



GSA news & information

G.S.A. ARCHIVES

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SEPTEMBER 1981

Report of the President

To the Council and Membership of the Geological Society of America:

When I was admitted to Fellowship in GSA (approaching 40 years ago!), Society affairs went forward in a general atmosphere of tranquility. Few waves were generated and these seldom propagated beyond the filter represented by Secretary Henry Aldrich who, secure in the belief that income from the Penrose bequest would continue to cover reasonable budgetary demands forever and ever, ruled a comfortable roost and almost never was required to strip off the velvet glove of office. The perception of societal stability was fostered by more than seeming fiscal security guarded by a faithful secretariat. The membership was limited to a relatively small number of self-professed "leading scientists" whose ranks were dominated by academia and the surveys; more significantly, the Fellows and their nonfranchised colleagues and students maintained a useful working level of cultural cohesion. That is, communication across the boundaries of the emerging subdisciplines was both possible and desirable; as a result, a broad spectrum of geological scientists could and did publish in the *Bulletin*, or in the Memoir or Special Paper series, with assurance that their papers would be read and appreciated by a significant proportion of the community.

The Good Old Days are long gone—quite likely they never really existed—and the Penrose money, administered some decades ago under policies that would make William McKinley feel warm all over, can no longer support the Society in the manner that it has tried to maintain. The Old School Tie no longer prevails—indeed, most dues-paying adherents of GSA wear no tie at all or, at best, a thong ornamented by some tribal device. Members outnumber Fellows about two to one (must we persist in this, to me, noxious distinction?), the modal age group is markedly younger, and scientists working for industry constitute about half of the Members/Fellows. Concurrently, the whole fabric of North American science, not excepting geology/geophysics/geochemistry, has shifted under our feet. The membership is familiar with the impact of the post-Sputnik surge, the rise (and imminent decline?) of government-supported

research, and the pressures imposed by the continuing energy/minerals crunch. The effect has been to partition geological scientists into increasingly finely discriminated specialized cells made up of workers who are driven to the conclusion that professional advancement derives from specialization, not from integration. After all, peer-review panels are drawn from identified specialists and danger attaches to any proposal that may fall between established stools.

GSA was organized for "the promotion of the Science of Geology in North America" through publications and scientific meetings. Ideally, the Society strives to be all things to all North American geologists, but realization of the ideal is placed at great hazard by continuing compartmentalization of the discipline. At least two paths are open to us—we can go with the flow and foster the establishment of more and more specialty divisions, each with a specialty journal, or we can, without denigration or inhibition of the specialties, place major emphasis on integration and synthesis among the subdisciplines. It is my urgent hope that the Society will follow the latter path because somewhere out there are several potential Harry Hesses; they need a platform from which to speak (they should not use Harry as a model in this regard) and a journal in which to publish. GSA should provide both.

Most of us harbor a love/hate relationship with the annual meetings of the Society, but no quick fix is in sight. Almost everyone agrees that the meetings are too expensive, too large, too diffuse, and too long. These widely recognized negative factors are intimately interrelated—in recent years accommodations have had to be procured for 4,000 to 5,300 registrants, upward of 1,000 papers, and 80-odd sessions (not including "special" symposia, workshops, and short courses on Sunday); the essential facilities cannot be had outside of major metropolitan areas equipped with convention centers and lots of hotel rooms with transport readily available. Costs go up accordingly.

There are ways to reduce the number of papers offered, the number of registrants, and concomitantly,

(continued next page)

Annual Report for 1980—The Geological Society of America

(continued from page 145)

the expense of the annual meeting. Why not rule that only members of GSA and the associated societies may present papers and why not soak nonmembers a healthy surcharge on their registration fees? One answer to these queries is philosophical; thus far, Councils have been unwilling to interpose barriers between the intellectual feast of the annual meeting and those who wish, if only on a once-a-year basis, to sup at our table. A second response lies in the fact that our annual meeting is also the annual meeting of the associated societies; several of these find it difficult to maintain up-to-date membership lists. Therefore, when papers are accepted, or at times of preregistration or registration, it would be next to impossible to check each name. Perhaps computerized listings will someday cause this problem to go away, but are you sure you want to exclude potentially valuable scientific contributions?

Many have suggested that the heat be taken off the annual meetings by driving larger numbers of papers and sessions to the sectional meetings. But face it—many, many topics are not confined by regional boundaries and reach appropriate audiences only at annual meetings. Most of the sections are doing just fine with their meetings, thank you, although only the Cordilleran section seems to have overcome a long-standing feeling in certain quarters that significant contributions are “too good” for section meetings.

The upshot of the last few paragraphs is that little progress has been made toward achieving the perfect annual meeting. Still, people keep coming, and the fact that they have a good time and even learn something is a tribute to the labors of local committees, program committees, and the unremitting attention of our convention lady, Sue Beggs.

Publications are something else. Dissemination of knowledge through the printed word is *the* major function of GSA, accounting for more than half of the annual budget and for well over 90 percent of the Valium consumed by Council, the Executive Committee, and the Executive Director in 1980. The Society's *Bulletin* was for years the prestigious medium for presenting major innovations and scholarly syntheses of the geological sciences to a large and influential readership. As the previously noted problems attendant on proliferating specialization began to have an effect and as costs and their projections into the near-term future rose alarmingly, it was decided to undertake the Great Experiment in microform publication. Now, with the acuity provided by hindsight, it is clear that this was an idea whose time had not arrived. Indeed, the Great Experiment never got a fair shake because the measures undertaken to make microfiche acceptable counterbalanced many of the anticipated economies.

Meanwhile, Memoirs and Special Papers continued to be money sinks rather than the profit centers created by book publication in some of our peer societies. I could (but will not) present a long, commonly tedious and only occasionally exhilarating, recounting of Council/Executive Committee considerations of the publication problem over the past three years. It is sufficient to note that matters came to a head in 1980, and the Headquarters Advisory Committee (John Rold, Chairman) was

asked to make rapidly formulated recommendations. Among many thoughtful actions proposed was a call for an ad hoc group empowered to identify the Draconian measures required for restoration of the Society's rightful position among scientific publishers. A hard-nosed and knowledgeable Special Publications Study Committee was assembled, chaired by Brian J. Skinner and peopled by a sometimes undisciplined but always concerned crew. The rest is history as Society history in-the-making is recorded by *GSA News & Information* and your annual dues statement. For the first time in quite a while we can look forward to a flagship *Bulletin* with a spine in its binding and in its intellectual content, as well as a book series priced within the reach of all.

So what else happened in Society year 1980? Plenty, and strongly positive. The program for celebration of the Society's Centennial is off and running hard despite early doom-sayers who dubbed it “boondoggle” or “pie-in-the-sky.” Pete Palmer's indefatigable enthusiasm has bred a continent-wide reception that would have been difficult to predict. Pete has kept you up to date with progress reports on the Decade of North American Geology (D-NAG) and on cooperative projects of our peer societies; what may have escaped you are the truly bandwagon proportions of the degree to which our scientific community has embraced D-NAG and its ancillary efforts.

GSA is thinking big, but translating megathink into action takes megabucks. Outstanding work by the Centennial Development Committee (James Boyd, Chairman) made it possible to initiate the Geological Society of America Foundation, an independent entity now in full operation. The Foundation President, Dwight V. Roberts, and the blue-ribbon Trustees are in place to generate, husband, and dispense funds for the promotion of the Science of Geology in North America. The raising of important dollars is greatly enhanced if it can be shown that the rank and file, you and I and the rest of us, are supportive to the extent that our finances permit—no contribution to the Foundation is considered trivial.

Before closing, I must remind you that Executive Director John C. Frye retires next year. When John returns fulltime to the Ogallala outcrop, he will have suffered through eight years of coping with the Society ephemera, the annual shift of officers, councilors, and other transients. His has been the most trying tenure in GSA history; that we have survived to greet the future with confidence is a tribute to his labors. Now an equally able successor is urgently needed. If you have suggestions, call Boulder, or write (attention: Executive Director Search Committee).

Speaking of trying tenures, mine was no great bed of roses in an ambience of sweetness and light, but at no moment did the gluteal misery brought on by concerned members come close to outweighing the pleasure gained from the knowledge that lots and lots of men and women really care about GSA. With Howard R. Gould in charge, to be succeeded in the following two years by men of demonstrated administrative ability, we are in good hands; the return to order and stability is already perceptible, and you can expect the next three past presidents' reports to be on time, not six months late as this is.

Respectfully submitted, L. L. Sloss, President, 1980

UPDATE

In August *Geology*

1. Revolution in Cretaceous sea-level analysis, by N.-A. Mörner
2. Identification of ancient sandy contourites, by J.P.B. Lovell, D.A.V. Stow
3. Selective destructive demagnetization—Another microanalytic technique in rock magnetism, by E. E. Larson
4. Occurrence of graphite in serpentized olivines in kimberlite, by J. D. Pasteris
5. Time-stratigraphic aspects of a formation: Interpretation of surficial Pleistocene deposits by analogy with Holocene paralic deposits, southeastern Delaware, by J. M. Demarest, R. B. Biggs, J. C. Kraft
6. Low-angle faulting and the origin of Kettle dome, a metamorphic core complex in northeastern Washington, by B. P. Rhodes, E. S. Cheney
7. Topology of ridge patterns: Possible physical interpretation of the "minimum spanning tree" postulate, by D. M. Mark
8. 130,000-yr continuous pollen record from Clear Lake, Lake County, California, by D. P. Adam, J. D. Sims, C. K. Throckmorton
9. Geochemistry of amino acids in sediments from Clear Lake, California, by D. J. Blunt, K. A. Kvenvolden, J. D. Sims

In September *Geology*

1. One hundred million years of geomagnetic polarity history, by W. Lowrie, W. Alvarez
2. Tectonic lineaments of Pliocene and Quaternary shorelines, northeast Gulf Coast, by E. G. Otvos
3. Effect of cooling on the water content and mechanical behavior of metamorphosed rocks, by B.W.D. Yardley
4. Early Holocene glacier advance in the North Cascade Range, Washington, by J. E. Beget
5. Flash flood in Arizona—Observations and their application to the identification of flash-flood deposits in the geologic record, by I. Lucchitta, N. Suneson
6. Anticrack model for pressure solution surfaces, by R. C. Fletcher, D. D. Pollard
7. On the origin of the Cocos-Nazca spreading center, by R. Wortel, S. Cloetingh

GSA News & Information

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CENTENNIAL NEWS

First D-NAG book now in preparation

About nine months from now, "Perspectives in Regional Geological Synthesis: Preparation for *The Geology of North America*" will be born as the first book in the extensive series of books and maps and charts that will comprise the products of the Decade of North American Geology. "Perspectives . . ." will be a 100-page Special Paper developed from chapter manuscripts that are due November 1. Each chapter will be a succinct statement by project leaders for one of the regional synthesis volumes in *The Geology of North America* describing the major geologic components of the area under consideration and presenting the rationale for the particular approach to synthesis that is being used.

The book will serve two important functions: it will be an overview of the current state of knowledge about major features of the North American Plate; and it will present the thinking behind the organizational effort to integrate geological, geophysical, and geochemical information on the scale of a plate. Look for the ads early next year.

Call for proposals for the Centennial Symposium: 1982 Annual Meeting, New Orleans

The Council of the Society has authorized the designation of a featured Centennial Symposium for each annual meeting during the decade of the 1980s. This symposium will be a part of the Centennial Program and of the Decade of North American Geology. The President of the Society will make the final selection from suggestions and proposals made by the Program Review Committee, the Council, divisions, sections, and the membership at large. Proposals are being accepted for the 1982 meeting in New Orleans.

The featured symposium should focus on pacesetting trends and current breakthroughs in research having broad interdisciplinary impact on the science of geology.

Suggestions and proposals of titles and subjects should be sent before October 2, 1981, to

A. R. Palmer, Centennial Science Program
Coordinator
Geological Society of America
P.O. Box 9140
Boulder, CO 80301

Guidelines for Preparation of and Writing a Penrose Conference Proposal

The key to an efficient and prompt review of any proposal is that the proposal contain all of the information needed by the Penrose Conference Committee to make a decision. Each proposal submitted to the Society must contain the following information, outlined in the format set forth below. Proposals should be sent to the Executive Director with a simple cover letter signed by all conveners.

