



# SAN DIEGO ASSOCIATION OF GEOLOGISTS

<http://www.znet.com/~sdag>

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## SDAG MEETING ANNOUNCEMENT

Joint meeting with the Society of Mining Engineers

**Wednesday, October 18, 2000**

**Where:** Raintree Restaurant  
755 Raintree Drive  
Carlsbad  
Phone: 760/931-1122

**When:** 6:00 pm – Social Hour  
7:00 pm – Dinner  
8:30 pm – Program

**Directions:** From I-5 take the Poinsettia Lane exit west; then right on Avenida Encinas; then right on Raintree Drive.

**Dinner:** "Ranch & Sea Buffet": Featuring mahi-mahi medallions and tender beef tip brochettes. With tossed green salad, seasonal vegetables, fresh baked rolls, fruit salad, pineapple rice, dessert, coffee and tea.

**Cost:** \$25.00 per person, Students with ID \$15.00. At the door without a reservation \$30.00

**Reservations:** Make your reservation at 858/974-6994, ext 1760, or the SDAG web site, ASAP.

**Program:** The Hydrothermal Origin of the Fish Creek Gypsum Deposit

**Speakers:** David Peterson and George Jefferson

### Program Topic:

The Fish Creek Gypsum deposit (FCG) (Dibblee, 1954) is located west of the tectonically active Salton Trough spreading center in Imperial County, California. This late Miocene age marine gypsum deposit, well exposed in the United States Gypsum quarry (USG), traditionally has been described as an evaporite. Contrary to previous models for the origin of the deposit (Sharp and Cork, 1995; Dean, 1996), these massive amounts of calcium and strontium sulfate and anhydrite contain highly elevated levels of

trace elements compared to sea water. The FCG is best interpreted as forming from subaqueous or sub-seafloor precipitation of anhydrite, hydrothermal mound building and hydrothermal alteration.

Anhydrite is a well documented major constituent of black and white smokers, and an integral part of chimney development and mound formation in seafloor hydrothermal systems. The millions of tons of anhydrite in the USG quarry contains comparable or higher levels of trace elements, such as chlorine, copper, gold, silicon, iron, manganese, strontium, silver, barium, and lead, than is found in black and white smokers on the Juan de Fuca Ridge in the eastern Pacific (Butterfield et al., 1990). Geologic setting, chemical composition of the hydrothermal fluids and basement rock may be responsible for quantitative chemical differences between the FCG and Juan de Fuca Ridge deposits.

In contrast to evaporite deposits, there is a significant absence of calcite, dolomite and halite in the FCG. Also, there is a massive amount of strontium sulfate. Euhedral biotite and phlogopite mica crystals, interpreted to be authigenic, occur within crystals of anhydrite, gypsum and celestite.

Within the USG quarry, bedding is usually massive, thick (0.5-1.0 m), and often forms large (4-6 m-diameter) mound-shaped structures. Soluble and insoluble anhydrite occur in local, white, black, gray, and red vertical structures (2-5 m-diameter). These structures (20 + m-high), which may be relic chimneys, emanate from the bottom of the deposit.

Temperatures in excess of 6000 °C are required to form insoluble anhydrite with very low chemical bound water from gypsum. Pure white, friable insoluble anhydrite with very low chemical bound water (0.29%) is present in discrete vertical structures that are inferred to have formed as conduits carrying hydrothermal fluids.

Manganese is found in significant quantities in the form of pyrolusite (manganese dioxide) throughout the Fish Creek Gypsum deposit including the celestite deposit. The presence of this manganese is typical of metalliferous sediments associated with hydrothermal deposits. Concentrated manganese in the form of a macronodule (manganite [MnO(OH)] with rare earths) has been discovered in the previously mined area of the USG quarry.

### **Speaker Biographies**

**David Peterson** has worked at United States Gypsum Corp. Research Center/Libertyville, IL as a Member of the Technical Staff for the past fourteen years. In this capacity he has been directly involved in the characterization of mineral powders which includes the determination of the particle size distribution using a light scattering laser particle analyzer, polarized light microscopy, XRD, SEM/EDX, GFAAS, and FAAS.

In 1995 he spent four months at the USG gypsum mine (Fish Creek Gypsum deposit) assisting in the construction and startup of a new, screening plant, which included the design and selection of all of the equipment. This time spent at the USG gypsum mine allowed for the collection of gypsum and anhydrite samples from the previously mined areas of the Fish Creek gypsum deposit as well as the adjacent celestite deposit.

**George Jefferson** presently works for the Colorado Desert District of the California Department of Parks and Recreation as District Paleontologist. The District encompasses all State Parks within southeastern California, including Anza-Borrego Desert and its rich late Tertiary and Quaternary marine and terrestrial vertebrate paleontological record.

George earned his undergraduate and masters degrees in geology and paleontology at the University of California, Riverside, finishing in 1968. Research interests have centered on Plio-Pleistocene vertebrate faunas of the American southwest. For much of his professional career George was head curator of the Rancho La Brea collections at the Page Museum in Los Angeles. He left the big city for Borrego Springs in 1993, and now heads up the paleontology program out of the District Stout Research Center.

