MICROMOUNTERS OF NEW ENGLAND

The MMNE was organized on November 5, 1966 for the purpose of promoting the study of minerals that require a microscope.

September 1990 Newsletter #143

Dues are $5.00 per year and are due on January 1st, payable to the Treasurer

Contributions of news items for the Bulletin are welcome and should be sent to the Editor.

NEXT MONTH

The next meeting of the MMNE will be Saturday, October 20, 1990, at the home of Forrest and Vera Fogg.

The next meeting of the Micromounters of New England will be Saturday, **September 15, 1990** at the Saco Valley Gem and Mineral Club's "Swap, Talk and Brag Day" at Runnells Hall, Chocorua, NH.

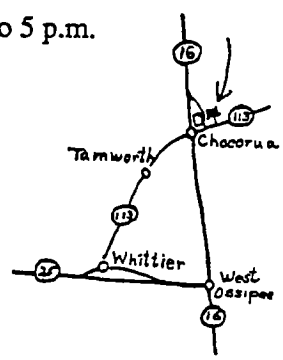
Welcome rejoining members:

Leonard and Lorraine Witkowski
10 Wicklow Street
Windsor Locks, CT 06096
(203) 623-3482

Micromounters everywhere have lost a good friend. After an extended battle with cancer, Violet Anderson passed away on August 13th. She was most widely known for her column "Microminerals" which appeared in the Mineralogical Record from 1977 to 1982, but has a special place for MMNE members who remember her slide program on the Francon Quarry at our second Northeast Meeting in 1983. A number of her photographs appeared in the "Palermo" issue of Rocks & Minerals (Sept./Oct., 1981), and two in the "New Hampshire" issue (July/Aug., 1990). She recently coauthored, with Joseph Mandarino, the book "Monteregian Treasures: The Minerals of Mont Saint-Hilaire", which is profusely illustrated with her beautiful and accurate photos. She was not only talented and knowledgeable in several fields, but she also had a vivacious and charming personality, and will be greatly missed by those fortunate enough to have known her.
Vi is survived by her husband, Ross, a personable and knowledgeable micromounter in his own right, as well as by their daughter, Mia Settle, son Rod, and two grandchildren.

9 a.m. to 5 p.m.

Runnells Hall
Chocorua, N.H.



EMMONS QUARRY (conclusion) by Gene Bearss

Strengite	as botryoids and individual crystals. The author, as previously stated, feels that some of the botryoids mentioned under phosphosiderite are probably strengite. In addition, the author has found spear-shaped crystals which are light pink in color, and have the same morphology as strengite crystals the author has in his collection from other pegmatite localities. The strengite crystals are found on Fe/Mn oxides.
Strunzite	as typical straw-colored acicular crystals. It is not a very common mineral at the Emmons. It is usually found in phosphate nodules with stewartite and hureaulite.
Uraninite	as typical iron-black blebs frozen in matrix. The average size of these blebs is around 5mm. The author has found several of these blebs completely altered to secondary uranium minerals. Since some of these are fluorescent, they are probably partially composed of meta-autunite. Several other altered blebs, while lemon yellow in color, show no discernible fluorescent response under short-wave UV light and are probably some other mineral.
Vivianite	as thin films and rarely as crystals. Most lithiophilite/triphylite has coatings and thin films of vivianite in minute cracks and fissures. Rarely vivianite crystals have been found by the author. These are of a typical color and habit. These crystals usually occur at the margins between lithiophilite/triphylite and rhodochrosite.
Zircon (var. cyrtolite)	as a typical pegmatite occurrence. Crystals are frozen in matrix, often as composite crystal groups, and usually can be extracted from matrix without incurring any damage. The zircon crystals are usually dark brown and opaque, but the author has found several that were light brown and translucent.
Undetermined Minerals	The author has many "unknowns" from the Emmons Quarry. Most of these are secondary phosphates. One found by the author might be bermanite, but the crystals are not uniform in color, and the crystal habit seems a bit off for bermanite. Another mineral that comes to mind, looks just like the metaswitzerite crystals from the Tip top Mine, Custer, South Dakota. Still another looks like it might be collinsite or gypsum or ??? Yet another has the look of the brownish variety of schoonerite found at Palermo #1, but I doubt it since I have never found sphalerite at the Emmons. I have also the white feathery material which I mentioned previously, and probably a dozen or so more. I am also most certain that montmorillonite or a similar clay-type mineral is found at Emmons. It seems that every time I go to collect at the Emmons I end up finding something new. Come to think of it -- that is why I keep going back to the Emmons.

