



GSA news & information

VOLUME 1, NUMBER 8

AUGUST 1979

San Diego, California: Site of the GSA 1979 Annual Meeting

San Diego, California, will host the 92nd annual meeting of the Geological Society of America from November 5 to 8, 1979. Highlights of the meeting will be the centennial anniversary of the U.S. Geological Survey and recognition of the international geological communities of Canada, Central America, Mexico, and the United States.

The San Diego area has a variety of geologic features and an equable climate that combine to make the city ideal for conventions. The high coastal cliffs, especially at La Jolla, provide excellent exposures of Mesozoic and Cenozoic sedimentary rocks; the inland areas are comprised of the Mesozoic Peninsular Ranges batholiths and their roof pendants. A variety of active processes is evident along the open coastline, in San Diego Bay, and in Mission Bay. Groundwater problems and geologic hazards are evident throughout the metropolitan area and in suburban areas.

San Diego's location allows for a wide variety of field trips. These will include ground, water, and air trips of local and regional scope, as well as opportunities to visit regions in Mexico. Climatic conditions during early November are usually

mild, with some morning fog and generally sunny days with little chance of rain. There is a strong possibility of Santana winds from the desert, which create dry, warm weather with dazzling visibility.

Headquarters for the annual meeting will be the Convention Center at the Town and Country Hotel located in San Diego's Hotel Circle. Seven associated societies will hold concurrent annual meetings with GSA: Cushman Foundation, Geochemical Society, Geoscience Information Society, Mineralogical Society of America, National Association of Geology Teachers, Paleontological Society, and Society of Economic Geologists.

Special recognition is given to the centennial of the U.S. Geological Survey.

Additional copies of this announcement are available from: Meetings Department, Geological Society of America, 3300 Penrose Place, Boulder, Colorado 80301.

LOCAL TRANSPORTATION

GSA shuttle buses will be provided at no extra cost for convenient transportation between the many hotels in Hotel Circle and the Town and Country Con-

vention Center. **BADGES MUST BE WORN TO BOARD THE SHUTTLE BUSES.** This service is scheduled from Sunday noon through Thursday afternoon, generally starting at 0700 hours. Additional buses, furnished by the merchants of Mission Valley, also will be running but on a less comprehensive and less convenient route.

Hotel limousines and taxicabs make frequent runs to and from San Diego International Airport, which is only about five miles from Mission Valley, keeping local transportation costs relatively low.

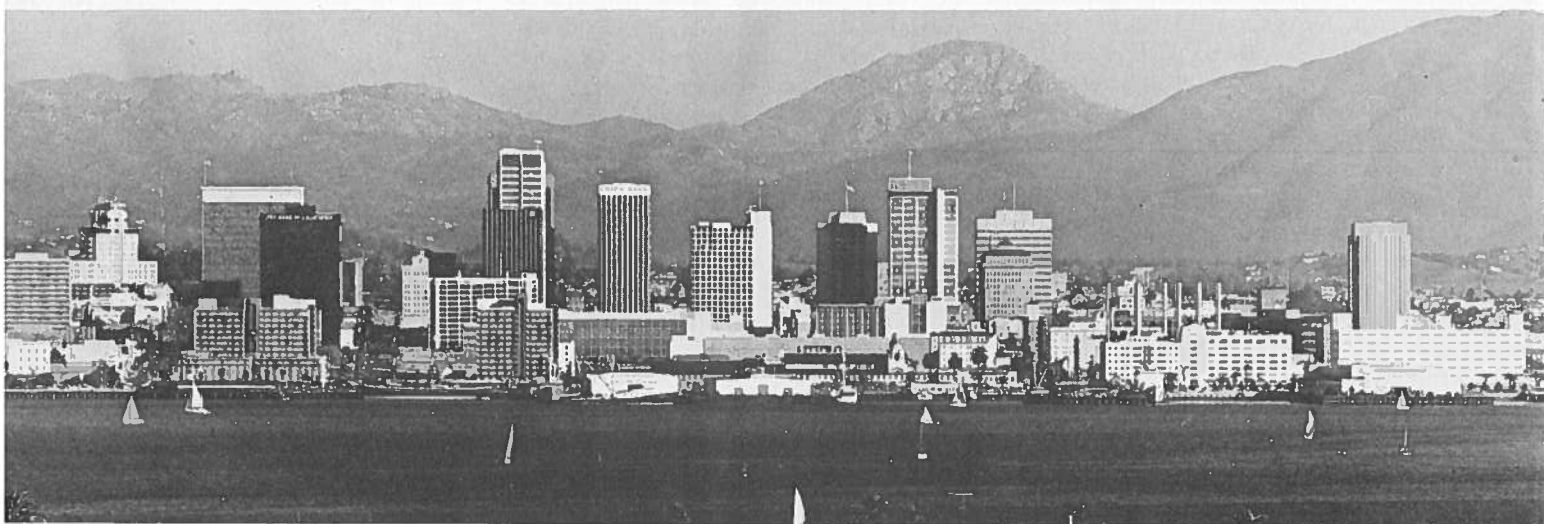
PREREGISTRATION

Preregistration is highly recommended because preregistration fees are substantially lower than on-site registration fees.

Preregistration fees will be accepted in U.S. currency only and are as follows:

Professional	\$55
Student	\$28
Spouse/Guest	\$20

To preregister and to make other reservations, use the forms that appear in this announcement. All must register to participate in events associated with



the meeting, except that nonregistered persons may accompany registered delegates to luncheons, dinners, and evening events.

Reservations for field trips and special events must be made NOW. Preregistration for the meeting is required for participation in all field trips and events. Meeting and field trip preregistration forms should be mailed to the Boulder address shown on the preregistration forms. The forms must be postmarked by **September 14, 1979**. Cancellations must be made in writing and received in Boulder no later than **October 5, 1979**; fees will not be refunded after that date. **NOTE: All cancellations will be subject to a \$10 processing fee.**

ON-SITE REGISTRATION

Only U.S. currency will be accepted during the meeting. On-site registration fees will be as follows:

Professional	\$65	
Student	\$32	
Spouse/Guest	\$25	
	Monday—	Thursday
	Wednesday	only
One-day Professional	\$32	\$16
One-day Student	\$12	\$ 6

Registration material and tickets may be picked up beginning at 1030 hours on Sunday, November 4, 1979, in the Atlas Ballroom Foyer of the Town and Country Hotel Convention Center. The registration area will be open the following hours:

Sunday	1030-1800
Monday	0700-1700
Tuesday	0800-1700
Wednesday	0800-1700
Thursday	0800-1200

HOUSING INFORMATION

All registrants are urged to make application for housing as soon as possible. The San Diego Convention and Visitors Bureau will act as housing bureau. Reservation forms are included in this announcement and should be sent to GSA Housing Bureau, 1200 Third Avenue, Suite 824, San Diego, California 92101 before October 5, 1979. If after making reservations you find it necessary to change them, write directly to the housing bureau at the above address. **NOTE: The mailing address of the housing bureau is NOT the same as the mailing address for preregistration and field trip forms.**

Limited student housing (mostly floor space) will be available at residences of geology majors at San Diego State Uni-

versity. Reservation cards will be sent on a first-come, first-served basis, providing a self-addressed, stamped envelope with an indication of the number of spaces required is sent to: Associated Geology Students, Department of Geological Sciences, San Diego State University, San Diego, California 92182. Attention: Student Housing.

LOCATOR BOARD

A booklet of all preregistrants with hotel reservations will be included in the meeting packet. A locator board for posting of on-site registrants will be set up in the registration area. If you have preregistered and are staying at one of the recognized hotels or motels listed on the housing form, your name will be listed in the booklet. If, however, you make housing reservations *after* the deadline or are planning to stay with friends in the San Diego area, you will need to notify the Meetings Department to have your name listed.