Proposal Outline

1. A short expression of the subject, by title. Normally, this title would be the same one that is used on announcements, publicity, and in any correspondence regarding the conference even before it is approved.
 2. A description of the subject. What is the conference all about? What is the objective of the conference?
 3. A statement explaining how a conference on this subject will meet the purpose/objectives that have been set forth for the Penrose Conferences in the general guidelines. What new ideas, unresolved controversy, or potential future significant advances pertaining to the subject justify the need for a conference?
 4. List of several key speakers and their fields of interest, with an indication of their willingness and ability to participate. This indication normally would be in the form of letters to the convener from the key speakers. Documented phone calls are less satisfactory. This is a particularly critical item in the review of the proposal because the success of a conference is largely a function of *who* participates.
 5. A preliminary general outline of sessions. Even though preliminary, an outline of the schedule is important because it forces careful thought about relevance, organization, and treatment of subject matter. The schedule might include tentative titles and speakers for key presentations, as well as some indication of the gross structure of the program or how the time will be used. Such information permits evaluation of the reasonableness of the conference content in terms of the time available.
 6. A suggested geographic location or locations. The geographic location, and even the precise site of a conference, often will be dictated by a field trip plan and little choice will be available. For conferences without associated field trips, a wider range of possibilities obviously will be possible and alternate sites should be identified. Regardless, conveners planning to use a coordinator are strongly advised against making formal contacts with the site management. Experience has been that a professional coordinator can negotiate much better when such contact has not been made.
 7. A choice of preferred and alternate dates (or at least a preference for the time of year). In selecting the dates refer to the appropriate discussion in the Penrose Conference General Guidelines. Be sure to allow enough time, normally no less than a year, for processing the proposal and advertising the conference. Check the schedule of GSA section meetings which appears from time to time in *GSA News & Information*, and check the *Geotimes* monthly calendar of events for possible conflicts. A schedule of future approved and recommended Penrose Conferences will be provided prospective conveners with these guidelines.
 8. Anticipated number of participants. If the anticipated number is above 80 or below 50, an explanation and justification should be included.
 9. A description of the nature and logistics of any field trip(s) that is a suggested part of the conference. How and when will the trip fit into the program? Generally, what is its length and destination? What forms of transportation will be needed? Will there be any difficulty in arranging this transportation?
 10. A statement on any international participants who might be considered and the source and amount of anticipated financial support for their participation. For most conferences, international participation is essential for success, but often the expense of overseas travel is prohibitive. Potential outside sources of funding for partially defraying the expenses of selected foreign participants should be identified, but no official contact with the source should be made until after the proposal has been approved.
 11. A statement indicating the willingness of the conveners to abide by the Penrose Conference General Guidelines and their intent, or lack thereof, to ask the Executive Director to contract a meeting coordinator. Conveners who do not opt for the services of a coordinator are reminded that they must accept full fiscal responsibility for the conference. In planning their budget, they should be aware that by action of the GSA Council, the maximum fee for a 5-day conference is \$400. Normally, this would include all costs, even field trips.
 12. Identification of co-sponsors, if any, and their roles in the conference.
 13. Curriculum vitae for each of the conveners, including telephone numbers and a list of publications and projects which qualify each for leading the proposed conference.
- In conclusion, proposers are reminded that failure to submit complete and adequate proposals may cause significant delay in the approval process. Therefore, because experience has shown that a year or more is generally needed between approval date and conference date, inadequate proposals may result in the loss of the hoped-for date.

Lee J. Suttner, Chairman
Penrose Conference Committee
May 19, 1981

PENROSE CONFERENCE

Laramide Deformation of the Rocky Mountain Foreland

A Geological Society of America Penrose Conference on "Laramide Deformation of the Rocky Mountain Foreland" will be held August 22-28, 1982, in Billings, Montana. Conveners for this conference are *David R. Lageson*, Department of Earth Sciences, Montana State University, Bozeman, MT 59717 and *Gary D. Couples*, AMOCO Production Company, 1670 Broadway, Denver, CO 80202.

The topic of Laramide deformation in the Rocky Mountain area is one of the leading controversies among structural geologists and tectonophysicists in North America. Scientists are sharply divided in their interpretation of basic, observable facts; models and hypotheses concerning the Laramide history of this region exhibit a great diversity. The resolution of this controversy would have important ramifications, both scientific and economic, in terms of our understanding of lithosphere/asthenosphere interactions, the geometry of late Mesozoic-early Cenozoic subduction along the western margin of North America, and enhanced predictive abilities in the exploration of structurally controlled mineral and hydrocarbon resources.

The major aim of this conference is to assemble geoscientists who represent this rather broad spectrum of views. Both organized and informal gatherings will pro-

vide an opportunity to evaluate and discuss the wealth of data collected over several decades. The format of this meeting will not be similar to GSA annual meetings with their large number of contributed papers. Rather, the conveners intend to organize topical sessions with a primary "reviewer" and selected "contributors." The remaining session time is to be reserved for open discussion. All conference participants are expected to participate in discussions and in evening poster-type sessions.

The conference is scheduled to last 5 days with a two-day field trip to study outcrops around the Big Horn Basin. An optional four-hour overflight of the field-trip route is being investigated, pending sufficient interest. Registration fees are expected to be between \$325 and \$375, including all meals and lodging. The estimated cost of the overflight is about \$100.

If you are interested in attending, do not wait for an invitation! Contact one of the conveners *now*. Also, please indicate interest in the overflight. Include a *brief* description of topic(s) you can contribute. Expanded outlines may be requested later. Deadline for applications is **February 15, 1982**.

Sale a big hit

GSA Publication Sale precedes warehouse move

As GSA prepares to move its publications warehouse to a new location in early 1982, earth scientists and book agents around the world are eagerly taking advantage of handsome pre-move discounts being offered on many GSA Memoirs, Special Papers, and Maps/Charts.

The "Warehouse Removal Sale" is being advertised energetically this summer by GSA in its own publications and by direct mail. The response has exceeded expectations. Orders began coming in heavily within days after the first announcement (see *June News & Information*) and have continued at a high level since. According to GSA Controller, Richard Drozda, orders totaling more than \$12,000 have been received for sale items between June 1 and July 10.

Not all GSA publications are included in the sale, only those listed on the sale price sheet available from GSA. The sale ends November 30, 1981. Special terms and conditions apply to the sale, including a minimum order level of \$10 and a handling charge of \$2.50 per order. All items are, of course, subject to prior sale, and some of the more popular items are selling fast.

Proposals are now being obtained by GSA from prospective new warehouse contractors in the Boulder and Denver areas. GSA officials feel that the warehouse inventory should be located in Boulder to provide improved inventory control, better accessibility, and more marketing opportunities.

1981 Annual Meeting Announcements

New GSA Planetary Geology Division meeting

The new Planetary Geology Division will hold its organizational meeting in Cincinnati on Tuesday, Nov. 3, 1981, 5:00-5:30 p.m., in Room 2, Convention Center. The meeting immediately follows the division symposium convened by Leon T. Silver and Harold Masursky: Comparative Planetary Geology.

GSA Public Forum

Harold Masursky will be the principal speaker for the 1981 GSA Public Forum scheduled for Sunday, November 1, from 2 to 4 p.m. The forum is open to the public. The topic, "Exploration of Venus, Jupiter, and Saturn," promises to be interesting and well attended by both the general and the scientific audiences.

UPDATE

Starting in September

Advertising to appear in GSA publications

The September issue of *Geology* carries the first paid, commercial advertisement to be published in the Society's journals. The advertisement, which appears on the outside back cover, promotes the 75th anniversary volume of *Economic Geology*.

As reported by President Gould in the July issue of this newsletter, Council, at its May meeting, made a drastic departure from long-standing GSA policy by approving the concept of acceptance of professionally oriented commercial advertising in all series of the Society's periodical publications.

The decision applies to the two monthly journals, *Bulletin* (to become a one-part, paper-copy journal as of January 1982), to *Geology*, to *News & Information*, and to the seven annual issues of *Abstracts with Programs*.

Advertisements will not be intermingled with journal articles. Council protected the integrity of the scientific articles by specifying that advertising will not be placed on the front cover of any Society publication nor will it be distributed throughout the volume. Rather, it is to be grouped at the front and back of the publications.

As a result, subscribers will see advertising only on the inside front cover, the two back covers, and on pages preceding and following the scientific material.

The first periodicals to be opened to advertisers will be *Bulletin* and *Geology*, both of which are being offered to advertisers "officially" as of January 1982.

However, the request from *Economic Geology* for space in the September issue of *Geology* was honored as an exception, and a limited amount of advertising space in the October, November, and December 1981 issues has been offered to exhibitors at recent GSA meetings and to a few other organizations that have contacted GSA concerning advertising. This offer is designed primarily to promote advertising contracts for 1982.

An important part of GSA's new advertising program is the critical review by the Executive Director of all advertising to ensure the "professional" orientation authorized by Council.

AEG 1981 annual meeting, September 27-October 4, Portland, Oregon

The 1981 Annual Meeting of the Association of Engineering Geologists is scheduled for Sept. 27-Oct. 4, 1981, in Portland, Oregon, at the downtown Hilton Hotel. The meeting consists of three days of technical sessions and symposia, preceded by five field trips. Because of Portland's proximity to Mount St. Helens, special sessions and field trips are planned to focus on the engineering geologic problems associated with the aftermath of a volcanic eruption.

For information, contact Ken Robbins, Dames and Moore, 1220 SW Morrison, Portland, OR 97205; phone (503) 228-7688.

Bulletin, Geology, News & Information

GSA chooses new printers for periodicals

Two new firms have been named by GSA to provide the printing, binding, and fulfillment for this newsletter and for the Society's two monthly journals, *Bulletin, Part I* and *Geology*. The new firms replace The Lane Press of Burlington, Vermont, GSA's journal-printer for many years.

Effective with this issue, *News & Information* will be produced at the A. B. Hirschfeld Press, Inc., in Denver. Contracts for printing of the two journals have been awarded to Edwards Brothers, Inc., of Ann Arbor, Michigan, starting with the November 1981 issues.

Both firms have provided printing services to GSA on books and others items for many years. They were selected as vendors for the journals, however, as the result of an extensive competitive bidding process in which 35 major printing houses across the country were invited to bid on one or more of these publications.

Detailed proposals received from 22 of those houses were analyzed carefully against criteria which included price, degree of service proposed, experience with scientific publications, reputation among present clients, GSA's own experience with the organization, and geographic location. Location plays a large role in the necessary turn-around time for proofs, in postal costs, and in delivery time through the mails.

Although price was not the only factor, it naturally played a very important role. Significant savings offered on these publications by the successful bidders will help meet the Society's new economic and publication goals. The cost analyses of the various proposals were provided to the Special Publications Study Committee earlier this year.

Twenty-fourth Institute on Federal Funding

The Twenty-fourth Institute on Federal Funding will be in Washington, D.C., on October 5-7, 1981, to assist administrators, researchers, educators, project directors, finance officers, and others to learn about new and available sources of support for a wide range of grants and contracts. Participants will be able to meet speakers and ask them specific questions.

The speakers, as top officials of 29 federal agencies, will also provide information about changed Congressional mandates for assistance and procurement, as well as the budget and governmental priorities for the coming months. Represented will be the Departments of Health and Human Services, Defense, Agriculture, Housing and Urban Development, Interior, Transportation, Labor, as well as the National Science Foundation, Office of Management and Budget, Environmental Protection Agency, and National Endowments for the Humanities and for the Arts.

A complete program and additional information may be obtained from Mrs. Donna Smith at National Graduate University, 1101 North Highland Street, Arlington, Virginia 22201; telephone (703) 527-4800.

Articles in *Bulletin*, Part II, July 1981

Articles in *Bulletin*, Part II are listed below. (Summaries only of these articles are in *Bulletin*, Part I.)

1. Calculation of temperature-oxygen fugacity tables for H₂-CO₂ gas mixtures at one atmosphere total pressure, by Arthur R. Prunier, Jr., and David A. Hewitt. (On microfiche: 30 p., 3 figs., 4 tables)
2. Significance of folds and mylonites at the Grenville front in Ontario, by Timothy E. LaTour. (On microfiche: 42 p., 11 figs.)

First International Symposium on Crystal Growth Processes in Sedimentary Environments

The first International Symposium on Crystal Growth Processes in Sedimentary Environments will be held in Madrid, Spain, from April 13 to 16, 1982, under the auspices of the International Mineralogical Association, the IMA Commission on Crystal Growth of Minerals, the International Organization for Crystal Growth, the Spanish Council for Scientific Research, the Spanish Mineralogical Society, and the Instituto Geológico y Minero de Espana.

The symposium is aimed to provide a forum mediating between the science of crystal growth and the science of sedimentation and sedimentary petrology, as well as to report and discuss recent studies on crystal growth processes in sedimentary environments. The symposium is organized in view of the increasing importance of the knowledge of crystal growth mechanisms in understanding the formation of sedimentary rocks and diagenetic processes.

