HUI PŌHAKU 'O HAWAI'I
Rock & Mineral Society of Hawai'i, Inc.

Meeting Times

MEETING
Wednesday
June 22
6:15-8:00 pm
Makiki District Park
Admin Building

NEXT MONTH
Aug 24
"Your Favorite Mineral"

LAPIDARY
Every Thursday
6:30-8:30pm
Makiki District Park
2nd floor Arts and Crafts ldg

MEMBERSHIP DUE COSTS 2011
Single: $10.00
Family: $15.00

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By Eric Heinen De Carlo, PhD.

Between February and June 2011, I had the great fortune of taking an academic sabbatical in France (Figure 1), where I took the opportunity to re-discover the country of my childhood. I lived (and worked) in Villefranche sur Mer, a small resort town on the Mediterranean, just to the east of Nice and only a few kilometers from the Principality of Monaco. My host institution was the Observatoire Océanologique de Villefranche sur Mer, a campus and field station of the University Pierre et Marie Curie, located in Paris. The area around Nice and Villefranche is in a department called the "Alpes Maritimes" and hosts the southernmost extension of this impressive mountain range. Here the Alps dive straight into the ocean, with 10,000 ft peaks about 50 miles to the north-north east and the ocean, over 2000 ft deep only a few hundred yards from the coastline, quickly drops to more than 6000 ft further offshore. The rugged topography is the result of plate tectonics with the African Plate pushing up against southern Europe, a process that created the Alps, and will ultimately close the Mediterranean Sea. This provided me with many opportunities to travel to nearby locations, trek and climb, see wildlife and, of course, collect minerals.

Figure 1: Map of France showing its principal mountain ranges. Nice is in the southeastern-most corner of France, close to Italy.

Through my "French Connections" I also had the opportunity to take several collecting trips to the Massif Central, a volcanic mountain range that was formed during the Tertiary and is host to many hundreds of volcanic vents, large mineral deposits and some of

Eric's French Adventure

the least populated and unexpectedly beautiful sets of ridges, valleys and "cirques" found anywhere in France.

In this article I provide a brief synopsis of the mines that are collectively known as "Les Malines" where I visited and collected with a select group of collectors. During this trip I also had the opportunity to collect in another part of the Massif Central (Piboul between the towns of Millau, famous for its high bridge, and Mende) and two very different places in the Alps (Allos in the Mercantour area of the Maritime Alps, and the glaciers of Mont Blanc in the highest parts of the Alps). My field trips to these four collecting areas will be illustrated in detail during a powerpoint presentation at the July meeting of Hui Pohaku. You will want to come to this event because there will be many rock and mineral giveaways through door prizes as well as games. Make sure you sharpen up your geography and geology skills before you come to the meeting.

The collecting trip to Les Malines was organized by Alain Martaud, a French mineral dealer friend of mine, and several of his colleagues who are very familiar with that mine complex. The expedition was to include two days of underground activities in this famous mining district near the town of St. Laurent le Minier in the Gard department of the Massif Central (see Figure 2). The group consisted of about a dozen avid collectors, photographers, and retired mining geologists, most of whom have visited this area multiple times since its heyday of operation that ended in 1991. Among the group on this trip was Louis-Dominique Bayle, the founder and director of publication of Le Règne Minéal, a monthly French magazine dedicated to mineral collecting. The most recent special edition of this magazine dedicated to "Les Malines" is full of historical, geological and mineralogical information about the area. Louis-Do graciously allowed me to excerpt some of the material from the volume for this article, but I refer you to the original reference (Règne Minéral, Hors Serie XV1, 2011) for the details than cannot be given adequate attention here. The website for the magazine is http://www.leregnemineral.fr.

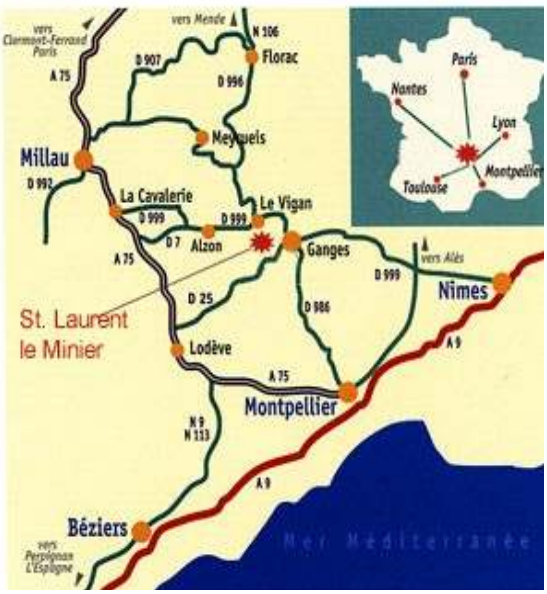

Figure 2: Detailed map the southern Massif Central area showing the location of St. Laurent le Minier.

Les Malines mining district is at the foot of the picturesque Cevennes range in the southern Massif Central. This area, where the Mediterranean climate interacts with rugged continental mountains, host to many contrasts. Normally very dry, the area can be subject to sudden floods during rain storms and the porous calcareous landscape impacted by volcanic mountain formation makes for very interesting mineralogical depositional settings.

