

## THE MINERALOGY OF SARATOGA COUNTY, NEW YORK

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### INTRODUCTION

Saratoga County includes within its boundaries the Adirondack Highlands and the Hudson and Mohawk Lowlands. The rock types range from the Precambrian Grenvillian granulites of the Adirondacks, located in the northwest quadrant of the county, through Cambro-Ordovician carbonate and clastic rocks. While the area is predominantly covered by Pleistocene glacial till and sediments of glacial Lake Albany, scattered bedrock exposures afford excellent mineral collecting.

Several of the county's most famous mineral collecting localities are either closed to the public or have been lost. An example of the former is the Gailor Quarry in Saratoga Springs. While the quarry is inactive, the faces have become very unstable and because of collector abuses, the owners no longer allow access. An example of a lost locality is the collection site for chrysoberyl, for which Saratoga County is famous. The original description of the quarry measures its location from Route 9. Since the publication of the location, routes have been renumbered and relocated.

All of the localities that are listed in this guidebook are on private property and require special permission from the landowner to visit.

### PURPOSE

The purpose of this field trip is to examine a variety of mining and mineral localities in Saratoga County that are typical of this area and the Southeast Adirondacks in general. The minerals available in large quantity are fairly common, but interesting in terms of size and development. The quarries visited will include a graphite mine and several pegmatites. Opportunities exist to collect a variety of minerals, observe the relationships between them, to study the mines' relationships with the country rock, and to see late 19th and early 20th century mining techniques.

### WILTON GRAPHITE MINE

The graphite mine is located to the west of US Route 9. Enter the woods directly opposite Worth Road. There you will find a dirt road leading up the side of the mountain. The following measurements are taken starting from the west edge of US 9. All measurements are in feet.

- 467 - The foundation of a former building on the left.
- 1533 - On the right is the foundation of the boarding house for the mine.
- 1756 - On the left is the foundation for the loading bins. Horse teams took the refined graphite from here to the railroad.
- 1890 - On the left is the waste water dam and settling pond, even then a matter of controversy. Each year the pond was allowed to flush itself out into the fields below. If you follow the stream valley 1,000 feet upstream, on the right you will find the foundations of

- the concentrating plant which originally consisted of five levels. The original turbines are still here. There was also a steam generating plant here that supplied power for the mill and mine.
- 2725 - Stream crossing. Foundations on the left are for the upper level of the mill. A narrow gauge railroad serviced the mine from here.
  - 2840 - A fork in the road, take the road to the right.
  - 2935 - The cut on the right and left was a drainage ditch for the underground mine and connects with it.
  - 2890 - The entrance to the underground mine, known as the mine, on the left.
  - 3411 - Follow the main road.
  - 3591 - Another drainage ditch.
  - 3833 - The trail from the Wilton-Greenfield Road enters on the right.
  - 3982 - On the left is the large open mine, known as the quarry. Water fills the west end.
  - 4326 - The road is now a trail. The end of the quarry.

The following description is taken from the Adirondack Graphite Deposits by H. L. Alling (1917).

The property was first opened about 1910 by the Saratoga Graphite Company which worked it in a small way for two years. After a few years the mine was taken over by the Graphite Products Corporation which enlarged the plant and the mine and worked it until about 1922.

The original mine is 22 by 30 meters and was worked only by the Saratoga Graphite Company. The Graphite Products workings consist of the mine and the quarry. The mine extends 115 meters along strike, inclines 38-42 degrees south. A number of openings have been driven down dip meeting two parallel horizontal drifts. The quarry is an open pit mine extending east-west, 125 by 30 meters. Now water filled, in 1917 it was 10 meters deep.

The rock containing the graphite is described as a quartz schist and occurs in two outcrops, the mine and the quarry, repeated by faulting. From Alling (1917, p. 106) describing a south to north section (fig. 1), "...a serpentinous limestone forms the head of the brook...next rock to the north is a para-amphibolite...grading into the quartzite...injected and saturated by Laurentian Granite...a lenticular mass of metagabbro...a siliceous limestone...beneath the limestone the graphite schist shot through with 'pegmatitic material which forms knots and stringers'...a fault parallel to bedding occurs here...a gap in the cross section...Pegamatite, quartzite, and metagabbro...a reddish garnetiferous quartzfeldspar para-gneiss...The rocks here are faulted and penetrated by pegmatite...It is not possible to name with certainty the rock forming the floor of the quarry...The north end of the section ends in a limestone." The section as described correlates with the Spring Hill Pond Formation of the southeast Adirondacks. A diabase dike 10 meters wide outcrops just west of the mine. A second dike, 25 cm. wide, outcrops west of the finishing mill.

