

Geology Club: Mineral Collecting Trip (10 October 2009)

Trip Notes by Charles Merguerian

STOP 1 – Grossular Garnet Locality, West Redding, Connecticut. [UTM Coordinates: 630.71E / 4575.38N, Bethel quadrangle].

Covering roughly 60 acres of land, this enigmatic massive fine-grained grossularite garnet + diopside rock in West Redding has made many mineral collectors and geologists take notice. Walk up the steep slope east of Simpaug Turnpike to see highly fractured, massive cinnamon-colored grossular garnet rock, part of a 0.6-km wide heart-shaped mass found at the faulted contact between the Stockbridge Marble (OCs) and injected muscovitic schist of the Rowe Schist member (OCr) of the Hartland Formation (Figure 1). According to Rodgers et al. (1985), we are very near Cameron's Line (red and black line in Figure 1).

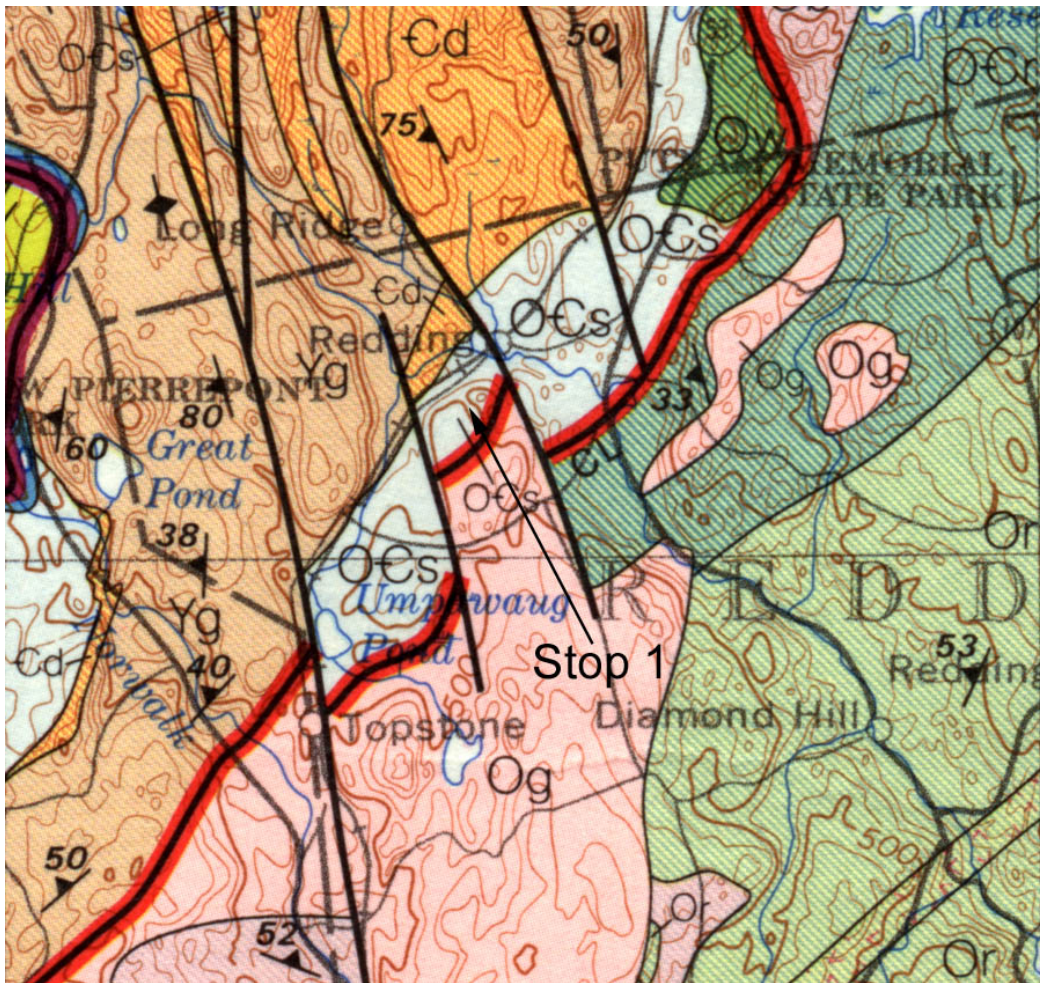


Figure 1 – Geologic map of the area surrounding Stop 1 showing the Proterozoic gneissic rocks (Yg) and Cambrian Dalton Schist (Cd) to the west, the Stockbridge Marble (OCs), Cameron's Line (CL in red), the injected schistose rocks of the Rowe Formation (OCr), and an Ordovician granitoid (Og) that may be responsible for this unusual Ca^{++} -enriched skarn deposit. Note the NW-trending high-angle brittle faults that cut the region. (Adapted from Rodgers et al. 1985.)