During the annual meeting, if your name is not listed on the board, please notify the person at the locator-board desk, which will be set up in the registration area.

SPECIAL EVENTS

Sunday, November 4

City Tour and Harbor Cruise. A pleasant afternoon as an introduction to San Diego is provided on Sunday, November 4, by a one-hour cruise of San Diego Harbor, aboard a comfortable excursion boat. A bus tour will follow, which will include the modern downtown complex; the colorful Embarcadero, which is home port for the largest tuna fishing fleet in the nation; the palm-lined resort and marine developments of man-made Harbor Island and Shelter Island in San Diego Bay; the broad and sparkling view of San Diego Bay from the Old Lighthouse area of Cabrillo National Monument on the tip of Point Loma; the municipal aquatic playground of Mission Bay Park; the elegant coastal residential areas of La Jolla; and Balboa Park, which contains the world-famous San Diego Zoo. The tour bus leaves the Town and Country Convention Center at 1215 hours and returns at 1700 hours. The cost is \$8, which covers both the Harbor Cruise and the bus transportation. Colorful brochures will help orient participants and will supplement narration by experienced tour guides.

Confirmed preregistration is required, but tickets are not required to board the tour bus and cruise boat.

Welcoming Party. This traditional event is an ideal opener for the annual meeting. Plan to meet friends and colleagues in the Town and Country and San Diego Rooms of the Town and Country Convention Center from 1830 to 2130 hours on Sunday evening. Drinks will be available at numerous cash bars in the area. No tickets or preregistration are required for the Welcoming Party.

Monday, November 5

GSA Presidential Address. Dr. Leon T. Silver, GSA President, will present his presidential address on Monday, November 5, at 1600 hours, in the Town and Country and the San Diego Rooms of the Town and Country Hotel Convention Center. All meeting participants are urged to attend.

Tuesday, November 6

GSA Cocktail Party, Annual Dinner, and Medal Presentations. These events will be held on Tuesday, November 6, in the Town and Country Hotel Convention Center. The cocktail party is scheduled from 1800 to 1845 hours, the annual dinner from 1900 to 2015 hours, and the Penrose and Day Medal presentations from 2015 to 2045 hours.

Shortly after the medal presentations, there will be a special program, organized by President Leon T. Silver, celebrating the centennial of the U.S. Geological Survey. Attendance at the annual dinner is not required for admittance to this program.

Wednesday, November 7

Sea World Night. Appropriate to the close ties of San Diego to the sea, an evening at Sea World will combine an enjoyable social event with an opportunity to experience outstanding aquatic entertainment. *(continued on p. 121)*

GSA News & Information

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HOUSING RESERVATION

GSA ANNUAL MEETING, SAN DIEGO, CALIFORNIA, NOVEMBER 5-8, 1979

To reserve your hotel accommodation in San Diego in November, please complete and mail the top portion of this form to:

GSA Housing Bureau
1200 Third Avenue, Suite 824
San Diego, CA 92101

Please PRINT or TYPE information requested.

LIST NAMES OF OCCUPANTS

NAME: _____

ADDRESS: _____

CITY: _____

STATE: _____ ZIP: _____

HOTEL PREFERENCE

TYPE OF ROOM

PRICE RANGE

1st Choice _____

Single (1 person) \$ _____

2nd Choice _____

Double (1 bed, 2 persons) \$ _____

3rd Choice _____

Twin (2 beds, 2 persons) \$ _____

Special Requirements _____

1 Bedroom Suite \$ _____

2 Bedroom Suite \$ _____

Arrival Date _____ / _____ a.m. _____ p.m.

Departure Date _____ / _____ a.m. _____ p.m.

DETACH HERE

INSTRUCTIONS AND INFORMATION FOR HOTEL RESERVATIONS

1. Requests for reservations must be received **NO LATER THAN OCTOBER 5, 1979**. RESERVATIONS WILL BE ACCEPTED ONLY ON OFFICIAL HOUSING FORM. DO NOT CALL FOR RESERVATIONS.
2. Confirmation will be sent directly to you from the GSA housing bureau. Your confirmation will indicate if a room deposit is required.
3. If after making reservations you find it necessary to change, write directly to the GSA housing bureau, 1200 Third Avenue, Suite 824, San Diego, CA 92101.
4. All cancellations should be made with the GSA housing bureau.

	SINGLE	DOUBLE	TWINS	SUITES
1. Town and Country (headquarters)	\$30-40	\$35-45	\$35-45	\$75-250
2. Hanalei Hotel	\$30	\$35	\$35	
3. Holiday Inn of Mission Valley	\$28	\$33	\$33	
4. Kings Inn	\$26	\$31	\$31	
5. Mission Valley Inn	\$30	\$35	\$35	
6. Seven Seas Lodge	\$28	\$32	\$34	
7. Stardust Hotel (1 Bedroom Suites Only)	\$32	\$34	\$38	\$85

**Room rates subject to local city tax*

HOUSING BUREAU CLOSSES ON OCTOBER 5, 1979. SPECIAL RATES APPLY ONLY TO THAT DATE.

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1000 UNIVERSITY AVENUE

1968

UNIVERSITY OF CALIFORNIA

1968

UNIVERSITY OF CALIFORNIA

IMPORTANT - PLEASE READ

- Use a separate form for each registrant.
- Please use ballpoint pen or typewriter.
- Full payment **MUST** accompany registration.
- Preregistration forms must be postmarked by **September 14, 1979**.
- Cancellations must be in writing and must be received by headquarters no later than October 5, 1979. Fees will not be refunded after October 5. Cancellations will be subject to a \$10 processing fee.
- Meeting materials may be picked up on Sunday, November 4, 1979, in the Atlas Ballroom Foyer of the Town and Country Hotel Convention Center, 1030 to 1800 hours.

THE GEOLOGICAL SOCIETY OF AMERICA

**1979 Annual Meeting
San Diego, California, November 5-8, 1979**

PREREGISTRATION FORM

TYPE OR PRINT CLEARLY

REGISTERED AS Professional Student

Name _____
(Last) (First) (Middle)

Mailing Address _____
(Street)

(City) (State/Province) (Zip/Country)

Phone (_____) (_____) (_____) _____
(Business) (Home)

Institution/Employer _____
(Abbreviate for badge)

Affiliations: GSA GIS GS MSA NAGT PS SEG AAPG AGU SEPM
1 2 3 4 5 6 7 8 9 10
(Please circle all societies to which you belong.)

SPOUSE/GUEST

(Spouse/Guests are not entitled to attend technical sessions.)

Name _____
(Last) (First) (Middle)

Mailing Address _____
(Street)

(City) (State/Province) (Zip/Country)

Make all checks payable in U.S. funds to:

**1979 GSA ANNUAL MEETING
(DO NOT SEND CASH.)**

Send this preregistration form with your check to:

**1979 GSA ANNUAL MEETING REGISTRATION
3300 PENROSE PLACE
BOULDER, CO 80301**

NOTE: All field trip participants **MUST** register for the meeting. In addition, registration for all field trips must be done on the official field trip form (following page). To facilitate processing and refunds, please send a separate check for field trip registrations.