The ore is similar to the American, Hague, Flake and Hooper ores. Graphite content is 7-8% all flakes are less than a millimeter in diameter. The outcrop is badly weathered, but at the bottom of the inclines in the mine is in better condition.

The mining technique was primitive by any standard consisting of steam

drilling, hauling the ore out of the mines with donkey engines, and loading it into wagons. Teams hauled the ore to the narrow guage mine cars which took it directly to the concentration mill. The usual Adirondack milling parctice of crushing, stamping, buddling, screening and drying was used. The finishing mill used Hooper pneumatic jigs which prepared the graphite for market.

#### Minerals and Rocks

Apatite	Graphite	Phlogopite	Quartz schist
Diabase	Pegmatite		

#### BLACK POND PEGMATITE

The Black Pond Pegmatites, unreported in the literature, were mined in the early twentieth century for abrasives used in Bon Ami Cleanser. The description of these bodies is taken from a 1984 field report by Tara Mandeville of Skidmore College.

Black Pond is one mile down the logging road from its intersection with Lincoln Mountain Road. The pegmatites are hard to spot from this direction. Directions for finding the bodies follows, the distances are in feet:

- 3450 - First sign of crushed pegmatite in the road.
- 4015 - Pegmatite (M1) on the west side of the road.
- 4150 - Road on the west goes to the big pit (M2).
- 4365 - Pit on the west side of the road (M4).
- 4590 - Side road to the east (M6).
- 5110 - Black Pond.

As one approaches the outcrops from Lincoln Mountain Road (fig. 2), the first evidence of the outcrops is a tailings pile (Ti) adjacent to a small mine pit, M1 (approximately 4.6 m. long by 4.6 m. wide by 2.4 m. deep). The tailings are composed of feldspar, quartz and biotite. The pit contains several small pegmatites varying from pure feldspar to quartz-rich pegmatite with large crystals of biotite. The country rock is a biotite-quartz-feldspar gneiss.

The largest pit in the area (M2) is 30 m. x 12 m. x 9 m and is partially water filled. The coarse grained feldspar-quartz-biotite pegmatite is discordant to the 280,35W striking, medium grained, biotite-quartz-feldspar gneiss country rock.

Pit #3 (M3), 6 m. x 6 m. x 3 m., contains several smaller pegmatites that are partially concordant and rich in quartz. The surrounding fine to coarse grained gneiss contains abundant biotite. The adjacent tailings pile (T2) includes feldspar and rose and smokey quartz, but little biotite.

A very large tailings pile (T3) lies just south of Mine #3 and is probably the tailings from Mine #2. The tailings are dominantly country rock with some pegmatite. Large crystals of tourmaline were found in this dump.

Further south along the logging road a small overgrown trail enters from the east. Opposite this trail is Pit M4. This is a small quartz-

feldspar pegmatite interrupted by a small lens of biotite-rich gneiss. At the entrance to the path is a small tailings pile (T4). Further up the path is a feldspar, quartz, biotite pegmatite mine (M5) 6 m. x 9 m. x 6 m.

South along the main logging road toward Black Pond, a side road enters from the east. Along this road are feldspar-rich tailings (T5), several test pits containing quartzite (Q), and Mine #6 (6 x 3 x 2 m.) which is another feldspar, quartz, biotite pegmatite.

Along the northwest corner of Black Pond is the last of the pegmatites (M7). Here is a small discordant pegmatite in a gneiss which contains coarse grained feldspar and finer grained quartz and biotite. The tailings (T6) associated with this mine contain feldspar, rose and smokey quartz and biotite.

#### Minerals and Rocks

Rose quartz	Smokey quartz	K-feldspar
Tourmaline	Biotite	Graphic granite
Rose quartz	graphic granite	Granitic gneiss

#### MOUNT ANTHONY WEST PEGMATITE

The following description is taken from Geology of the Luzerne Quadrangle by W. J. Miller (1923). The pegmatite has not been described in detail, but is referred to several times.

