

Bulletin of the Mineralogical Society of Southern California

Volume 76 Number 12

December 2006

The 826th Meeting of The Mineralogical Society of Southern California

**"Growth of the Fallbrook Gem and Mineral Society Museum
and Better Museums to Come"**

by Garth Bricker and John Watson

Friday, December 8, 2006, at 7:30 p.m.

**Geology Department, E-Building, Room 220
Pasadena City College
1570 E. Colorado Blvd., Pasadena**

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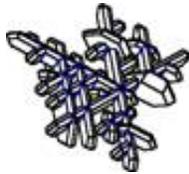
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December Meeting to Explore the Fallbrook Gem and Mineral Society Museum

Garth Bricker and John Watson will speak at the December 8, 2006, meeting at 7:30. Their presentation "Growth of the Fallbrook Gem and Mineral Society Museum and Better Museums to Come" will trace the FGMS Museum's growth from the beginning to the present, and then explain plans for the museum's future expansion will be explained. Come and learn more about this society-sponsored museum that is known for its exhibits of minerals from throughout the world and its special San Diego County mineral displays.

Garth Bricker is the FGMS Museum curator. He has been with the FGMS since 1960, serving as its representative to CFMS for a number of years and as FGMS president for six terms. The 1990 Tucson poster was wulfenite Garth dug at the Red Cloud mine, which was photographed and submitted by the Van Pelts from an article he and Pete Bancroft submitted to the Mineralogical Record. Of the eight new minerals Gene Foord, Tony Kampf and Bob Housley have identified for him over 35 years, two are still unidentified and are without a name.

John Watson is the fund raiser and organizer for the future FGMS museum hall. John was FGMS president for a year and spent much of his time in Russia gathering minerals that he displays now in the FGMS meeting room prior to being displayed in the expanded future museum hall. He has taken first place prizes at the Del Mar mineral section of the fair. John went to the Board of Supervisors of San Diego County to secure TOT funds for Society building projects. He will share his enthusiasm for the project utilizing a new Powerpoint presentation. John was instrumental in getting Igor V, Pekov to the US for a tour of important mining areas and to meet American mineralogists.



Minutes of the November 17, 2006, Meeting

The 825th meeting of the Mineralogical Society of Southern California was held on Friday, November 17, 2006 at Pasadena City College. President Ilia Lyles brought the meeting to order at 7:30 p.m.

She then introduced the speaker of the evening, Howard Brown, who gave a presentation entitled: "Geology, Mining and Fluorescent Minerals at the White Knob Limestone Quarry, Lucerne Valley, CA." Mr. Brown has extensive mining industry experience, has been involved in numerous mineral evaluation projects, is the author of many published papers on a variety of geologic topics, and is currently

responsible for exploration, evaluation, reclamation and related activities at six Omya limestone operations in California, Arizona and Washington.

During his presentation, Mr. Brown displayed a generalized geologic map of the Lucerne Valley and discussed the formation of the white crystalline limestone deposits. He revealed the surprising facts that \$200 million in annual sales were generated by the 1,000 direct employees who worked in the Lucerne Valley mining area. He then described the manufacturing processes and equipment used to crush the "big rocks" of calcium carbonate to powder form, to meet the color and particle size requirements of customers. He also set forth the steps involved in reclamation efforts, including the staining of rock piles with a manufactured desert varnish coating.

Of particular interest to MSSC members was Mr. Brown's description of the highly fluorescent (under shortwave UV light) minerals that occur in the waste rock at the quarry. He discussed the various modes of occurrences, as well as specific minerals and their respective display colors under the UV light.

Mr. Brown also brought numerous mineral samples and some shortwave UV lamps to the meeting so that members could experience the wide variety of colorful optical effects displayed by the minerals.

There was no new business. The door prize was won by Mr. Brown. The meeting was brought to a close by President Lyles at 8:50 p.m.