A NOTE TO THOSE GOING TO MONT SAINT-HILAIRE

Next time you're uncertain about the weather when you're packing for a trip to Mont Saint-Hilaire, you can get the latest forecast for the Montreal area for less than a dollar. Dial 1-(514) 636-3026 for a recorded one-minute forecast. Rates for AT&T are lowest from midnight to 8 AM, Monday through Sunday, highest from 8 AM tp 6 PM, Monday through Friday. Add the number to your personal telephone list for future reference. -- JWC

NOTES ON SOME WATER-SOLUBLE MINERALS

I have quickly rinsed gaylussite crystals with no adverse effects.

Gypsum is not very soluble in water (2 1/2 ppt). I have washed it and water did not seem to affect it. As an experiment, I soaked some in oxalic acid solution which dissolved the edges off within the hour.

I have heard the Sinkankas' Gemstone & Mineral Data Book is back in print. Chapter 10 ("Cleaning Mineral Specimens") is helpful.

A useful list would be minerals to soak (or not) in oxalic acid. Unfortunately I do not know of any reference which addresses this problem in depth. -- Dana Morong

SUMMARY

Minerals of the old slags from Lavrion, Greece

History

The southernmost part of the Attika peninsula, 50 miles south of Athens, is a mineralogical area of outstanding importance for more than 3000 years. Its name is Lavreotiki; its capital is the small harbor village, Lavrion.

Myceneans sporadically exploited lead and silver ore there, and Phoenician trade ships landed there as early as 2000 years B.C.

Information about this locality is plentiful in the chronicles of the most important classic historians. In the VII century, B.C., Solon established public officers to deal with the subcontracting of mining claims to private Athenian citizens. Under the rule of Pysistrathos, a great boost was given to mining activities, and the famous silver tetradrachm featuring the sacred owl was minted for the first time.

In 482 B.C., Themistokles, admiral of the Athenian fleet, succeeded in persuading the Assembly of Athens to invest the whole public silver treasury in the construction of an enormous fleet of 200 triremes, to face the impending menace of Persian invasion. The previous year, 483 B.C., a very rich silver ore body had in fact been discovered at Maroneia, and the Athenians were able to use up to 8000 pounds of pure silver to build the fleet in less than two years; so the Persians were completely defeated at Salamina in 480 B.C. thanks to Lavrion silver.

During the rule of Perikles, 460 to 429 B.C., mines were exploited very intensively; mining techniques and rules were developed and established for the centuries to come. Mines were property of the city-state of Athens, but were subcontracted to private people, in some cases extremely rich entrepreneurs. Very often, also singles organized in cooperatives. Up to 35,000 slaves worked in the mines. Vertical shafts were dug as deep as 350 feet, with horizontal adits along the ore veins. At least 2000 shafts can be identified even today. Each slave was able to dig as much as 4 inches into the very hard marble during a 10 hour continuous work. The ore was lifted to the surface in leather bags carried by children. It was then graded and crushed to pea size. Washing plants were numerous, even if using only rain water, treasured in sheltered tanks. The enriched ore was then transported to the smelter, all located along the beaches for easier supplies of wood that arrived by ship from the nearby island of Eubea. This explains why so many slags were thrown into the sea.

The Peloponnesian War caused almost total interruption of the mining activities due to the enlistment of all valid slaves into the army. Exploitation flourished again in the second century B.C., mostly by a second smelting of the old slags. After a slave revolt, and following the siege of Athens in 86 B.C., the Romans decided to close the mines indefinitely. The locality was considered worked-out and therefore abandoned and almost forgotten until 1864, when an Italian-French mining company started activities again by both exploiting the deepest ores and smelting again and again up to 400 tons of old slags per day. Since 1970, though, mining activities have been practically abandoned.

MINERALS OF THE OLD SLAGS

New minerals had been noted in the old slags since their re-use for further smelting. Many scholars have studied and reported about them, and the authors wish to particularly remember Eng. Günther Schnorrer-Köhler, who gave a determining contribution to their understanding.

