

**THE 763rd MEETING
OF
THE MINERALOGICAL SOCIETY
OF SOUTHERN CALIFORNIA**

**Annual Picnic and Mineral Swap
Sunday, August 19, 2001**

**at the
Arcadia Woman's Club
324 S. First Avenue
Arcadia, California**

Time 3:00 to 7:00 PM

**With a Talk By
Rock Currier
on
Recent Experiences in China**

ANNUAL MINERAL SWAP AND PICNIC

**SUNDAY AUGUST 19TH
ARCADIA WOMAN'S CLUB**

Our annual mineral swap and picnic will be held indoors this year in a very nice air conditioned place where it was held once before a few years back. The event begins at 3:00 p.m. and will end at 7:00 p.m. All members who attend are asked to bring some sort of main dish, salad, or dessert to share. I will be bringing a large pot of my Texas Chili to share as before as well as an appetizer tray that will be out at 3:00. Bring your own beverages of any type for yourself, and alcohol is allowed at this location since it is a private club. We will supply ice, cups, utensils, plates and napkins. Please bring your own serving spoon for your dish. Mineral Swap will be ongoing from 3-7, with Potluck dinner beginning at 5:00 p.m. I would like a few members to volunteer to help me put up tables and chairs at 2:45 and take them down again at 7:00, and to also help me clean up any mess we have made.

The program by Rock Currier will be a slide presentation on China and his experiences there as a mineral dealer looking for minerals and crystals. It will also contain pictures of the beautiful country in Guilin and the amazing Karst topography of the region. It will also show pictures showing the explosive growth now taking place in China.

The city of Changsha in Hunan state is the center of Chinas mineral specimen trade much as El Paso, Texas used to be the center of the Mexican mineral trade. China today is probably the most prolific country of the world today (the hottest place) in terms of producing mineral specimens of interest to collectors. You will learn first hand about this specimen trade and see slides of the lead mine in Guilin that has recently produced such a quantity of good pyromorphite specimens.

The Arcadia Womans Club is on the Northeast corner of Diamond and First in the City of Arcadia. Take the Huntington Drive exit on Interstate 210. Go South West on Huntington until you reach First Avenue. Turn Left (South) on First, and travel a short way to DIAMOND where there is a four way stop. The Womans Club is on the Northeast (left) corner of First and Diamond, but turn LEFT onto Diamond and park on the street. Enter the building on Diamond. There is a sign in front of the Womans Club on First Ave that also includes the address. Any questions? Please call Cathy Casey at (626) 358-7628 or email me at caseyscurios@earthlink.net. I look forward to seeing you all there for a GREAT afternoon.

THE IRON OXIDE "RUST" MINERALS

by Charlie Crutchfield

There are eleven minerals known to date that are composed essentially of the elements: Iron, Oxygen, Hydrogen, and water of crystallization. Some of this group are fairly common, easily recognized, and furnish good desirable specimens for the collector. They are hematite, magnetite, limonite, goethite and [maybe] lepidocrocite, although I do not remember seeing any specimens of the last at shows or in stores. The other six akaganeite, bernalite, feroxyhyte, ferrihydrite, maghemite, and wustite are quite rare as specimens, and identification requires laboratory tests, such as X-Ray diffraction or [for maghemite] Mossbauer spectroscopy. This is no great loss to the average collector, since they are rather dull and uninteresting and are not [yet] found as attractive specimens. Several of these six may be actually quite common and widespread, but are present only as thin coatings on soil particles, finely dispersed in clays, etc. For some, the properties are often poorly known. They look like various colors of iron rust, which is exactly what they are.

Many of their properties are similar, and some have an annoying tendency of changing irreversibly from one mineral species to another depending on the temperature, moisture, and exposure to Oxygen [air]. In the same mineral the color can vary from yellow to orange, red, brown, or black, depending on the habit or

state of division. The hardness and density may also vary. Most of these minerals occur in several habits; crystalline, granular, earthy, or ocherous. This group also tends to occur as a mixture of several members in intimate contact and as inclusions. To keep life interesting, some, notably goethite, are often found as pseudomorphs after other Iron minerals. The field properties of most use are the crystals [if present], habit, streak, hardness, and the response to a magnet. Many of this mineral group are of considerable technical interest as they are stages in the oxidation [rusting] of iron metal. Identification of the particular compound[s] in a corroded [rusted] iron article can furnish useful information on the conditions causing the corrosion. In fact, some of these were discovered in the laboratory before they were found in nature.