In an attempt to determine the age and depositional environment of a newly discovered terrestrial fossiliferous horizon that appeared to predate the Fish Creek Gypsum, George began a study of the Miocene stratigraphy of the western Salton Trough. Coming from completely different approaches, he and Dave Peterson have reached the same conclusions concerning the origin of the Fish Creek Gypsum.

## UPCOMING 2000 MEETINGS:

November 15	Tim Smith (UCLA), Crustal-Mantle Evolution on Mars: Paleo Plate Tectonics? Meeting Location: TBA
December 20	Tom Deméré, San Diego Natural History Museum Paleontology Update, Scholarship announcements and SDAG elections.

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Please consider becoming a Corporate Sponsor of SDAG. In addition to monthly recognition for your contribution, you will be entitled to a free internet "link" from the SDAG Website, and we plan to list our sponsors at the front of the SDAG Field Trip Volume.

## ANNOUNCEMENTS:

**The 7th Dibblee Medal**, presented on the Palos Verdes Peninsula AAPG Field Trip on June 17, was conferred by 88-year old Tom Dibblee on **Dr. Thomas A Steven**, who retired from the USGS in 1985 after a 43-year career.

Dr. Steven's 170 publications, some comprehensive Professional Papers, include more than 40 geologic maps. Steven's legacy is real: outstanding productivity of high quality publications. Dr. Steven is a Fellow of the Geological Society of America and the Society of Economic Geologists, received the Dept. of Interior Meritorious Service Award, and is past president and honorary member of the Colorado Scientific Society. Tom and his wife Grace reside in Lakewood, Colorado, continuing his research on the late Cenozoic geomorphic history of the southern Rocky Mountains. Dr. Steven was grateful for being chosen as a medallist by the Dibblee Foundation, and especially to have Dibblee present the medal. Tom summed up his feeling about mapping with "Good geologic maps are the basic data sources and the primary interpretive media for much of our science".

**SDAG NEWSLETTER GOING DIGITAL!** Beginning with this issue, the monthly newsletter will be transmitted via e-mail to all members (for whom we have email addresses). You will need the Adobe

Acrobat Reader to open it, but that is freely available for download (at [www.adobe.com](http://www.adobe.com)). If we don't have your e-mail address, please provide it to Bob Stroh ([rstroh@ninyoandmoore.com](mailto:rstroh@ninyoandmoore.com)). Starting in January 2001, SDAG will offer the newsletter by e-mail as the primary means of distribution, reducing the postal mailing list as much as possible. This will allow us to control costs (as mailing costs are our largest expense), freeing up more funding for field trips, scholarships, publications, and keeping membership dues low. It's also faster, with the same publication quality that SDAG members have come to expect. You will have an opportunity to specify e-mail distribution on your membership form for 2001, or if you prefer, to continue with a hard copy mailing.

**TREASURER WANTED!** SDAG is now accepting nominations for Treasurer for the 2001 term. This is typically a four-year commitment, as officers usually "move up the ladder" on an annual basis, serving as President in their fourth year on the Executive Committee. As always, the election will be held in conjunction with the December meeting at the Natural History Museum. If you are interested, please contact Greg Cranham.

**Visit Trona**, the "Gateway to Death Valley"! The Searles Lake Gem & Mineral Society presents the annual Trona weekend on October 14-15, 2000. In addition to mineral exhibits and sales, popular events include collecting rare evaporite minerals on the Searles dry lake bed. For information, contact Bonnie Fairchild at (760) 372-5356, or visit [www.iwvisp.com/](http://www.iwvisp.com/).

**Mineral Collectors' Workshop** at Barstow's Desert Discovery Center, Saturday, October 21, followed by a field trip on Sunday. The technical program includes talks on borate minerals, minerals of California and Nevada, and the stratigraphy and mineralogy of Searles Lake. The field trip will visit the Copper World Mine and Mohawk Mine. The Desert Discovery Center is located at 831 Barstow Road. Call (760) 256-2324 for more information. Hosted by the Friends of Mineralogy, Southern California chapter.

**REGISTER FOR THE GSA ANNUAL MEETING:** The GSA Summit 2000 Meeting will be held in Reno, Nevada, November 8 - 18 (technical sessions will be held November 13 - 16). On-site registration rates will be \$75 more for professionals and \$30 more for students. Go to [www.geosociety.org](http://www.geosociety.org) for more details on how to register.

**The San Diego Natural History Museum** is pleased to present the following program that may be of interest to you.

*Faults, Folds, and Foliation: Geology in San Diego's Desert*

Leaders: Don Albright and Pat Flanagan

Sunday, October 29; 7:30 a.m.-6 p.m.

SDNHM Member \$69; Nonmember \$79

This one-day van excursion takes you to one of the most geologically diverse locations in North America. See San Diego and Imperial Counties' spectacular desert geology from the Desert View Tower. Then examine the desert's most recent fault rift. You will trace and examine portions of the San Jacinto and Elsinore faults and visit multicolored, deformed, and fossiliferous rock formations in Painted Gorge and Shell Canyon.