About 80 mineral species are found in the slags. Such a great variety depends upon two main reasons:

1. Many elements are present in the ore already, mainly metals such as: Pb, Ag, Cu, Fe, As, Sb, V, Ni, Zn, Hg, Al, Si, S. They have been concentrated in single slags by smelting processes. Sea waters have added, over 2000 years, Cl, F, Br, J (I?), O, P. The availability of elements for the formation of minerals is therefore extremely wide, and it would even originate many more minerals than the ones identified up to date.
2. Due to numerous cavities in each slag and their variable permeability to sea waters, different concentrations and combination conditions of the various elements can therefore coexist in cavities of the same slag just a few mm apart from each other.

The minerals will be hereunder described in a chemical systematic order. Those marked with an (*) at the end of each group have been identified during 1988.

ELEMENTS

Copper as secondary arborescent aggregates to 5mm, with, and sometimes on, paratacamite, atacamite, cuprite, olivine.

Sulphur (*) as yellowish grains with galena, aragonite, laurionite

SULPHIDES

Covellite described only in 1981 due to its insignificant look. As blue-black tablets to 0.1 mm, grouped in sprays lining cavity walls with fluorite, anglesite, fiedlerite, cerussite, phosgenite.

Sphalerite as brown crystals to 0.1 mm with gypsum.

Galena (*) as cubes to 1mm with phosgenite, smithsonite, anglesite, aragonite, laurionite

HALIDES

Halite as tiny cubes and spherules, probably formed due to evaporation of sea water.

Embolite[1] as yellowish crude micro crystals and crusts, quickly darkens after exposure to light.

Jodargyrite only found twice as bipyramidal, pale yellow, crude crystals to 0.2 mm with greasy luster, grouped and associated with botallackite, anglesite, cerussite.

Fluorite very frequent but rarely crystallized, as tiny cubes or cube-octahedrons. More often it occurs as spheric or worm-like aggregates, similar to halite. Sometimes spherules are lined necklacewise, or resembling cotton wads. With aragonite and hydrocerussite.

Atacamite as green-blue crusts and crude micro crystals.

Paratacamite frequently as green-gray to green-black crusts and crude micro crystals.

Botallackite very rare, as micro, crude, blue-green crystals with cerussite.

Anthonyite as elongated prismatic, sometimes curved sky-blue crystals to 0.1 mm with paratacamite and aragonite. Rare.

Calumetite found only once as micro sky-blue spheric aggregates, with ekdemite.

Cotunnite as radiating aggregates of colorless to white lamellar crystals to 0.3 mm ; very lustrous and easily cleavable.

Paralaurionite the most common oxychloride at Lavrion; its crystals to 10 mm, are also the largest. Easy pliability of crystals differentiates paralaurionite from laurionite whose crystals are extremely brittle. Good cleavage (001) shows in broken crystals, frayed and opaque-white on fractures. Paralaurionite occurs with many different habits: elongated tabular; prismatic with slantwise base; elongated lamellar and striated lengthwise; 140^0 cross twins of the two previous types; pseudohexagonal prisms, sometimes bent; thin tabular 90^0 cross twins; pseudorhombic twins resembling laurionite. Associated with all the slag minerals.

Laurionite also very frequent, but crystals are smaller than paralaurionite; very rarely larger than 5 mm. It typically occurs as disorderly radiating aggregates of prismatic crystals, very often "V" striated on tabular faces. Associated with all the slag minerals. Very often with paralaurionite.

Fiedlerite as tabular crystals to 8 mm, often twinned (100). One of its typical habits is chisel-like with a triangular slant face on termination. Also very thin, pseudotetragonal tabular crystals with trimmed, slant edges.

Penfieldite as hexagonal prisms to 10 mm, terminated with base or pyramids. Horizontally striated, resembling quartz which is much harder; quartz doesn't, however, exist in slags. Easily mistaken for phosgenite. Sometimes transformed into aggregates of acicular laurionite. Often associated with lead; also with fiedlerite, aragonite, shakovite, boleite, diaboleite, cumengeite.

Matlockite originally described as square yellow tablets, never found again. It usually occurs as extremely thin, colorless, lustrous tablets resembling octagons with sharp edges to 1 mm. Associated with phosgenite, laurionite, anglesite, penfieldite.