Respectfully submitted,
Pat and Geoff Caplette

January Banquet Preview:

The MSSC's annual banquet will feature Dr. David K Lynch, author of the newly published "Field Guide to the San Andreas Fault." This guide includes numerous excellent photographs of the fault and its features in areas that are unknown to the general public. The talk promises to be a spectacular tour of this important plate boundary from Cape Mendocino to the Salton Sea.

The banquet will be held on Saturday, January 20, beginning at 5:30 p.m. at the Oak Tree Room in Arcadia. A silent auction of mineral specimens and a book purchase and signing opportunity will be part of the social hour activities before dinner is served. Complete details, including how to make reservations, will follow in the January Bulletin. Those wishing to donate specimens for the auction should contact Janet Gordon (626-441-6715).



Banquet speaker Dr. David Lynch will explain why this line of Macomber palms and other oasis greenery in the Indio Hills are growing along the San Andreas fault. Photo by David K. Lynch. Used with premission.

**An invitation for the
Mineralogical Society of Southern California
to attend an open house at
Jewel Tunnel Imports**

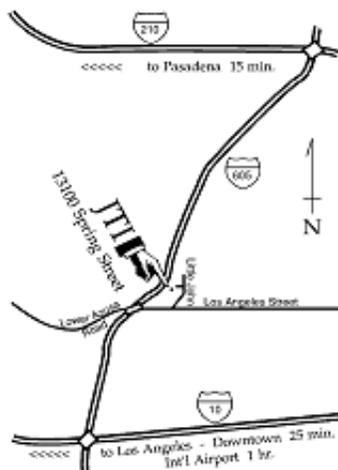
**Saturday, December 9, 2006, 10 AM to 4 PM
13100 Spring St., Baldwin Park, CA 91706
626-814-2257**

**Map available at jeweltunnel.com
Refreshments will be served.**

Jewel Tunnel Imports is a leading wholesale distributor of mineral specimens, crystals, fossils, tumbled stones and many different kinds of lapidary items like balls, eggs, jewelry etc. made from different minerals. We have a warehouse in excess of 10,000 sq. feet full of mineral related natural history items, perhaps the largest of its kind in the United States.

Historically Jewel Tunnel Imports has had limited open house parties for mineralogically and geologically oriented groups such as the students and faculty of various university geology departments and members of certain gem and mineral societies. These open houses, by invitation only, on a few weekends just preceding Christmas, offer a chance for individuals belonging to these groups to buy minerals and crystals at wholesale prices and to learn something about the wholesale gem and mineral business.

The owner of Jewel Tunnel (Rock Currier) is also interested in learning about new sources of mineral specimens and has been known to buy and trade such items. He is a micromounter and always interesting in trading for good micromount material not represented in his collection.



Basic Concepts about Ore Deposits (That Every Mineral Collector Should Know) Part 4

by Janet Gordon

Secondary enrichment of ore deposits-

Many of the ore deposits discussed in previous Bulletins can be enriched by secondary processes, reactions that take place after the main ore formation event. This additional concentration of desired chemical elements is often what makes a deposit economic. A good example of a secondary process that produces many minerals of interest to collectors and miners alike is the enrichment of copper porphyry deposits (discussed on the October Bulletin).