Miller (1923) describes west of Mounth Anthony a terrane of metagabbro-granite rocks where many small pegmatites without sharp borders cut across the foliation. Magnetite, in amounts to be classed as ores, in 1923, is observed associated with granite, pegmatite, and metagabbro. This stop has been selected for this magnetite-pegmatite association. The magnetite is always in moderately coarse grained, gray pegmatite in masses up to 2 or more centimeters across. The country rock is a garnetiferous Grenville gneiss or amphibolite. Mines in this area were worked 90-100 years ago and some ore was shipped. Also, attempts were made to use the white feldspar in the pegmatites.

#### Minerals and Rocks

Pegmatite	Magnetite	Country rock
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#### OVERLOOK QUARRY

The following map (fig. 3) and description are taken from Tan (1966). Miller (1923) describes the Overlook Quarry as producing pottery feldspar as late as 1920.

The country rocks are granitic gneiss and magnetite-bearing metagabbro.

The border and wall zone (I) is in sharp contact with the country rock. The border zone is difficult to distinguish from the wall zone. The border zone is fine grained in places. A lense rich in andesine which occurs at the west margin of the ore body is interpreted by Tan to represent an incompletely developed border zone, although a segregation (replacement) origin is possible. In the border and wall zone, both pink and white potassium

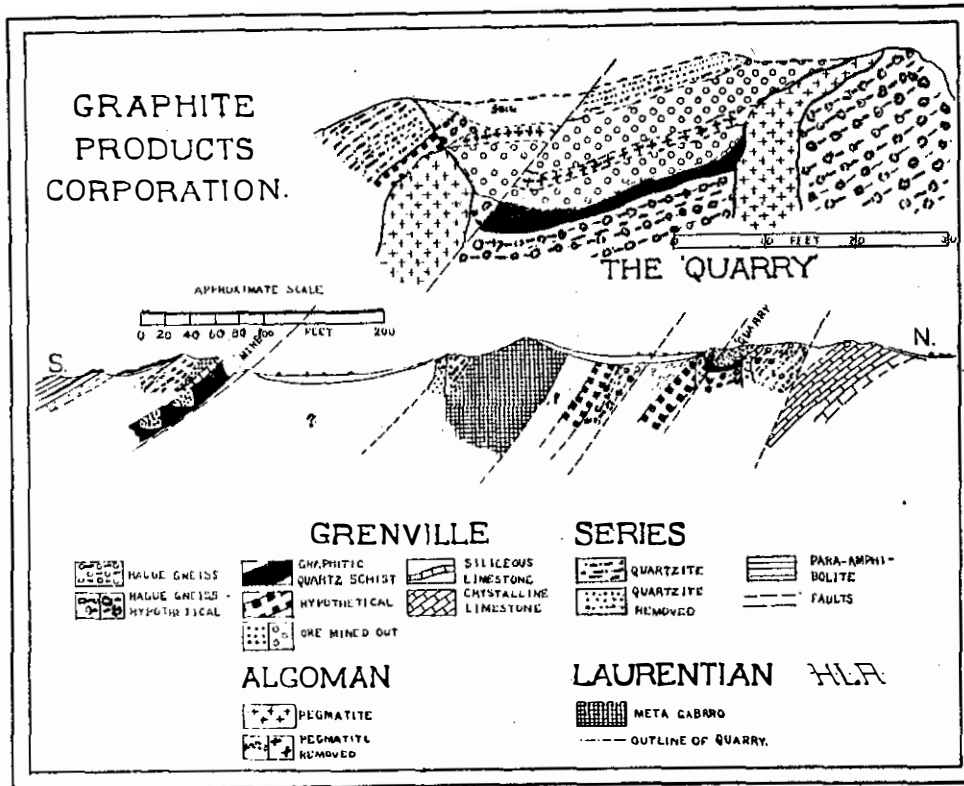


Figure 1. Geologic cross-section of the Graphite Products corporation's property. (Alling, 1917, Fig 24, p. 108)

