Dennis E. Hayes and Brian Taylor, shows major plate boundaries classified as compressional or extensional, and as active or inactive, together with paleomagnetic data giving the direction and approximate age of plate movement. The map also presents a regional synthesis of earthquake epicenters and focal mechanisms.

The sediment isopach map, by Cary L. Mrozowski and Dennis E. Hayes, shows by contour lines and color patterns the approximate regional thickness of sediment over the acoustic basement, in seconds of two-way traveltime for areas of thinner sediment, and in thousands of metres for areas of thicker sediment. A heavy stippled pattern indicates areas where the acoustic basement is known, or assumed, to be above the crystalline basement. Deep-sea drill sites and data points along ship traverse lines are also shown.

The crustal structure map, by Dennis E. Hayes, Robert E. Houtz, Richard D. Jarrard, Cary L. Mrozowski, and Teruhiko Watanabe, shows for many identified stations throughout the region, the compressional wave velocities (in km/sec) of the submarine sediments in six velocity categories, which are indicated by color patterns. Data for this compilation were obtained from two-ship refraction stations and from sonobuoy stations.

The free-air gravity field map, by Anthony B. Watts, John H. Bodine, and Carl O. Bowin, shows most of the major structural and topographic features of the region with remarkable clarity through use of 12 color shades. The map is based on about 100,000 gravity measurements on land and at sea obtained by the older pendulum apparatus between 1934 and 1953, and by beam-type sea gravimeters between 1961 and 1977. The map is contoured and color shaded at 25-mgal intervals. It also shows ship traverse lines and the location and value of all points used in drawing contours.

The magnetic anomalies map, by Jeffrey K. Weissel and Dennis E. Hayes, shows areas along ship traverse lines where the magnetic values are relatively "high" or "low." For purpose of map construction, a magnetic anomaly is defined as the observed magnetic field intensity minus the appropriate magnetic reference field, plus or minus an arbitrary constant that represents the average value of the anomalies over a linear distance of several hundred kilometres. Values higher than the adjusted value are defined as positive and are shown in red; values lower than the adjusted value are defined as negative and shown in blue. The magnetic anomalies map is intended as an aid in predicting the maximum depth to a "source"; to identify the presence of a magnetic "fabric," and its likely trend; and to speculate on the nature of magnetic source rocks. The map was used to derive the sea-floor–spreading magnetic lineations shown on the tectonics map by Hayes and Taylor included in this atlas.

The heat flow, thermal conductivity, and thermal gradient map, by Roger N. Anderson, Marcus G. Langseth, Dennis E. Hayes, Teruhiko Watanabe, and Mashashi Yasui, shows each of the conventional types of Earth-heat measurement by appropriate black and white symbols. At heat-flow stations, the information was evaluated in three categories according to experimental quality, and in five categories according to the sedimentary environment near the station. The evaluated and adjusted data were then used to draw smooth, generalized thermal conductivity lines. The geothermal gradients at specific points of measurement are shown by symbols in three categories: high, normal, and low. The points of high geothermal gradient are very prominent features of this map, as are the locations of historically active volcanoes.

Supplementary to the six maps that comprise this atlas is a seventh companion bathymetric map of the region by J. Mammerickx, R. L. Fisher, F. J. Emmel, and S. M. Smith published in 1977 by GSA as MC-17 in the map and chart series.

MC-26—Bathymetry of the Southeast Pacific

MC-26 — *Bathymetry of the Southeast Pacific.* J. Mammerickx and S. M. Smith. 1978. In color, 42″ × 46″; contour interval 1,000 metres, scale at equator, 1:6,442,194 or 1.74 cm per degree of longitude. Folded: $8.00; rolled: $9.50*

This new contribution to the bathymetry of the Southeast Pacific covers the area between 3°N to 45°S lat, and 70° to 130°W long. The western edge of central South America and the parallel 7,000-m-deep Chile Trench form the eastern edge of the mapped area.

The most conspicuous features of the area are the East Pacific Rise, which extends N-S a short distance west of the center of the area; and the Easter Fracture Zone, which extends E-W across the central part of the area. Easter Island marks the junction of these two structures.