PREREGISTRATION FEE

	Price each	No.	Amount
Professional	(1) \$55.00		\$ _____
Student	(2) 28.00		_____
Spouse/guest	(3) 20.00		_____

SPOUSE/GUEST ACTIVITIES

	Date			
San Diego Wild Animal Park	Nov. 5	(4)	12.00	_____
Old Town Lunch and Shopping	Nov. 5	(5)	16.50	_____
Two-hour Harbor Cruise	Nov. 5	(6)	7.50	_____
San Diego Metropolitan Tour	Nov. 6	(7)	5.50	_____
Extended Shopping in Tijuana	Nov. 6	(8)	20.00	_____
Hotel del Coronado	Nov. 6	(9)	13.00	_____
San Diego Wild Animal Park	Nov. 7	(10)	12.00	_____
Deluxe Lunch and Shopping Tour of Tijuana	Nov. 7	(11)	20.00	_____

SPECIAL EVENTS

City Tour and Harbor Cruise	Nov. 4	(12)	8.00	_____
Sea World Night	Nov. 7	(13)	20.00	_____
Annual Dinner	Nov. 6	(14)	15.00	_____
Coal Geology Division Luncheon	Nov. 7	(15)	8.00	_____
Engineering Geology Division Dinner	Nov. 5	(16)	11.00	_____
Geophysics Division Luncheon	Nov. 7	(17)	8.00	_____
History of Geology Division Luncheon	Nov. 6	(18)	8.00	_____
Hydrogeology Division Luncheon	Nov. 6	(19)	8.00	_____
Quaternary Geology & Geomorphology Division Luncheon	Nov. 6	(20)	8.00	_____
MSA Luncheon	Nov. 6	(21)	8.00	_____
NAGT Luncheon	Nov. 5	(22)	8.00	_____
PS Luncheon	Nov. 6	(23)	8.00	_____
SEG Luncheon	Nov. 7	(24)	8.00	_____

Total \$ _____

FOR OFFICE USE ONLY

Balance Due \$ _____ Refund \$ _____

Received _____ Check No. _____

Comments: _____

Section 1

Section 2

Section 3

Section 4

Section 5

Section 6

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(continued from p. 114)

tainment and exhibits. Sea World is not just a successful marine-oriented entertainment center. Sea World's scientific staff is engaged in significant research on projects ranging from toxicology and seawater chemistry to cardiovascular defense against asphyxia. The work is carried on in close cooperation with Scripps, Woods Hole, and U.S. Navy oceanographic institutions.

GSA participants in Sea World Night will have exclusive use of the entire facilities on Wednesday evening, November 7, plus a colorful and delicious luau dinner, at far less cost than an individual would have to pay. GSA shuttle buses will begin leaving the Town and Country Convention Center at 1700 hours and will continue shuttling participants during the no-host cocktail period, at the spectacular live shark exhibit, until 1830 hours.

After a relaxed and tasty Polynesian luau dinner in the new Pavilion, a sequence of entertaining and educational shows at half-hour intervals will be offered until 2200 hours. Simultaneously with the major shows, 30 educational exhibits and unlimited use of the Skytower and Skyride will be available. The shows include the Underwater Theater, dolphins, seal and otter high jinks, Water Fantasy, Japanese pearl divers, and a grand finale with Shamu, the killer whale, and a special GSA fireworks display. The exhibits include alligators, tide pool denizens, sea otters, pinnipeds, walruses, fresh-water porpoises, exotic birds, unusual botanical gardens, and live sharks, all in natural settings. The 60-passenger Skytower capsule travels 150 feet per minute up a 320-foot spire, slowly revolving to give passengers a 360° view of San Diego's foothills, bays, and skyline. The Atlantis Skyride features enclosed gondola cable cars that make a half-mile round trip across an arm of Mission Bay and Sea World's facilities.

November nights tend to be cool (about 40 °F), unless a desert Santana meteorological condition is present, so sweaters and coats are recommended for the outdoor seating at the shows. Surprisingly good photographs can be taken at night with available light or with flash, so cameras are recommended.

Shuttle buses will be available to return to the Convention Center starting at 2100 hours, but participants need not clear the park until about 2300 hours. Additional late rides on the Skytower, after the shows, can be a delightful way to climax the Sea World Night.

Total cost for this memorable evening is \$20.

SCIENCE THEATER

The Science Theater will be located in the Santa Fe, Helix, and Del Mar Rooms in the Town and Country Hotel Convention Center during the following hours:

Sunday	1300-1630
Monday	0900-1600
Tuesday	0900-1600
Wednesday	0900-1600
Thursday	0900-1200

The Science Theater will provide registrants with an opportunity to view, during technical session hours, an absorbing program of geologically oriented films. In charge is John S. Shelton, P.O. Box 48, La Jolla, CA 92038.

EXHIBITS

Exhibit space will be available in the Convention Center of the Town and Country Hotel. If your university, organization, or company is interested in exhibiting, please write or call: Meetings Department, Geological Society of America, 3300 Penrose Place, Boulder, CO 80301, (303) 447-2020.

GROUP ACTIVITIES

Space assignments for meetings, breakfasts, luncheons, dinners, and cocktail parties have been made, and no further space is available for group events.

GSA COMMITTEE ON MINORITIES

The one-day program, sponsored by the Committee on Minorities in the Geosciences, will be held Tuesday, November 6, at the Town and Country Hotel, headquarters for the GSA Annual Meeting. The program will focus on career opportunities in geology, geophysics, and hydrology for secondary-school teachers, career counselors, and minority students from the San Diego area. There will be an introductory session giving the participants an overview of the geological sciences, followed by a film and slide session. The program will also include a panel discussion and informal discussion groups. A field tour for part of the day is being considered.

SPOUSE/GUEST PROGRAM

A wide variety of spouse/guest activities has been planned for those not

attending the technical sessions. **REGISTRATION AS A SPOUSE/GUEST AT THE ANNUAL MEETING IS A PREREQUISITE FOR PARTICIPATION IN THE SPOUSE/GUEST PROGRAM AND FOR THE USE OF THE HOSPITALITY CENTER. BADGES MUST BE WORN.**

The tours and related spouse/guest activities will highlight some of the most interesting aspects of metropolitan San Diego and the surrounding countryside, as well as neighboring Tijuana, Mexico. Costs listed include transportation, admission fees, lunch, tax, and gratuities, except where noted otherwise. Please note that tours are restricted to adults only. All tour buses depart from and return to the foyer of the Town and Country Convention Center.

Monday, November 5

San Diego Wild Animal Park. This recent adjunct to the famous San Diego Zoo is situated in an authentic "African bush" setting in the San Pasqual Valley east of Escondido, about an hour's drive north of the Convention Center. The tour arrives at the Park early enough for participants to take full advantage of all attractions at an individual pace: a monorail ride along the edge of large compounds, where a wide variety of African and Asian animal herds roam through savanna and veldt landscapes as they would in their native lands; spectacular bird-of-prey shows; and dozens of smaller exhibits. The park facilities are not set up for group luncheons, but a variety of snack bars and a restaurant allows each participant to satisfy individual tastes for lunch.

The tour bus leaves the Convention Center at 0930 and returns at 1600 hours. An experienced tour guide on the bus will provide commentary during the trip to and from the Park. The cost is \$12, not including lunch.

Old Town Lunch and Shopping. Old Town marks the location of the first permanent European settlement in what is now California. The little cluster of adobe buildings at the base of Presidio Hill has evolved into an interesting complex of historic landmarks, museums, art galleries, shops, and restaurants. Presidio Hill itself is now a park with important archaeological sites. San Diego's nucleus shifted in the early 1870s to the present downtown site, but Old Town has remained relatively untouched by "progress." Many of its original buildings have been preserved and carefully restored; others have been rebuilt.

Tour buses leave the Convention Center at 1100 hours and go directly to an authentic Mexican restaurant in Old Town for lunch. Lunchtime is made even more enjoyable by gaily decorated tables, music by roaming mariachis, a personal gift for each participant, and a fashion show. A no-host bar is provided.

During the afternoon, participants are free to roam, individually or in small groups, through the colorful shops and historic buildings, but the tour bus must leave promptly at 1500 hours and return to the Convention Center.

The tour is limited by luncheon facilities; reservations by preregistration are highly recommended. Cost is \$16.50.