Mendipite as yellow-gray, fibrous, globular aggregates. Rarely as crude rounded crystals to 1 mm, often intergrown with paralaurionite. Also associated with blixite.

Blixite as whitish micro spheres or rounded crystals.

Boleite the most common "blue" mineral at Lavrion. As micro crystals to 1 mm, lined along fissures and in cavities. Usually cube-octahedral. Associated mainly with laurionite, also with phosgenite, anglesite, aragonite.

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1 Discredited species. Either bromian chlorargyrite or chlorian bromargyrite

Pseudoboleite it occurs as tabular overgrowths on boleite cube faces. Sometimes oxidized boleite cubes are completely transformed into pseudoboleite.

Diaboleite less frequent, but much more showy than boleite due to its larger, bright blue crystals. Typically hemimorphic, with pyramidal and basal terminations. Often pyramids are very elongated to resemble prisms. Also as hopper crystals and crossed tablets.

Cumengeite as tabular blue crystals or overgrowths on boleite crystals. It is the only cleavable blue mineral at Lavrion. Crystals rarely larger than 1 mm. Associated with phosgenite, anglesite, paralaurionite, aragonite, calcite.

Thomsenolite (*) found only once as globular aggregates of silky acicular crystals to 0.1 mm; hedgehog-like, with phosgenite.

Perite (*) as micro globular aggregates to 0.5 mm of scaly, pale-yellowish crystals. Very rare.

OXIDES AND HYDROXIDES

Hematite as thin red blades and crusts. Very rare.

Massicot as scaly, earthy or massive yellow aggregates.

Litharge as reddish aggregates, often mixed with massicot.

Cuprite as red, lustrous crystals to 0.1 mm, often grouped with copper.

Feroxyhyte as reddish-brown crusts and micro hexagonal crystals. Often transformed to limonite.

Lepidocrocite as brownish microblades.

Goethite some of the frequently found limonitic crusts are goethite.

shakovite the first Hg mineral found in the slags. As monoclinic yellow crystals with adamantine luster, partly rounded and partly tabular. Found only once with fiedlerite and penfieldite.

Ferrihydrite (*) as rusty to yellow-brown tablets to 1 mm, in ferriferous slags, with cerussite, phosgenite, and aragonite.

CARBONATES

Aragonite the most frequent mineral in the slags. Mostly as sprays of colorless to white acicular crystals, to 10 mm. Crystals sometimes opened like brushes at one end. Also as globular, reniform or crusty aggregates. Rarely yellow to orange, or with very high Pb content.

Calcite rare, as rhombohedrons and scalenohedrons, also as globular or crusty aggregates.

Smithsonite extremely rare, as pale green pseudohexagonal crystals to 2 mm. Also as colorless crusts with cerussite.

Cerussite the most frequent Pb mineral in the slags. It occurs in a great variety of different habits. Very often as trillings or star twins of white, striated crystals. Rarely single. Thin blades may be mistaken for paralaurionite, but are duller and whiter. Associated with almost all the other slag minerals.

Hydrocerussite as showy pseudohexagonal tablets to 0.5 mm, transparent and lustrous. Often grouped in scaly aggregates. With aragonite, fluorite, paralaurionite, thorikosite.

Malachite very rare, as green crusts to 1 mm. Rarely as acicular micro crystals.

Strontianite very rare, as pseudohexagonal bipyramids to 1 mm, with calcite and annabergite.

Phosgenite as euhedral crystals to 5 mm, often very rich in faces. Forty different habits have been identified to date. Colorless and transparent, sometimes white to pale tan. Most frequently cubic and short tabular, rarely rounded looking due to numerous faces. Also prismatic, acicular, vertically striated. Sometimes cerussite is found pseudo after phosgenite. Mostly associated with paralaurionite, nealite, georgiadesite.

SULPHATES

Gypsum frequent, but good crystals (to 20 mm) are very rare. Mostly filling pockets completely.

Anglesite very frequent, but difficult to identify. Mostly as needles, grouped in sprays and similar to aragonite. Crystals are elongated bipyramids; rarely pseudooctahedral or tabular. Associated with all minerals.