Many other named bathymetric features are shown by contour lines drawn at 500-m and locally smaller intervals; by shades of blue, nine categories of water depth are shown, to a maximum depth in excess of 7,000 m. The map also

*On orders to be mailed outside the United States, a map or chart that is more than 36 inches in the shorter dimension can be supplied folded only.

shows the lines of ship traverses along which the bathymetric data were taken.

Marginal information includes a bibliography of 17 charts incorporated in the present map and a small index map showing areas covered by these charts.

MC-28A—Cross Section of Alaska Peninsula–Kodiak Island–Aleutian Trench

MC-28A — *Cross Section of Alaska Peninsula–Kodiak Island–Aleutian Trench.* R. von Huene, J. C. Moore, G. W. Moore. (Contribution from Plate Margins Working Group, U.S. Geodynamics Committee, John C. Maxwell, Coordinator.) 1979. Two sheets, 42″ × 44″ each, in color; scale, 1:250,000; with 4-page text.

Folded: $10.00; rolled: $11.50*

This multicolored cross section extends southeastward from the south side of the Alaska Peninsula, across Kodiak Island, and down the continental slope to the Aleutian Trench. It provides a factual and interpretative view of the seismically active continental margin in this well-chosen area. The section presents data from surface geologic mapping, marine dredging, deep-sea drill cores, reflection and refraction seismic sections, a gravity traverse, and earthquake hypocenter studies.

On land, the section shows thrusting and folding of Mesozoic and lower Cenozoic rocks along the accretionary margin in Mesozoic and early Cenozoic subduction zones. The southeast boundary of these disturbed rocks is a fault zone on the northwest side of Kodiak Island. At sea, the section shows the initial stages of Pliocene-to-present subduction along the Aleutian Trench. When the epicenters of many earthquakes, some centered as far away as 160 km, are projected to the plane of the section, their distribution pattern suggests that the Pliocene-to-present Benioff zone is about 15 km thick, and that at the northwest side of Kodiak Island it is about 50 km below the surface.

An index map, printed in color on sheet 1 at the scale of 1:1,000,000 shows the generalized local geology, lines of two strip geologic maps and six cross sections, lines of ship traverses, and other features of the area.

This report is the first of a series prepared by the Plate Margins Working Group, one of 13 study groups sponsored by the United States Geodynamics Committee. The Plate Margins Working Group has focused attention on modern and ancient continental margins of the western Cordillera and Aleutian arc, and on the Ouachita-Marathon fold system. An index map on the envelope in which this report is enclosed shows the area of consideration and locations of 23 cross sections planned to be published by GSA as part of the program of the Working Group.

*On orders to be mailed outside the United States, a map or chart that is more than 36 inches in the shorter dimension can be supplied folded only.

MC-28B—Cross Section of Southern Part of Northern Coast Ranges and Sacramento Valley, California

MC-28B — *Cross Section of Southern Part of Northern Coast Ranges and Sacramento Valley, California.* John Suppe. (Contribution from Plate Margins Working Group, U.S. Geodynamics Committee, John C. Maxwell, Coordinator.) 1979. One sheet, 36″ × 28″, in color; scale, 1:250,000; with 8-page text. Folded: $8.25; rolled: $9.75

This multicolored cross section extends northeastward from the San Andreas fault at the Pacific Coast some 185 km to the Sacramento Valley. The section is keyed to a generalized geologic map, also in color, extending 20 to 40 km north and south of the line of section.

Intricately folded and imbricated rocks of the Franciscan Complex, Coast Range Ophiolite, and the Great Valley sequence, all of Jurassic to Cretaceous age, form the southern part of the northern Coast Ranges of California. These rocks are shown in an improved structural interpretation on this newly published cross section. The older structures shown are those in which the Great Valley sequence was emplaced on coeval strongly metamorphosed Franciscan; and those in which the strongly metamorphosed Franciscan was emplaced on younger, less metamorphosed Franciscan. These older structures were displaced in turn by a younger sequence of large-scale thrust faults, in which movement of the overlying blocks was to the southwest.

The cross section is consistent with observed gravity readings. A gravity high that extends the length of the Sacramento Valley is interpreted on the cross section as a westward dipping slab of Mesozoic oceanic crust and mantle, overlain by a correlative of Coast Range ophiolite.