Eric's French Adventure

Mining began during the Gallo-Roman period and numerous small mines were operated from the 11th to the 13th century, followed by more activity in the 14th to 16th centuries. Most of the activity during this time was sporadic, uncoordinated and often interrupted by the chaotic and violent historical events of the period. Mining activity resumed following the French revolution (1789) and continued in some form or other through 1991. The last period was driven by a "zinc rush" that began in 1870 fueled by high demand and high zinc prices. The largest deposit of "blende", the common French word used for sphalerite, occurred in 1880 and more than 3000 people were directly employed by the Les Malines mine in that period. Principal minerals of interest to collectors in the Les Malines deposits are crested and "pompon" barite (Figure 3), "cogwheel" bournonite (Figure 4), galena (Figure 6) often found with smithsonite and on crested barite, pyrite, sphalerite and a whole slew of secondary species, many of which derive from the weathering/ oxidation of the primary sulfide ore body. Some of the more spectacular among the secondary minerals are the epsomite veils shown in Figure 5.

Figure 3: Barite Pompon, Les Malines, St. Laurent le Minier, Gard, France

Figure 4: Bournonite cogwheel, Les Malines, St Laurent le Minier, Gard, France

The geological context of Les Malines mines is quite complex. The area hosts several sedimentary discontinuities in terrains of lower Cambrian to upper Triassic age, as well as in mid-Bathonian (Middle Jurassic) aged rocks. Multiple phases of mineral deposition have occurred throughout the geologic history of the area and Les Malines is really a network of multiple ore bodies. Details of the geology and ore formation processes are beyond the scope of this article but the special volume on Les Malines will be available for examination during my presentation. You can also order your own copy (25 Euros + shipping) from Le Règne Minéral.

The mine is a real "monster", with multiple miles of tunnels. Some of the haulage tunnels are large enough to handle trucks as shown in Figure 7, a photo taken during my visit, but other passages are quite restrictive. We walked nearly 2 miles from our entry point (a 2ft wide and 25 or

Eric's French Adventure

more feet long rat-hole) into the mine, down shafts with precarious ladders (Figure 8), through tunnels, and over numerous slumps (Figure 9) to get to the epsomite area. It is very easy to get lost! This mine is clearly not for the faint of heart or the claustrophobic. The good news is that the mine is still full of minerals, and even better considering the cold French winter outside, it is warm. Oxidation of the massive sulfides (pyrite especially) is an exothermic process (i.e., gives off heat) and keeps the temperature in the mine in mid to upper 60's.

Figure 5: Our group next to more than 6ft long veils of Epsomite, Les Malines, St. Laurent le Minier, Gard, France.

Figure 6: So called "galène maillée" (i.e., a mesh of galena), Les Malines, St. Laurent le Minier, Gard, France

Figure 7: Large haulage tunnel in Les Malines, St. Laurent le Minier, Gard, France

Figure 8: Long ladder leading into a shaft (about 50 ft overall). Note the use of rags to tie two sections of ladder together to reach the desired height.

Eric's French Adventure

Figure 9: One of the younger members of our group climbing to bet over a slump in the way of our progress.

In Figure 10 you can see Alain Martaud examining stalagtites of iron oxides formed as acidic iron rich water oxidizes and drips from the mine ceilings. The mine has multiple different zones that tend to have concentrations of minerals in different habits. Just among the barite deposits, there are massive sections, crested white barite, pompon balls of barite, blue translucent barite and clear gemmy golden barite. Towards the end of our visit, we spent about one hour collecting barite from a wall full of small cavities where beautifully formed pocket crystals could be found (Figure 11, on back page).

What a great adventure… the next day was so rainy that we could not enter the mine and the day was spent eating, drinking, and looking at mineral collections…

Figure 10: French mineral dealer, Alain Martaud, examining a ceiling of iron oxides stalagtites formed as alteration products of pyrite and other sulfide minerals in Les Malines, St. Laurent le Minier, Gard, France

WE HAVE A FACEBOOK PAGE! LET'S GO LIKE IT!

HTTP://WWW.FACEBOOK.COM/PAGES/ROCK-AND-MINERAL-SOCIETY-OF-HAWAII/103902329673700?V=WALL&REF=SGM
MAHALO TO MARKUS FOR ESTABLISHING OUR *ROCK FACE*!

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The Rock & Mineral Society meets on the 4th Wednesday of each month (except for adjusted dates in November and December) at the Makiki District Park, 6:15-8 pm. Enter from Keeaumoku Street. Parking is free but limited.

The Newsletter is published monthly, some days prior to the meetings and is distributed in electronic format by email (Adobe Acrobat PDF file attachment). Printed copies are "snail" mailed to those who do not have email. The electronic format usually contains full-color images; the print version may be limited to B&W due to reproduction costs.

DOOR PRIZES

Please note that we have instituted door prize drawings at our monthly meetings. Because of Hawaii's gambling laws, these drawings cannot be conducted in the common "raffle" format where tickets are sold. Rather, each *paid* member attending the meeting will receive a drawing ticket upon request. A voluntary donation of $1.00 is requested and encouraged. Drawings will be conducted at the end of the meeting with available prizes awarded in random order. You must be present to win. Please remember: if you win a prize, please bring one to the next meeting. This helps to keep our drawings going. Thank you.

Parking at Makiki Park
Parking along Keeamoku St. starts at 5:30

After that, good luck because it drops off really fast!

Figure 11: A pocket of blue barite covered with red clay in a wall of massive barite, Les Malines, St Laurent le Minier, Gard, France

Special Door Prizes

Eric is bringing some of his treasures to this month's Rock Club, and will be donating them for this week's door prizes! Look for things he collected while visiting three mines, one field location, and goodies found amongst the glaciers in Mt. Blanc! Thank you Eric!

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