Two knolls at this locality are almost entirely composed of grossularite garnet (var. essonite) and lesser clinopyroxene. Mostly the garnet occurs alone with minor quartz and localized quartz veining has been observed. Chemical analysis of the garnet ($\text{SiO}_2 = 39.10\%$, $\text{CaO} = 34.85\%$, $\text{Al}_2\text{O}_3 = 19.61\%$, and total $\text{FeO} + \text{Fe}_2\text{O}_3 = 5.44\%$), are quite similar to published analyses of grossular garnet, including the phenomenal grossular garnet crystals from Morelos, Mexico. The West Redding garnet is relatively soft (for garnet) at 6.5 to 7, or less than quartz. In some areas, particularly the northeast end of the exposed mass and in a railroad cut to the southwest, mixtures of clinopyroxene and garnet produce a beautifully speckled green and cinnamon-colored rock. The clinopyroxene occurs as light green anhedral diopside whose mode varies from 30% to 60% in the pyroxene-rich zones. Rocks consisting of 90% fine-grained clinopyroxene have been found in pits to the east and in the railroad cut to the west. At the highest eastern knob, a unique fine-grained colorless rock was found to consist of quartz, diopside, garnet, andesine, zoisite, titanite, wernerite, and apatite (listed in order of abundance). Together with the grossular garnet that underlies most of the locality, the assemblage of minerals found here (calcium-iron silicates) mandates the introduction of silica in a skarn-type contact metamorphic setting.

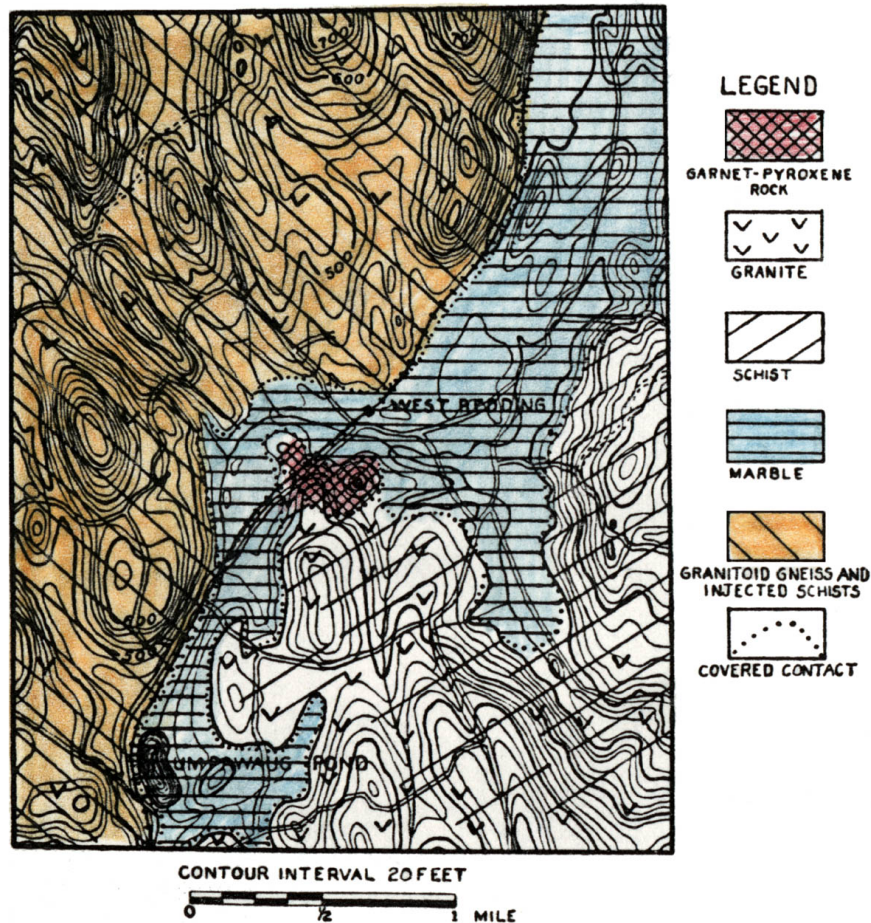


Figure 2 – Geologic map of the West Redding garnet locality demonstrating that the grossular garnet + diopside rock (red) is the contact with Stockbridge marble (blue) and injected (granitized) muscovitic Rowe schist (diagonal ruling). NW-trending brittle faults (See Figure 1) cut through the area and are likely responsible for the highly fractured nature of the garnet rock. Adapted from Agar and Kreiger (1932) using similar coloring as Figure 1.

