Ottawa Lapsmith & Mineral Club

Mineral Collecting Guide

Beryl Pit

Quadeville, Ontario.

The guide was created to gather available information about the area in one document to help members of the OLMC and give information on the geology and the minerals that can be found at the location.

DRAFT

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Content

1. Location

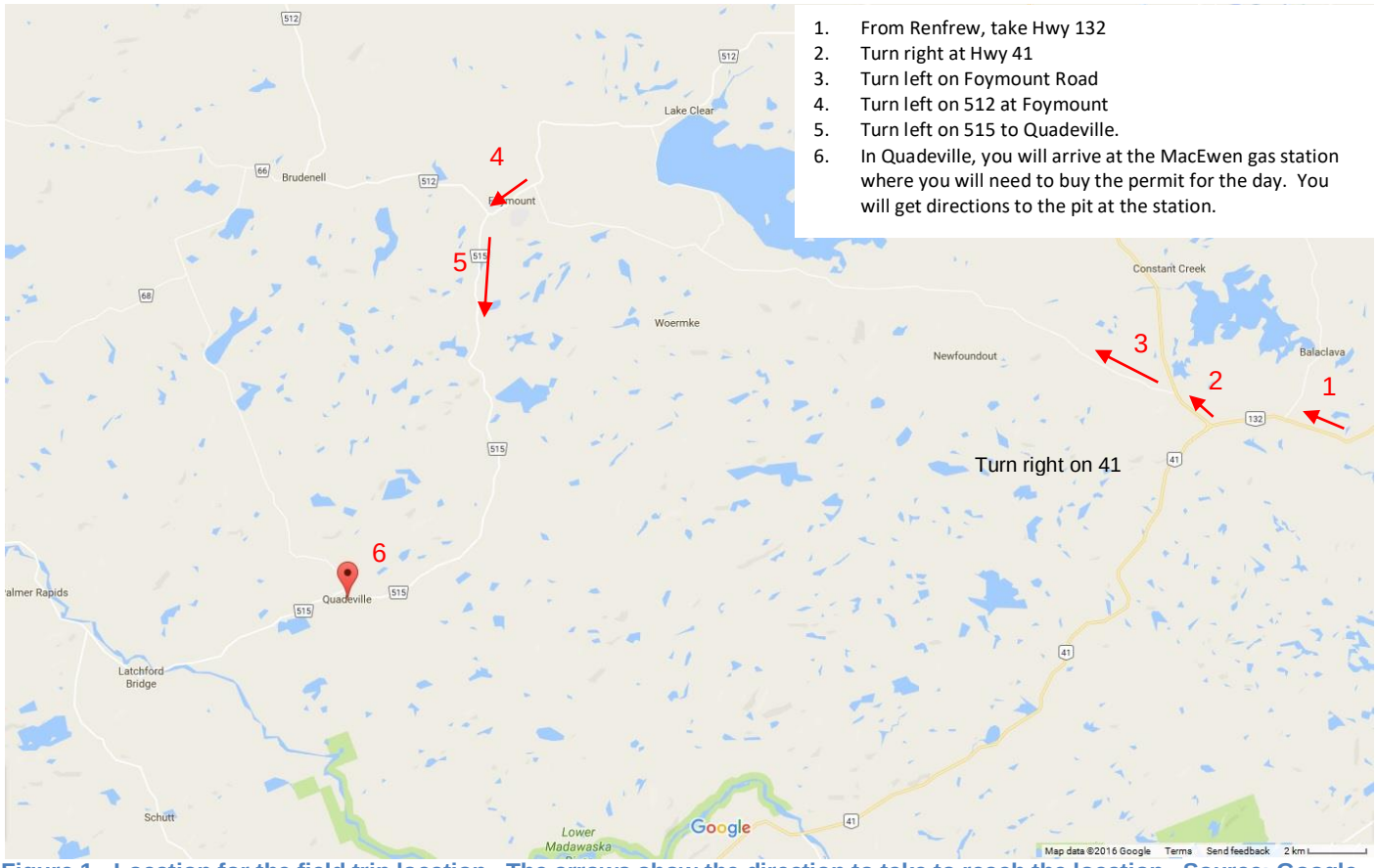


Figure 1 - Location for the field trip location. The arrows show the direction to take to reach the location. Source: Google map, 2016.