The symposium will consist of lectures by invited speakers (about ten speakers are expected), round-table discussions led by invited speakers, and contributed papers presented by the assistants in the form of posters. Those who are interested in this symposium may obtain further information from

Dr. R. Rodríguez Clemente, Instituto de Geología
Consejo Superior de Investigaciones Científicas
c/ José Gutiérrez Abascal, 2. Madrid-6. Spain

The registration fee is fixed at 100 US \$, and the deadline for submission of abstracts of contributed papers is December 20, 1981.

GSA Foundation now has tax-exempt status

The series of steps necessary to develop the GSA Foundation is now complete. With the granting of tax-exempt status by the IRS in mid-May, the Foundation became fully operational. Several major contributions have already been received. The Foundation will be the main source of funding for GSA's component of the products of the Decade of North American Geology, as well as significantly expanding opportunities for service to the profession through grants and other sponsored activities that are currently supported out of the Penrose and other bequests to the Society.

NEW ORLEANS 1982 ANNUAL MEETING CALL FOR SYMPOSIA PROPOSALS

Individuals interested in organizing a symposium for the 1982 Annual Meeting should contact the Joint Technical Program Chairman for details:

Dr. William W. Craig
Dept. of Earth Sciences
Univ. of New Orleans
New Orleans, LA 70122
(504) 286-6790 (office)
(504) 286-6325 (dept.)

Deadline for receipt of all proposals:
DECEMBER 15, 1981

Additional award winners for 1981

BURWELL AWARD: *Allen W. Hatheway*, Haley & Aldrich, Inc., 238 Main Street, Cambridge, MA 02142, and *Cole R. McClure, Jr.*, 12580 LaCresta Drive, Los Altos, CA 94022 (Engineering Geology Division)

CADY AWARD: *Clayton G. Ball*, 1500 Hinman Avenue, Evanston, IL 60201 (Coal Geology Division)

NOAA data announcements

The National Geophysical and Solar-Terrestrial Data Center of the National Oceanic and Atmospheric Administration has recently released data announcements on the following subjects:

Studies in East Asia Tectonics and Resources (SEATAR), data announcement 81-MGG-04

High-Resolution Seismic Reflection Data, Lease Sale 59, data announcement 81-MGG-05

Geophysical Data for Outer Continental Shelf, Lease Sale 45—Gulf of Mexico, data announcement 1980 (SE-Z)

Geophysical Data for Outer Continental Shelf, Lease Sales 58 and 58A—Gulf of Mexico, data announcement 1980 (SE-P)

High-Resolution Seismic Reflection Data, OCS Lease Sales 55 and 60, data announcement 1980 (SE-JJ)

Magnetic Field Models announcement listing availability of recent geomagnetic field models and associated data services, data announcement 81-TGB-18

Further information on these data announcements may be obtained by telephoning (303) 497-6478 or by writing to

National Oceanic and Atmospheric Administration
EDIS/NGSDC (D62)
325 Broadway
Boulder, CO 80303

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

NORTHEASTERN AND SOUTHEASTERN SECTIONS, GSA, Combined Annual Meetings, Washington, D.C., March 25–27, 1982

The Northeastern and Southeastern Sections of the Geological Society of America will meet March 25–27, 1982, at the Shoreham Hotel in Washington, D.C., together with the Northeastern and Southeastern Sections of the Paleontological Society and the Eastern Section of SEPM. The meeting is sponsored by the Geological Society of Washington, D.C.

CALL FOR PAPERS. Papers are invited for presentation at traditional technical and poster sessions and symposia. Fifteen minutes for presentation and five minutes for discussion is the prescribed format for the technical sessions. Papers of regional interest to geologists in the northeast and southeast, as well as those of general geologic interest, will be considered for the program. Technical and poster sessions will be arranged based on the abstracts received and accepted. Abstracts for a symposium should be submitted directly to the symposium convener. Abstracts not accepted for symposia will be considered for the general technical sessions.

SYMPOSIA. The following symposia titles and conveners have been organized or are in final planning stages:

1. Barrier Island Processes (Stephen P. Leatherman, National Park Service—Cooperative Research Unit, University of Massachusetts, Amherst, MA 01003, (413) 545-0648, and George Oertel, Old Dominion University, Norfolk, VA 23508).

2. Geology of the Great Appalachian Cambro-Ordovician Carbonate Bank (L. A. Hardie, Department of Earth and Planetary Sciences, The Johns Hopkins University, Baltimore, MD 21218, (301) 338-7050).

3. Weathering and Soil Genesis in the Eastern U.S. (Milan J. Pavich and Helaine W. Markewich, USGS, 926 National Center, Reston, VA 22092, (703) 860-6421).

4. Grenville Terranes of the Appalachians (Mervin J. Bartholomew, Virginia Division of Mineral Resources, c/o Department of Geological Sciences, VPI and SU, Blacksburg, VA 24061, (703) 961-7647; Krishna Sinha, VPI and SU; Eric Force, USGS, Reston, VA; Norman Herz, University of Georgia, Athens, GA).

5. Timing of Orogenic Events in the Appalachians (William A. Thomas, Department of Geology, University of Alabama, Tuscaloosa, AL 35486, (205) 348-5095; James Tull, Florida State University, Tallahassee, FL).

6. Geological Information Transfer: How Well Is It Working? (Emery T. Cleaves, Maryland Geological Survey, The Johns Hopkins University, Baltimore, MD 21218, (301) 338-7106; David Moody, USGS, Reston, VA).

7. Environmental Geology: Case Studies in the Eastern U.S. (sponsored by NE and SE Sections, NAGT; James V. O'Connor, USGS, 109 National Center, Reston, VA 22092, (703) 860-7414).

8. Process Sedimentology (sponsored by Eastern Section, SEPM; Jon Boothroyd, Department of Geology,

University of Rhode Island, Kingston, RI 02881, (401) 792-2265 and Dag Nummndal, LSU, Baton Rouge, LA).

9. Geologic Aspects of the Newark Supergroup Rift Basins (sponsored by Eastern Section, SEPM; Roy C. Lindholm, Department of Geology, The George Washington University, Washington, DC 20006, (202) 676-7197).

10. Paleontology of Branching Organisms (sponsored by NE Section, Paleontological Society; Roger J. Cuffey, Department of Geosciences, Pennsylvania State University, University Park, PA 16802, (814) 865-1293).

11. Adaptive Strategies of Shallow Water Faunas and Floras (sponsored by SE Section, Paleontological Society; Ernest A. Mancini, Department of Geology, University of Alabama, Tuscaloosa, AL 35486, (205) 343-5095, and Scott Brande, University of Alabama, Birmingham, AL).

12. Tectonics and Geophysics in the Eastern U.S. (Isidore Zietz, Phoenix Corporation, 1700 Old Meadow Rd., McLean, VA 22102, (703) 790-1450 or 860-7233; Jeffrey Phillips, USGS, Reston, VA).

FIELD TRIPS. The following field trips have been planned:

1. Cenozoic stratigraphy and structure of tidewater, Virginia and Maryland (Wayne Newell, USGS, MS 925, Reston, VA; Eugene Rader, Virginia Department of Mineral Resources, Charlottesville, VA).

2. Post-Jurassic tectonics of the inner Coastal Plain, Virginia (Robert Mixon, USGS, MS 925, Reston, VA; Wayne Newell).

3. A geologic traverse of the Triassic-Jurassic Culpepper Basin, northern Virginia (Brian Leavy, USGS, MS 927, Reston, VA; Albert Froelich, USGS, MS 926, Reston, VA; Roy Lindholm, Department of Geology, George Washington University; Tucker Hentz, Department of Geology, University of Kansas).

4. Structure of the Blue Ridge anticline in northern Virginia (Gautam Mitra, Department of Geology, University of Wyoming, Laramie, WY; Christopher Halladay, Virginia Department of Mineral Resources, Charlottesville, VA).

5. Grenville anorthosite, ferrodiorite, and titanium deposits in the Roseland District, central Virginia (Eric Force, USGS, MS 954, Reston, VA; Norman Herz, Department of Geology, University of Georgia, Athens, GA).

6. A traverse across the Piedmont, Blue Ridge, and Valley and Ridge provinces near the Roanoke recess (Thomas Gathright, Mervin J. Bartholomew, William Henika, and James Conley, Virginia Department of Mineral Resources, Charlottesville, VA).

7. Lower Paleozoic platform carbonates of the central Appalachians, upper Cambrian Conococheague limestones and middle Ordovician St. Paul Group (Robert Demieco and Ray Mitchell, Department of Geology, The Johns Hopkins University, Baltimore, MD).

SHORT COURSE. A two-day short course on recent advances in organic geochemistry (Marilyn F. Estep, organizer, (202) 966-0334) will be offered at the Geophysical Laboratory, March 23-24. Course topics include: molecular fossils, structure and formation of humic acids and kerogen, amino acids, isotope biogeochemistry, and microbiological effects on metals/minerals and methane formation/sulfate reduction.

ABSTRACTS. Abstracts are limited to approximately 250 words and the original **MUST** be submitted camera-ready on official 1982 abstract forms, available from

Abstracts Coordinator	or	Juergen Reinhardt
Geological Society of America		U.S. Geological Survey
P.O. Box 9140		928 National Center
Boulder, CO 80301		Reston, VA 22092
(303) 447-8850		(703) 860-6595

ALL ABSTRACTS ARE DUE OCTOBER 15, 1981.

Send one original and four copies of abstracts to be considered for **technical sessions** and **poster sessions** to

Juergen Reinhardt
U.S. Geological Survey
928 National Center
Reston, VA 22092

Send one original and four copies of abstracts for **Symposia directly to the convener** (first name following the symposium topic or title in the above section). Acceptance or rejection of abstracts will be based on review by the Technical Program Committee. Abstracts will be judged on the basis of scientific merit, informative content, readability,

and relevance to geologic problems of the eastern U.S. There is no limit to the number of abstracts that may be submitted, but no more than two abstracts bearing an individual's name will be accepted for the program.

STUDENT PAPERS. Three cash awards (\$100, \$50, and \$25) will be made for the best student papers presented in the technical sessions. To be judged and eligible, the abstract must be by a single author and must be designated on the abstract form as a student paper.

PROJECTION EQUIPMENT. All slides must be 2" x 2" and fit a standard 35mm carousel tray and projector. Only one projector and screen will be used in the technical sessions. Please plan your presentation accordingly and bring your own loaded carousel tray, if possible.

EXHIBIT SPACE will be available near the technical session area. Individual booths will be a standard size, but double booths will be available. The cost of a booth for educational and nonprofit institutions will be reduced. For additional information, contact Bruce Lipin, USGS, 954 National Center, Reston, VA 22092, (703) 860-7356.

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 1982.

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

Thomas O. Wright (NE GSA)	Jack H. Medlin (SE GSA)
Earth Sciences Division	U.S. Geological Survey
National Science Foundation	956 National Center
Washington, DC 20550	Reston, VA 22092
(202) 357-7915	(703) 860-7734

MORE UPDATE

Necrology

Notice has been received of the following deaths: John D. Hale, Calgary, Alberta, Canada; Earl M.P. Lovejoy, El Paso, Texas; Xavier M. Picard-C, Caracas, Venezuela; John T. Sanford, Highlands, North Carolina; Barkley S. Wyckoff, Sparks, Nevada.

1981 International Gas Research Conference

September 28–October 1, 1981, Bonaventure Hotel, Los Angeles. For registration information, call (312) 236-7273 or TWX: 910-221-2506.

Announcement of interest

Donald L. Turcotte, GSA's 1981 Day Medalist, has been appointed chairman, Department of Geological Sciences, Cornell University, effective July 1, 1981, succeeding Jack E. Oliver, Irving Porter Church Professor of Engineering, who will return to teaching and research after ten years as chairman. Turcotte has been a member of the Cornell faculty since 1959, first in the Department of Mechanical and Aerospace Engineering, then since 1973 in the Department of Geological Sciences.

Two opportunities for study and research in China

The Committee on Scholarly Communication with the People's Republic of China (CSCPRC) announces opportunities under the National Program for Advanced Study and Research in China for graduate students and postdoctoral scholars in the natural sciences, engineering, social sciences, and humanities for 1982–83. This program makes possible long-term study (10 to 12 months) or research (3 to 12 months) in affiliation with Chinese universities and research institutes. Application is open to citizens of the United States regardless of national origin, sex, or religious affiliation. Grants, the number of which depends on available funding, include transportation to and from China, stipend, living and travel allowances while in China, and a limited research and educational materials allowance. The program does not provide dependent travel or support. The program has two components: application should be made *either* to the Graduate Program or to the Research Program. Address inquiries to the CSCPRC, Natl. Academy of Sciences, 2101 Constitution Ave., Wash. DC 20418. **Postmark/Mailing deadline for applications: November 6, 1981.**



THE GEOLOGICAL SOCIETY OF AMERICA

Annual research awards program 1982

The Geological Society of America will continue its annual research awards program in 1982. Eligibility is not restricted to GSA members. New application forms for 1982 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 1982 forms.**

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

The Geological Society of America awarded \$100,000 for grants in 1981. The grants went to 176 students doing research for advanced degrees and to one postdoctoral applicant. The average amount granted was \$575. The highest grant was \$1,000, but there is no predetermined maximum amount.

