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Bannerman, Harold M.

Quarrier, Sidney S.

Schooner, Richard

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MINERAL DEPOSITS OF THE CENTRAL CONNECTICUT PEGMATITE DISTRICT

by

Harold M. Bannerman
Connecticut Geological and Natural History Survey

Sidney S. Quarrier
Connecticut Geological and Natural History Survey

Richard Schooner
Connecticut Geological and Natural History Survey

Pegmatite deposits occur in considerable profusion in various portions of the metamorphic and igneous terranes of the Connecticut Highlands, and, beginning in the early 1800's, scores of these deposits have been tested by prospectors seeking minable quantities of industrial minerals, such as feldspar, mica, quartz, and beryl, and by mineral collectors in search of rare minerals, and/or mineral specimens of unusual form and beauty. A goodly number of these operations were successful. As a consequence, the pegmatites of Connecticut have been a fairly constant source of industrial minerals for the past century and a half. They have also yielded a relatively large number of rare and unusually fine mineral specimens, many of which have found their way into museum and amateur mineral collections the world over. Connecticut pegmatites are discussed in some detail by Cameron and Shainin (1947), Cameron et al. (1954), and Stugard (1958) and this review is largely based upon these sources.

Of the several pegmatite districts in Connecticut, by far the most important is the so-called Middletown district - a 9 x 11 mile stretch of country which straddles the Connecticut River just east of the City of Middletown. This district includes parts of the towns of Haddam, Middletown, Portland, East Hampton, and Glastonbury. Its western boundary is delimited by the Triassic border fault. The east boundary of the district is indefinite and fades rather gradually into the area underlain by Monson Gneiss (fig. 1).

The district has been an important and fairly constant producer of feldspar and, to a lesser extent, of sheet mica since 1865 and it has yielded many rare minerals, some semi-precious gems, and a large number of fine mineral specimens. Well over 400 pegmatites are known to occur within the district and, over the years, a large number of them have been the scene of small mining operations for varying intervals of time. During World War II (1942-1945), under the spur of a national shortage of sheet mica and beryllium, Connecticut produced over 60,000 lbs of sheet and punch mica, and about twenty six tons of beryl. Of this, more than 87% of the mica and practically all of the beryl came from the Middleton district. Currently the district contains the only operating pegmatite plant in the state (the Feldspar Corporation mine at White Rocks, Middletown). Here the Feldspar Corporation maintains an open cut mining operation, which

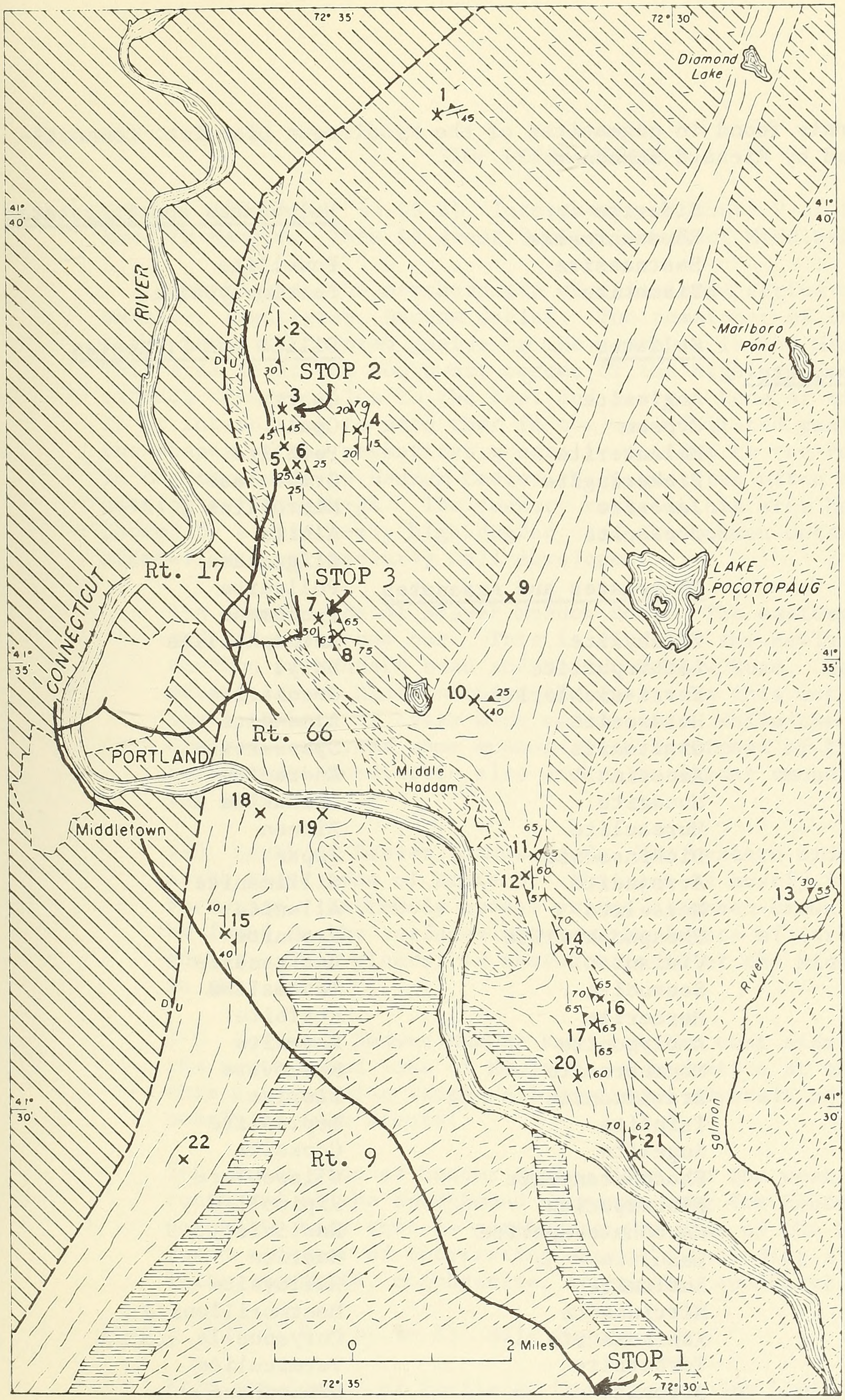
produces about 6,000 tons of pegmatite per month and a modern mill and flotation plant geared to treat the entire rock and to deliver a three-fold commercial product, feldspar, ground mica, and quartz.