2. Geology

[These notes were taken during a field trip to Rose Quartz and Beryl Pit mines. Dave Patterson gave us a very interesting talk about the geology of the mines. I have edited the notes to remove information that is not relevant to this guide and to add some clarity. I did leave the information about the Beryl Pit quarry as it is quite interesting. C.R.]

Rose Quartz and Beryl Pits in Quadeville
May 27, 2015 Field Notes by Susan Lehman

"Being retired allows you to work 7 days instead of 5." – Dave Patterson

Dave Patterson and his wife have been the owners of the quartz and beryl pits since 1993. They own the mineral rights (not the actual property) of 848 acres. The pits are located on lots 31, 30, and 23 on Concession 3 in Lyndock Township.

The current theory is that both mines were [formed at] the same [geological time] 1.28 billion years ago, 20 to 30 km below ground [in the crust]. (Dating done by the ROM [date not available]). An example of an intrusive [rock], the pegmatite was formed as [felsic] magma came up and ran into a plug [and crystallized]. The mines are examples of granite pegmatite (quartz, feldspar, mica) which Dave likens to "Grandma's chunky soup for giants", you can see huge samples of each of the constituent 'veggies'. In terms of composition, the mines have NYF *[niobium-yttrium-fluorine*

mineralization], not LCT *[Lithium -Cesium-Tantalum]*. This determines a lot of what you can find here. For example, there is no coloured tourmaline because there is no lithium. And because there is lots of iron, you have [black-coloured] schorl [tourmaline].

At the rose quartz quarry you have a monster core pegmatite. The quartz core is 750 feet across and 90 feet down. Dave points across the quarry to a distinct smooth face. This is an 8ft long crystal, a single crystal of K-spar [a single crystal of potassium feldspar, eight feet long]. He points to a 'barn roof' formation which is part of a quartz crystal the size of a school bus.

Dave reviews the 4 main factors for such large crystal growth:

1. The selection of ions available
2. Temperature
3. Pressure (7 thousand atmospheres of pressure!)
4. Cooling rate

The cooling rate is considered the most important factor and proves to be a surprise for the group. According to Skip Simmons (University of New Orleans) the crystallization that happened here at the Rose Quartz Quarry took less than a year to form. This is far from the slow process of millions of years that was previously assumed necessary for such large crystals. (Even the Czech guy from the University of Manitoba who is an expert on pegmatites is starting to agree with this new theory)

The rose quartz quarry has seen several periods of commercial mining throughout the 1920s and 1940s. It was mostly mined for feldspar which is a commercial mineral used in glazes and muds for ceramics, paints, fillers, and… coffeemate! (silicates in coffeemate are feldspar).

The beryl mine was mined later and only mined for beryl which originally was a strategic mineral used for alloying naval guns and armour plating of tanks. Dave also described how it was used as a skin for the 2 hemispheres around the original atomic bomb. Nowadays the Web telescope (?) uses beryllium. Beryllium is the fourth lightest element in the periodic table but it is stiff and light so it is great for space applications.

Note that beryl is essentially the same as emeralds but in this location you don't have the right trace elements required for actual emeralds. However, sometimes you can find aquamarine.

At one point the rose quartz quarry was mined for the rose quartz. The idea was to mine the quartz and ship it to China for carving. But they used dynamite which just shatters the quartz so the idea was abandoned. Now Dave mines all the rose quartz by hand. He processes the rose quartz with "iron out" to get rid of the iron staining and make it prettier. You can buy samples for 2 to 5 dollars per pound depending on the quality. Other samples (colombite, feldspar, etc) can be collected under the 20 dollar access fee.