Confidential evaluations from two faculty members are required from masters and doctoral candidates and must accompany applications submitted. **PLEASE USE THE NEW "APPRAISAL OF APPLICANT" FORMS, WHICH ACCOMPANY THE 1982 APPLICATION FORMS.**

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

The Committee on Research Grants will meet 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, 1982.

[PLEASE POST]

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

SOUTH-CENTRAL SECTION, GSA, 16th Annual Meeting Norman, Oklahoma, March 29-30, 1982

THE SOUTH-CENTRAL SECTION of the Geological Society of America will hold its 16th annual meeting in Norman, Oklahoma, on March 29-30, 1982. The hosts will be the Oklahoma Geological Survey and the School of Geology and Geophysics at The University of Oklahoma in Norman. The Texas Section of the National Association of Geology Teachers will meet with the South-Central Section of the GSA at this time for the second consecutive year.

TECHNICAL SESSIONS. Two days of technical sessions will be held on March 29 and 30, 1982, at the Oklahoma Center for Continuing Education on the campus of The University of Oklahoma. Five symposia are tentatively scheduled on the following topics: Wichita Mountains/Anadarko Basin Relationships, Hydrocarbon Potential of the Ouachitas, The Atokan Series and its Boundaries, Seismotectonics of the Nemaha Ridge, and Uranium and Base Metals in the Midcontinent. Technical sessions of voluntary papers will be arranged into appropriate sections after abstracts have been reviewed by the program committee. If you are planning to prepare a paper for the meeting, don't delay. We need your contribution to make this one of the most successful South-Central meetings.

ABSTRACTS ARE DUE November 2, 1981.

*Send one original
and four copies to*

Patrick K. Sutherland, Program
Chairman
School of Geology and Geophysics
The University of Oklahoma
Norman, OK 73019

New, revised abstract forms can be obtained from either the above address or from

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

The use of the new GSA section meeting abstract form, completed according to instructions, is required.

All papers in ordinary technical sessions are to be a maximum of 15 minutes. An additional 5 minutes can be devoted to discussion.

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

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.

CAROUSEL PROJECTION EQUIPMENT will be provided for 2" x 2" (35mm) slides only. Only one projector can be used by a speaker. Please bring your own loaded carousel trays if possible.

FIELD TRIPS are tentatively scheduled for the Wichita Mountains and the Lower Pennsylvanian of the Arbuckle Mountains Region. An additional trip sponsored by the National Association of Geology Teachers will review the general geology of the Arbuckle Mountains.

SPECIAL EVENTS. A Welcoming Party will be held Sunday evening (March 28), and the annual banquet will be held Monday evening. Among the guest events tentatively planned is a trip to the Cowboy Hall of Fame and Western Heritage Center.

HOUSING AND MEALS. The Oklahoma Center for Continuing Education operates a complete conference facility, with rooms and suites in a wide price range. They also operate a cafeteria for participants.

ANNOUNCEMENTS concerning registration, housing, off-campus accommodations, and guest events will appear in a later issue of *GSA News & Information* and as part of the *Abstracts with Programs* for 1982.

For additional information contact the General Chairman

Kenneth S. Johnson
Oklahoma Geological Survey
The University of Oklahoma
Norman, OK 73019

CALENDAR OF SECTION MEETINGS FOR 1982

SOUTHEASTERN

Shoreham Hotel, Washington, D.C.
March 25-27, 1982
Abstract deadline: October 29, 1981

SOUTH-CENTRAL

University of Oklahoma, Norman, Oklahoma
March 29-30, 1982
Abstract deadline: November 2, 1981

NORTH-CENTRAL

Purdue University, West Lafayette, Indiana
April 29-30, 1982
Abstract deadline: December 2, 1981

NORTHEASTERN

Shoreham Hotel, Washington, D.C.
March 25-27, 1982
Abstract deadline: October 29, 1981

CORDILLERAN

Anaheim Convention Center, Anaheim, California
April 19-21, 1982
Abstract deadline: November 16, 1981

ROCKY MOUNTAIN

Montana State University, Bozeman, Montana
May 7-8, 1982
Abstract deadline: December 15, 1981

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS

CORDILLERAN SECTION, GSA, 78th Annual Meeting Anaheim, California, April 19-21, 1982

THE CORDILLERAN SECTION. The Department of Earth Science, California State University, Fullerton, will host the 78th annual meeting of the Cordilleran Section of the Geological Society of America, the annual meeting of the Seismological Society of America, and the annual meeting of the Pacific Coast Section of the Paleontological Society on April 19-21, 1982, at the Anaheim Convention Center, Anaheim, California.

REGISTRATION. Preregistration will be made by mail. On-site registration will take place on Sunday, April 18, from 1700 to 2000 hours at the Anaheim Quality Inn and during the meeting at the Convention Center. Preregistration fees are \$30 for professionals, \$3 for GSA Student Associates, and \$6 for other students. On-site registration is \$40 for professionals and \$6 for all students. All are urged to take advantage of the lower preregistration rates. **Preregister by March 19, 1982.**

SYMPOSIA. A. The regional geology of the state of Washington in honor of J. D. Barksdale, H. A. Coombs, P. Misch, A. L. Washburn, and H. E. Wheeler (Eric S. Cheney); B. Paleomagnetism and tectonics of the Cordilleran margin (Bruce Luyendyk); C. Fluvial sedimentation, western North America (Tor H. Nilsen and Roland Brady); D. Tertiary volcanism west of the San Andreas Fault and tectonic implications (Peter W. Weigand); E. Neotectonics of the western Transverse Ranges (Arthur C. Darrow and Roy H. Patterson); F. Geology, tectonics and origin of the crystalline terranes and adjacent sedimentary basins of the Transverse Ranges, California (Bruce Carter and Robert E. Powell); G. Cretaceous and Cenozoic regional metallogenic evolution of the Mojave Desert and southwestern boundary of the Colorado Plateau (Stanley Keith); H. Hydrogeology of inland arid basins (John F. Mann, Dick Moyle, and Prem Saint); I. Surficial deposits of southwestern United States: Stratigraphy, chronology, and depositional environments, a memorial symposium to Denis E. Marchand (David Hoover and David Weide); J. The upper Precambrian and lower Paleozoic environmental stratigraphy of the southwestern Great Basin (Jeffrey Mount and Richard Miller); K. The Cretaceous and Cenozoic paleontology and chronostratigraphy of northwestern Mexico and southwestern United States (Ismael Ferrusquia); L. A comparison of Mesozoic compressional tectonics and mid-Tertiary detachment faulting in the Colorado River area (Eric G. Frost, Terry E. Cameron, and Donna L. Martin).

FIELD TRIPS. **Premeeting.** (1) Sedimentation history of Ridge Basin, southern California (J. C. Crowell and M. H. Link), April 17-18; (2) Cenozoic geology of the central Mojave Desert (R. K. Dokka and A. F. Glazner), April 17-18; (3) Neotectonics of the Ventura Basin, southern California (R. S. Yeats, E. A. Keller, K. R. Lajoie, A. M. Sarna-Wojcicki, and R. F. Yerkes), April 17-18; (4) Geologic hazards along the San Andreas Fault system, San Bernardino-Hemet-Elsinore, California (G. S. Rasmussen),

April 17; (5) Geology and structural setting of the San Gabriel anorthosite-syenite body and adjacent rocks of the western San Gabriel Mountains, Los Angeles County, California (B. A. Carter), April 17-18; (6) Late Cenozoic stratigraphy and structure of the San Bernardino Mountains, California (P. M. Sadler, J. Foster, K. Meisling, and R. Weldon), April 18; (7) Comparison of Mesozoic tectonics with mid-Tertiary detachment faulting in the Colorado River area, California, Arizona, and Nevada (E. G. Frost, T. E. Cameron, and D. L. Martin), April 16, 17, 18; (8) Late Cretaceous depositional environments and paleogeography, Santa Monica and Santa Ana Mountains, southern California (I. P. Colburn, J. D. Cooper, R. Blake, S. Carey, F. A. Sundberg), April 17-18. **Postmeeting.** (9) Stratigraphy and structure of selected areas in the San Bernardino Mountains, Mojave Desert, and southwestern Great Basin (B. W. Troxel, C. S. Cameron, E. L. Miller, R. H. Miller, J. D. Cooper, R. Brady, and P. Butler), April 22, 23, 24; (10) Landslides and landslide abatement, Palos Verdes Peninsula, southern California (P. L. Ehlig), April 22; (11) Crystalline basement terranes in the southern Eastern Transverse Ranges, California (R. E. Powell), April 22, 23, 24; (12) Late Quaternary pedogenesis and the alluvial chronologies of the Los Angeles Basin and San Gabriel Mountains areas, southern California (J. C. Tinsley and L. D. McFadden), April 22-23; (13) Mineral deposits in the Mojave Desert region (A. Flint and M. S. Woyski), April 22-23; (14) Structure of the San Andreas Fault, western portion of the "Big Bend" (T. Davis and E. Duebendorfer), April 22-23.

ABSTRACTS for talks and poster sessions, which are limited to 250 words, **MUST** be submitted camera-ready on official abstract forms available from

Margaret S. Woyski	OR	Abstracts Coordinator
Earth Science Department,		Geological Society of America
S-263		P.O. Box 9140
California State University		3300 Penrose Place
Fullerton, CA 92634		Boulder, CO 80301

Abstracts are due November 16, 1981 with preregistration fee. Acceptance or rejection of an abstract will be based on the abstract as submitted by the author. *Acceptance of the abstract is contingent upon receipt of the non-refundable preregistration fee.*

**SEND ONE ORIGINAL
AND FIVE COPIES**

Margaret S. Woyski
Earth Science Department, S-263
California State University
Fullerton, CA 92634

Please note: In order to discourage authors from not presenting papers which have been accepted for the Cordilleran Section meeting, the non-refundable (in event paper is not presented) preregistration fee of \$30 (\$6 for *single* author student abstracts and \$3 for *single* author GSA student associates) must accompany ALL abstracts when submitted. Credit will automatically be given to the check's writer for preregistration unless otherwise indicated. Make checks payable to GSA—Cordilleran Section.

All papers in ordinary sessions will be 15 minutes, plus 5 minutes for discussion. Poster presentations will be on display for one-half day.

All abstracts will be reviewed by an Abstract Review Committee for informative content, correct structure, reliability of data, Cordilleran Section geographic coverage, and originality. Only one paper will be accepted from a single author; if papers are co-authored, no more than one paper may be presented by an author. Authors will be notified of acceptance well in advance of the meeting.

CAROUSEL PROJECTION EQUIPMENT will be provided for 2" x 2" (35mm) slides only (dual projectors by prior request only). Please bring your own loaded carousel trays.

BUSINESS MEETING. The Cordilleran Section business

meeting and luncheon will be at the Anaheim Quality Inn Hotel at 1200 hours on Tuesday, April 20, 1982.

EXHIBITS of educational and commercial organizations will be on display. Exhibit space must be reserved by **February 15, 1982.**

SOCIAL ACTIVITIES. A no-host cocktail party will be held from 1930 to 2300 hours on Sunday, April 18, at the Anaheim Quality Inn Hotel. Activities such as visits to Disneyland, La Brea Tar Pits, and Universal Studios, are being organized.

HOUSING. The headquarters hotel will be the Anaheim Quality Inn Hotel, located a short walk from the Convention Center. A great variety of hotels and motels are available in the Convention Center-Disneyland area.

DETAILED INFORMATION will appear in a later issue of *GSA News & Information* and as part of the *Abstracts with Programs* for 1982.

INQUIRIES AND SUGGESTIONS should be directed to
Neil J. Maloney, Local Committee Chairman
Earth Science Department, S-263
California State University
Fullerton, CA 92634 (714) 773-3882

MORE UPDATE

Opportunities abroad for teachers, academic year 1982-1983

Opportunities to teach abroad and to attend seminars abroad are available under the Fulbright Teacher Exchange program of the U.S. Department of Education for the 1982-1983 year.

Elementary and secondary school teachers, college instructors, and assistant professors are eligible to participate in the academic-year-abroad-teacher-exchange program. Exchanges are currently conducted with the United Kingdom, Germany, France, Switzerland, Denmark, Canada, and New Zealand. Basic requirements are U.S. citizenship, a bachelor's degree, and three years of teaching experience for one-year positions. As most of the positions are on an interchange basis, applicants must be employed currently.