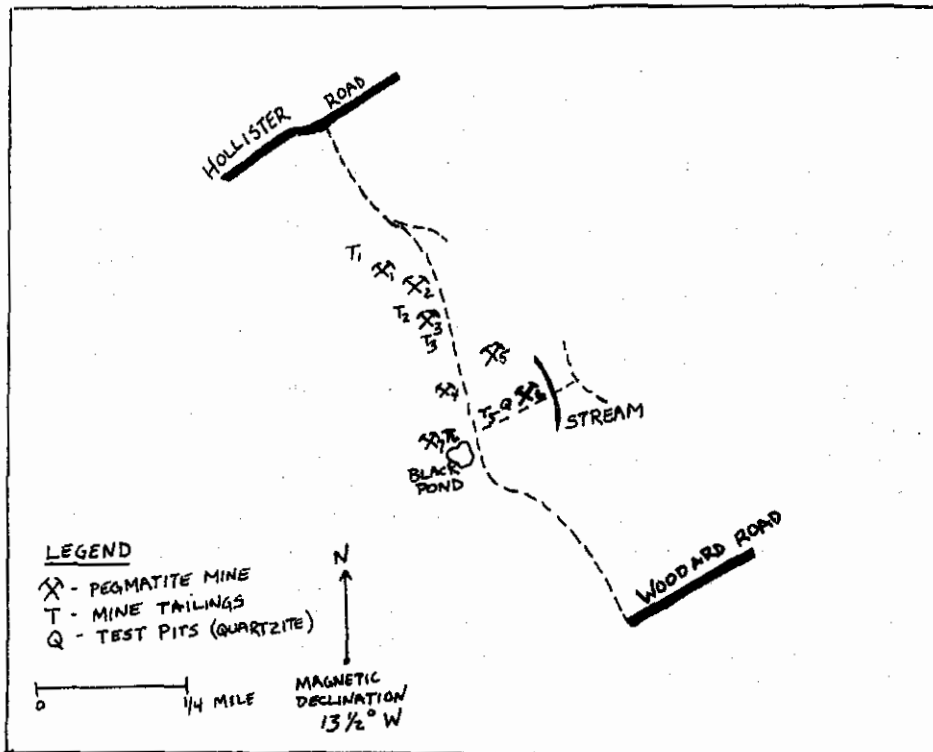


Figure 2. Sketch map of the Black Pond pegmatites in Wilton, New York. (Mandeville, 1984)

List of Minerals

	Gt	Al	Ap	Ur	Pl	Ks	Bi	Mu	To	Be	Fl	Qz	Ja
Garnet Pit													
Zone I	X	X				X						X	
Zone II					X	gr	X		X			X	
Zone III												X	
Lower Pit													
Zone I		X	X	X	An21- 23	X	X	X				X	
Zone II					An16	gr	X	X				X	
Zone III					An15	mi	X	X	X	?		X	
Zone IV												X	
Narrow Pit													
Zone I					An27	gr	X					X	
Biotite Pit													
Zone I					An27	X	X					X	
Zone II					An27	X		X	X	?		X	
Tourmaline Pit													
Zone I					An23	X	X	X				X	
Zone II					An16	X		X				X	
Zone III									X			X	
Flourite Pit													
Zone I					An25	X	X	X				X	
Zone II					An23	gr		X			X	X	
Replacement Vein												X	X
Jasper Pit													
Zone I					X	gr		X	X			X	
Replacement Vein												X	X

(Gt-garnet, Al-allanite, Ap-apatite, Ur-uraninite, Pl-plagioclase, Ks-potassium feldspar, Bi-biotite, Mu-muscovite, To-tourmaline, Be-beryl, Fl-fluorite, Qz-quartz, Ja-jasper, gr-graphic, mi-giant microcline)

In the lower pit, the contact between the pegmatite body and the wall is sharp. On the south wall the pegmatite body lies in a gently folded anticline plunging 30 degrees toward the south. Biotite, uraninite, pink and pale green apatite, and bladed allanite are found along the vertical northwest wall of the pit. In the wall zone (III), scrap muscovite (about 1/4 to 1 cm. in width) appears. White graphic potassium feldspar with parallel short quartz rods is exposed in the south wall. The biotite is partly chloritized. Subhedral high-temperature quartz is intergrown with muscovite. Pyrite and low-temperature quartz crystals, with prism faces, are found in small vugs about an inch across. The intermediate zone (III) consists of giant white microcline about 1 m. long, muscovite columns, and small amount of quartz. The quartz core (IV) near its upper margin contains columnar muscovite crystals with lengths of 15 to 25 cm. Veinlets of quartz extend outward from the core and invade the microcline, but no sign of argillization or sericitization is observed.