Two-Hour Harbor Cruise. This intimate look at San Diego's waterfront, marine industries, and naval facilities is more comprehensive than the cruise during Sunday's tour of San Diego. This cruise covers 25 miles in a circuit around the inner San Diego Bay and out as far as the tip of Point Loma, affording a water-based view of aircraft traffic over Lindbergh Field and North Island Naval Air Station, boat traffic in naval and commercial activities, and the aquatic recreational developments for which San Diego is noted. Abundant sea life—pelicans, sea lions, cormorants, and many other interesting species—further enliven the trip.

Glass-enclosed cabins on the cruise boat make sightseeing comfortable, regardless of weather, but San Diego's usually sunny weather allows open-air viewing from the decks, with only a sweater or jacket for warmth.

The tour bus leaves the Convention Center at 1300 and returns at 1630 hours. Cost is \$7.50.

Tuesday, November 6

San Diego Metropolitan Tour. This tour covers the same features as the Sunday tour, except for the Harbor Cruise, but includes also a brief stop at the oceanarium at Scripps Institution of Oceanography in La Jolla.

The tour leaves at 0900 and returns at 1300 hours, in time for participants to have a late lunch. Cost is \$5.50.

Deluxe Lunch, Shopping, and Sightseeing in Tijuana. This tour offers participants a visit to Tijuana, the gateway to Baja California, with its blend of modern and old Mexico, with the opportunity to sample diverse shops and open-air markets, which contrast strikingly with those in nearby San Diego. Tijuana has been designated as a duty-free zone, with high-

quality imported merchandise at substantial savings over U.S. prices. Shoppers may bring back a maximum of \$100 worth of goods without paying duty.

Itinerary includes downtown Tijuana, the new shopping area at Agua Caliente racetrack complex (including a government store), and a superb Mexican restaurant for lunch (with a complimentary margarita). Experienced tour guides will accompany each bus, and they can help locate just the right store for special-interest items. A comprehensive booklet will provide a nice souvenir for each participant and will explain not only the Mexican cuisine but also will provide many interesting facts about the sightseeing and shopping.

The tour bus will leave the Convention Center at 0900 and will return at 1600 hours. Cost is \$20, including lunch and guidebook.

Hotel del Coronado. This tour will cross the Bay Bridge to Coronado and North Island and will proceed first to the marina-oriented Coronado Cays on the Silver Strand sand spit. The highlight of the trip will be a visit to the famous old Hotel del Coronado for lunch, followed by a guided tour of the elegant seaside hotel. First opened in 1888, this hotel is a reminder of a bygone era. Its Victorian styling resembles that of a castle, complete with turrets, cupolas, and rambling red roof. The Hotel del Coronado has hosted countless celebrities, including several U.S. presidents and the Duke and Duchess of Windsor. The hotel has undergone extensive restoration in recent years and still entertains its guests in lavish style.

The tour bus leaves the Convention Center at 1000 and returns at 1445 hours. The cost is \$13, including lunch.

Wednesday, November 7

San Diego Wild Animal Park. This tour is a repeat of the Wild Animal Park tour on Monday, except that this tour leaves the Convention Center at 0900 and returns at 1530 hours. Cost is \$12, not including lunch.

Deluxe Lunch, Shopping, and Sightseeing in Tijuana. This is the same tour as on Tuesday, November 6, except that tour buses will leave the Convention Center at 0830 and will return at 1530 hours. Cost is \$20, including lunch and guidebook.

EMPLOYMENT INTERVIEWS

Employers of earth scientists and those of you who are seeking jobs are in-

vited to join us in San Diego for the tenth annual employment interview service. All interested employers with job openings are urged to submit their job requirements and receive a computer printout of all the qualified applicants on our file. The minimum fee is \$45 for two specialty listings and \$12 for each additional listing. Booth rental for interviews is available at a nominal fee. Staff will be available to help with the scheduling of interviews.

Applicants who attended the annual meeting last year reported that interviewing through this service was extremely helpful in their job search. The applicant fee is \$15 per year and although you may be unable to join us in San Diego, now is an excellent time to send us your application as your qualifications will be distributed to some 60 employers across the country.

Applications for both employers and applicants appeared in the June issue of *GSA News & Information*. Application forms and additional information may be obtained by writing:

Charlene Bicknell,
Membership Coordinator
Geological Society of America
3300 Penrose Place
Boulder, CO 80301
Phone: (303) 447-2020

NOTE TO APPLICANTS: The deadline for application acceptance is September 21, 1979. Any application postmarked after that date will be accepted and put on file, but it will not appear on the computer printout that is sent to employers prior to the annual meeting.

FUTURE EMPLOYMENT OPPORTUNITIES

A forum on Future Employment Opportunities in the Geological Sciences is designed to aid students who are seeking jobs and to aid advisors of future geologists. It will also be of interest to potential employers, because it will provide an overview of the employment situation for earth scientists in governmental, industrial, and academic fields.

Future Employment Opportunities Forum: Panel Discussion. Chairman: Richard A. Paull. November 4, 1330 to 1600 hours, in the California Room of the Town and Country Hotel Convention Center. For further information: Charlene Bicknell, 3300 Penrose Place, Boulder, CO 80301, (303) 447-2020.

HOSPITALITY CENTER

Relaxation and light refreshments will be provided to registered guests from Sunday through Thursday, November 4 to 8, in the exotic Tiki Hut near the Convention Center at the Town and Country Hotel. **BADGES MUST BE WORN.**

Hostesses will help plan individual activities and supply information about local features. Members of the Guest Committee are looking forward to welcoming each of you to San Diego.

TECHNICAL PROGRAM

Symposia

1. *Earthquake Hazards and Prediction*: Geophysics Division, GSA; James N. Brune and Kerry E. Sieh
2. *Depositional Processes in Continental Margin Basins*: Michael E. Field and Donn S. Gorsline
3. *Cenozoic Correlations of North America—The Neogene*: Warren O. Addicott, Lloyd Burckle, and John M. Armentrout
4. *Mesozoic and Cenozoic Microplate Tectonics of the Pacific Continental Margins*: John Hillhouse and David Jones
5. *The Nature and Origin of Granitic Magmas*: Bruce Chappell
6. *Miocene Paleooceanography*: CENOP; James P. Kennett and Samuel M. Savin
7. *The Evaluation of North American Coal Resources*: Coal Division, GSA; Jack A. Simon and Charles D. Masters
8. *Collection Development in Geoscience Libraries*: Geoscience Information Society; Rosalind Walcott
9. *Human Origins*: Paleontological Society; Leo F. Laporte
10. *Properties of Silicate Liquids*: Mineralogical Society of America; Bjørn Mysen
11. *Oxygen and Carbon Isotopes in Foraminifera*: Cushman Foundation; Wolfgang H. Berger and Allan W. H. Bé
12. *Geodynamics: Subduction of Oceanic Plates—Magma and Minerals*: R. Gordon Gastil and Richard P. Phillips
13. *Project CLIMAP: Progress in Understanding Quaternary Climatic Change*: W. F. Ruddiman and W. L. Prell
14. *Recent Advancements in Analytic Methods Applicable to Archaeological Geology*: Archaeological Geology Division, GSA; William R. Farrand
15. *Perspectives on Government and Science: Occasioned by the Centennial*

of the U.S. Geological Survey: M. Gordon Wolman

16. *Water Quality Management*: Hydrogeology Division, GSA; John F. Mann, Jr., and Darwin Knochenmus
17. *Hydrothermal Alteration of the Oceanic Crust (or Deeper?)*: Geochemical Society; Debra S. Stakes and Michael J. Mottl
18. *The Environmental Constraints and Impacts Related to the Extraction of Uranium Resources*: GSA Committee on Geology and Public Policy; Dawn S. Kaback and Donald D. Runnells
19. *G. K. Gilbert Symposium: Geology in America—Growth of a Scientific Community*: History of Geology Division, GSA; C. C. Albritton, C. M. Nelson, C. J. Schneer, E. L. Yochelson
20. *A Century of Research on Metallic Mineral Deposits*: Society of Economic Geologists; Eugene M. Shoemaker
21. *Geochemical Exploration for Uranium*: Association of Exploration Geochemists, U.S. Department of Energy; Robert H. Carpenter
22. *Academic Training for Engineering Geologists*: Engineering Geology Division, GSA, Association of Engineering Geologists, National Association of Geology Teachers; Richard H. Jahns, James V. O'Connor, and Martin L. Stout
23. *Organic Geochemistry Correlations*: Organic Geochemistry Division of the Geochemical Society; Colin Barker (full day Sunday)
24. *Environmental Geology: Do Academic Programs Meet Current Needs?*: National Association of Geology Teachers; Russell Utgard and James Hoffman (Sunday p.m.)