As for the 1982 seminars, those eligible to apply include teachers of the classics, German, Italian, and world; Asian or Middle Eastern history and area studies; social studies supervisors; curriculum directors; teacher educators; and school administrators responsible for curriculum development. Basic requirements are U.S. citizenship, a bachelor's degree, and two years of teaching experience.

Applications are due between September 1 and November 1, 1981. All programs are subject, of course, to the availability of Congressional appropriations.

A brochure and application should be requested from

Teacher Exchange Branch, Office of International Education
U.S. Department of Education
ROB-3, Room 3068
Washington, DC 20202

Telephone (202) 245-9700

New monograph series planned in Canada

"Palaeontographica Canadiana" is the title for a new series of paleontological monographs to be published in Canada. Debate on the desirability and feasibility of such a series has been going on for several years, and a recent agreement between the Geological Association of Canada and the Canadian Society of Petroleum Geologists resulted in the formation of a Joint Committee on Paleontological Monographs (JCPM). This committee, comprising paleontologists and editors from both societies, met recently and appointed Dr. Rolf Ludvigsen (University of Toronto) as the first editor of the series. He will be aided in his task by seven associate editors who together represent a broad variety of paleontological subdisciplines. The day-to-day affairs of the series will be handled by the members of JCPM, and they are currently seeking funds to sustain the project as well as discussing format and production. Some money will be raised from pledges by individual paleontologists, and the remainder will be raised from corporate, institutional, and government sources. The Editorial Committee is preparing a set of guidelines for authors, and as soon as this is prepared, they will be in a position to consider manuscripts for the first monograph. Each monograph is to be a substantial paleontological contribution, dominantly systematic in content, which is pertinent to Canada. The series will maintain the highest international standards of content and production, and it is hoped that the first volume will appear in 1982. For many years major works on Canadian paleontology have been published in European or American monograph series; the advent of "Palaeontographica Canadiana" provides a long overdue medium for the publication of monographs of Canadian content or interest in Canada.

COUNCIL ACTIONS, SPRING 1981

The following actions were taken by Council during its spring meeting in Boulder on May 19–20, 1981:

1. Received the report of the ad hoc Publications Study Committee that was appointed by Council last November and chaired by Brian J. Skinner; discussed and acted on its recommendations.

2. Rescinded former Council action and re-established the *Bulletin* as a one-part printed journal, with microfiche copies of the *Bulletin* and *Geology* being an option available at the same price as printed copies; *Bulletin* and *Geology* to be published as separate journals.

3. Voted that *GSA News & Information* continue to be a separate, monthly—but less expensive—document mailed to all members.

4. Voted that all regular members shall receive the *Bulletin*, *Geology*, and *GSA News & Information* as part of their membership dues of \$48; same package to Student Associates for \$28; effective 1-1-82.

5. Voted that dues-exempt members shall continue to receive *GSA News & Information* at no cost; they shall have the option of subscribing to the *Bulletin* and *Geology* as a package for \$28; Life Members shall receive the *Bulletin* and *Geology* with their one-time dues payment; the membership fee for spouses shall be the same as for regular members, including receipt of the same publications.

6. Established the 1982 nonmember subscription rate for the *Bulletin* to be \$60; *Geology* to be \$35; *Abstracts with Programs* for section meetings to be \$5 each, annual meeting to be \$9.

7. Voted that the *Bulletin*, *Geology*, *Memoirs*, *Special Papers*, and *Maps and Charts* be edited externally; that an editor be appointed for each publication series to serve a 3-year term, with an option for renewal for an additional 3 years, subject at all times to the pleasure of Council; editors' positions to be honorary, with costs of editors' travel and office expenses borne by the Society; editors to be nominated by the Committee on Publications and appointed by Council.

8. Restructured the Committee on Publications to consist of 8 people, at least one of whom, the chairman, be a councilor; each of the 4 editors to be a member of the committee; 3 members-at-large to be appointed from a list drawn up by the Committee on Committees, with service to be for 3 years.

9. Voted to accept the following:

Voluntary page charges of \$100/published page shall be levied on papers published in the *Bulletin* and *Geology*, effective before the end of this volume year.

Specific page charges not be requested for publication of *Memoirs* or other publications but that grant or gift funds be sought for each publication, the magnitude of the grant to be determined by the editor on the basis of estimated costs.

The cost of *Memoirs* be reduced through the use of 8½ x 11" pages and 2- or 3-column printing; hard covers to be retained.

Papers for the *Bulletin* should normally be no

longer than 25 printed pages; if in the opinion of the editor circumstances dictate publication of a longer paper, the editor and the editor alone will have the power to make that decision.

Special feature options such as color plates, fold-out maps, and microfiche data depositories be available to authors in the *Bulletin*, at the discretion of the editor, if authors can pay for the entire cost of the special feature.

The goals and aims of *Geology* as stated in Vol. 1, issue #1, be continued, but the editor be encouraged to experiment with special features such as comment columns and short reviews.

The criterion of length not be a hard-and-fast discriminator between papers in *Geology* and the *Bulletin* even though most papers in *Geology* will be less than 6 printed pages and most in the *Bulletin* more than 6 printed pages.

Professional advertising be accepted in the *Bulletin*, *Geology*, *GSA News & Information*, and *Abstracts with Programs*.

The possibility of marketing reprint volumes using material from all Society publications be explored; a committee of 3 be appointed by the Committee on Publications to explore the possibility.

The use of bank credit cards be a service available to all members for payment of dues, registration at meetings, and purchase of Society publications.

10. Asked the Budget Committee to seek an explanation of the cost of the membership fee.

11. Selected a slate of nominees for officers and councilors for 1982; selected a firm of certified public accountants to perform an audit for the year ending December 31, 1981; all to be presented by ballot to the membership for election in November.

12. Selected Penrose and Day medalists; voted to elect 3 Honorary Fellows each year and did so for 1981; ratified the award winners from the QG&G and Hydrogeology Divisions; selected a nominee for the 1981 National Medal of Science.

13. Took no exception with the History of Geology Division providing a silver award, but a medal would be against Society policy.

14. Accepted the following Annual Meeting invitations:

Reno, Nevada	November 5–8, 1984
Boston, Massachusetts	October 14–17, 1985
San Antonio, Texas	November 10–13, 1986

15. Approved the Cincinnati Annual Meeting budget, including the following supporting registration fees:

	Preregistration	On-site	One-day
Professional	\$65	\$75	\$35
Students	32	38	17
Guests	20	30	—

16. Set November 1 and 4, 1981, for the fall meetings of Council in Cincinnati, Ohio; set November 3, 1981, 8:00–8:30 a.m., for the corporate meeting and question and answer session, to be unopposed by technical sessions.

17. Designated 3 proxy holders and 3 tellers and inspectors of election for the November corporate meeting.

18. Voted to restrict the Sunday symposia preceding the annual meeting to the associated societies only; that abstracts be included in the *Abstracts with Programs* volume; these symposia to be accommodated insofar as the meetings coordinator can arrange for space; such symposia must be reported to the JTPC chairman by an announced date.

19. Authorized that retroactive to 1-1-81, the meetings of GSA no longer be billed the \$20 fee for abstracts that appear in *Abstracts with Programs* but be charged for the programs that are included in the registration packets.

20. Rescinded previous Council action allowing a reduced preregistration fee for dues-exempt Members and Fellows of GSA and its associated societies because of the difficulty of implementation.

21. Discussed the impact of USGS travel restrictions on Society meetings.

22. Received updated reports on the GSA Centennial/D-NAG program and on the GSA Foundation.

23. Voted to discharge the ad hoc Centennial Development Committee with sincere thanks; that GSA plans no further development efforts and will encourage potential donors in the future to contribute through the GSA Foundation.

24. Established a Planetary Geology Division within the Society; approved their bylaws and ratified their slate of officers; named Dallas L. Peck as the division representative to Council.

25. Advanced 33 Members to Fellowship; ratified the election of 437 candidates to Membership; the question of levying a processing charge on manuscripts published by GSA was referred to the Committee on Publications for study; the question of levying a surcharge on candidates at the employment service was tabled.

26. Approved 177 research grants totaling \$100,662; passed the recommendation to the Budget Committee that the funding level for grants for the year 1982 be maintained at the 1981 level or be increased; that the names of outstanding recipients of GSA research grants, their institutions, and project titles continue to be listed in *GSA News & Information*; commended Mrs. June R. Forstrom for the strong and effective support she has provided to the committee over the years, without which its work would be next to impossible; voted to continue the valued contribution made to the work of the committee by its NSF conferee and that the services of Dr. Robin Brett be retained.

27. Approved 2 Penrose Conference proposals; accepted the newly written "Guidelines for Writing a Penrose Conference Proposal," subject to writing a statement regarding the solicitation of funds from private industry; accepted the revised "Penrose Conference Guidelines" and authorized their publication as soon as possible in an appropriate Society publication; clarified previous Council action concerning an override on the conference registration fee to recover insurance and administrative costs to be a flat rate of \$5 per conference participant.

28. Voted to accept the Access Panel Report # 2 on State and Private Lands; that GSA not publish the access

reports but that they be turned over to AGI and its committee; that the committee prepare an article for *GSA News & Information* summarizing the activities on access and recommending to the membership that they participate through AGI in the future; that the Access Panel be discharged with thanks; that the committee be authorized to form an ad hoc committee to plan and implement a workshop on scientific manpower, earth-science education, faculty research, and equipment needs, with a budget not to exceed \$5,000 for this fiscal year.

29. Received the report of the GSA Audit Committee; discussed the 1980 audit statement from Arthur Andersen & Company.

30. Authorized the treasurer to engage Arthur Andersen & Co. to make a special study of the Society's computer needs.

31. Voted to name the chairman of the Committee on Investments as a nonvoting, ex officio member of the Budget Committee for purposes of better communication.

32. Ratified the actions of the Committee on Investments taken during its February 6, 1981, meeting in Boulder, Colorado, involved the various funds in the portfolio of the Society.

33. As required by law, approved certain financial resolutions.

34. Retained Claude C. Albritton as editor of "The History of GSA" volume by Edwin B. Eckel to be published as a special volume, available in both hard cover and paperback.

35. Accepted reports from standing committees, sections, and divisions.

36. Ratified the History of Geology Division bylaws to add the immediate past-chairman to the management board.

37. Voted to authorize the division management boards the right to raise their division dues to a maximum of \$5 per year, at any time the management boards choose to act.

38. Named 2 GSA designees/representatives to the Joint ASCE-GSA-AEG Committee on Engineering Geology through 1984 and 1985; 1 to U.S. National Committee on Tunneling Technology through 1983.

39. Voted to be a cooperating organization of a symposium on May 8-9, 1981, in celebration of the 150th anniversary of the establishment of the U.S. Naval Oceanographic Office; submitted names to the National Science Board for consideration in filling openings on the Board; agreed to be a cooperating organization for the Circum-Pacific Energy & Mineral Conference of 1982 in Honolulu and named Robert Decker as GSA's representative.

40. Ratified the action of the Executive Committee in naming an observer to the February 1981 conference on conservation of historic stone buildings and monuments held in Washington, D.C.

41. Ratified the amendment to the AGI constitution making the AGI past-president a member of the AGI Executive Committee.

42. Took other minor actions, records of which are on file at headquarters.

Dues statements coming this month

1982 DUES INCLUDE *BULLETIN* AND *GEOLOGY*

On the facing page is a sample of the 1982 membership dues statement, now being prepared for mailing about mid-month. It is newsworthy in that it reflects Council's action requiring that all dues-paying Fellows, Members, and Student Associates receive three monthly publications, *GSA News & Information*, the reformatted one-part *Bulletin*, and *Geology* as part of their membership package.

Council's action was first reported by President Gould in the article, "Decisions on Publications," in the July 1981 issue of this newsletter. An accompanying article, "Report to Members," from the Special Publications Study Committee, appeared in the same issue. (For those who may have missed those articles, reprints are available to members at no cost by writing to GSA Production Manager, P.O. Box 9140, Boulder, CO 80301.)

As indicated on the form, the annual dues for a Fellow or Member for 1982 will be \$48 for the entire package, including membership and 12 issues each of *GSA News & Information*, *Bulletin*, and *Geology*. The required dues for Student Associates for the same package will be \$28. Dues-exempt members who wish to receive the two journals in 1982 may do so for \$28 also (they already receive *GSA News & Information*).

The major problem addressed by Council's action is the rapidly increasing cost of producing and delivering monthly journals, especially those with relatively small pressruns. The resulting increases in sale price, in turn, tend to cause a further decline of present subscribers and discourage potential new ones.