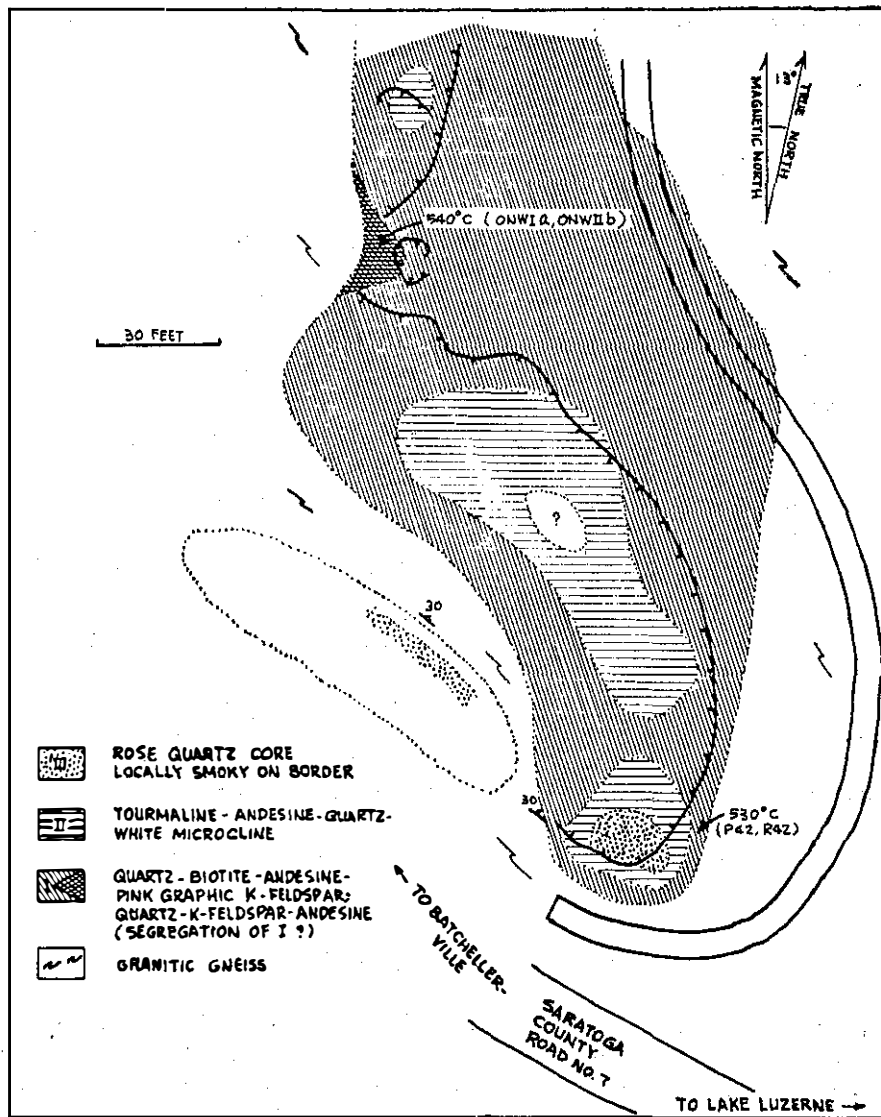


Figure 3. Sketch of Overlook quarry. (Tan, 1966, Fig. 14, p. 45)

feldspars are found and a coarse graphic texture is common. Associated biotite plates are more than 1 m. in diameter.

The intermediate zone (II) is mainly white potassium feldspar crystals up to 1 m. across, with subordinate amounts of quartz, plagioclase, and large black tourmaline crystals which reach lengths of 15 cm. or more.

The core zone (III) is rose quartz and crosscuts the intermediate zone (II).

Approximate Modes at Overlook Quarry

	Zone I	Zone II	Zone III
Biotite.....	10		
	(Green, Ny: 1.646)		
Plagioclase.....	10	5	
	(An34-39)	(An32)	
K-feldspar.....	65	80	
	(graphic)	(giant microcline)	
	(Or82-84)		
Tourmaline.....		5 or less	
Quartz.....	15	10	100
	(smokey)	(smokey)	(rose)

Minerals and Rocks

Albite	Allanite	Andesine	Biotite
Magnetite	Manganoaptite	Microcline	Monazite
Oligoclase	Orthoclase	Plagioclase	Polyclase
Rose quartz	Smokey quartz	Quartz var.	Sericite
Thorite	Tourmaline	Uranite	Uranothorite
Zircon (Cyrtolite)		Manganoan-flourapatite	
Graphic Granite		Country rock	

BATCHELLERVILLE QUARRY

The following description is taken from Tan (1966). The Batchellerville deposits can be reached by a logging road at the rear of the mobile home park east of Saratoga County Route 7. The outcrops consist of two pegmatite bodies (fig. 4) reported by Newland and Hartnagel (1939) and six more bodies found by Tan (1966).