The interpretation shown on this section of the Coast Ranges requires a horizontal shortening of the folded, faulted, and imbricated rocks from an original pre-structural width of about 275 km to the present width of about 100 km.

MC-28C—Section from Northeastern Oregon to West-Central Montana near 46° N

MC-28C — *Section from Northeastern Oregon to West-Central Montana near 46°N.* Donald W. Hyndman and Ronald B. Chase. (Contribution from Plate Margins Working Group, U.S. Geodynamics Committee, John C. Maxwell, Coordinator.) 1979. One sheet, 54″ × 41″, in color; scale, 1:250,000; with 12-page text. Folded: $9.50; rolled: $11.00*

This 300-mile-long section crosses the tectonic grain of the northern Rocky Mountains. The section begins on the west in eastern Oregon and, successively, crosses a broad area of highly deformed Precambrian rocks on the west side of the Idaho batholith, the Bitterroot dome on the Idaho-Montana line, the Willow Creek stock, the Phillipsburg

thrusts and batholith, the Boulder batholith, and the overthrust belt near Bozeman, Montana.

From west to east, the tectonic elements recognized on the section are (1) A western subduction zone and island-arc volcanic complex of early Mesozoic age developed over oceanic crust; most of the structures in this element dip eastward. (2) The old continental margin. (3) Regionally metamorphosed upper Precambrian sedimentary rocks and associated older granitoid orthogneiss, which together form a basement complex. (4) The Idaho batholith and the associated Bitterroot dome. (5) A mylonite detachment zone. (6) The Sapphire tectonic block, which is 15 to 21 km thick and is formed almost entirely of sedimentary rocks of the Belt Supergroup, is interpreted as the former east carapace of the Bitterroot dome; this is a detached block that has moved eastward 60 to 65 km, and in so doing has pushed the underlying rocks of Belt, Paleozoic, and Mesozoic ages on the north and east sides into tight upright folds. (7) The Boulder batholith. (8) A platform sedimentary sequence, and the adjoining Montana overthrust belt.

The cross section is accompanied by a 12-page text that cites about 110 reports bearing on the geology and structure of the region traversed by the section.

OCTOBER 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 "October Summaries" on coupon.

• S91001—Paleogene sediment dispersal and paleotectonics in northern California: Summary.

William R. Dickinson, Geology Department, Stanford University, Stanford, California 94305 (present address: Department of Geosciences, University of Arizona, Tucson, Arizona 85721); Raymond V. Ingersoll, Geology Department, University of New Mexico, Albuquerque, New Mexico 87131; Stephan A. Graham, Exploration Department, Western Region, Chevron U.S.A., Box 3862, San Francisco, California 94119.

• S91002—Petrogenesis of the Mount Albert Ultramafic Massif, Quebec: Summary.

Ian D. MacGregor, Asish R. Basu, Department of Geology, University of California, Davis, California 95616. (present address, Basu: Department of Geological Sciences, University of Rochester, Rochester, New York 14627).

• S91003—Fluid inclusion evidence for Silurian evaporites in southeastern Vermont: Summary.

R. A. Rich, Yankee Atomic Electric Company, 20 Turnpike Road, Westborough, Massachusetts 01581.

Bulletin Briefs

Titles and abstracts of conventional articles in the October 1979 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 159.*

• 91004—Early Tertiary "Incaic" tectonism, uplift, and volcanic activity, Andes of central Peru.

Donald C. Noble, Department of Geology and Geological Engineering, Michigan Technological University, Houghton, Michigan 49931; Edwin H. McKee, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025; François Mégard, Institut Français d'Etudes Andines, Contralmirante Montero 141, Lima 18, Perú. (5 p., 1 fig., 1 tbl.)

Potassium-argon age determinations on volcanic strata that overlie an extensive postorogenic erosion surface in the Western Cordillera show that the "Incaic pulse" of compressive deformation as well as subsequent uplift and erosion of the Andes of central Peru had taken place before 40 to 41 m.y. ago. Intense volcanic activity, which began before the end of uplift and erosion, continued for about 6 m.y. into early Oligocene time. The timing of these events suggests that uplift and volcanic activity, and perhaps also the

preceding tectonic pulse, may have been initiated by the same global disturbance that produced the abrupt change in direction of movement of the Pacific lithospheric plate reflected by the bend in the Hawaiian-Emperor volcanic chain.