Council's decision to require all members to receive the Society's two journals will allow GSA to increase substantially its pressruns of both journals, thereby lowering the unit costs markedly. The plan provides an obvious bargain for the membership, compared to today's typical membership and subscription prices, and at the same time it provides for a significant increase in the distribution of the science contained in our journals.

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**

P.O. Box 9140 • Boulder, Colorado 80301
(303) 447-2020

1982 DUES STATEMENT

We must receive your 1982 dues payment no later than November 30, 1981, to avoid a delay in receipt of your 1982 publications.

PLEASE RETURN THIS FORM WITH PAYMENT

*SAMPLE
DO NOT USE -*

- Please change my voting section to: _____
- Phone number during business hours: () _____
- Please **CHANGE** my name and/or address below:

Name

Address

TO HELP US GATHER MEMBERSHIP DATA, PLEASE CHECK the ONE CATEGORY that best describes your MAJOR professional interest.

- | | | | |
|--|---|---|---|
| 1 <input type="checkbox"/> Engineering geology | 5 <input type="checkbox"/> Paleontology | 9 <input type="checkbox"/> Organic geochemistry | 13 <input type="checkbox"/> Petroleum geology |
| 2 <input type="checkbox"/> Environmental geology | 6 <input type="checkbox"/> Stratigraphy, sedimentology | 10 <input type="checkbox"/> Structural geology, tectonics | 14 <input type="checkbox"/> Coal geology |
| 3 <input type="checkbox"/> Hydrogeology | 7 <input type="checkbox"/> Mineralogy, petrology, volcanology | 11 <input type="checkbox"/> Oceanography, marine geol. | 15 <input type="checkbox"/> Geophysics |
| 4 <input type="checkbox"/> Geomorphology, glaciology | 8 <input type="checkbox"/> Geochemistry | 12 <input type="checkbox"/> Economic geology | 16 <input type="checkbox"/> Other _____ |

STUDENT VERIFICATION

(Must complete if taking advantage of Student rates)

Full-time enrollment of the above-named student at _____
(Print name of school)

is hereby confirmed for the 1981-1982 academic year.

SIGNATURE OF DEPT. CHAIRMAN & PRINT LAST NAME

MEMBER SPONSORSHIP

(Must complete if transferring from Student to Member status)

Please do not sign for yourself. Transfers must have the minimum of a bachelor's degree or equivalent to qualify.

As a Member of the Society, I am pleased to sponsor the above-named person for Membership.

Signature (GSA Member/Fellow)

Name (please print) Date _____

1982 ANNUAL DUES AND PUBLICATION SELECTION

(Please see explanation on back of form)

GSA MEMBERSHIP DUES:

Dues are required and include receipt of: *GSA News & Information, Geology*, and the *Bulletin*. Both journals will automatically be sent in paper copy unless you indicate your preference for positive microfiche by checking the appropriate box/boxes.

- | | |
|--|---------------|
| (1) MEMBER/FELLOW | \$48 \$ _____ |
| (2) STUDENT | \$28 \$ _____ |
| (3) <i>Bulletin</i> , positive microfiche <input type="checkbox"/> | |
| (4) <i>Geology</i> , positive microfiche <input type="checkbox"/> | |

DIVISION DUES:

CHECK AFFILIATIONS DESIRED

- | | | | |
|--|-----|--|-----|
| (10) <input type="checkbox"/> Archaeological Geology | \$3 | (14) <input type="checkbox"/> Coal Geology | \$2 |
| (11) <input type="checkbox"/> Engineering Geology | \$3 | (15) <input type="checkbox"/> Geophysics | \$2 |
| (12) <input type="checkbox"/> History of Geology | \$3 | (16) <input type="checkbox"/> Hydrogeology | \$3 |
| (13) <input type="checkbox"/> Quaternary Geology & Geomorphology | \$2 | (17) <input type="checkbox"/> Planetary Geology | \$3 |
| | | (18) <input type="checkbox"/> Structural Geology & Tectonics | \$3 |

TOTAL COST OF ALL DIVISIONS CHECKED \$ _____

ABSTRACTS WITH PROGRAMS:

CHECK ABSTRACTS DESIRED

- | | | | |
|--|-----|---|-----|
| (25) <input type="checkbox"/> Annual Meeting | \$6 | (29) <input type="checkbox"/> South-Central | \$3 |
| (26) <input type="checkbox"/> Cordilleran | \$3 | (30) <input type="checkbox"/> Northeastern | \$3 |
| (27) <input type="checkbox"/> Rocky Mountain | \$3 | (31) <input type="checkbox"/> Southeastern | \$3 |
| (28) <input type="checkbox"/> North-Central | \$3 | | |

TOTAL COST OF ALL ABSTRACTS CHECKED \$ _____

MEMBERSHIP DIRECTORY (Yearbook) mailed in spring (32) \$6.50 \$ _____

DONATIONS: You will note the absence of the usual form for contributions on this year's dues statement. Now that the GSA Foundation has been established, you are encouraged to make all contributions through the Foundation. The Foundation will be contacting you soon.

TOTAL AMOUNT REMITTED \$ _____

PLEASE RETURN THIS FORM WITH PAYMENT IN U.S. FUNDS

NEW FELLOWS, MEMBERS, AND STUDENTS

NEW MEMBERS— The following 437 Members have been elected to Membership by Council action during the period from September 1, 1980 through February 28, 1981. (*indicates transfer from Student Associate to Member).

Per Aagard
Tunde Adegbesan
Abdulkader M. Afifi*
Paul C. Agnew
Dennis S. Albaugh*
Roy F. Allen*
William T. Allen*
Calvin E. Allison*
Garth S. Anderson
Walter K. Arbuckle
Dean C. Armstrong
Patricia L. Arndt
Nolan L. Ashburn
Brian K. Ayers

Jan Backman*
James T. Bales, Jr.*
Maria A. Balzarini*
David B. Bannan*
Larry B. Barber II
James M. Barker*
John C. Barone
Warren Barrash
Eric J. Barron*
Lance S. Barron*
Kenneth T. Barrow*
Peter S. Barrows*
Alan R. Bartley
John M. Bartley*
Lou Battams
James R. Bauder
Geoffrey B. Beardall, Jr.
Peter L. Beblowski*
M. S. Bedinger
Katherine J. Beinkafner*
F. Christopher Benedict, Jr.*
Victor M. Beras*
Manuel Berberian*
Thomas J. Bernatowicz*
Elmer A. Bettis III
Mark Z. Bieniulis*
James V. Bikun*
Peter Bird
Rose M. Birdsong*
Debbie M. Bliefnick*
Kevin T. Blose
Pamela Bloss*
George J. Blyskun*
Paul A. Bogseth
Bruce A. Bohlken
Paulette A. Bond*
Theodore J. Bornhorst*
Joanne Bourgeois*
Susan Carol Bradford
Christine B. Brewster*
Bruce W. Bridenbecker
William D. Briner*
Kay L. Brodersen*
Debra A. Brooks
Alton A. Brown*
Kebba Buckley*
Scott F. Burns*
David C. Bushnell
Kim R. Butler*
Dan C. Buzea

Clark N. Callander*
Maryellen Cameron
S. Christopher Caran*
Joao E. Cardoso-Neto
Richard K. Cardwell*
William D. Carlson*
Richard S. Carr III*
Michael R. Cartwright
John F. Casey*
Mary Rose Cassa*
William B. Cathey
Peter A. Cawood*
Theodore Chamberlain
Jorge A. Chirinos-Garcia
David J. Christiansen*
Gerald H. Clark
Robert C. Cobb
Patricia Collins
Carol L. Colwell*
John Lloyd Conner*
James R. Connolly*
Edmund A. Cortellini*
Gary D. Couples*
Cheryl T. Cox
John T. Creedle
Leland D. Cress
Robert E. Criss*
Alan K. Crockett
Angel Curet*
William B. Curry

Clyde G. Dabbs, Jr.
M. Dewitt Daggett*
Anton M. Dainty
Brian H. Davidson
Katherine M. Davis*
Thomas L. Davis*
James S. Dean*
Paul T. Delaney*
Richard F. De Long*
William F. De Lorraine
James M. De Martinis*
J. Negus De Wys*
Mala R. Di Bernardo
Margaret N. Dillahunt
William A. Dimichelf
W. Lyle Dockery
Roy K. Dokka*
Anna Dombrowski*
Jeffrey B. Donnellan*
Elizabeth A. Downie*
Dennis P. Dunn*

James M. Ellis*
Ahmed O. Enbaya*
Eric A. Epslev
Parrish N. Erwin, Jr.*
Thomas R. Eschner*
Nancy Evans
Thomas E. Ewing*

Kingsley P. Fairchild
James F. Farley
Glen L. Faulkner
Ferk*
Christian C. Finch*

David P. Findley
Patricia A. Fithian*
Michael F. Fitzpatrick
Randall D. Forsythe*
Joseph R. Francica
Joanne M. Frazier
Curtis J. Freeman*
Lawrence K. Freeman*
Franz Froelicher
Robert E. Fryklund*
Steve R. Fuller*
Francis C. Furman*

Brian S. Gaber
Paul B. Garrison*
Eldon M. Gath
Ilmars Gemuts
David P. Gepford*
Robert C. German
Mark S. Ghiorso*
Virginia S. Gillerman*
William H. Gillespie
Mary K. Gilmore*
Philip M. Giudice
Axexander S. Glover
Marjorie S. Goettle*
Emilio Gonzalez, Jr.
Richard G. Gordon*
Julia Reid Goss
Michael Robert Granata
Susan A. Green
Allen L. Greene*
Jeffrey B. Griffin*
David G. Grooms
Myles F. Grotbo
Marilyn A. Grout*
Alberto A. Gutierrez*
Giuseppe Guzzetta

Rhonda G. Hakundy*
Mary Jo Hall*
Gary B. Hallock
Barry B. Hanan*
Glenn B. Handley, Jr.
Judith L. Hannah*
James J. Hardy, Jr.*
Barbara D. Hathaway*
Edward F. Hawkinson
Kevin M. Heaton*
Henry P. Heim*
James R. Heinzman
Allen T. Hemberger
Mark W. Hermeston
Kenneth G. Hilfiker*
Gregory S. Holden
Rebecca A. Holeman
Carleen D. Holloway*
Arthur J. Horowitz
Mary Beth Horst*
Terry R. Howard
Joel A. Hubscher
Michael J. Hudson
Fernando Huertas*
Virginia Huggins*
Gary C. Hughes
Thomas C. Hughes

William A. Hultman
Mary F. Hume*

Carl E. Jacobson*
Julius S. Jemilugba
Margo J. Jennison*
Kent R. Johnson*
Milo J. Johnson*
Randy J. Johnson*
Steven A. Joliat*
Douglas R. Jones
Mark L. Jones
Wilma J. Jones*
Ron S. Jong
Nancy L. Joseph*

Roy A. Kaelin, Jr.
Karlis Kanbergs*
Russel A. Kari*
Gilbert M. Karpel
Ernst H. Kastning, Jr.*
Margaret A. Keller*
George C. Kendrick III*
Jerry Wilson Kennedy
Joel O. Kimrey
David T. King, Jr.*
Frederick C. Kintzer*
Gail L. Kirchner
Howard Franklin Kirk III
Charles Frederick Kluth*
Karen F. Knirsch*
Gary Kocurek*
Juhani Tapio Koljonen
Michael Konig*
Paul R. Kopsich*
Ira S. Kornreich
Kathy M. Koskelin*
Chris M. Kravits*
Richard L. Kraybill
Robert J. Krumm

Tarik M. Labib
Adrienne L. Labotka*
Frank V. La Salata
Dixie B. Lass*
Robert E. Lauth
David A. Lawler
Charles A. Lawson*
Daniel N. Leavell*
Stephen W. Lenhart
Louis R. Lepp
Phillip Levine*
Donald R. Lewis
Robin G. Lighty*
Paul K. Link*
John P. Lockridge
Brenda J. Longway*
Dana P. Loomis
Steven A. Loose
Paul W. Loubere*
Robert C. Lowman
Kenneth D. Luff
Annabelle C. Lusser-Powell
John C. Lydzinski
William C. Lynch*
Gerald J. Lyons

Larry W. Massen
 Kathleen Stacy Mack*
 Hans E. Madeisky*
 Clifford W. Mallett
 Richard F. Marcell*
 Charles D. Markun*
 John E. Marsh
 Ronnie G. Masters
 Robert S. Mateik*
 Lawrence R. Matson
 Bruce Warren McCall
 Jill McCarthy*
 James D. McElman
 Mark W. McLarty
 Virginia T. McLemore*
 D. David McMillen
 Martha M. Mehalik*
 Lawrence D. Meinert*
 Javan N. Meinwald*
 Kevin S. Meyer
 Jacquelin Michel*
 Gary D. Michels
 Donald D. Miller
 Suzanne M. Miller*
 Sandra A. Mills*
 William N. Mode*
 Sally Pennington Moore
 Carl Walter Morgeneier II
 Craig G. Moseley
 Sharon Mosher
 David S. Muller*
 Charles Robert Muren*