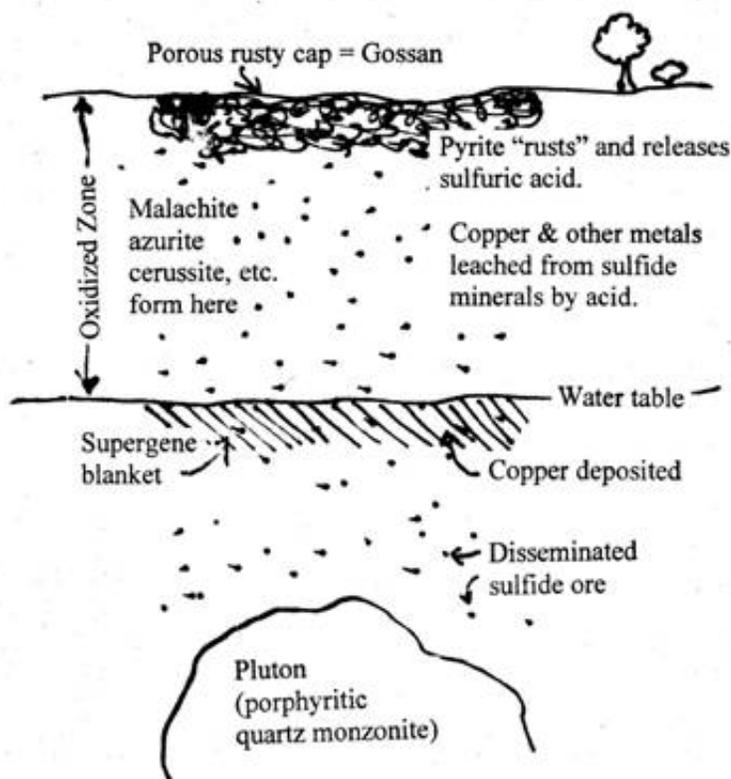
Envision that a hydrothermal system that deposited sulfide minerals such as pyrite, chalcopyrite, molybdenite, galena, and sphalerite as small disseminated blebs in the rock has cooled off. Also some of the overlying rock has been eroded away so that sulfide minerals are now near the surface. If we add a ground water system to the picture, as in the cartoon on the next page, we now have a natural factory for further concentrating copper.

The groundwater system basically has two parts separated by the water table. Below the water table all the pores and cracks in the rock are completely filled with water. Above the water table, water percolates through the cracks and pores of the rock after a rain and eventually reaches the water table, but most of the time these spaces are filled with air. This region is known as the oxidized zone.

Pyrite is the most abundant sulfide mineral in these and many other deposits, and it reacts more readily with water and the oxygen in the air and water in the oxidized zone than the other sulfides minerals. A possible reaction as the water percolates by pyrite grains is



The Fe^{2+} and SO_4^{2-} are ions dissolved in the water. The liberated iron is free to react with more oxygen and become rust. This produces a very rusty zone at the top of the deposit known as an “iron hat” or “gossan.” The sulfate ion (SO_4^{2-}) becomes available to combine with other chemicals and make sulfate minerals such as gypsum, barite, and anglesite. But the big player is the sulfuric acid (H_2SO_4), which is now available to attack more pyrite and the other sulfide minerals. This in turn produces more sulfuric acid and very low pH environments that are capable of doing in the most resistant sulfide minerals. The acid also produces holes in the rock with room for crystals to grow.



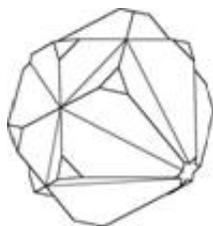
Cartoon of a copper porphyry deposit in cross section showing the main components of the secondary enrichment process.

More metals now become available to form minerals in the oxidized zone. Copper liberated from chalcopyrite can form malachite, azurite, cuprite, and native copper. Galena releases lead to form cerussite or anglesite, zinc from sphalerite can form smithsonite or hemimorphite, molybdenite adds wulfenite to the list of possibilities, and the list goes on and on.

The formation of these oxidized minerals is great for the mineral collector, but it is not what the economic geologist is after. The economic geologist is interested in what happens to the copper ions liberated from the chalcopyrite (CuFeS_2) that dribble all the way down to the water table without reacting in the oxidized zone.

Below the water table conditions are no longer oxidizing. Under these conditions copper sulfides are less soluble than most other common sulfides, consequently the copper ions can replace the iron in pyrite and chalcopyrite as well as the zinc in sphalerite to form minerals such as chalcocite (Cu_2S) and covellite (CuS). Both of these new minerals have greater concentrations of copper than chalcopyrite, and if enough copper removed from the oxidized zone and makes it to below the water table, a copper-rich zone called a supergene blanket forms. This is the prime target of many copper mining operations, and its richness and extent can determine if a deposit is economic.