Akaganeite $b\text{-Fe}^{3+}\text{O}[\text{OH}]$ or $b\text{-Fe}^{3+}\text{O}[\text{OH},\text{Cl}]$

Tetragonal ? Monoclinic?

H = ? D = 3.0 - 3.6; Magnetic: ?

Color: Brown, rust brown, yellowish brown

Streak: Brownish - Yellow

This is found in some soils, in brines, and in sea-floor nodules. Also in a few mines usually with pyrrhotite, goethite, and hibbingsite, by corrosion of the former. Also as corrosion products of some meteorites. The habit is massive to earthy and powdery, existing as microscopic [5 mm] rods. It is semi-transparent with adamantine to metallic luster. Akaganeite strongly resembles limonite, so it may be confused with this, and may be more common than it is thought to be. No attractive specimens are known. It is a polymorph of goethite, feroxyhyte, and lepidocrocite. Common in iron rust. On the web see Treasure-troves.com/chem/Akaganeite,

and for a photo, www.adamsminerals.com/g/ak.jpg

Bernalite $\text{Fe}[\text{OH}]_3 \cdot n\text{H}_2\text{O}$ [n=0.0-0.25]

Orthorhombic [pseudocubic]

H = 4 D=3.32 - 3.35; Magnetic: ?

Color: Dark bottle green - yellow green

Streak: Pale apple green

Transparent to opaque [due to goethite inclusions] with vitreous, adamantine, resinous luster. Very rare, for several years it was known only as a single specimen in a museum in NSW, Australia, mixed with goethite and coronadite. The habit in this specimen is flattened pyramidal, pseudo-octahedral crystals up to 3 mm in size. Recently bernalite was found in a mine in Oberwolfach, Germany. None of the

references I found state whether it is or is not magnetic, it probably isn't.

Feroxyhyte $d\text{-Fe}^{3+}\text{O}[\text{OH}]$

Hexagonal

H = ? D = 4.20; Strongly magnetic

Color: Brown - yellow brown, Opaque

Streak: Yellow

A polymorph of akaganeite, goethite, and lepidocrocite. It is found in deep-sea Fe-Mn nodules, i.e. at high pressures, and low temperatures as minute opaque acicular crystals and thin plates. On exposure to air and ambient conditions it transforms rapidly and spontaneously to its polymorph, goethite. It is also found in some soils as minute thin plates mixed in clays and in the ancient slag at Laurium, Greece.

Photograph: www.comune.pisa.it/apsn/Articoli/Scorie/Feroxyhyte.htm, also treasure-troves.com/chem/Feroxyhyte.htm

Ferrihydrite $\text{Fe}_{4-5}[\text{OH},\text{O}]_{12}$ or $5\text{Fe}_2\text{O}_3 \cdot 9\text{H}_2\text{O}$

Hexagonal

H = ? D = 3.80 - 3.96; Magnetic ?

Color: Yellow to dark brown

Streak: Yellowish-brown

The habit is ocherous and massive, it is found as aggregates of opaque minute [50 micron] spheres. Ferrihydrite is actually widespread in soils, weathered rocks, precipitates in hot and cold springs, and in acidic mine effluent. As a specimen, a very rare mineral.

Photograph: www.comune.pisa.it/apsn/Articoli/Scorie/Ferrihydrite.html

Goethite $a\text{-Fe}^{3+}\text{O}[\text{OH}]$

Orthorhombic

H = 5.55 Density = 3.3 - 4.3; Never Magnetic

Color: Black-red-brown -yellow often with iridescent tarnish

Streak : Orange -brown - yellow

As prismatic crystals, vertically striated, usually in rounded forms with fibrous or concentric structure radiating from the center, as concretions, earthy, or powdery, or pisolitic. Crystals are prisms or tabular with perfect cleavage. It is nearly opaque, the luster varies: adamantine-metallic-earthy-dull to silky when fibrous. It is a polymorph of akaganeite, feroxyhyte, and lepidocrocite. Most "limonite" is actually goethite and/or lepidocrocite. Goethite is a very common mineral. It often forms pseudomorphs after other iron minerals. In the Bristlecone Pines Monument and the Champion Andalusite mine in the White Mtns., Inyo Co. CA. excellent pseudomorphs after pyrite are common, some show the pyrite diploidal striations. The habit, streak, and [when present] iridescent tarnish help identify goethite.