The bodies were worked by the Claspka Mining Company in 1906 and were still mined in 1916 and 1921. Mining was for microcline for the ceramic industry. Most of the pits show only wall rock with the central productive portions, the pegmatite, having been removed. The small size of the mining pits indicates that the production was never great. The deposits are famous for having yielded the largest beryl reported in the state, 69 cm. long and 25 cm. in diameter. The muscovite contains too many iron inclusions for electrical uses.



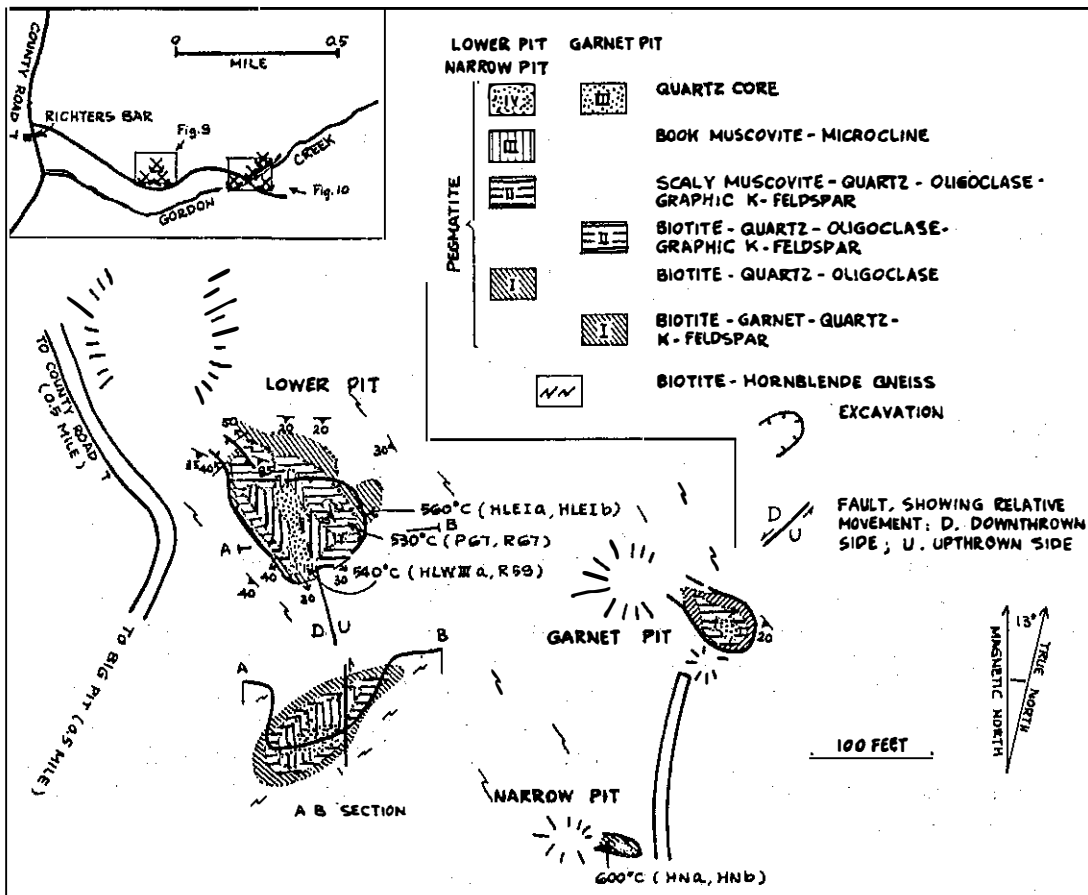


Figure 4a. Sketch map of Garnet pit, Lower pit, and Narrow pit at Batchellerville. (Tan, 1966, Fig. 11 p. 37)