• 91005—Intradune flats of the Algodones chain, Imperial Valley, California.

Robert P. Sharp, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California 91125. (9 p., 14 figs., 1 tbl.)

A striking characteristic of the southeastern part of the remarkably linear northwest-southeast Algodones Dunes chain is a succession of regularly spaced, wholly enclosed flats exposing the alluvial substrate. Each flat is bounded on the northwest by a high active slip face of sand and on the southeast by a more gently inclined deflated sand slope, suggesting that the flats are moving southeasterly along the chain axis. Measurements over a 12-yr interval confirm this movement and indicate an average southeasterly movement of 34 to 40 cm/yr.

Development of alluvium-floored intradune flats is presaged by formation of ridge-and-hollow couplets farther to the northwest. Embryonic ridge-and-hollow forms extend almost to the northwestern tip of the chain. Development of long, linear transverse, sand-trapping ridges, which are instrumental in creating downwind hollows, appears to be an inherent characteristic of eolian transport under conditions of relatively smooth terrain, scanty vegetation, and a limited flux of sand supplied approximately orthogonally to a dominant resultant direction of drift.

Principal resultant sand drift produced by a multidirectional wind regime over the dunes is southeast; northeast is the next most favored direction. Secondary influences of faulting may account for the unusual linearity of the chain, which is probably a belt of shoreline dunes about 37,000 yr old. Intradune flats are large enough to be resolved on orbiter photos of Mars, and some of the patterns on the martian surface attributed to eolian processes may involve intradune flats.

• 91006—Electron micrography of mineral surfaces subject to wind-blast erosion.

Marion I. Whitney, Central Michigan University, Mt. Pleasant, Michigan 48859. (18 p., 17 figs.)

The erosional results of two different kinds of wind-blast experiments on isometric minerals, ranging from 2 to 6 in hardness on the Mohs scale, are compared and illustrated, chiefly by electron micrography. One prolonged experiment employed only normal laboratory air. In the other experiment, silt-sized projectiles were added to the air that was blown over one of two similar fluorite specimens for a period of 50 hr during a five-month wind-blast test of the two specimens.

In all cases, wind erosion occurred. However, in the second experiment, it was greatly accelerated on the test specimen which was wind-blasted by the air with the added projectiles. Also, these experiments demonstrated in detail where the aerodynamic and vorticity erosion processes concentrate to effect erosion on the shapes that were used.

Although wind moves as a fluid, the interfacial flow lines along which erosion occurs form a complex reticulum. Each flow line is attracted to a center of low pressure. Such centers may be within traveling vortices along a flow line but often are at stationary points such as at vortex centers in irregularities along sharp margins where air escapes. Such vortices oriented the flow lines variously so that they merged or even transected one another, despite the use of a single wind direction. Likewise, traveling vortices along flow lines developed pit chains which show all stages of development from isolated scores and pits to fine U-shaped fluting. Thus vorticity plays a major erosive role, and wind can erode in the total absence of sand. Furthermore, aerodynamic erosion can affect every surface of an object, even the basal surface, and may even be greater on the lee face than on the windward face, and the suspended tools produce more definitive erosion than does sand grain impact.

In addition, shape and size of the target, its orientation to wind, inclination of faces, surficial texture and irregularities, and internal constitution are all important determinants of the character, locations, and rates of erosion.

• 91007—Ductile deformation zones in Blue Ridge basement rocks and estimation of finite strains.

Gautam Mitra, Department of Earth and Planetary Sciences, Johns Hopkins University, Baltimore, Maryland 21218 (present address: Department of Geology, University of Wyoming, Laramie, Wyoming 82071). (17 p., 23 figs.)