Hematite a- Fe_2O_3

Hexagonal

H= 5-6 Density = 5.26; Never magnetic

Color: Steel-gray, bright red - dark red

Streak: Cherry-red - reddish brown

Very varied habit, hexagonal plates, micaceous, reniform. It is opaque with metallic -submetallic to dull earthy luster. A very common mineral, the streak "Rouge" is very characteristic .

Lepidocrocite g- $\text{Fe}^{3+} \text{O}[\text{OH}]$

Orthorhombic

H = 5 Density 3.8 - 4.0; Not Magnetic

Color: Red, red-brown, yellow-brown

Streak: Dull orange

It is usually found massive, bladed, micaceous, fibrous, powdery. Crystals are rare, as thin scales. Small fragments are transparent, with sub-metallic luster. Lepidocrocite is usually found with goethite and as a component of "limonite". It is a polymorph of akaganeite, goethite, and feroxyhyte. It may be the most common component of ordinary rust. It is formed when a material rusts under water. The "Iron" stain that forms under dripping water pipes is lepidocrocite. Specimens for collectors are rare, I have never seen any.

Limonite ca. $\text{HFeO}_2 \cdot n\text{H}_2\text{O}$

Crystal: None

H= 4 - 5.5 Density 2.7 - 4.3; Not magnetic

Color: Yellow, orange, red, brown, black

Streak: Yellow - brown

"Limonite" is a catch-all name for hydrous ferric oxides of unknown identity. Habit: Stalactitic, mammillary, ocherous, earthy, and "varnish" on some rocks. It is always found with goethite, and often as pseudomorphs as is goethite. Frequently "limonite" is a mixture of goethite and lepidocrocite. If a specimen has a yellow-brown streak, and a fibrous internal structure, it is probably goethite. Massive limonite and goethite cannot be distinguished without laboratory methods, e.g. XRD.

Maghemite $\gamma\text{-Fe}_2\text{O}_3$

Isometric

H= 5 Density 4.8 - 5.2; Very Magnetic

Color: Brown-Yellow

Streak Brown - Yellow

It is nearly opaque with a dull luster. Maghemite is very common and widespread in very small amounts. Crystals are very rare, they occur as minute octahedra and acicular overgrowths. It is usually massive, and is often an alteration product on the surface of magnetite. The yellow pigment in soils is usually maghemite, and it is a major component of yellow iron rust. Maghemite is not only strongly magnetic as is magnetite, it is also said to sometimes be a magnet itself, attracting iron filings as does "Lodestone." It occurs with hematite at the Iron Mtn. mine, NW of Redding, CA. The yellow-brown coating on some weathered magnetite specimens may be maghemite. Synthetic maghemite is the active component in many recording tapes and floppy disks. It is extremely difficult to identify and distinguish from magnetite, even the XRD pattern of magnetite and maghemite are identical, thus an exotic method such as Mossbauer Spectroscopy is required.

Magnetite $\text{Fe}^{2+}\text{Fe}^{3+}_2\text{O}_4$

Isometric

H = 5.5 - 6.5 D = 5.1 - 5.2; Very Magnetic

Color: Brown-black-gray Streak: Black

The luster is metallic, sub-metallic, to dull. Crystals are octahedral with no cleavage. It can also be granular, or massive. Magnetite is very common and widespread, such as in beach sands. Magnetite is always attracted to a magnet, and in some varieties [Lodestone] it is a magnet itself. That is, it will attract iron filings or pins to itself. Maghemite is said to be the only other mineral with this

property. Identifying properties are: magnetism, crystal habit, and streak.

Wustite $\text{Fe}^{2+} \text{O}$

Isometric

H = 5-5.5 Density 5.74 - 6; Very magnetic

Color: Grey - black- brown

Streak: Black

Opaque, metallic luster. It is found as crusts, massive, in some meteorites, from alteration of other iron minerals at high temperatures, some iron-bearing basalts. Always found with other Iron oxides and sulfide minerals.

MINERAL NEWS

Rock Currier

A new mine in China is producing a lot of azurite and I think we can expect to see a lot of it on the market place soon. The exact locality is not known yet to the best of my knowledge. Some dealers are calling it from the Daye copper mine in Hubei province but that is not correct. Others are calling it from Guandong provenience in order to send competitors on a wild goose chase. This material is so abundant that some local paint companies are buying it to make blue paint. The Daye copper mine is better known for the specimens of tabular apophyllite that it produces. They also find inesite specimens there, some associated with amethystine quartz crystals and the new mineral Hubeite.