SPECIAL COURSES

American Geological Institute. *Geowriting for Results—A Workshop on Writing*. To be held November 3–4, 1979, in San Diego, California, preceding the meetings of the Geological Society of America. Enrollment limited to 50 participants. Fee: \$85 (includes textbook and all supplies). For information write: William H. Matthews III, Director of Education, American Geological Institute, Box 10031, Lamar University Station, Beaumont, TX 77710.

American Geological Institute—National Association of Geology Teachers. *Workshop; Teaching Problem-Solving Skills in Geology*. To be held November 3–4, 1979.

A workshop on innovative teaching techniques preceding the GSA meetings in San Diego, California. Sponsored by the American Geological Institute and the National Association of Geology Teachers. Enrollment limited to 30 participants. Fee: \$45 (including all course materials). For information write: William H. Matthews III, Director of Education, American Geological Institute, Box 10031, Lamar University Station, Beaumont, TX 77710.

American Geological Institute Women Geoscientists Committee. *Workshop; Skills for Moving Up in the Geosciences*. To be held November 4, 1979. A management skills workshop preceding the GSA meetings in San Diego, California, and sponsored by the Women Geoscientists Committee of the American Geological Institute. Enrollment limited to 30 participants. Fee: \$45 (including all course materials). For information write: William H. Matthews III, Director of Education, American Geological Institute, Box 10031, Lamar University Station, Beaumont, TX 77710.

Paleontological Society. *Short Course in Arthropods*. To be held November 4, 1979, 0900 to 1700 hours, in the Town and Country Hotel. For schedule of program and information, write organizer: Frederick Schram, San Diego Natural History Museum, P.O. Box 1390, San Diego, CA 92112.

MSA Workshop on Asbestos Minerals. No more information available at press time. Watch for announcement in following issues of *GSA News & Information* and in the *Annual Meeting Abstracts with Programs*.

FIELD TRIPS

Note: All field trip registrants MUST ALSO register for the meeting.

Registration

Preregistration for field trip is VERY IMPORTANT. Use the official field trip form included in this announcement. Field trip preregistration forms must be post-marked no later than **September 14, 1979**. On-site registration MAY be possible for those trips not fully subscribed. Participants will be selected on a first-come, first-served basis. Participants should be prepared to make their own arrangements for transportation, lodging, and meals

not specified in the field trip descriptions. Additional information on some trips is available upon request to GSA headquarters. Beyond that, questions may be answered by the general field trip chairman; write or call Patrick L. Abbott, Department of Geological Sciences, San Diego State University, San Diego, CA 92182, (714) 286-5591.

Cancellations

Cancellations of field trip reservations must be made in writing and must be received at headquarters no later than **October 5, 1979**, to be eligible for refund. Refunds will be subject to a \$10 processing fee.

Weather and Clothing

Early November weather in the southwestern United States and northwestern Mexico is usually warm and sunny. Although rain from an early winter storm is possible, it is even more likely that Santana winds from the deserts to the east will create warm, dry weather with dazzling visibility. Medium-weight jackets should provide ample protection.

PRE-MEETING

1. **Quaternary terraces and crustal deformation in coastal southern California.** Saturday and Sunday, November 3 and 4. Bus—max. 45. *Leaders: K. R. Lajoie and J. P. Kern.*

Emphasis on late Quaternary tectonic history of coastal southern California as expressed in deformed marine terraces dated by uranium-series, amino-acid stereochemistry, and carbon-14 techniques. The trip will begin at Point Loma in San Diego, where a 120,000-year uranium-series age from fossil corals makes the Nestor terrace one of only two confidently dated Pleistocene terraces on the west coast. Results of moderate uplift and deformation of the Nestor and other terraces will be seen on the drive to Camp Pendleton and Dana Point, where a larger series of terraces records a greater interval of time and more rapid tectonic uplift. On the way to the classic terrace sequence of the Palos Verdes Hills a stop will be made at one of the historical San Pedro localities to see part of the Los Angeles basin Pleistocene stratigraphic section. Most of the second day will be spent between Ventura and Carpinteria, where a 40,000-year-old terrace rises from sea level to 400 m on the south flank of the Ventura Avenue anticline, and a Holocene surface is approximately 10 m above the sea.

Cost: \$45. Includes bus fare, lodging in Ventura, and guidebook.

2. **Santa Cruz Island, geologic overview.** Friday and Saturday, November 2 and 3. Air-

plane—max. 26. *Leaders: D. G. Howell, H. McLean, and J. G. Vedder.*

Group will examine complex stratigraphic relations within Tertiary sedimentary rocks and will walk through part of the crystalline basement complex. Day 1: Half of the group will take an arduous, all-day hike over rugged terrain; the other half will drive to the west end of the island. Day 2: The groups will switch. The hiking group will examine the contact relations between the Santa Cruz Island schist and the basal conglomerate and breccia of the overlying Miocene Blanca Formation, and examine the complex stratigraphic relations within the Blanca Formation, which includes units of tuffaceous volcanoclastic sandstone, conglomerate, and breccia derived in part from reworked silicic ash-flow tuffs. The group at the west end of the island will inspect channelized conglomerate facies of a submarine fan complex in the Eocene Jolla Vieja Formation and coarse-grained facies of the Miocene San Onofre Breccia, the Vaqueros and the Blanca formations. At Near Point, several kilometres to the west of the breccia facies, the sequence grades into thin-bedded, fine-grained sandstone and siltstone with lenses of pebble conglomerate. Intertonguing relations between the San Onofre Breccia and Rincon formations can be seen at Near Point.

Cost: \$80. Includes roundtrip airlift from Oxnard, lodging on island, jeep transportation, 1 breakfast, 2 lunches, and 1 dinner. Participants must be ready to hike up to 10 miles over rugged terrain. Participants must bring sleeping bag, a small backpack, and canteen.

3. **Roundtrip flight to Colorado Plateau.** Saturday and Sunday, November 3 and 4. (Should weather prevent, trip will be offered on Thursday and Friday, November 8 and 9, if quotas can be met.) Twin-engine, high-wing aircraft—max. 24. *Leaders: J. S. Shelton, J. C. Crowell, and G. A. Davis.*

Emphasis on large structures and geomorphology with opportunities for photography. Weather permitting, features seen will include: Salton Basin folds and shorelines; Martinez landslide; trace of San Andreas fault; plutons; Quaternary volcanism; playas, bajadas, and dune complexes; Death Valley faults, fans, shorelines; Keystone and Muddy Mountain thrusts; Frenchman Mountain faults; Weiser Bowl; Virgin anticline; Hurricane fault; Zion and Bryce; Pink, Grey, White, and Vermillion Cliffs; Lake Powell; Waterpocket and other monoclines; Henry Mountains; incised meanders of the San Juan River; diatremes; Monument Valley; Navajo Mountain; Grand Canyon stratigraphy, unconformities, structures, and volcanism; Lower Colorado River; Whipple Mountains gneiss dome and detachment blocks; Algodones dunes; Laguna Salada and southern Peninsular Ranges.