Individual pegmatite deposits in the Middletown district range in size from a few inches in thickness and a few feet in length up to bodies measuring more than a thousand feet in length and 100 feet in thickness. Structurally they take on a variety of forms. In general the deposits are elongate lenses, often warped, sometimes helmet-shaped. Those bounded by schistose rocks are especially prone to swell and pinch both along the strike, and down the dip, conforming in gross detail to the trends in the schistosity of the structural rolls and convolutions in the enclosing rocks. Some of the deposits tend to taper toward the ends but many end abruptly in a bluntly rounded, boudin-shaped nose.

Pegmatites intrude all of the crystalline, schist, and gneiss rock units shown on the geologic map of the Middletown district but about 75% of all the pegmatites thus far discovered, and by far the greater number of those of a size and composition suitable to sustain a profitable mining operation, are in the so-called Bolton Schist - a coarse grained complexly folded metasedimentary unit, made up largely of biotite schist, sparingly interlayered by micaceous quartzite and amphibolitic gneiss. A few pegmatites found in the more massive gneissic rocks have been mined for mica, feldspar and some of them have also yielded a variety of other minerals but their number and their production records are relatively small.

The pegmatites of this district are granitic in composition and consist for the most part of microcline perthite, sodic plagioclase, quartz, and muscovite and commonly some biotite. Some are more or less massive with haphazard arrangement of the mineral components. Others show a consistent and systematic zoning, wherein the major mineral constituents are grouped into mappable structural units of contrasting composition. In such cases the mineral zones tend to bear a concentric relationship to each other in a manner roughly relating to the overall shape of the pegmatite body, hence roughly parallel to the walls. Beryl, black tourmaline, and apatite, magnetite and garnet are common accessory minerals. In some deposits irregularly spaced pockets, miarolitic cavities and crude vein-like structures within the main body of the pegmatite are prone to carry eohedral crystals of quartz and clevelandite, lepidolite, spodumene, amblygonite, and sometimes pollucite, vari-colored tourmaline, beryl, lithiophyllite and a number of relatively rare phosphates and other more or less unusual minerals.

A very wide variety of minerals have been recovered from these deposits. One of us (Richard Schooner) has compiled the following list of 114 mineral species reported from pegmatites in the Middletown district. Most of the quarries from which these minerals came have been idle for many years, however, and in the interim, the waste piles have been rather thoroughly combed by mineral collectors. The chances are, therefore, that most of the rare and more beautiful specimens, once exposed in the walls, or abandoned on the dumps, have long since been picked up.



EXPLANATION

TRIASSIC

Shale, sandstone and conglomerate

DEVONIAN AGE UNKNOWN

Haddam granite gneiss

Monson gneiss

Måronas granite gneiss

PALEOZOIC(?)