Chile is again producing a few things. Mostly atacamite from the Mina Farola near Copiapo. A lot of about 1000 pounds recently came out and we can expect to see a fair amount at the Denver show.

I heard of a mining prospect in Argentina that has produced a few crystals of covellite up to about a quarter inch and a little bit of it is on sulfur. I have not seen any of this material and the number of specimens is very small because the locality is only a prospect and until the place is worked as a mine there will not be much production from this place.

Apparently Charcas, San Luis Potosi in Mexico has produced a few specimens of danburite crystals associated with citrine. I have seen pictures of two of these specimens. One was a large hand size specimen.

COLLECTOR'S NOTES

Crystal Hill

Crystal Hill is not widely written about although it is widely known to exist particularly among locals of youthful age. Also, some guidebooks to the Pacific Crest Trail probably mention it. From the parking spot to the area with clear double terminated quartz crystals is one mile along the PCT. The crystals are abundant and sitting in one spot for an hour, people become amazed that they seem to grow out of the ground the longer you stay.

The trail is level and could be rated Easy. I've taken many six year olds and they did just fine.

Zero your odometer at the small village of Fawnskin located on the North Shore of Big Bear Lake. You should be heading east on highway 18 (330 which brought you up the mountain became Highway 18 when it passed the dam at Big Bear)

0 AT FAWNSKIN

2.8 Miles. FOREST SERVICE DISCOVERY CENTER

(buy your discovery pass here if you don't already have one, they are good for all through the San Gabriels, San Bernardinios and San Jacintos. You will continue on Highway 18. Do not cross the lakebed. Signs will say "to Victorville, Lucerne Valley.

10.2 M. HOCOLMB VALLEY turn off and dump. This is out on the north side of the dry Baldwin Lake. There is a much earlier road to Holcomb but that one is before the Discovery Center / Pass this turn which is to the left and proceed briefly further.

10.5 M. BALDWIN LAKE ROAD. This is paved road turn to the right just after the dump road This will take you South along the east side of the dry lake.

11.7 M. VALE ROAD There is a sign for Valle Rd and a **Forestry Road MARKER #2N02 Turn left.**

12.3 M. The road passes between two houses and at the indicated mileage of 12.3 miles total from Fawnskin there is parking area to the left. Park and you will see the Pacific Crest Trail leading north. Take the trail. I'm not great with distances but it is only a mile or less. The trail is level. You will note a large hill to the right of the trail literally covered in white quartz. Sorry you aren't quite there yet. I have walked that other hill and found not one clear crystal. Keep on the PCT until you are literally passing through a shade canopy of pinyon pines. The ground underfoot is getting heavily spotted with chunks of white quartz. Now you are there. Veer directly north (right) about fifty yards cross country to the edge of the drop off. Note the small prospect holes down the dirt slope.

Go get em!

MINUTES OF THE JULY 2001 MEETING

The meeting was called to order about 7:40 by president Dave Smith, who having everyone's agreement decided to conduct our short business meeting before the program. After some general announcements Jim Schlegel made some specific announcements about the Show and went into some detail about the jobs that we will need volunteers to fill. These include besides setup and tear down, manning the door, the MSSC booth, and the kid rock booth. If you will be able to help out with any of these please contact Dave or Jim and sign up for a slot.

We also had some discussion of how to best use the e-mail list that Ron Thacker originally developed and that Walter Margerum and I have been trying to keep current. We now have about seventy current or recent past MSSC members on it. One possibility would be to restrict use to announcements about general MSSC events such as the Show, regular meetings, and the picnic. That way probably no one would be getting e-mail they did not want from us. Another possibility would be to use it announce field trips planned on too short a time frame to be announced in the Bulletin. A third suggestion was to pass on news of general interest to mineral collectors, such as new finds or changing availability of material. I have taken it as an action item to poll the people on the list about their interests and perhaps divide it into separate groups if appropriate.

The other item that was discussed before the program was liability. One of our presenters, Larry Bruce, is an attorney and felt that without an appropriate waiver we could be conceivably held liable just for passing out maps and written locality information. He brought a waiver which everyone in attendance signed. To paraphrase it basically says we are providing geological information only. We are not implying that minerals can be safely or legally collected at the spots described. It is the responsibility of anyone planning to use the information to ascertain those things for themselves. It may provide the basis for a waiver to be used more generally, but that is something the Board will need to discuss.