Paul H. Nadeau*
 Theresa L. Nakai
 Syed Mahmood Naqvi
 James Narkunas
 Edward A. Need*
 Eric P. Nelson*
 K. Douglas Nelson*
 Gordon E. Ness
 Rainer J. Newberry*
 Sarah E. Newcomb*
 Christopher G. Newhall*
 Suzanne W. Nicholson*
 Walter F. Nijak
 Jeffrey B. Noblett*

William M. Obering
 Keith M. O'Brien
 Lauren H. O'Donnell
 Patrick F. O'Hara*
 Wendell G. Olivier
 Thomas T. Olsen
 Donald Wayne Olson
 Suzanne C. Olson
 Inemibo K. Opuiyo*
 Lee J. Otte
 Robert P. Ottenstein
 David C. Outsen
 Douglass E. Owen

Jory A. Pacht*
 Richard J. Page
 John S. Pallister*
 Jean C. Palmour*
 Maria L. Pankos*
 Christopher P. Paski
 Keith H. Patton*
 Rachel K. Paull*
 Michael R. Pawlowski*
 Norman J. Pearson*
 M. Anne Pendergast*
 Glenn M. Pense
 Frank T. Pescatore, Jr.*
 Rolf G. Pestel
 Joseph A. Peters, Jr.*

Kim P. Peterson
 Dorothy A. W. Phinney
 David C. Pieri
 Marijan Poljak*
 D. Brandreth Potter*
 John D. Powell
 Ross D. Powell*

Phyllis M. Radack*
 Paul M. Rady
 Edward C. Ralston*
 David K. Rankin*
 Michael L. Raub
 Douglas M. Rearic
 John W. Reeder*
 Bruce K. Reitz*
 Gretchen R. Rich
 Stephen B. Richards
 Judith D. Richardson*
 Debra A. Ridenour-Defotis*
 Susan A. Roberts
 Christopher A. Robertson*
 Philip L. Robertson
 Elisa K. Robyn*
 Mark C. Rowley*
 William R. Roy
 Bruce F. Rueger*
 Branch J. Russell*

Robert W. Sabate
 William M. Sackett
 Lila W. Salvatore*
 Jose A. Samaniego*
 R. Tyler Sauer
 Cynthia Ann Schooler
 David L. Schug
 David C. Schuster*
 Subhashish Sengupta
 Ahmed Nabil Shahin
 Sarah J. Shomo*
 Lawrence R. Shore*
 Henry G. Siegrist, Jr.
 F. Tyler Smith
 James J. Smith*
 Larry B. Smith*
 Michael B. Smith
 Peggy A. Smith*
 Rita J. Smith
 William T. Snedden*
 Stephanie Sofranoff
 Jon N. Sondergaard
 La Monte G. Sorenson
 Malia K. Spaid-Reitz*
 Deborah A. Spratt*
 James R. Stachowski
 Elizabeth A. Steele*
 George Alexander Steele
 Kenneth K. Steele*
 Michael H. Steinbach
 Cathryn R. Stewart*
 Jennifer K. Stewart
 Marjorie L. Stockton*
 Steven J. Stokowski, Jr.*
 Kenneth G. Stollenwerk*
 Neil Suneson*
 Nicholas J. Susak*
 Guy A. Swenson III*

Eiichi Takahashi
 Susan E. Tanges*
 William J. Teplow
 Thomas M. Thapp
 Richard L. Thiessen*
 Elizabeth A. H. Thomas*
 Alison B. Tilt*
 Clinton R. Tippett*
 Donald F. Todd

NEW FELLOWS—

The following candidates were elected to Fellowship by Council action at the May 1981 meeting.

Arthur Baker III
 Denny N. Bearce
 Zvi Ben-Avraham
 Donald M. Burt
 Charles E. Chapin
 James W. Collinson
 Clinton D. A. Dahlstrom
 Kees A. DeJong
 Terrence J. Donovan
 Perry L. Ehlig
 Hassan A. El-Etr
 Gregorio M. Escalante
 Edward B. Evenson
 Joseph S. Gates
 Edward S. Grew
 John M. Guilbert
 Alan D. Hecht

Raymond Herrmann
 Linda E. Heusser
 Raymond V. Ingersoll
 Joseph H. Kravitz
 Charles A. Landis
 Roger Laurent
 Robert D. Lawrence
 James W. Mercer
 Glen K. Merrill
 Jacques R. Renault
 John W. Rold
 W. Bruce Saunders
 Douglas Smith
 Stephen H. Stow
 Robert L. Sutton
 Robert M. West

Brian B. Tormey
 Margaret A. Townsend*
 Timothy E. Townsend*
 Robert J. Traylor
 Angela M. Tripp*

Gerald K. Van Kooten*
 Reed Van Valin
 Robert J. Varga*
 Gary F. Vargas
 Bruce J. Vesterby*
 Evelyn C. Vollmer

Blanche M. Wallace*
 Roger K. Wallace
 Mark A. Walters
 Kim M. Wargo*
 E. Robert Warzeski*
 John D. Watson*

Paul Weimer*
 Eberhard W. Werner*
 Gary W. White*
 Clinton C. Whitmer
 Douglas A. Wierman
 Edith M. Wilde*
 Kevin L. Wiley*
 Steven B. Willcut
 Augustus O. Wilson
 Jerry C. Wilson*
 Kenneth H. Wohletz*
 William Douglas Wolters
 Frederick J. Woodson*
 Glen M. Wyatt*

Gary M. Yeo*
 Paul M. Yoder*
 Elizabeth J. Young*
 Ho-Shing Yu

NEW STUDENT ASSOCIATES—

Listed are 361 Student Associates who became affiliated with the Society during the period from September 1, 1980 through February 28, 1981.

Donald Wade Abbott
 Bobby Steven Absher
 Dawn R. Ackerman
 Leslie E. Adams
 Serifat Apinke Akintunde
 Teresa A. Alsobrook
 Sandra J. Anderson
 John L. Appel

M. L. Babuin
 Frederick R. Baddour
 Ricardo Baitelli
 Jeffrey P. Baker
 Kevin R. Barta
 Paul W. Bauer
 L. Sue Beard
 Weldon H. Beauchamp
 Joseph H. Beckerman

Edward B. Beecher
 Brian E. Behar
 Stanley D. Belieu
 Dulcy A. Berri
 Linda Besse
 John S. Biedenharn
 Robert W. Blake
 Jon F. Blickwede
 Scott B. Blount
 Andy R. Bobyarchick
 William R. Boltin
 Linda D. Bond
 Diana M. Borges
 Carol W. Bowers
 G. Patrick Bowling
 Ronald C. Bristler
 Brian S. Brock
 Thomas F. Bullard

STUDENT ASSOCIATES (continued)

Rose C. Bumanglag
A. Lindsay Bundschu
Anna Camille Burack
Nadine Butcher

John G. Callanan
Carol M. Campbell
Brian J. Cardott
William J. Cavin
Tina Chandler
Larry N. Chasen
Chen-Hong Chen
Chu-Yung Chen
Felix K. Chinweze
Douglas M. Clark
Vickie L. Clay
George Robert Clemenceau
Peter J. Cochrane
David B. Coddling
Valerie R. Colville
Bonnie J. Conklin
M. Elizabeth Conley
Terry A. Cook
Spencer J. Cotkin
Gregory B. Cox
Jean M. Crespi
David P. Crisman
Jeffrey Arlan Crisp
Elizabeth D. Cron
Mary K. Crouchet
Amber Crystal
Sergio Cuevas
John M. Curchin
William R. Currin

Anthony D. Daus III
Jeanne Davidson
Garrett A. Day
Jeffrey A. Deen
Mark L. DeJarnette
Michael Della Mea
Alan D. Dewey
Margaret A. Dewhirst
Pietro A. Di Bona
Marcel Di Giovanni, Jr.
Glen D. Dillon
Lee D. Di Tullio
Marc M. Druckman
Mark Steven Drummond
Steve J. Drussell
Lisa D. Du Bois
Sherilyn K. Dunklau
Anthony Price Dunn

Christopher J. Earle
Thomas W. Engler

Martin B. Farley
Patti J. Fassauer
Craig S. Feibel
Lynna J. Ferrari
Gerard M. Flaherty
John J. Flynn
Annabelle M. Foes
Donna L. Fouch-Flores
John M. Fox
Gregory M. French
Elizabeth A. Frick
Mark S. Fridley
Karen H. Fryer

Lisa K. Gale
David L. Garner
Holly C. Garrow

Michael C. Gay
Jennifer S. Getsinger
Ivan P. Gill
Lawrence M. Glaser
P. Jean Glenn
A. Onder Gokce
Louis P. Goldstein
Steven L. Goldstein
Kathleen S. Goodman
Lee L. Gorday
Jamie M. Graham
John P. Graham
Robert Andrew Graham
Rhonda Grantham
Joel P. Grimm
Keith H. Gronwald
John R. Groves
M. Abby Gruen
Paul A. Gruntmeyer

Stephen A. Haas
Claudia J. Hackbarth
Fred L. Hafer III
Virginia L. Hagee
Allan M. Hama
Lane R. B. Hammons
Kevin James Hanson
James T. Harden
Brad D. Harp
Robert J. Harrington
Timothy S. Hayes
Glenn A. Hayman
Janet Sue Heiny
Robert W. Heitzman
Paul L. Heller
Donna M. Herring
Duncan R. Hickmott
Gary O. Hill
Robert E. Hill
Jean L. Hoff
W. Steven Holbrook
Kurt T. Hollocher
Lu Anne J. Horvath
Jeanna S. Hudson
Scott S. Hughes
Mark R. Hyland

Dana V. Imes

Alexander D. Jack
Kristin C. Jackson
Martin C. Jensen
Cheryl Elaine Johnson
Kirk R. Johnson
Kurt J. Johnson
Marcus W. Johnson
E. Lin Jones
Steven K. Jones
Erling A. Juel

Raynold I. Kablanow
Les H. Kanat
Ann Bykerk Kauffman
Kerry L. Keen
Kenneth R. Keiser
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Information about the following courses can be obtained from Continuing Education, Mining & Engineering, University of Nevada—Reno, Reno, Nevada 89557; phone (702) 784-4046; Telex 910-395-7054.

Cost Engineering in the Mineral Industry

September 17–18, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

Construction claims: How to manage contract changes profitably

September 24–25, 1981; sponsored by the College of Engineering, Reno, Nevada

Zoning in volcanic and subvolcanic mineral deposits: Implications for exploration

October 4–8, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

Quality control circles: The proven new technique for increasing quality productivity and morale

October 6–7, 1981; sponsored by the College of Engineering, Reno, Nevada

Understanding the "hard rock" mining industry.

October 13–16, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

Mining law

October 23–24, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

Volcanic rocks and their vent areas

October 26–31, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

An appreciation of geostatistics for executives and managers

October 29–30, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

The practical side of geostatistics

November 2–7, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

Geostatistics of Gold-Metals

November 9–10, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

Mine cooling

November 11–13, 1981; sponsored by the Mackay School of Mines, Reno, Nevada

Construction cost estimating and bidding

November 30–December 1, 1981; sponsored by the College of Engineering, Reno, Nevada

Preventative maintenance

December 3–4, 1981; sponsored by the College of Engineering, Reno, Nevada

JULY BULLETIN BRIEFS

Article Summaries

- Significance of folds and mylonites at the Grenville front in Ontario: Summary.

Timothy E. LaTour, Geology Department, University of Western Ontario, London, Ontario, Canada, N6A 5B7 (present address: Geology Department, Georgia State University, Atlanta, Georgia 30303). (3 p., 4 figs.)

- Calculation of temperature-oxygen fugacity tables for H_2 - CO_2 gas mixtures at one atmosphere total pressure: Summary.

Arthur R. Prunier, Jr., David A. Hewitt, Department of Geological Sciences, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061 (present address, Prunier, Jr.: Department of Ceramic Engineering, The Ohio State University, Columbus, Ohio 43210). (3 p., 2 figs.)

Articles Complete in the July Issue of Part I

- The Chocoy Group, Lake Superior region, U.S.A.: Sedimentologic evidence for deposition in basinal and platform settings on an early Proterozoic craton.