According to Agar and Kreiger (1932), the unique mineralogy of the deposit suggests that it “originated by both igneous and metamorphic processes”, suggesting that contact metamorphism and silicification during syntectonic intrusive activity was important (Figure 2). The garnet formed during contact metamorphism and silicification at the marble-schist contact during the injection of granitoids and later pegmatite dikes. In addition to the obvious mineral to be found at the famous West Redding garnet locality, collectors have reported calcite, clinozoisite, diopside, quartz, wernerite, apatite, andalusite, coccolite, titanite, graphite, tremolite, and plagioclase.

STOP 2 - Roxbury Garnet Mine, Roxbury Falls, Connecticut. [UTM Coordinates: 641.62E / 4595.95N, Roxbury quadrangle.]

The Roxbury garnet mines were operated as small prospect pits in the 1800s and were a major source of garnet abrasive material until the huge discoveries of massive almandine garnet in the Adirondacks near North Creek, New York. The Roxbury garnets occur as perfect 1-3 cm dodecahedral (twelve-sided) crystals embedded in a crumbly, muscovite-quartz schist and granofels of the Hartland Formation (Figure 3). In some rocks, 1-2 cm tabular brown staurolite crystals coexist with garnet and the staurolite is locally twinned (30°). Mapping by Gates (1959) indicates that the mines occur along the west edge of 1.5-mile lens of similar porphyroblastic rocks within more typical Hartland as found on Mine Hill.



Figure 3 – Porphyroblastic dodecahedral garnet up to 1 cm in size and tabular staurolite exposed in fine-grained muscovitic schist of the Hartland Formation. (CM digital image, December 2001.)

In addition to the major phases garnet and staurolite, mineral collectors have also reported biotite, clinocllore, gypsum, magnetite, kyanite, hematite, limonite, loellingite, pyrite, and pyrrhotite.

STOP 3 - Roxbury Iron Mine, Roxbury, Connecticut. [UTM Coordinates: 638.71E / 4601.90N, Roxbury quadrangle.]

Originally opened as a silver mine in roughly 1750, iron ore was ultimately discovered (probably much to the surprise and chagrin of investors!) and, later (by 1800), mined for iron ore. Forming an important deposit of "spathic" or "sparry" ore, to use the old vernacular, the iron ore occurs as siderite, an iron carbonate. The siderite occurs with quartz, pyrite, black sphalerite, chalcopyrite, galena, limonite, and arsenopyrite (rare). The ore formed in a 2-3 m wide subvertical vein cutting the Hartland strata at a high angle. Here, the mine occurs along a fault at the contact of the Mine Hill granite gneiss and mica quartzite, schist, and feldspathic mica quartzite and schist (Gates 1959). Mineralization may have occurred here the result of hydrothermal activity peripheral to the Mine Hill granite gneiss, a different buried pluton, or be due to melting and metamorphic recrystallization of carbonate-rich strata. Interesting reading on this mine can be found in Shepard (1837), Schairer (1931), and Januzzi (1972, especially pp. 194-203).

As a result of the efforts of the Roxbury Land Trust, the best preserved iron furnace site in Connecticut is here in Roxbury. Builder I. N. Bartram of Sharon is responsible for the large 33' high structure shown in Figure 4. Farther up the hill, two iron roasting ovens are also preserved on site. Initial failure led to the first cast iron on June 1867 and in 1871 the system was converted to hot blast. Just to the south of the furnace note a rectangular wheel pit, whose water wheel converted water power to the bellows.

Unfortunately, blast iron production at Roxbury was short lived. Mining and operational problems plagued the effort and the Roxbury blast furnace was decommissioned in 1872.

Figure 4 – View of the Roxbury iron smelting blast furnace on Mine Hill in Roxbury, CT. (CM digital image, November 2005.)



Take Route 8 back to I-84 and then eastward or take 202 to 44 to 372 to 9 to Middletown. Pass over James J. Arrigoni Bridge and enter Portland, CT. The road log below is tacked on but I came from a different direction on my pre-trip check so the mileages do not follow from Day One. A map of the area is shown below.