The deformation of basement massifs in orogenic belts presents several fundamental problems—what is their mechanical response to deformation, how does the strain vary through them, and how does one explain the "missing" basement suggested by palinspastic reconstructions? The Blue Ridge anticlinorium in northern Virginia has at its core Precambrian granitic basement deformed during the late Paleozoic orogeny; there is a major cleavage fan across this anticlinorium. The deformation in the basement is inhomogeneous, being concentrated along narrow zones of ductile deformation where rocks are mylonitized. These zones may range in size from microscopic dimensions to tens of metres wide, and they tend to develop preferentially in certain basement rock types. Narrow deformation zones in coarse granitic rocks often occur in conjugate sets whose bisector is the regional cleavage. Integration of strain across these zones added to the penetrative strain, calculated from the rotation of these zones, and the shortening due to displacement on thrust faults, give the total shortening of the basement. Such shortening must be taken into account in attempting any kind of geologic reconstructions.

• 91008—Deposition of resedimented sandstone beds in the Pico Formation, Ventura Basin, California, as interpreted from magnetic fabric measurements.

Asahiko Taira, Geosciences Program, The University of Texas at Dallas, Richardson, Texas 75080 (present address: Institute of Geology, Kochi University, Kochi, 780 Japan); Peter A. Scholle, U.S. Geological Survey, Denver Federal Center, Mail Stop 934, Denver, Colorado 80225. (11 p., 13 figs., 3 tbls.)

Settling velocity distributions and magnetic fabrics in sediments from the Pico Formation were studied in order to determine the relationships between these properties and the observed sedimentary structures and to evaluate the processes of deposition of turbidites.

Three basic types of settling velocity frequency distributions were recognized: P_1 profile, a low, flat distribution pattern indicating very poor sorting; P_2 profile, a distribution which shows a distinctive mode; and P_3 profile, a slope-shaped pattern composed predominantly of fine materials. P_1 was found in the graded and massive divisions of turbidites; P_2 was found in the lower division of horizontal stratification and the ripple stratification division; P_3 was found in the uppermost divisions. Comparison of these patterns with previous results from modern sediments reveals that P_2 and P_3 are similar to patterns found in fluvial environments, whereas P_1 was quite rare in "normal" current- or wave-formed deposits.

The uniqueness of the graded and massive division is also evident in the results of the magnetic analysis. Although the magnetic fabrics in the upper parts of turbidites show similarity to other current-formed fabrics, the magnetic fabrics of the graded and massive divisions are quite different. The magnetic fabrics in the graded and massive divisions are characterized by (1) the presence of the current-normal orientation, and (2) less foliated and inhomogeneous fabrics which are indicated by high imbrication and q-value as well as large standard deviations of q-value and K_{max} directions. Comparison with results from modern sediments indicates that fabric characteristics in the sediments of the graded and massive divisions are best explained by a combination of (1) an orientation mechanism related to layer by layer grain collision in a highly concentrated flow and (2) an orientation mechanism related to the suspension of grains in a viscous flow. This evidence indicates that a highly concentrated and partly viscous basal flow in turbidity currents may be responsible for the deposition of the lower part of the graded division and the massive division, whereas a more diluted flow may be responsible for the deposition of the upper divisions.

• 91009—Isotopic composition and diagenetic history of carbonate cements in Devonian Golden Spike reef, Alberta, Canada.

R. A. Walls, Shell Canada Limited, P.O. Box 880, Calgary, Alberta, Canada; E. W. Mountjoy, Department of Geological Sciences, McGill University, 3450 University St., Montreal, Quebec H3A 2A7, Canada; P. Fritz, Department of Earth Sciences, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada. (20 p., 17 figs., 3 tbls.)

Extensive cementation in the margin of the Golden Spike (Upper Devonian, Alberta) reef complex is due largely to formation of carbonate cements in a marine environment. Subaerial cements are absent in the reef margin, but they occur in shallow-water reef interior facies. Middle and late burial calcite cements are less abundant but occur vertically and laterally throughout Golden Spike.

The $\delta^{13}C$ and $\delta^{18}O$ values of selected carbonate cements and sediments, mainly from the reef margin, show: (1) a narrow range (+4.0‰ to +1.6‰) of $\delta^{13}C$ values for all samples; (2) the most positive ($\bar{X}$ = +3.8‰) $\delta^{13}C$ values occur in lime mudstones; (3) radiaxial calcite cements (submarine) and associated (often interlayered) marine internal sediments have similar $\delta^{13}C$ (+3.5‰ to +1.6‰) and $\delta^{18}O$ (−5.8‰ to −7.7‰) values; (4) submarine radiaxial and radial fibrous calcites ($\bar{X}$ = −6.7‰), middle burial nonferroan calcites ($\bar{X}$ = −8.8‰), and late burial ferroan calcites ($\bar{X}$ = −13.0‰) contain progressively more negative $\delta^{18}O$ values.