The same process that produces great mineral specimens in the oxidized zones of mineral deposits can have serious environmental consequences. Wherever pyrite is exposed to air and water by mining, sulfuric acid is produced. If there is sufficient time and pyrite, extremely acidic mine water can be the result. Think about how many historic abandoned mines there are through out the western United States where water is flowing through tunnel and rain is falling on pyrite-laden dumps. The acid run-off from these sites has polluted many a mountain stream. Clean-up has begun, and today's mining operations must prevent this type of pollution, but it is part of the mining legacy that will be with us for a long time to come.



Field Trip: A Glowing Success

On a near perfect November day, MSSC members met geologist Howard Brown at the Omya, Inc. offices in Lucerne Valley for a brief orientation before heading to collect in the White Knob limestone quarry. The orientation included an interesting video showing how high purity limestone is processed for food and pharmaceutical use.

The group then proceeded to the quarry where collecting was allowed in three areas. Most of the time was spent inspecting the contact areas where reaction between the limestone and the country rock produced wollastonite, diopside, and garnets. Kevin Brady helped everyone in the group check for fluorescent minerals by huddling under his small portable black "tent" with his UV light and a seemingly endless supply of rocks to appraise. The limestone is recrystallized into beautiful coarse-grained white marble, and most collectors could not resist taking some of this rock home. Large rhombs of pale blue calcite were also collected.



Geologist Howard Brown explains features of the White Knob quarry to field trip participants.
Paul Gordon photo.



A young collector hard at work at the White Knob quarry.
Paul Gordon photo.

The last stop was at a dump area where scrap rock of interest to collectors had been stockpiled. Crystals of pyrrhotite, pyrite and other sulfides were collected, as well as more contact metamorphic minerals, some of them spectacularly fluorescent.

The trip concluded with a stop back at the office to check the newly collected fluorescent minerals in a dark room. The show was spectacular! The participants wish to thank Howard Brown and Omya, Inc. for their hospitality, and field trip chairman Jim Imai for arranging the trip.

Mineral Donations Requested for Micromount Conference

Gene Reynolds reminds conference participants to bring mineral specimens of any size for the "give away table." He will be ready to receive them as he sets up the table on Saturday morning. All specimens need to be labeled. [Get conference poster here.](#)

Mineral Stamps for the Holidays!

This bulletin is being mailed with the latest issue of US postage stamps to feature a mineral. At last December's meeting, Dr. Kenneth Libbrecht of Caltech wowed MSSC members with a fascinating lecture on snowflakes. His books "The Snowflake: Winter's Secret Beauty" and "The Little Book of Snowflakes" were noticed by the USPS, and they have issued four stamps based on his photographs. Reportedly 1.5 billion snowflake stamps will be fluttering through mail.

Welcome to the New MSSC Bulletin Editor

As retiring bulletin editor I have the pleasure of welcoming Shou-Lin Lee as the new editor. She is taking over with the January issue, and I urge all members to help her in this task. Support her by contributing to the Bulletin! Remember that she is the editor, not the writer. Committee chairs need to submit copy to her that is ready to publish. Members need to send in mineral articles, photos, reports and short notes that would interest fellow members. Mineral-related paid advertising is welcome. It is the Society's Bulletin, and it will only succeed if many members participate.

I would like to thank those who have contributed to the Bulletin during my tenure as editor. Steve Knox, Walt Margerum, Rock Currier, Justin Butt, Bob Housley, Charlie Crutchfield, Bill Moller contributed articles. Secretaries Ilia Lyles and Pat and Geoff Caplette sent me the minutes in a timely fashion. Jim Kusley worked with me to get speaker information together. Carolyn Seitz sent leads for interesting items. Paul Gordon, Steve Knox, Herman Ruvalcaba and others have provided photographs. Hopefully these contributors will continue and more will join this team effort.

I have enjoyed serving as editor for the last three years, but the time has come to do other things. As your new vice president, I look forward to arranging for meeting speakers and I welcome your suggestions.