As Dave showed us around the pit, he took us to the side where we saw huge samples of deep pink rose quartz, some of the best rose quartz in the world. Dave pointed out the lighter lines in the quartz and explained how residual heat had healed shattering in the quartz. So these bubble lines are like quartz "scar tissue". [The] 120 degree angles on the crystal faces indicate a prismatic crystal.

Dave points to another area and notes the succession of crystal faces. His theory is that the crystal grew and stopped, grew and stopped, grew and stopped. Then he points to a line of

feldspar along a crystal face. This could have been due to plate movement or perhaps the cooling and shrinking of the crystals which allowed the feldspar to come in and fill the space.

The tour continues as Dave points up to the top of the hill where you can find an example of hard rock glaciation. Unlike limestone which is soft and shows the scratches of the grinding glacier, quartz is extremely hard and resistant to scratching. Instead the glacier polishes the quartz until it is ultra-smooth.

A question is asked about a mineral at hand and Dave excitedly reports that this is biotite mica dynamically altering to chlorite. Unfortunately the expert who originally reported this does not answer emails or phone calls so Dave does not have the full explanation for this phenomenon. [Chlorite is a metamorphic mineral. It is the first one to crystallize from clay minerals under heat and pressure increase during metamorphism. With more heat and pressure, chlorite can metamorphose to biotite, which can revert to chlorite under decrease of pressure and temperature (reserve metamorphism)]. Besides rose quartz there is also a lot of smokey quartz. When questioned on the very dark quality of this quartz, Dave explains that the smokiness is due to proximity to radiation. Just small amounts of radiation are enough, like being in proximity to the potassium of the feldspar.

Rough notes here…[Susan's rough notes]

Smokey quartz is made up of silicon dioxide. Aluminum and silica ions are almost the same size and so nature sometimes sneaks in some of the aluminum in place of the silicon in the quartz. Sylvia asked about a specimen she thought was chlorite but Dave said it was seresite (sp?) or possibly muscovite.

Susan found a sample which Dave identified as colombite which is a mineral (oxide) that contains niobium, tantalum, iron and other elements. It is called colombite because niobium used to be called columbium.

