

Going Up the Country  
A Field Trip to Ruggles Mine  
By Ralph G. and Mary C.



Figure 1. Mary at the Ruggles Mine Entrance

While planning our trip to Massachusetts, we planned a side trip to New Hampshire to collect at the Ruggles Mine in Grafton, New Hampshire. We took the opportunity to stay in New Hampshire and do some sightseeing. We chose Monday, Labor Day, September 2 to go to the mine.

The collecting trip to the mine almost didn't happen. Storms on Sunday night and showers on Monday morning almost washed out the trip. Despite the weather, we went.

We drove to Grafton. Just past the center of Grafton, we saw an arrow for the mine pointing to a side road. We turned, following the arrow. The road went through forest and turned into a dirt road and we finally arrived at the mine. We now know why Ruggles is Called "The Mine in the Sky."

The Ruggles mine is on Isinglass Mountain, named after the mica deposits. Isinglass is an old name for mica. Commercial production commenced in 1803 by Sam Ruggles and his family. New Hampshire was the sole producer of mica until 1868. General Electric once mined mica at the mine. Bon Ami worked the mine from 1932 to 1959 for feldspar, mica and beryl. They found one mass of beryl that filled 3 freight cars. Mindat lists 31 minerals, including beryl and uranium minerals.

The mine is a pegmatite in the Littleton Formation which was formed during the Devonian era approximately 300,000,000 years ago. The Littleton formation consists mainly of mica schist. New Hampshire was once a sea bed with years of sediments slowly accumulated on the ocean bottom. Compression changed the sediments into sandstone, siltstone, and shale. Eventually these layers of rock grew to be several miles thick.

Sometime near the close of the Devonian period, about 300,000,000 years ago, a period of crustal unrest set in. Western New Hampshire, which for a hundred million had been dominantly a region of wide spread seas, began to be uplifted. Two major phenomena; intense compression of the earth's crust and the rise of molten rock into the crust marked this period. Great compressional forces, acting horizontally in a more or less east-west direction, squeezed the rocks and forced them to buckle. Gigantic folds, both upwards and downwards, trending north and south were produced.

The accumulation of buried sedimentary rocks were heated, squeezed into great folds, and shattered. The heat and pressure changed the mineralogical character of the rocks. The new metamorphic rocks were characterized by mica schists. The schists consisted of mica and quartz, with the shiny mica flakes having formed from the pre-existing dull clay particles. Without these enormous upheavals and pressure New Hampshire would not be as mineral rich as it is today.

The molten rock solidified and resulted in a vein of course grained granite called pegmatite. The pegmatite vein is 1640 feet long and 335 feet wide, and is approximately 250 feet deep. The crystal formations within the Ruggles pegmatite are larger than any other ever discovered in New Hampshire.

We paid our \$25.00 fee and entered the mine Figure 1. The path descends into the mine and as we walked into the mine, we were reminded that what goes down must come up with buckets of rock.

Walking through the tunnel, we entered the first "room". In this room, we collected schorl – black tourmaline. The rooms had side rooms - partial tunnels, Figure 2, which came in handy to shelter us during brief showers.

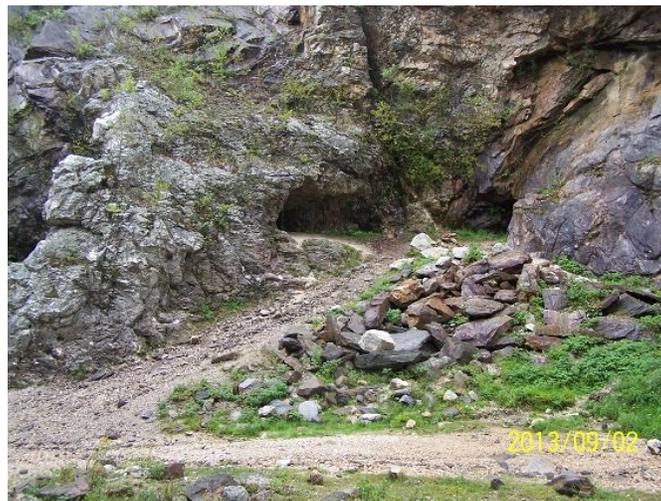


Figure 2. Side Rooms at Ruggles Mine

Walking through the next tunnel, we entered a second room. While collecting in this room, one of the owners – Lance – said that this is where he made the most recent blast on July 4. Mary stayed and collected while I walked to the end of the mine. This presented a wonderful view of the surrounding mountains, Figure 3, even on a cloudy day.



Figure 3. View of Ragged Mountain from the Ruggles Mine

Here Ralph found his first nice specimen in the tailings pile – an apatite crystal in the pegmatite matrix, with the Littleton formation mica schist. We headed back to the room where they blasted and I noticed a light blue area in the wall, Figure 4. Lance identified this as beryl. He said that the beryl at Ruggles occurred as large but fractured crystals. After Ralph collected his beryl, Mary hammered at the beryl, Figure 5.



Figure 4. Beryl Crystal



Figure 5. Mary Collecting Beryl

As noon approached, we sat on a rock to have lunch. That is when I spotted it – a boulder with the telltale yellow and green combination indicating the uranium ores autunite and gummite. Other rocks showed a green hue from algae growth. This sample seemed different.

Not wanting to ingest uranium, I decided to eat my lunch before collecting the samples. Upon testing the samples with long wave ultraviolet (UV) light, the samples glowed bright green, indicating the presence of the uranyl ( $\text{UO}_2$ )<sup>2+</sup> radical. I also collected some of the smoky quartz in the boulder in case they contained more of the uranium ores. The UV test showed that some of these samples had areas that glowed bright green under long wave UV light.

One smoky quartz sample exhibited unusual behavior. The tip glowed bright green under long wave UV, but the body glowed green under short wave UV.

Even Lance was a little surprised at the find, because he said that he did not notice any of the uranium ores in the last blast. He did say that the uranium ores often occurred with apatite. I then showed Lance some apatite in the ledge.

Lance mentioned that the mine yielded rose quartz. I began hunting for a specimen, finding a boulder and obtaining a piece. The piece was very pale, but did have a pink hue. Later I spotted another boulder of pale rose quartz, Figure 5.



Figure 5. Rose Quartz Boulder

We continued collecting until about 3:30, with Mary finding more beryl and Ralph more apatite. We also found dendrites, some pyrite, almandine garnet, microcline feldspar – one piece with a pleasant blue hue, muscovite mica, and “biotite” mica. We found a few “seeded” specimens: galena, amethyst and copper ores. Pleased with our finds, we began the long, uphill trip to the car.

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References:

National Audubon Society, Field Guide to Rocks and Minerals.

[www.rugglesmine.com](http://www.rugglesmine.com), web site for the Ruggles Mine

[www.mindat.org/loc-3281.html](http://www.mindat.org/loc-3281.html), Mindat.org for the Ruggles Mine