131.7 Bear L following signs for 66 E and 17 N onto Arrigoni Bridge.

132.2 Mid-span on Arrigoni Bridge over the meandering Connecticut River. Look L and R for spectacular views to the north and south along the river valley. On the north side of the eastern footing of the bridge, are large sandstone quarries, the type locality for the Portland Formation. Here, the hematite-stained arkose and quartzose sandstones have been quarried for use as building stones. Some of the older buildings in Portland (ahead) are constructed of these materials. New Yorkers know this appealing but easily friable building material as "brownstone". Just downstream from this bridge, the river curves to its L and leaves the Central Valley province to enter the Eastern Uplands province. The boundary between these two provinces is the basin-marginal fault at the east side of the Hartford basin.

132.7 At east end of bridge and stop lights (Brooks Pharmacy on SE corner), travel straight ahead for Route 17A through Portland. Road to R is CT Route 66 toward Route 17 and Cobalt.

133.0 Portland Post Office on L.

134.1 Pass road junction with Bartlett Street Extension. The famous Strickland quarry is located in Collins Hill at the east end of the Bartlett Street Extension. Currently owned by a golf course and closed and inaccessible for many years now, the Strickland quarry was one of the prized localities for cleavelandite (unique "platy" albite), beryl, tourmaline, spodumene, manganapatite, garnet, lepidolite and a host of other collectible specimens.

135.0 Pass over Carr Brook. Meander loop of Connecticut River on L.

135.7 Road junction of CT Routes 17 and 17A (Fogelmarks Corner). Turn L onto Route 17 N.

137.9 Pass Isinglass Hill Road on R.

138.0 Turn R onto Michelle Drive.

138.4 Exposed contact between pegmatite (E) and lineated biotite gneiss (W) on L.

138.7 Park at end of paved road and walk into the woods (N) to Simpson Quarry (Stop 7).

STOP 4 – Simpson’s Quarry, Glastonbury, Connecticut. [UTM Coordinates: 700.50E / 4612.00N, Glastonbury quadrangle.]



The Simpson Quarry is another typical pegmatite with many gemmy stones found scattered throughout the dump. Look for beryl, spessartine garnet, schorl, torbernite, autunite, and other pegmatite minerals.

The best collecting is accomplished by digging down into the dump materials and selecting specimens for their mineral content (showing) or potential (vuggy, visible crystal faces, etc.). The potentially good specimens should be interrogated and broken down (with a hammer). Experience helps here as minor "shows" of minerals on the side of a rock specimen would entice the mature collector into breaking the rock open to see what's inside. Look especially for the hexagonal outline of beryl and other minerals of "color". A view of a fabulous collection of bluish-green beryl found at the Quarry is shown in Figure 5.



Figure 5 – View of beryl crystals found in 2001 by a local collector from Thomaston, CT. (CM digital image taken 02 December 2001.)

Drive out from Michelle Drive and turn L onto Route 17 southbound.
Turn L onto Route 66 E.
In Cobalt, turn L on Route 151 and follow road northward.
Turn R and find Gadpouch Road to visit Stop 8.

STOP 5 - Arsenopyrite and “Gold” Mine, Cobalt, Connecticut. [UTM Coordinates: 704.0E / 4605.6N; Middle Haddam quadrangle.]

This prospect, first mined in 1661, is one of the oldest prospects in western Connecticut and is described by Blake (1883), Shannon (1921), and Kirkland (1954). The mine was closed for a while but reopened in 1762 and worked until the 1850s. Remains of old stone walls, a kiln, and a deep vertical shaft (fenced in) can be found on the upland trail. Twenty tons of ore were shipped to China. The main mineral of interest here is arsenopyrite (Figure 6), occurring as bright silver-colored, wedge-shaped crystals in bull quartz. Scorodite, niccolite, sphalerite, galena, chloanthite, and smalltite have also been reported. Chomiak (1989) and Januzzi (1972) list a great number of minerals from this site.