Textural evidence (that is, cement fabrics, their distribution, superposition, and relationships with associated sediments) and isotopic compositions considered in light of the Golden Spike burial history indicate the following. Submarine cements of the reef margin apparently have not been significantly modified by meteoric waters (^{18}O, ^{13}C depleted) throughout their diagenetic history. Submarine cements and associated sediments have $\delta^{13}C$ values similar to modern marine cements and sediments, and any diagenetic re-equilibrations occurred in a "closed system" with little or no addition of ^{12}C. $\delta^{13}C$ values in middle and late burial stage cement are the result of calcite precipitation, probably in equilibrium with subsurface fluids.

The $^{18}O/^{16}O$ ratios for marine sediments, fossils, and submarine cements are probably due to isotopic re-equilibration of originally enriched (marine) $^{18}O/^{16}O$ at elevated burial temperatures before the end of the Mississippian. On the basis of burial history, middle and late burial calcite ce-

ORDERING SEPARATES FOR 1979

The system for ordering separates has changed. Those members who have purchased separates of conventional articles for 1979 have received, or will receive in the near future, 10 or 20 coupons and instructions for ordering separates in 1979.

It is not too late to purchase separates for 1979. The price to members having paid their basic membership dues is $5 for 10 separates and $10 for 20 separates. All orders and inquiries should be addressed to **Bulletin Separates Division, Geological Society of America, 3300 Penrose Place, Boulder, Colorado 80301.**

ments are post-Mississippian to pre–Late Cretaceous; the Late Cretaceous is the most likely time of major petroleum entrapment.

• 91010—Structural distinction between a metasedimentary cover and an underlying basement in the 600-m.y.-old Pan-African domain of northwestern Nigeria, West Africa: Discussion and reply. (2 p., 1 fig.)

Discussion: *Howard S. Mullan, Department of Geology, University of Calabar, P.M.B. 115, Calabar, Nigeria. (present address: 52 Farquhar Road, Edgbaston, Birmingham B15 3RE, Great Britain.*

Reply: *Norman K. Grant, Department of Geology, Miami University, Oxford, Ohio 45056.*

• 91011—A lower Paleozoic trench-fill sequence, New World Island, Newfoundland: Discussion and reply. (2 p.)

Discussion: *K. Douglas Nelson, W.S.F. Kidd, Department of Geological Sciences, State University of New York at Albany, Albany, New York 12222.*

Reply: *W. S. McKerrow, Department of Geology and Mineralogy, Parks Road, Oxford, OX1 3PR, Great Britain; L.R.M. Cocks, Department of Palaeontology, British Museum (N.H.), Cromwell Road, London SW7 5BD, Great Britain.*

• 91012—The Colorado Lineament: A middle Precambrian wrench fault system: Discussion and reply. (2 p.)

Discussion: *M. H. Hickman, Department of Geology, Miami University, Oxford, Ohio 45056.*

Reply: *Lawrence A. Warner, Department of Geological Sciences, University of Colorado, Boulder, Colorado 80309.*

• 91013—Transition analysis of structural sequences: Discussion and reply. (4 p., 2 figs., 1 tbl.)

Discussion: *Göksel Türk, Yıldız, Posta Cad 22/13, Gayrettepe, Istanbul, Turkey.*

Reply: *M. A. Naylor, N. H. Woodcock, Department of Geology, Sedgwick Museum, Downing Street, Cambridge CB2 3EQ, Great Britain (present address, Naylor: Koninklijke Shell Exploratie en Produktie Laboratorium, Volmerlaan 6, Rijswijk ZH, Nederland).*

THE GEOLOGICAL SOCIETY OF AMERICA
3300 Penrose Place · Boulder, Colorado 80301

SECOND CLASS
Postage Paid
at Boulder, Colorado
and at additional mailing office

GSA news & information

Section Announcements

North-Central

Rocky Mountain