Janet Gordon

2006-2007 Calendar of Events

December 2-3 Orangevale, American River Gem & Mineral Society, Orangevale Grange, 5805 Walnut Ave. near Madison Ave. Hours: 10-5 both days. Evelyn Tipton (96) 372-3452, ektipton@charter.net.

December 9, MSSC Open House at Jewel Tunnel Imports, 13100 Spring St., Baldwin Park, Sat. 10-4, 626-814-2257, jeweltunnel.com.

January (all month), Quartzsite, Arizona, see Quartzsite Area Chamber of Commerce web site for multiple show details: www.quartzsitechamber.org.

January 12-21, Laughlin, Nevada, Cloud's 6th Annual International Rock, Gem, and Jewelry Show, Don Laughlin's Riverside Resort Hotel & Casino, www.cloudsjamboree.com.

January 20, MSSC Annual Banquet, Oak Tree Room, Arcadia. Festivities start at 5:30 p.m. Dr. David K. Lynch will present new views of the San Andreas Fault.

January 26-28, Pacific Micromount Conference, San Bernardino County Natural History Museum. Details in this and previous bulletins. Contact Walt Margerum, wmargerum@sbcglobal.net, 310-324-1976. [Get conference poster here.](#)

January 27-February 10, Tucson, Arizona Mineral and Fossil Show, Five locations: Quality Inn-Benson Hwy, Clairon Hotel, InnSuites Hotel, Ramada Ltd, Mineral & Fossil Marketplace, Details at www.mzexpos.com.

February 8-11, Tucson, Arizona, Tucson Gem and Mineral Show: "Australia-Minerals from Down Under," Tucson Convention Center, www.tgms.org.

February 16-25, Indio, San Geronio Mineral & Gem Society, Riverside Co. Fair & National Date Festival/Gem & Mineral Building #1, 46-350 Arabia St., Hours: 10 a.m.-10 p.m., Bert Grisham (951) 849-1674.

March 2-4, Hayward, Mineral & Gem Society of Castro Valley, Centennial Hall at 22292 Foothill Blvd., Hours: Fri. & Sat. 10-8, Sun. 10-5, Larry Ham (510) 887-9007, info@mgscv.org.

March 3-4, Arcadia, Monrovia Rockhounds, Los Angeles County Arboretum & Botanical Garden, 301 N. Baldwin Ave., Hours: 9-4:30 both days, Jo Anna Ritchey, j.ritchey@verizon.net, www.morocks.com.

March 3-4, Ventura, Ventura Gem & Mineral Society, The Ventura Gem Show: Gems, Minerals, Lapidary Arts, and Fossils, Seaside Park, Ventura Co. Fairgrounds, 10 W. Harbor Blvd., Hours: Sat. 10-5, Sun. 10-4. Ed Clark (805) 983-0028 clarkoe@aladelphia.net.

March 10-11, Turlock, Mother Lode Mineral Society, Stanislaus Co. Fairgrounds,

Hours: 10-5 both days, Bud & Terry McMillin (209) 524-3494
 terry.mcmillin@yahoo.com.

March 17-19, Bakersfield, San Joaquin Valley Lapidary Society, Indoor Show/Outdoor Tail Gate, 5th Annual Rock & Mineral Rendezvous, Kern County Fairgrounds, Hours: Fri. 9-8, Sat. & Sun. 9-5, Lewis Helfich (661) 872-8230 or (661) 323-2663.

TUCSON 2007 . . . JAN. 27 - FEB. 10 (Sat. - Sat.)
 Open 10 to 6 Daily (except Sat., Feb. 10th only, 10 to 5)

ARIZONA MINERAL & FOSSIL SHOW

5 Easy to Find LOCATIONS

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- **InnSuites Hotel - Downtown** - 475 N. Granada Ave., at St. Marys
- **Ramada Ltd. - Downtown** - 665 N. Freeway, at St. Marys
- **Mineral & Fossil Marketplace** - 1333 N. Oracle, at Drachman

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