Cost: \$400. Includes roundtrip airlift,

lodging, 2 lunches, and guidebook. Trip is weather-sensitive and subject to last-minute modification, postponement, or cancellation.

4. **Geomorphology of the Salton Basin (NAGT trip).** Friday and Saturday, November 2 and 3. Bus—max. 42. *Leaders: R. M. Norris, E. A. Keller, and G. Meyer.*

Trip will visit the Indio Hills badlands, uplifted and deformed along two branches of the San Andreas fault, well displayed native palm oases, laterally offset streams, beheaded streams, deflected streams, fault scarps, pressure ridges, shutter ridges, stream captures, beheaded alluvial fans, and deformed erosional surfaces. Stop at the relict beaches of Lake Cahuilla with good examples of beach ridges, shingle beaches, and barrier beaches. Stop at 96-km-long Algodones dune chain and observe mega-barchans of disputable origin. Second day visits include Split Mountain Canyon, where arid-climate stream erosion is well displayed along with good exposures of Late Tertiary fanglomerates, mud flows, and lacustrine and shallow marine beds; well-formed barchan dunes near the southwest corner of the Salton Sea; truckhaven pediment and desert pavement with at least three erosional surfaces, probably all of Quaternary age; shoreline features on the east face of the Santa Rosa Mountains include calcareous tuffa-coated rocks, boulder beaches, bayhead-barrier beaches, and wave-cut cliffs; little-known Martinez Mountain rockslide whose vertical fall was about 1,800 m and whose volume is estimated to be between 200 and 300 million m³.

Cost: \$65. Includes bus fare, lodging in El Centro, 2 lunches, and guidebook.

5. **Gem-bearing pegmatites in San Diego County.** Sunday, November 4. Bus—max. 46. *Leader: R. H. Jahns.*

Mineralogy and petrology of well-exposed bodies of gem- and lithium-bearing pegmatites within the Pala and Mesa Grande pegmatite districts. Special features will be long stops for pegmatite inspection and collecting at two active gem mines, the Stewart near Pala and the Himalaya near Mesa Grande, and shorter stops to observe the southern California batholith and the Elsinore fault zones.

Cost: \$37. Includes bus fare, deli box lunch, guidebook, and maps.

6. **Geology of Death Valley.** Thursday through Sunday, November 1 to 4. Bus—max. 90. *Leaders: B. W. Troxel and L. A. Wright.*

Emphasis on tectonics and Precambrian stratigraphy. Features to be inspected include Mesozoic thrust-fault belt west of Las Vegas, upper Precambrian to Cambrian sedimentary section, Death Valley fault zone, Cenozoic extension and low-angle faults, type area for chaos of Noble, turtlebacks, Cenozoic volcanic and sedimentary rocks, Amargosa aulacogen, faulted Qua-

ternary section, and much, much more. Quality of geologic exposures in the Death Valley region is outstanding. Several short hikes are planned for detailed observations.

Cost: \$145 (\$85 rate available for those who sleep outside and provide own food; lodging available for 40 people only.) Includes bus fare, 3 nights' lodging, 3 breakfasts, 4 lunches, 3 dinners, and guidebook.

7. **Geology and geothermics of the Salton Trough.** Saturday and Sunday, November 3 and 4. Bus—max. 78. *Leaders: W. A. Elders, A. de la Peña, and S. Biehler.*

Emphasis on sedimentation, faulting, volcanism, and hydrothermal manifestations associated with the geothermal fields of the Colorado River delta at the head of the Gulf of California. First day in Imperial Valley visiting East Mesa, Salton Sea, and Brawley geothermal fields. Overnight in Mexicali, Baja California. Second day at Cerro Prieto power plant, then transect Peninsular Ranges in Mexico to Tijuana, then return to San Diego.

Cost: \$70. Includes bus fare, lodging in Mexicali, 2 lunches, and guidebook. Non-United States citizens and naturalized United States citizens must have necessary border-crossing papers in hand before trip starts.

8. **Some prehistoric earthquakes on the San Andreas fault, Los Angeles area.** Sunday, November 4. Bus—max. 42. *Leader: K. Sieh.*

Examine sites along the San Andreas and San Jacinto faults, within 100 km of Los Angeles, in order to understand aspects of their Holocene behavior. Planned stops include Palmett Creek, where many large earthquakes are recorded in sediments deposited during the last several thousand years; Wrightwood, where trees were tilted by fault slippage underfoot during the great 1857 earthquake; Cajon Pass, where offset Holocene(?) terraces suggest the rate of fault slip; and San Bernardino, where faulted late Holocene sediments are being studied to determine earthquake recurrence along the San Jacinto fault.

Cost: \$40. Includes bus fare, 1 lunch, 1 dinner, and guidebook.

9. **Borate deposits of the southeast California deserts.** Saturday and Sunday, November 3 and 4. Bus—max. 90. *Leaders: G. I. Smith, B. C. Burchfiel, and J. F. McAllister.*

Trip will visit all three currently active borate-producing properties in the United States and some formerly active sites. The three active properties are notably different in both geology and production methods. Tertiary calcium borates are mined underground at Death Valley, Tertiary sodium borates are mined by open-pit methods at Boron, and Quaternary sodium borate brines are pumped and processed at Searles Lake. En route to these sites, stops will be scheduled to view the scenic and geologically spectacular terrain that characterizes

these Great Basin-Mojave Desert settings. Emphasis will be on the Cenozoic evolution of the regions but the pre-Cenozoic stratigraphy and structures will be described.

Cost: \$90. Includes bus fare, lodging in Ridgecrest, 2 lunches, and 2 dinners.

10. **Geology of Vizcaino Peninsula and Cedros Island, Baja California Sur, Mexico.** Tuesday through Sunday, October 30 to November 4. Plane, boat, and van—max. 30. *Leaders: R. G. Gastil, F. Suarez-V., J. R. Boles, F. H. Kilmer, C. Rangin, and D. A. Barnes.*

Trip will emphasize Mesozoic and some Cenozoic rocks exposed in this southernmost significant exposure of Continental Borderland geology. Late Mesozoic rocks considered to represent an extension of the California Coastal Ranges province are extensively exposed in excellent beach and desert outcrops. Major geologic units to be inspected include blueschist subduction-complex melanges, ophiolitic rocks, a thick section of volcanogenic forearc basin turbidites, oceanic arc-like volcanic and plutonic rocks, and an unusual assemblage of chaotic clastic rocks derived from this arc bearing evidence of both open-ocean and shallow-water environments of deposition. These very significant exposures may provide unique insight into late Mesozoic convergent plate margin geology. Outcrops of fossiliferous Miocene and Pliocene rocks will be visited along with deformed Quaternary terraces.

Cost: \$350. Includes fares for boat, vans, and roundtrip plane flight, food, and guidebook. No motels are available; participants must bring sleeping bags. Must have necessary papers to enter Mexico and reenter the United States.

11. **Upper Cretaceous deep-sea fan deposits, San Diego.** Sunday, November 4. Bus—max. 90. *Leaders: T. H. Nilsen and M. A. Arthur.*

The beautiful coastal communities of La Jolla and Point Loma are sites of excellent exposures of sediments deposited as part of an Upper Cretaceous submarine fan. Outcrops are composed mainly of sandy and conglomeratic inner-fan channel and middle-fan channel facies and muddy interchannel facies. Seacliff exposures present a cross section of the fan and display many unusual sedimentary features which are very photogenic.

Cost: \$25. Includes bus fare, deli box lunch, and guidebook.