Making a Field Collectors Forum into the main program was an experiment, but it seemed to go well. There was no shortage of interesting material. If anyone feels strongly pro or con about doing it again in a year or so please let us know.

We started out with a very interesting presentation by Walter Margerum who described a database he has been assembling on Southern California mines and minerals. It now covers four counties and has over ten thousand entries. Besides the basic information on the occurrences Walter includes scanned text and geologic maps when they are available and if he has been to the site digital photos. Thus when he is ready to write an article he has all the necessary information at hand. He also includes specific information on how to recognize the minerals at a site. When he is ready to set out into the field to investigate a location he is able to print out a complete packet of information describing it, including appropriate GPS coordinates.

Walter provided a comprehensive handout describing this database and his procedure in using it. He also offered to make the whole database available to members for the cost of the computer disks. Of course it would require some computer savvy to use it.

Next Ann Meister told us about some of the experiences she and Gus and the Schoettlins had on their recent trip to Brazil with Tony Kampf. They were quite interesting and all very positive. Charley Schoettlin passed around some samples including lovely golden topaz and brazilianite he had acquired, and Ann showed us a very interesting lepidolite pseudomorph after tourmaline that she had self collected.

After that Larry Bruce told us about a spot up near Big Bear Lake where one can easily find small but beautifully sharp and clear quartz crystals perfect for thumbnail mounts. He passed out a write-up with detailed directions. It sounds like a great nearby place to do a little easy collecting in a pleasant alpine environment.

Finally I finished up by describing three place I had been to in the preceding two weeks. One is a totally new locality for druzey datolite to about 3 millimeters in length. It is along Pacific Coast Hiway in Malibu and will be fully described in an article in an upcoming MSSC Bulletin. The second is an almost unknown locality for nicely crystallized barite on and partially coated with druzey quartz near Mount General in the Barstow area. The third was a locality near Barstow that produces abundant blue satin celestine. This one was first described to me by John Jenkins.

After the program lively discussion continued over cookies and Brazilian coffee kindly provided by the Schoettlins until we had to vacate about 10 pm.

Respectfully Submitted by Bob Housley, Secretary

IN MEMORIAM

Long time MSSC member, Dr. Royal Marshall, passed away at Huntington Hospital in Pasadena on June 27, 2001. He was laid to rest at Forest Lawn Cemetery in Glendale. Dr. Marshall is survived by his wife of over 50 years, Cynthia, also a long time MSSC member.

Dr. Marshall moved to Pasadena after completing his PhD at California Institute of Technology, and after serving two postdoctorate fellowships, one in Chicago and one for two years in Switzerland. He was a Geochemist at JPL for eight years before doing private consulting work for the rest of his career.

Dr. Marshall joined the MSSC while in graduate school at Caltech. He was from Minnesota, where he was born on September 18, 1926, and where he met his wife Cynthia, a geologist, at a meeting of the Geological Society of Minnesota.

Dr. Marshall was a prolific field collector and loved attending MSSC meetings and field trips for close to fifty years. Cynthia told me that he was also former President of the MSSC at one time. I enjoyed viewing his collection at his home and buying specimens from him for Grieger's during the 80's. I was especially impressed by the Diopside he had collected at the Harquahala Mine that I believe is in Arizona. I remember a fine lecture he gave on the Solid Solution Series that occurs between the minerals Vanadinite, Pyromorphite, and Mimetite at one MSSC meeting. He had also published papers on the association between these minerals. Dr. Marshall was also a collector of postage stamps and maintained a fine collection of these as well. His presence will be missed in the Society.



HEY!
Are YOU ready
for our
BIG SHOW?

VOLUNTEERS NEEDED



Maybe you are ready
for the show but the show will not
go on without your help.

Volunteers are needed.
This show is run by the MSSC,
for the MSSC.

Volunteers are needed for setup on Thursday (Dec 6)
and Friday (Dec 7), during the show (Dec 8 & 9),
as well as during teardown Sunday night.

Contact:
Dave Smith, 818-908-3071, dave_topaz@yahoo.com
Jim Schlegel, 626-449-9197, jeschlegel@earthlink.net

Original "Hey!" artwork for 1966 show by Bob Brewer

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| R.E. PEDERSEN 3901 N. Calle Entrada Tucson, AZ 85749 (520) 760-0333 | UNDERGROUND EQUIPMENT Wheat mine lights, chargers, batteries, parts MSA mine lights, chargers, batteries, parts Hard hats, belts, knee pads, etc. |



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