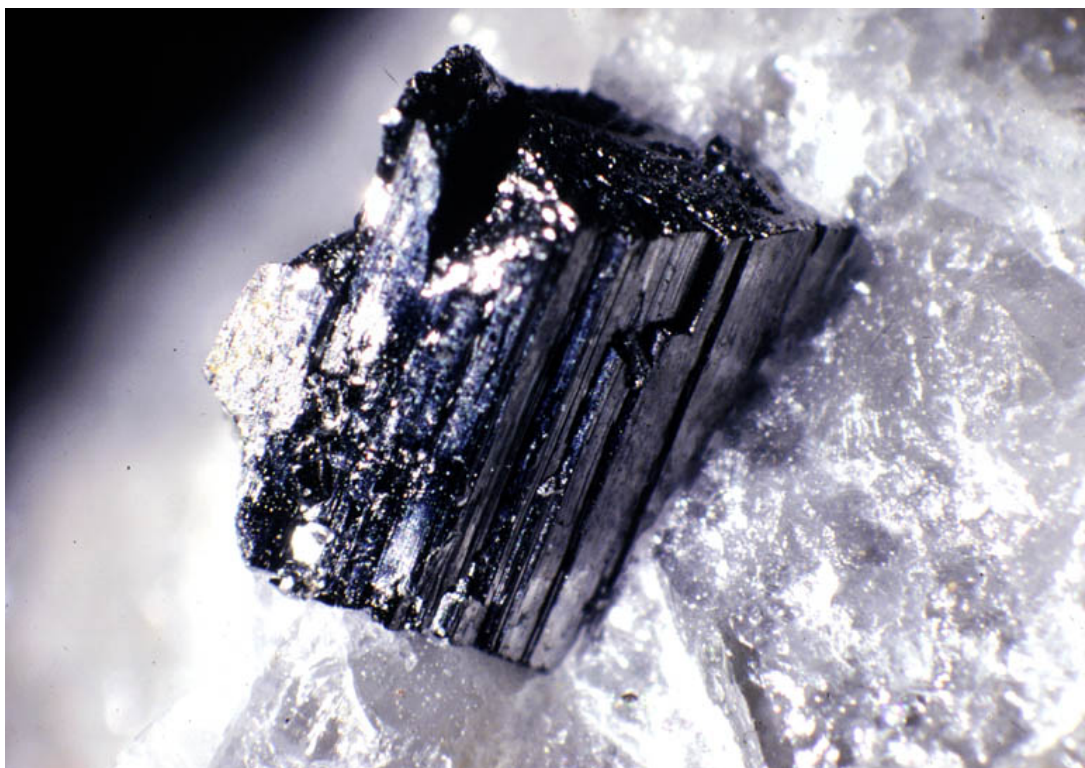


Figure 6 – Photomicrograph of 4 mm wedge-shaped arsenopyrite crystal in milky quartz collected from Cobalt mine. (CM specimen and photo.)

A few years ago, gold was reported found from this area by our friend Professor Tony Philpotts of the University of Connecticut. This discovery generated a lot of interest by local collectors and, as Ernest P. Worrell would have said, “swindlers and entremanures”. As such, the Parks Department sought to close off access to all. Student mapping projects at U. Conn. of the shafts and tunnels are in progress as of 1996. According to our dear friend Professor Dickson of Eastern Connecticut State University, there was an older couple who had lived near this property for probably 50 years or so. Back in 1996 samples of their hair were analyzed using XRF and traces of gold were detected. In 1999, twenty-five soil samples were collected at 5m spacing and analyzed around their house using XRF. Although no traces of gold were found, arsenic was detected.

Up to 6 ounces of gold per ton are reported here, much higher than typical gold mines. The adits, which are dug into the moderately dipping schist, are clearly visible in the ravine. Walk down to the ravine and walk upstream. Look for quartz boulders and break them open to find the arsenopyrite. The blue-tagged hiking trails are maintained by the Connecticut Forest and Park Association (203 346-TREE). The phone number for Connecticut State Parks is (860 424-3200). The local park supervisor (Bruce Elliot) can be reached at (203 295-9523).

Drive out from Gadpouch Road and turn L onto Route 151 extension.
Continue past Route 66 on Route 151 toward Middle Haddam.

Pass Middle Haddam and take R onto Haddam Neck Road to, of all places, Haddam Neck. Stop near powerlines about 0.5 miles down from Route 151 near Firehouse (but do not block Fire Department access). Walk along powerlines to workings of Swanson's Quarry for Stop 9.

STOP 6 – Swanson's Pegmatite Quarry, Haddam Neck, Connecticut. [UTM Coordinates: 706.65E / 4499.03N, Middle Haddam quadrangle.]

This is an old pegmatite quarry with very extensive workings. Several dumps exist as well as nearby prospects for hard rock collecting. Fine- to coarse-grained purple lepidolite, muscovite, green to yellow beryl, and green tourmaline (elbaite) are found here.

Drive back to Route 151 and turn L through Middle Haddam.

Turn L onto Route 66 (W) to intersection of CT Routes 17A and 66 at Brock's Pharmacy.

Turn L and follow signs to Industrial Area immediately before Arrigoni Bridge.

At base of hill, turn R then another quick R onto Brownstone Road.

Follow along to quarries (Stop 10) exposed on R.

Nice view of both quarries from crest of Silver Street.