12. **Geology of Baja California, La Paz to San Diego.** Thursday through Sunday, November 1 to 4. Bus—max. 34. *Leaders: J. A. Minch, C. Obregon, and T. Leslie.*

Day 1: Paleocene marine section, Miocene marine and volcanic facies, Pliocene coastal marine facies, Miocene volcanic section along Gulf. Day 2: Pliocene-Miocene marine section, Loreto embayment, Gulf fault, Miocene volcanic sequence, Concepcion Bay,

marine Pliocene section near old French mining town of Santa Rosalia, Tres Virgenes volcano, old oasis town of San Ignacio. Day 3: Mesozoic metavolcanics and granitics, Paleocene coastal facies, elevated erosion surfaces, Cretaceous marine and nonmarine sediments, Pliocene coastal marine sediments. Day 4: San Quintin volcanic field, Cretaceous Alisitos carbonates and volcanics, Mesozoic granitics, Agua Blanca fault zone, City of Ensenada, Miocene volcanic and marine rocks, coastal landslides, Pliocene marine rocks. One co-leader is a biologist versed in the unique, indigenous flora and fauna of Baja California.

Cost: \$210. Includes bus fare, 4 nights' lodging in El Presidente motels in La Paz (on All Souls Night), Loreto, Guerrero Negro, and San Quintin, 4 breakfasts, 4 lunches, 3 dinners, and guidebook. Must have necessary papers to enter Mexico and reenter the United States.

13. **Geology of northern Baja California.** Friday, Saturday, and Sunday, November 2, 3, and 4. Carryalls—max. 32. *Leaders: R. P. Phillips and G. Silvera.*

Day 1: Along coastal route; Miocene basalt, Upper Cretaceous molasse, Jurassic andesite; inland from Ensenada to view a complete section across the granitic and metamorphic rocks of the Peninsular Ranges batholith. First camp between Miocene basalt-anorthosite and andalusite schist, where cigar-sized andalusite crystals are scattered across the ground. Day 2: Continue inspection of batholith; second camp on the desert alongside 10,000-ft. Mt. Diablo near Miocene diatomite and richly fossiliferous Pliocene beds with monolithic megabreccias. Day 3: Only fossiliferous Paleocene rocks in peninsular California, 3-km-thick section of tilted Miocene volcanic rocks, Pleistocene and Holocene delta, mudflat, and evaporite deposits of the Gulf of California.

Cost: \$135. Includes transportation, prepared meals, staffed camps provided by Wilderness Trails Expeditions, and guidebook. Mexican tourist permit will not be required, but need papers to reenter the U.S.

14. **Water management practices in coastal southern California (Hydrogeology Division).** Saturday, November 3. Bus—max. 44. *Leaders: D. Knochenmus, W. F. Hardt, and J. F. Mann.*

In semi-arid and highly populated coastal southern California, management practices for water conservation are extensively developed and sophisticated. Such practices as the reuse of water, artificial recharge, water treatment, and salt-water encroachment prohibition will be examined. The trip will include visits to sites from San Diego to Los Angeles with a stop at Orange County's famous "Water Factory 21."

Cost: \$15. Includes bus fare, deli box lunch, and collection of papers and brochures.

15. Geology and coal deposits of the Black Mesa region, Arizona (Coal Geology Division). Saturday and Sunday, November 3 and 4. Bus and airplane—max. 41. *Leaders: H. W. Pierce and W. Breed.*

Bus trip from Phoenix will discuss spectacular geology en route to the Black Mesa coal region. The route will traverse Precambrian-Tertiary, Paleozoic-Tertiary, and Mesozoic terrain. The coal occurs in a large remnant of Cretaceous strata in northeastern Arizona. Observe Peabody Coal Company's Black Mesa coal-mining and reclamation operations on the Navajo Indian Reservation and see the only active coal slurry pipeline operation. Tour the Navajo coal-fired power plant the second day and return by air on a flight swinging near the Grand Canyon.

Cost: \$140. Includes bus fare and air fare, lodging in Phoenix and Page, 2 lunches, 1 dinner, and guidebook.

16. Regional Miocene detachment faulting and early Tertiary(?) mylonitic terranes in the Colorado River Trough, southeastern California and western Arizona. Friday, Saturday, and Sunday, November 2, 3, and 4. Vans—max. 44. *Leaders: G. A. Davis, J. L. Anderson, and E. G. Frost.*

Examination of a spectacularly exposed, low-angle, regional detachment surface of Miocene age and older (Tertiary?) mylonitic gneisses that lie below it. Upper plate, normal faulting, and the relationships of structure to coeval alluvial and lacustrine sedimentation will also be inspected, principally in the Buckskin and Whipple Mountains of Arizona and California, respectively. Below the detachment fault, the transition between regionally developed, mylonitic rocks and their structurally higher, non-mylonitic counterparts will be studied. Many of the localities and relationships to be studied will be seen on moderately strenuous hikes of two to five miles. Participants should be in good physical condition.

Cost: \$120. Includes van fare, lodging in Parker for 2 nights, 3 lunches, and guidebook.

During meeting

17. Geology of the San Diego metropolitan area (mini-trips). Monday, Tuesday, Wednesday, and Thursday morning and afternoon, November 5, 6, 7, and 8. Van—max. 7 per trip. *Leaders: B. W. Nocita and San Diego State University staff.*

Two-hour-long trips to break the tedium of the technical sessions by learning the geologic framework of the San Diego area. Drive east to top of scenic Mt. Helix to view prebatholithic and batholithic rocks and discuss their history. Drive to coast and to the peak of fault-uplifted Mt. Soledad for a spectacular overview of Cenozoic sedi-

mentary rocks, Quaternary deformation, and active processes.

Cost: \$2. Includes van fare.

Postmeeting

18. Eocene depositional systems in San Diego. Thursday and Friday, November 8 and 9. Bus—max. 90. *Leaders: M. H. Link, G. L. Peterson, and J. E. Warme.*

Eocene sedimentary rocks of San Diego exhibit integrated nonmarine and marine depositional systems that are unusually well exposed and well understood. Day 1: Trip will follow paleoslope from channel deposits of Ballena fluvial gravels (brought under a semi-arid climatic regime from a largely pre-Gulf of California source in Sonora, Mexico), through the apex and body of the alluvial fan (exposed in quarries), to the shoreline facies. Day 2: A three-mile walk along the base of the Torrey Pines-Scripps beach cliffs will allow detailed examination of lagoon, beach-associated, and shelf facies transected by a major submarine canyon system.

Cost: \$30. Includes bus fare, deli box lunch, and guidebook.

19. Geologic hazards in San Diego. Thursday, November 8. Bus—max. 90. *Leaders: W. J. Elliott, M. W. Hart, R. J. Dowlen, and G. T. Farrand.*

Examination of a representative sample of the active geologic processes bedeviling the San Diego metropolitan area. Inspection of effects of high rainfalls of past two years in the urbanized San Diego River Valley and planned, open-space valley of Tijuana River; prehistoric offsets and potentials for movement along Rose Canyon and La Nacion fault systems; ancient and active slump and block-glide landslides in two different geologic terranes; and sea cave formation, collapse, and cliff erosion at Sunset Cliffs. The trip will traverse some of southern California's most scenic coastline.

Cost: \$25. Includes bus fare, deli box lunch, and guidebook.

20. Gem-bearing pegmatites in San Diego County. Friday, November 9. Bus—max. 46. *Leader: R. H. Jahns.*

Mineralogy and petrology of well exposed bodies of gem- and lithium-bearing pegmatites within the Pala and Mesa Grande pegmatite districts. Special features will be long stops for pegmatite inspection and collecting at two active gem mines, the Stewart near Pala and the Himalaya near Mesa Grande, and shorter stops to observe the southern California batholith and the Elsinore fault zone.

Cost: \$37. Includes bus fare, deli box lunch, guidebook, and maps.