D. K. Larue, Department of Geology, Stanford University, Stanford, California 94305. (19 p., 19 figs., 6 tables)

The early Proterozoic Chocoy Group in the Lake Superior region is a cratonal sequence consisting of a basal unit overlain successively by quartzite, dolomite, and slate formations. Two regional depositional environments are described: (1) present-day structural troughs (Marquette, Menominee, and Felch, Michigan) show evidence of having sedimentary-basin precursors, and (2) other areas (Gogebic Range, Michigan) show evidence of sedimentation in platform settings. The basal unit in the Marquette and Menominee troughs is

as much as 160 m thick and was probably deposited by alluvial processes. In the Gogebic Range, the basal unit is less than 10 m thick and resembles lag deposits at the base of transgressive sequences. The overlying quartzite contains cross-beds that show two regional sedimentary-vector (paleocurrent) distributions: (1) unimodal low-variance distributions with sedimentary vectors oriented subparallel to local structural trough axes (Marquette, Menominee, and Felch troughs), and (2) polymodal distributions with sedimentary vectors showing greater dispersion about the mean (Gogebic Range). As indicated by many varieties of sedimentary structures (silicified evaporites, cryptalgal structures, intraclast breccias, and so on), the carbonates and interstratified siliciclastics of the Chocoy Group were deposited in subtidal to supratidal conditions. Taylor noted in 1972 that certain members of the Chocoy Group carbonates thicken

toward the center of the Marquette trough, with concomitant facies changes. The uppermost pelite unit of the Chocoyay Group was probably deposited below normal wave base. It is concluded that the basins and platforms were formed on a craton undergoing rift-type tectonism.

-
- The fixed-hotspot hypothesis and origin of the Easter-Sala y Gomez-Nazca trace.

Rex H. Pilger, Jr., Department of Geology, Louisiana State University, Baton Rouge, Louisiana 70803; David W. Handschumacher, Seafloor Division, Code 360, Naval Ocean Research and Development Activity, NSTL Station MS 39529 (10 p., 6 figs., 1 table)

Reconstructions of the Pacific and Nazca plates suggest that both the Nazca and Tuamotu Ridges originated from a melting anomaly which existed beneath the Pacific-Farallon Ridge during the time interval between anomalies 19 and 11, as would be predicted from the fixed-hotspot hypothesis. The hotspot hypothesis, interpreted according to morphology of the Easter-Sala y Gomez-Nazca trace, would further suggest that the hotspot was located entirely beneath the Nazca plate during the time interval between anomalies 11 and 2. At the end of this interval, the eastern boundary of the Easter plate formed, centered above the hotspot. According to this scheme, the present location of the hotspot is about 200 km west of Easter Island.

However, the Easter model is incompatible with the hotspot model for the Hawaiian-Emperor chain, if the hotspots are fixed relative to one another, as the age of the point on the Tuamotu Ridge, which corresponds with the Hawaiian-Emperor bend (53 to 55 m.y.), is significantly greater than the age of the bend (43 m.y.). The fixed-hotspot hypothesis can be satisfied by the two traces only if one or a combination of the following conditions is met: the kinematic age of the Hawaiian-Emperor bend is substantially greater than the isotopically dated age, the magnetic-anomaly time scale is in significant error, and/or magnetic-anomaly identifications in the vicinity of the Tuamotu Ridge are erroneous.

It might appear that other mechanisms for the origin of hotspot traces are preferable to the hotspot hypothesis. The most promising of these involves propagating fractures resulting from intraplate stress. This hypothesis has the advantage of accommodating anomalies in some hotspot traces, such as persistence of igneous activity long after passage of the trace over the hotspot.

-
- Plate reconstructions, aseismic ridges, and low-angle subduction beneath the Andes.

Rex H. Pilger, Jr., Department of Geology, Louisiana State University, Baton Rouge, Louisiana 70803. (9 p., 6 figs., 1 table)

Low-angle-subduction segments beneath Peru and Chile are believed to represent interaction of the subduction zone with the aseismic Nazca and Juan Fernandez Ridges. On the basis of symmetric sea-floor-spreading models and plate-hotspot reconstructions, predicted continuations of the relatively buoyant ridges correspond well with the limits of the low-angle-subduction segments. Further, the history of interaction of the aseismic ridges with the subduction zone,

as predicted by plate reconstructions, is not inconsistent with available information on volcanic episodes of the Andes, if the contemporary correlation of volcanic gaps and low-angle subduction is also applicable to the rest of the late Cenozoic.

The occurrence of deep seismicity beneath the eastern flanks of the Andes is also believed to reflect the effects of low-angle subduction. The deep-seismic segments are adjacent to segments which are presently, or were recently, experiencing low-angle subduction. Thus, the deep seismicity is interpreted as representative of remnants of "normal" oceanic lithosphere subducted before interaction of aseismic ridges with the subduction zone.

Other geologic phenomena are associated with low-angle subduction beneath South America, including landward shift in loci of tectonism, surficial subsidence, and Laramide-style deformation. The aseismic-ridge-buoyancy hypothesis appears to be a valuable predictive tool for the interpretation of such geologic effects.

-
- Hydrothermal mounds and young ocean crust of the Galapagos: Preliminary Deep Sea Drilling results, Leg 70.

Jose Honnorez, School of Marine and Atmospheric Sciences, University of Miami, 4600 Rickenbacker Causeway, Miami, Florida 33149; Richard P. Von Herzen, Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543 (Co-Chief Scientists).

Timothy J. Barrett, Institut und Museum fur Geologie und Palaontologie, Universitat Tubingen, 7400 Tubingen I, Sigwartstrasse 10, Federal Republic of Germany; Keir Becker, Marine Physical Laboratory A-005, Scripps Institution of Oceanography, La Jolla, California 92093; Michael L. Bender, Graduate School of Oceanography, University of Rhode Island, Kingston, Rhode Island 02881; Peter E. Borella, Deep Sea Drilling Project A-031, Scripps Institution of Oceanography, La Jolla, California 92093; Hans-Wolfgang Hubberten, Institut fur Petrographie u. Geochemie der Universitat, 75 Karlsruhe 1, Kaiserstr. 12, Federal Republic of Germany; Steven C. Jones, Department of Geology, Florida State University, Tallahassee, Florida 32306; Shun'ichiro Karato, Ocean Research Institute, University of Tokyo, Nakano, Tokyo 164, Japan; Christine Laverne, Laboratoire de Geologie, Faculte des Sciences et Techniques, BP W SFAX Tunisie, France; Shaul Levi, School of Oceanography, Oregon State University, Corvallis, Oregon 97331; Areg A. Migdisov, Vernadsky Institute of Geochemistry and Analytical Chemistry, U.S.S.R. Academy of Sciences, Moscow, U.S.S.R.; S. Anthony Moorby, Department of Geology, Imperial College, London SW7 2BP, United Kingdom; Ed L. Schrader, Department of Geology and Geography, University of Alabama, P.O. Box 1945, University, Alabama 35486. (16 p., 8 figs., 4 tables)

A total of 32 holes at 5 sites near 1°N, 86°W drilled on Deep Sea Drilling Project (DSDP) Leg 70 (November-December 1979) provide unique data on the origin of the hydrothermal mounds on the south flank of the Galapagos spreading center. Hydrothermal sediments, primarily Mn-oxide and nontronite, are restricted to the immediate vicinity of the mounds (≤ 100 m) and are probably formed by the interaction of upward-percolating hydrothermal solutions

with sea water and pelagic sediments above locally permeable zones of ocean crust. Mounds as much as 25 m in height form in less than a few $\times 10^5$ yrs, and geothermal and geochemical gradients indicate that they are actively forming today. The lack of alteration of upper basement rocks directly below the mounds and throughout the Galapagos region indicates that the source of the hydrothermal solutions is deeper in the crust.

- Multichannel seismic evidence bearing on the origin of Bowers Ridge, Bering Sea.

Alan K. Cooper, Michael S. Marlow, U.S. Geological Survey, Menlo Park, California 94025; Zvi Ben-Avraham, Department of Geophysics, Stanford University, Stanford, California 94305. (11 p., 11 figs.)

Bowers Ridge is a large, arcuate submarine ridge that extends north and west from the Aleutian Ridge and separates the abyssal Aleutian and Bowers Basins in the Bering Sea. Two multichannel seismic-reflection lines recorded in 1976 over Bowers Ridge and the adjacent basins confirm the existence of 8- to 10-km-thick sediment wedges on the north side of Bowers Ridge and at the base of the Bering continental margin. Deformed sediment within the Bowers wedge indicates that subduction of the adjacent ocean crust beneath the ridge probably occurred prior to middle Cenozoic time. Flat-lying reflectors near the bottom of the trench suggest that a bathymetric trough and large ridge existed in Mesozoic time. The major period of underthrusting, subsidence, and in-filling of the trench probably occurred from Mesozoic to early Tertiary time. Small amounts of underthrusting may have continued after the early Tertiary development of the Aleutian Ridge; however, by middle Miocene time, the formerly subaerial Bowers Ridge had subsided below sea level.

The multichannel seismic data do not show evidence for a buried spreading center within the eastern Aleutian Basin. Consequently, the sediment wedges (trenches) at both Bowers Ridge and the Bering continental margin are believed to be the consequence of subduction that occurred during the convergence of the ridge and the margin. The large size of Bowers Ridge suggests that a large amount of convergence has occurred since Mesozoic time. If Bowers Ridge was a large feature in Mesozoic time, as suggested by the apparent bathymetric trough, then the ridge may be as old or older than the Aleutian Ridge to which it connects.

- Early evolution of the Bering Sea by collision of oceanic rises and North Pacific subduction zones.

Zvi Ben-Avraham, Department of Geophysics, Stanford University, Stanford, California 94305; Alan K. Cooper, U.S. Geological Survey, 345 Middlefield Road, Menlo Park, California 94025. (11 p., 11 figs., 1 table)

Three major bathymetric features exist in the Bering Sea: Shirshov Ridge, Bowers Ridge, and Umnak Plateau. New refraction data over Umnak Plateau and previous geo-

physical data across Bowers Ridge indicate that a thickened welt of crustal material is present beneath both features. The crustal structure is transitional between oceanic and continental types.

Various models for the origin of these features have been investigated. One that has not been proposed previously assumes that the protostructures of Bowers Ridge and Umnak Plateau could have formed outside of the present Bering Sea. According to this model, before formation of the Aleutian Ridge in late Mesozoic or earliest Tertiary time, these protostructures moved into their present Bering Sea positions.

Prior to the arrival of these two structures in the Bering Sea, oceanic crust was subducted along the Bering continental margin connecting Alaska and Siberia. The collision of the Umnak Plateau protostructure with the southeastern edge of the margin may have caused subduction to terminate here and move southward. The new southerly position of subduction beneath the Aleutian Ridge was therefore controlled by late Mesozoic or early Tertiary locations of Umnak Plateau, Bowers Ridge, and possibly, the north-trending Shirshov Ridge farther to the west.

- Bottom sediments and depositional rates near Thimble Shoal Channel, lower Chesapeake Bay, Virginia.

John C. Ludwick, Department of Oceanography, Old Dominion University, Norfolk, Virginia 23508. (11 p., 4 figs., 2 tables)

Thimble Shoal Channel is a major navigational waterway in lower Chesapeake Bay, Virginia. It is 19.3 km long, 13.7 m deep, and 305 m wide. On an annual basis, the volume of maintenance dredging of the channel averages $400,000 \pm 130,000$ m³. Averaged over the area of the channel, this amounts to a depositional rate of 67 ± 22 mm/yr, which is at least 50 times the depositional rate averaged for Chesapeake Bay as a whole.

Comparison of depth changes between 1854 and 1978 in a 205-km² study area that encloses the channel reveals that the average net depositional rate, excluding the channel, is 3.7 mm/yr. In marginal belts parallel to the channel on the north and on the south, the net depositional rates are 9.5 and 6.5 mm/yr, respectively.

A computation of depositional rate for the ebb plume of the James River yields a figure of 32 mm/yr as an upper limit for the rate for the center of the area studied. The chart comparisons show that Tail of the Horseshoe, a sediment shoal to the north of Thimble Shoal Channel, has experienced net aggradation on its southern flank as if the shoal were migrating southward toward the channel, a direction of motion exhibited by other shoals of the area. This motion would also contribute to in-filling of the channel. Estimates from a model which considers the distribution of sediment types indicate that filling by settling from suspension and by lateral migration of sediment as bed load into the channel over its northern rim are approximately equal in magnitude.

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INSIDE---

PRELIMINARY ANNOUNCEMENTS AND CALL FOR PAPERS

Northeastern and Southeastern Sections, Combined Meeting	p. 152
South-Central Section	p. 155
Cordilleran Section	p. 156

COMPLETE CALENDAR OF 1982 SECTION MEETINGS p. 155



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