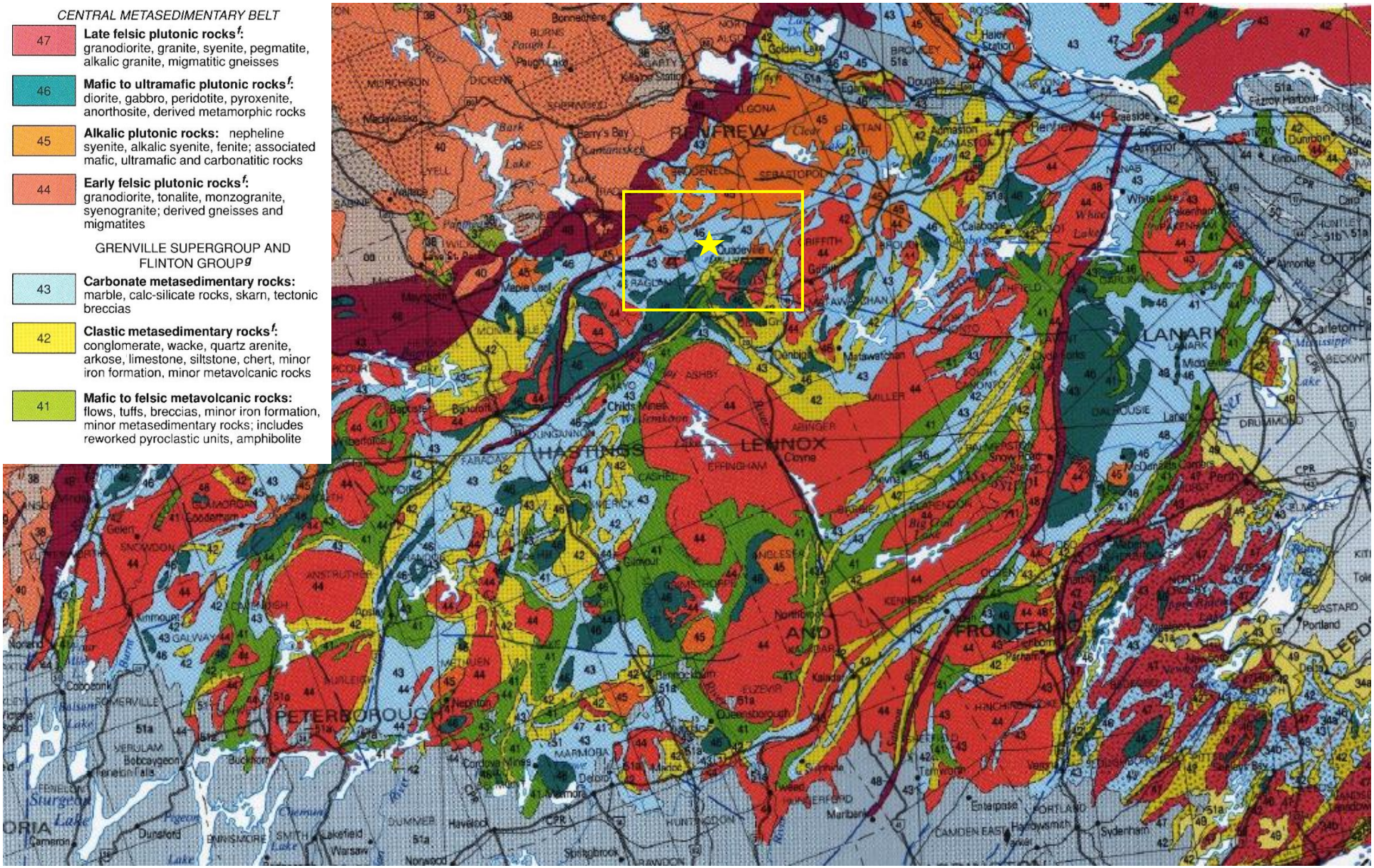
Note that euxenite is glossier than colombite and is radioactive.

Recent discovery in the beryl mine: some of the albanite has altered to magnetite.

[End of Susan's notes]

The Beryl pit is in a granite pegmatite located about 2.1 km north of Quadeville, and approximately 500m east of the road leading north from the town (The Letterkenny Road). The area has also been refered to as a pegmatite on lot 23, concession XV, Lyndoch Township. The occurrence is made up of two mines: Quadeville East Mine (Beryl Pit), & the Quadeville West Mine (Rose Quartz Quarry).

The Beryl Pit is made up of an open cut 76 m long, 15 m wide, & 2 to 11 m deep. The western part of the cut exposes microcline-perthite-cleavelandite-quartz pegmatite containing tourmaline. The eastern part of the cut exposes albite-perthitic microcline-quartz-biotite pegmatite.



Quadeville Area

3. Mineral List

Aeschynite-(Ce)
Aeschynite-(Nd) ?
Aeschynite-(Y) ?
Albite
var: Cleavelandite
var: Peristerite
'Allanite'
'Almandine-Spessartine Series'
Anatase ?
'Apatite'
Bertrandite ?
Beryl
var: Aquamarine
Bismite
Bismuthinite
Bismutite
'Columbite'
Columbite-(Fe)
Euxenite-(Y)
Fluorite
Gadolinite-(Y)
'Garnet'
Goethite
Hafnon ?
Hematite
'Heulandite'
Ilmenite
'K Feldspar'
Kyanite ?
Magnetite
'Manganese Oxides'
'Mica Group'
Microcline
var: Amazonite
Molybdenite ?
'Monazite'
Muscovite ?
Opal
var: Opal-AN ?
Phenakite ?
Pyrite
Pyrochlore Group
Quartz
var: Rose Quartz
var: Smoky Quartz
Rutile
var: Ilmenorutile ?
var: Strüverite
Samarskite-(Y) ?
Schorl
Thorite ?
Titanite
'Tourmaline'
Vigezzite
Zircon
var: Cyrtolite