Susannite rare, as combination of rhombohedrons resembling bipyramids. Often as parallel overgrowth on cerussite. Also on paralaurionite and thorikosite. Crystals to 0.5 mm.

Lanarkite as thin scaly micro crystals on laurionite, paralaurionite and cerussite. Scales are soft, pliable and with greasy luster. Sometimes pseudo after paralaurionite.

Connellite as globular aggregates of radiating blue needles to 0.2 mm. Also as felty fillings in fissures.

Leadhillite as large tabular, often twinned crystals with pearly luster. With cerussite.

Macphersonite rare, as pseudohexagonal, pyramidal, wine-yellow crystals to 0.5 mm. With cerussite.

Mammothite very rare, as radiating or cockscomb aggregates of blue prismatic crystals to 0.5 mm. Also as blue pillows of thin needles, resembling connellite. With diaboleite, boleite, phosgenite. paralaurionite, laurionite, fiedlerite, aragonite, penfieldite.

Creedite very rare, as elongated prismatic, vitreous colorless crystals to 0.5 mm. Often grouped in fan aggregates. Usually on fluorite crusts, sometimes twinned. With anglesite, phosgenite, fiedlerite, covellite.

Plumbojarosite very rare, as yellow coating and globules to 0.1 mm. With gypsum, covellite and cerussite.

Cyanotrichite extremely rare, as pale to green-blue crusts 0.3 mm thick, with aragonite and calcite. Color changes to green in a few weeks after exposure to light.

Schulenbergite as globular aggregates of sky-blue pseudohexagonal scales, mainly in resmeltered slags. With pharmacosiderite, phosgenite, cuprite, olivenite, paratacamite, copper.

Brochantite (*) as vitreous green crusts with schulenbergite.

Antlerite (*) very rare, as vitreous green-blue crystals to 0.1 mm, with plumbojarosite, atacamite, and boleite group minerals.

Ettringite (*) as sprays or globular aggregates of white silky needles to 1 mm. With calcite and heliophyllite.

Namuwite (*) as very pale blue-green balls to 0.2 mm, with copper, diaboleite, ktenasite, phosgenite, laurionite, paralaurionite.

Ktenasite (*) very rare, as tabular, pseudohexagonal, translucent green-blue micro crystals, with cerussite and boleite group minerals.

ARSENATES AND ARSENITES

Nealite described in 1980 as a new mineral specie and considered very rare. It has later proved to be rather frequent; probably often mistaken for heliophyllite. It occurs as tabular crystals to 0.5 mm, often grouped in sheaf aggregates. Color is greenish-yellow when fresh, turning into lemon-yellow in a few weeks, probably due to iron oxidation. Also as disordered aggregates of needles, yellow to orange-red. Typically associated with georgiadesite, also with phosgenite and paralaurionite; rarely with laurionite, anglesite, fiedlerite, matlockite.

Georgiadesite considered extremely rare up to a few years ago, it has since been found more frequently. As short, slighlly opaque to white crystals to 4 mm with typical striation. Rarely pale pink. Sometimes as epitaxial overgrowth on phosgenite and paralaurionite. Smaller crystals often thickly grouped. Some associations of nealite.

Heliophyllite-ekdemite-thorikosite group

Always requiring X-ray tests to be distinguished from each other. Moreover, two other very similar minerals, probably new species, are currently in study. Thorikosite only shows some typical features that may help in its identification.

Heliophyllite as globular aggregates of extremely thin tabular crystals, pale-yellow to lemon-yellow. More common than ekdemite.

Ekdemite also as globular aggregates similar to heliophyllite, but color brighter, to lime-yellow. Rarely as single tabular crystals to 0.5 mm. With aragonite, calcite, phosgenite, paralaurionite, laurionite, anglesite.

Thorikosite as yellow prismatic to tabular crystals with greasy luster, often in parallel growth with paralaurionite. Crystals sometimes rounded. According to authors' experience, the frequently occurring thin tabular yellow micro crystals are very rarely thorikosite.

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Conclusion next month...

by Rewitzer, et. al. (1989) from "I Minerali della Antiche Scorie di Lavrium, Grecia", Revista Mineralogica Italiana, 12:21-38, 83-100. Reprinted with permission of the Editor, Eberto Tealdi