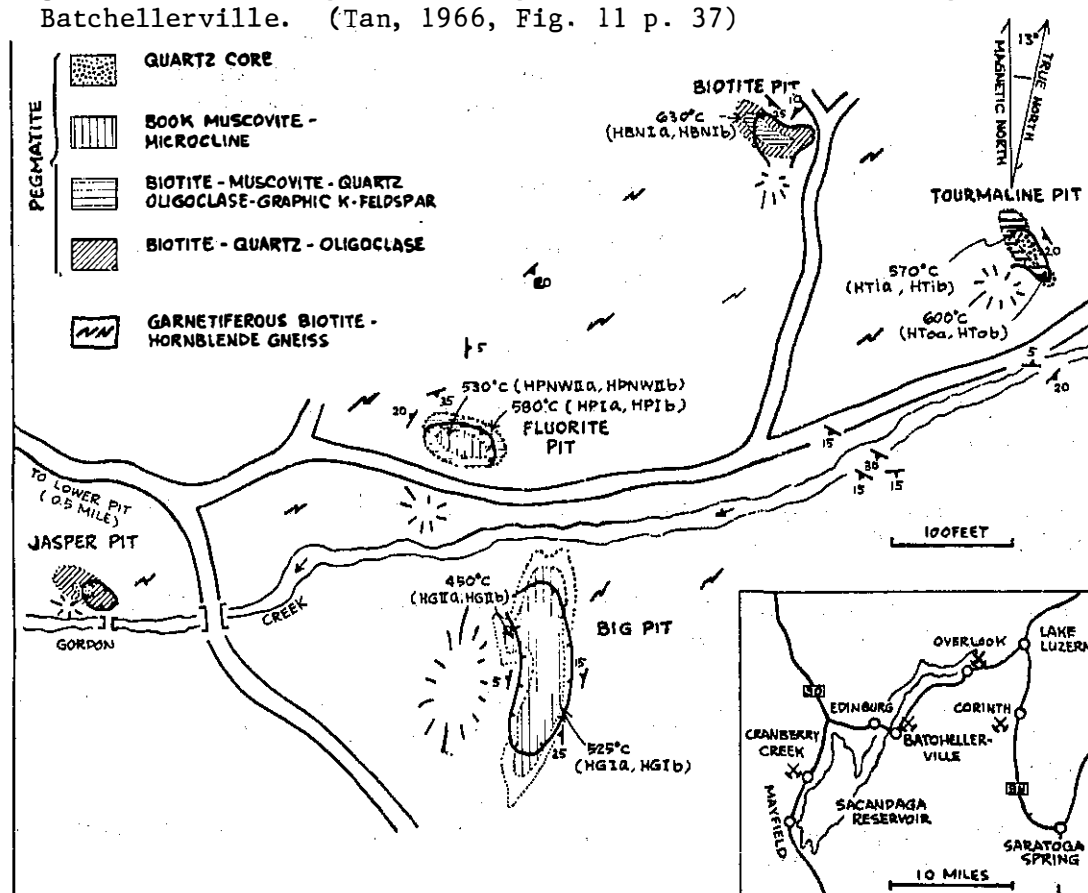


Figure 4b. Sketch map of Bit pit, Biotite pit, Fluorite pit, Jasper pit and Tourmaline pit at Batchellerville. (Tan, 1966, Fig. 12, p.38)

Modes at Lower Pit

	Zone I	Zone II	Zone III	Zone IV
Biotite	10	5		
		(chloritized)		
Plagioclase	57	5	1	
	(An 21-23)	(An16)	(An15)	
K-feldspar	10	72	80	
		(graphic)	(giant microcline)	
Muscovite	3	8	9	
Quartz	20	10	10	

In the Garnet pit, the garnet, quartz, and potassium feldspar are found in the border or wall zone (I). The garnet, which is found only here, is subhedral to euhedral and reaches 2 1/2 cm. in diameter. It is partly to completely chloritized. The composition of the garnet in the pegmatite differs from that in the country rock. In the intermediate zone (II) are allanite, biotite, plagioclase, graphic potassium feldspar, and tourmaline. The allanite is dark and altered. The tourmaline fills fissures in the feldspars. The core (III) is rose quartz. Pink xenoliths consisting of colorless sillimanite and biotite are common in this pit, although no such rocks occur in the vicinity.