To register for this or any of the Museum's programs, please call the San Diego Natural History Museum's Education Department at (619) 232-3821, ext. 203.

**Los Angeles Basin Geological Society** The next meeting of the LABGS is on Thursday, October 19, at 11:30am. The speakers are T. Davis and J. Namson. They will speak on Fold and Thrust Structure and Exploration Concepts Along the Southwestern Margin of the San Joaquin Basin, California.

**SDAG Mountain Biking** Are you interested in forming an SDAG mountain biking club? If so contact Mike Hart at [mwhart@AOL.com](mailto:mwhart@AOL.com) or call 858.578.4672.

**SDAG website:** Carolyn Glockhoff continues to update and manage our ever-evolving website. If you haven't yet seen this excellent and useful resource, check it out at: [www.znet.com/~sdag](http://www.znet.com/~sdag). Also, send the URLs of your favorite geology sites to Carolyn ([carolion@aznet.net](mailto:carolion@aznet.net)) for listing on the Geologic Links page.

**Thanks to Lowell Lindsay** and Sunbelt Publications for housing the SDAG Library and Archives. Any SDAG member may peruse our collection of past SDAG field guide volumes as well as a complete collection of California Geology magazines back to 1971. You are welcome to stop by during business hours at 1250 Fayette Street in El Cajon, or call (619) 258-4911 to set up an appointment (especially for after-hours or weekend research).

**Call for Book Proposals:** Geology guidebook proposals are being accepted by Sunbelt Publications, a regional trade publisher of general interest natural science and travel books about the Californias. The model format for geology books is that of Pat Abbott's recently released "Rise and Fall of San Diego: 150 Million Years of History Recorded in Sedimentary Rocks" (6"x9", B&W photos, illustrations, maps, color cover.) Sample topical areas are: the Los Angeles region, northern Baja, Coachella/Imperial Valleys (Salton Trough), southern California coast and inland valleys, and mountains of the Inland Empire (San Bernardino and San Jacintos). Field identification guides, specific to the Californias, would also be of interest (e.g., Rocks and Minerals of Southern California, Illustrated Guide to Geologic Structures of the California Deserts). Further information is available via e-mail: [lindsay@sunbeltpub.com](mailto:lindsay@sunbeltpub.com).

**South Coast Geological Society (SCGS):** The SCGS usually meets on the first Monday of every month, in Orange County. For more SCGS information, visit their new website at: [www.southcoastgeo.org](http://www.southcoastgeo.org), or contact this year's SCGS President, Bill Goodman at (949) 442-2442.

**Geology Terms in English and Spanish-** Although author and former SDAG member Henry Aurand passed on just prior to publication of this new book, his legacy lives on through the designation of all royalties to the SDAG scholarship fund. In addition to bookstores and on-line ordering, the book is available from GSA at a member discount. <http://www.geosociety.org>.

**The Gordon Gastil Endowed Scholarship Fund** continues to seek donations of any amount. Gifts of \$ 500.00 or more will be recognized on a plaque to be placed in the remodeled Geology Building. Donations can be sent through SDAG, or contact Pia or Marie, Department of Geological Sciences, SDSU, at (619) 594-5586.

**For all of those SDAG Members who have NOT renewed** their membership (indicated with an **exp** next to the address) this will be your last newsletter (until you renew).

## **EARLY FIRST CALL FOR PAPERS:**

This is to announce that the 2001 San Diego Association of Geologists (SDAG) volume theme, associated with the annual field trip, will be **Engineering Geology of San Diego County – A Technical Addendum to Pat Abbott's Rise and Fall of San Diego**. The Field Trip chair will be Bob Stroh, Vice President (elect?) of SDAG.

**OVERVIEW:** The field trip is tentatively scheduled for September, and will focus on San Diego County. The trip will look at the geology of the region, including faults, landslides and unique features. There will be an emphasis on engineering geology. At this point, I welcome any additional ideas for topics.

**PAPERS:** All papers (of any length) relating to the geology, tectonics, sedimentology, geomorphology, hydrology, hydrogeology, or engineering aspects of these regions are welcome. If you are interested in writing or submitting a paper for the field guide, please contact Bob Stroh (see newsletter header for contact info).

**FORMAT:** Text and tables should be provided by 3.5" diskettes in Microsoft Word or text format, with an identical hard copy included. Final page size will be 6" x 9", with black and white illustrations, photographs and tables. Illustrations should be print quality and camera-ready hard copy, legible when reduced to 6" x 9" format. Oversize maps will be considered, but this and other issues that may modify the volume should be discussed with the General Editor in advance. Photos may be color prints or slides, but black and white originals typically result in a higher quality print in the final volume.

For guidance on matters of style and composition, consult the *U.S. Geological Survey Suggestions to Authors* (now in its 7<sup>th</sup> edition), and/or the *Chicago Manual of Style* (now in its 4<sup>th</sup> Edition). For technical matters, it is anticipated that an informal peer reviewer will read a draft of each paper and provide comments and suggestions to the author(s).

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