21. Peninsular Ranges batholith, San Diego and Imperial Counties. Friday, Saturday, and

Sunday, November 9, 10, and 11. Bus—max. 43. *Leaders: V. R. Todd, M. J. Walawender, and L. T. Silver.*

Field trip will cross the western and central zones of the batholith with an emphasis on structure, including syn- and post-intrusive deformation (mylonitization), geochronology, and compositional patterns both within and between plutons. Walking traverses through major zones of a typical cumulate gabbroic series as well as examination of the complex contact relationships between the gabbroic and granitic plutons. Stops will include metamorphosed (amphibolite grade) prebatholithic sedimentary and volcanic rocks, late Tertiary basalt-andesite complexes, and Quaternary fault zones. The trip will traverse unique southern California coastal mountain and desert geomorphology.

Cost: \$145. Includes bus fare, 2 nights' lodging in Pine Valley, 2 breakfasts, 3 lunches, 2 dinners, and guidebook.

22. Southern San Andreas fault, Salton Trough. Thursday through Sunday, November 8 to 11. Bus—max. 90. *Leaders: J. C. Crowell and A. G. Sylvester.*

Tectonics of juncture between the San Andreas transform system and the Gulf of California divergent plate boundary. Leave San Diego at 1330 hours, Thursday, November 8, driving to the margin of the Salton Trough in the eastern Peninsular Ranges for overnight stop, including briefing session. Among the stops are hikes of about three hours each where details of structures and sedimentary facies, as well as basement rocks, are especially well displayed: One in Split Mountain Gorge, Borrego Valley, and the other in Painted Canyon, Mecca Hills. On Sunday, November 11, a ride up to 8,516 feet elevation on the Palm Springs Tramway is planned.

Cost: \$155. Includes bus fare, 3 nights' lodging, 2 breakfasts, 2 lunches, 2 dinners, tramway ticket, and guidebook.

23. Miocene lithofacies and depositional environments, coastal southern California, Baja California, and Coronado Islands. Thursday, Friday, and Saturday, November 8, 9, and 10. Buses and boat—max. 76. *Leaders: C. J. Stuart, W. R. Normark, J. C. Ingle, Jr., G. Hess, R. Scheidemann, and T. Lamb.*

The middle and late Miocene faulted Continental Borderland off southern California consists of elongate basement uplifts separated by deep-water troughs. Basement uplifts consisted primarily of Mesozoic glaucophane schist west of the present shoreline and Mesozoic granitic and andesitic rocks in the Peninsular Ranges to the east. Rapid sedimentation and varied provenance produced complex and abrupt facies changes

and sedimentary petrography. Sedimentary rocks range from coarse conglomerate and breccia wedges (fan-deltas) deposited sub-aerially and in shallow sea water, to bathyal diatomite, shale, and limestone. Examples of some of the sedimentary rocks that formed within this tectonically active borderland setting will be examined during the field trip in outcrops from Laguna Beach to Camp Pendleton, and from Tijuana, Baja California, to Los Coronados Islands where the marine portion of a fan-delta(?) wedge is exposed.

Cost: \$70. Includes bus fare and boat passage, 2 deli box lunches, and guidebook. Non-United States citizens and naturalized United States citizens must have necessary border-crossing papers in hand before trip starts.

- 24. Point Sal ophiolite.** Thursday, Friday, and Saturday, November 8, 9, and 10. Bus—max. 36. *Leader: C. A. Hopson.*

Trip will traverse a relatively complete section of the California Coast Range ophiolite, a remnant of composite (two-stage?) Jurassic oceanic crust. The ultramafic and gabbro cumulates, high-level gabbro, diorite, and sheeted-sill complex will be traversed early. The submarine volcanic rocks and pelagic sediment cover will be viewed later.

Cost: \$75. Includes bus fare, 2 nights' lodging in Lompoc, 2 lunches, and guidebook. Participants must be prepared for a rugged 4-mile hike and some rock climbing.

- 25. Scuba, southern California borderland.** Thursday and Friday, November 8 and 9. Boat—max. 45. *Leaders: R. F. Dill, N. Marshall, and J. Stewart.*

The first day will be spent looking at the underwater regions surrounding the Coronado Islands, Mexico. These islands of Miocene(?) age are areas of high carbonate production (algal nodules), even though

they are in temperate waters and provide an excellent example of the rocky environments off southern California. The second day will be directed at investigating the upper heads of La Jolla and Scripps Submarine Canyon. These nearshore features tap the longshore flow of terrigenous sands moving south along the coast zone and divert coarse clastic sediments and organic material into the deep San Diego Trough to the west. The processes of transportation, erosion, and deposition will be observed and discussed in the field. These canyons have many counterparts in the ancient rocks and should provide the participant with a good insight and a comparative understanding of the marine processes acting in these important nearshore features.

Cost: \$90. Includes boat passage, 2 breakfasts, 2 lunches, tanks, weight belts, backpacks, and guidebook. All participants will have to provide proof of scuba certification by one of the major certifying organizations (NAUI, PADI, YMCA, NASDS, or equivalent) and a recent (within one year) physical for eligibility. A swim check will be conducted by the Diving Safety Officer (James Stewart) during the first day's dives to ensure persons diving in the canyons have capability to 80 feet. Need personal flotation device, submersible tank pressure gauge, and wetsuit (can be rented locally).

- 26. Geology of northern Baja California.** Thursday through Saturday, November 8–10. Carryalls—max. 32. *Leaders: R. P. Phillips, F. Suarez-V., and R. Amaya.*

Day 1: Along coastal route; Miocene basalt, Upper Cretaceous molasse, Jurassic andesite; inland from Ensenada to view a complete section across the granitic and metamorphic rocks of the Peninsular Ranges batholith. First camp between Miocene basalt-anorthosite and andalusite schist, where

cigar-sized andalusite crystals are scattered across the ground. Day 2: Continue inspection of batholith; second camp on the desert alongside 10,000-ft. Mt. Diablo near Miocene diatomite and richly fossiliferous Pliocene beds with monolithic megabreccias. Day 3: Only fossiliferous Paleocene rocks in peninsular California, 3-km-thick section of tilted Miocene volcanic rocks, Pleistocene and Holocene delta, mudflat, and evaporite deposits of the Gulf of California.

Cost: \$135. Includes transportation, prepared meals, staffed camps provided by Wilderness Trails Expeditions, and guidebook. Will not be required to have Mexican tourist permit but need papers to reenter the United States.

- 27. Geology of northern Sonora.** Thursday through Sunday, November 8 to 11. Vans—max. 40. *Leaders: T. H. Anderson and J. Roldan-Q.*

Field trip will serve as an introduction to the complicated geologic history recorded by the rocks in Sonora. Inspection of major elements of the stratigraphic section of northwestern Mexico, including layered and plutonic rocks that form part of the Precambrian basement in Sonora and are the oldest known rocks in Mexico; upper Precambrian and lower Paleozoic carbonate and clastic beds; Permian, Upper Triassic and Lower Jurassic limestone and sandstone; Middle Jurassic(?) sandstone; the Albian-Aptian sequence; Upper Cretaceous plutonic rocks and Upper Cretaceous(?) or Tertiary conglomerate and volcanic beds.

Cost: \$155. Includes transportation by vans, 3 nights' lodging in Caborca and Hermosillo, 3 lunches, 2 dinners, and guidebook. Must have necessary papers to enter Mexico and reenter United States. Trip ends in Hermosillo; arrangements must be made to fly from Hermosillo.

ABSTRACTS WITH PROGRAMS

To assure delivery before the 1979 meeting in San Diego, orders for *Abstracts with Programs* must be received by GSA no later than September 15, 1979. Member price is extended to (1) all GSA members who did not pay for this issue at the time they paid 1979 dues, (2) members of affiliated societies, and (3) nonmember authors who have an abstract in this issue. **ONLY ONE COPY MAY BE PURCHASED AT THE MEMBER PRICE.**

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