Minerals and Rocks

Allanite	Apatite	Aquarmarine	Biotite
Beryl	Cerite	Garnet	Feldspar
Fluorite	Pyrite	Rose Quartz	Pink sillimanite
Uranite	Green muscovite with magnetite and hematite		

ACKNOWLEDGMENTS

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ROAD LOG FOR THE MINERALOGY OF SARATOGA COUNTY, NEW YORK

CUMULATIVE MILEAGE	MILES FROM LAST POINT	ROUTE DESCRIPTION
0.00	0.00	Start at the entrance to Skidmore College on North Broadway. Go south toward Saratoga Springs.
0.20	0.20	Turn left on East Ave.
0.55	0.35	Intersection of East Ave. and N.Y. Route 50. Turn left on N.Y. 50.
0.75	0.20	Intersection of N.Y. 50 and U.S. Route 9. Turn left on U.S. 9.
4.00	3.25	STOP # 1. Intersection of U.S. 9 and Worth Rd. Park on the shoulders of Worth Rd.
STOP # 1. WILTON GRAPHITE MINE		
		Proceed north on U.S. 9.
4.80	0.80	Intersection of U.S. 9 and Parkhurst Rd. Turn left on Parkhurst Rd.
5.10	0.30	Intersection of Parkhurst Rd. and Greenfield Rd., Saratoga County Route 36, sign points toward Greenfield. Turn left on Greenfield Rd., Saratoga County 36.
9.90	4.80	Intersection of Greenfield Rd., Saratoga County 36, and N.Y. Route 9N. Turn right on N.Y. 9N.
12.50	2.60	Intersection of N.Y. 9N and Spier Falls Rd., Saratoga County Route 25. Turn right on Spier Rd, Saratoga County 25.
17.20	5.00	Stop sign in the hamlet of Randalls Corners. Turn right on Main St., Saratoga County 25, sign points the way toward Route 9.
17.60	0.40	Intersection with Hollister Rd. on the right. Turn right on Hollister Rd.
18.40	0.80	Intersection of Hollister Rd., Clothier Rd., and Lincoln Mountain Rd. Continue straight on Lincoln Mountain Rd.
19.00	0.60	STOP # 2 - Intersection with a dirt logging road on the left. Park so that you are off the road and so that you can turn around and return the way that you came.

STOP 2. BLACK POND PEGMATITE

Turn around and return on Lincoln Mountain Rd.

19.50	0.50	Intersection of Lincoln Mountain Rd., Hollister Rd., and Clothier Rd. Continue straight on Hollister Rd.
20.40	0.90	Intersection with main road, Saratoga County Route 25. Turn left toward Randall Corners.
20.70	0.30	Stop sign at Randall Corners. Turn right on Hack Rd.
21.70	1.00	Stop sign at the intersection of Hack Rd. and Eastern Spiers Falls Rd., Saratoga County Route 24. Turn left on Saratoga County 24.
24.30	2.60	Intersection of Main St., and Palmer Ave. in Corinth. Turn right on Main St., Saratoga County 24.
24.50	0.20	Intersection of Main St., Saratoga County 24, and N.Y. Route 9N. Continue straight on N.Y. 9N.
26.10	1.60	Intersection of N.Y. 9N and Antone Rd. Turn left on Antone Rd. Antone Rd. becomes Mount Anthony Rd.
28.00	1.90	STOP # 3. Park on the right on the shoulder, there is a slight wide spot in the road here.

STOP # 3. MOUNT ANTHONY WEST PEGMATITE

Continue straight ahead on Mount Anthony Rd.

29.40	1.40	Intersection with Saratoga County Route 7, sign points to South Shore Rd. Bear left on South Shore Rd., Saratoga County 7.
33.05	3.65	STOP # 4. Park in the log loading area on the right.

STOP # 4. OVERLOOK QUARRY

Continue west on Saratoga County 7.

40.85	7.80	Enter Town of Edinburg. Continue on Saratoga County 7.
42.70	1.85	STOP # 5. Park on the left in the parking area.

STOP # 5. BATCHELLERVILLE QUARRY.

Continue west on Saratoga County 7.

45.10	2.40	Batchellerville. Intersection of Saratoga County 7 and Fox Hill Rd. Turn left on Fox Hill Rd.
53.80	8.70	Lake Desolation. Continue straight on Lake Desolation Rd., Saratoga County Route 12.
59.00	5.20	Intersection of Lake Desolation Rd., Saratoga County 12, and Middle Grove Rd., Saratoga County Route 21. Turn left on Middle Grove Rd., Saratoga County 21.
63.15	4.15	Intersection of Middle Grove Rd., Saratoga County 21, and N.Y. Route 9N. Turn right on N.Y. 9N.
65.60	2.45	Stop light, go straight on Van Dam St., do not follow N.Y. 9N.
66.10	0.50	Intersection of Van Dam St. and North Broadway, U.S. Route 9 and N.Y. Route 50. Turn left on North Broadway.
66.80	0.70	Entrance to the Skidmore College campus. End of the trip.

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