Hebron gneiss

Bolton schist

Middletown gneiss

45
Inferred contact, showing dip

U / D
Inferred fault; U, upthrown side; D, downthrown side

45
Strike and dip of pegmatite

65
Strike and dip of foliation

×8
Pegmatite mine or prospect with number for key to name

*7
Pegmatite from which radioactive mineral has been analyzed

LIST OF MINES AND PROSPECTS

1. Spinelli prospect
2. Hollister prospect
3. Hale quarry
4. Case prospect
5. Bordonaro prospect
6. Gotta - Walden prospect
7. Strickland - Cramer mines
8. Hale - Walker prospect
9. State Forest No. 1 mine
10. State Forest No. 2 mine
11. Markham mine
12. Reeb mine
13. Slocum prospect
14. Selden prospect
15. Toll Gate mine
16. Enegren mine
17. Anderson No. 1, No. 2 and Bailey mines
18. Consolidated mine
19. Riverside prospect
20. Rock Landing quarry
21. Gillette quarry
22. Roberts mine

Geologic boundaries slightly modified from H. E. Gregory and H. H. Robinson, and from W. G. Foye and A. C. Lane

Fig. 1. Generalized Geologic Map of the Middletown Pegmatite District. (after Cameron, 1954).

Note: A modern revision of the stratigraphy and structure of this area can be found in Lundgren (1962).

List of minerals found in pegmatites of the Middletown District, Connecticut. Compiled by Richard Schooner.

Elements

Bismuth
Sulfur
Graphite

Sulfides, Arsenides, etc.

Galena
Sphalerite
Chalcopyrite
Pyrrhotite
Bismuthinite
Pyrite
Loellingite
Marcasite
Arsenopyrite
Molybdenite

Oxides

Hematite
Pyrolusite
Cassiterite
Uraninite
Becquerelite
Fourmarierite
Vandendriesscheite
Goethite
Gahnite
Magnetite
Chrysoberyl
Pyrochlore
Microlite
Fergusonite
Columbite
Tantalite
Euxenite
Samarskite

Halides

Flourite

Carbonates

Calcite
Siderite
Rhodochrosite
Bastnaesite
Bismutite

Sulfates

Anglesite
Gypsum
Melanterite
Pickeringite
Jarosite
Copiapite

Phosphates and Arsenates

Triphylite
Lithiophilite
Ferri-sicklerite
Heterosite
Graftonite
Xenotime
Monazite
Hureaulite
Dickinsonite
Arrojadite
Messelite
Phosphophyllite
Vivianite
Scorodite
Herderite
Amblygonite
Montebrasite
Brazilianite
Triplite
Augelite
Phosphuranylite
Fluorapatite
Carbonate-apatite
Lazulite
Ludlamite
Mitridatite
Xanthoxenite
Torbernite
Autunite
Diadochite
Strunzite
Laueite

Molybdates and Tungstates

Powellite
Ferrimolybdite

Silica and Silicates

Quartz
Opal
Petalite
Orthoclase
Microcline
Albite
Oligoclase
Pollucite
Spodumene
Anthophyllite
Beryl
Cordierite
Almandite
Spessartite
Andradite
Phenakite
Zircon
Topaz
Sillimanite
Allanite
Prehnite
Bertrandite
Tourmaline
Stilbite
Bavenite
Muscovite
Biotite
Lepidolite
Cookeite
Clinochlore
Ripidolite
Kaolinite
Nacrite
Halloysite
Montmorillonite
Chrysocolla
Vermiculite
Uranophane
Sphene

STOP DESCRIPTIONS

Stop 1 (22.73 N - 66.06 E) Interchange on Route 9 at Beaver Meadow Road in Haddam. This is about 9 miles south of Middletown.

The rock at the northern tip of this large series of cuts is the massive, light-gray, Haddam Gneiss. The remainder of the alternating light and dark colored gneiss to the south is in the Middletown Formation. This area is at the southwest corner of the highly pegmatized region that extends several miles to the east and several tens of miles to the north. It is interesting to note that in the well foliated gneisses and schists, the shapes of the pegmatites generally conform to the regional structure. In the more massive Haddam Gneiss the pegmatites often exhibit cross-cutting relationships. The country rock in this area has been metamorphosed to a relatively high degree, and the common metamorphic accessory minerals are particularly well developed.

1-A North side of Beaver Meadow Road. The eastern side of the eastern most road cut. This is actually the newly blasted intersection of Hubbard Road and Beaver Meadow Road. Several small pegmatite lenses have intruded the gneiss in this cut and they contain small pockets of clear blue cordierite. While the blasting was under way last year some museum sized specimens of this mineral were recovered. Cordierite also occurs in lesser amounts in the surrounding gneiss.

1-B North of Beaver Meadow Road. The western side of the cut of the north bound lane of Route 9. This cut is mostly in the Middletown Formation. Extremely coarse prisms of green-brown anthophyllite can be found on the surfaces between the layers of dark and light colored gneiss. This mineral is characteristic of the Middletown Formation in this area.

1-C North of Beaver Meadow Road, on the east side of the cut for the south bound lane of Route 9. A pegmatite at the south end of this cut contains large well developed crystals of magnetite, some nearly an inch across.

1-D South side of Beaver Meadow Road, on the west side of the south end of the southbound entrance ramp for Route 9. The small pegmatite body that is perched on the side of the hill has produced a number of interesting minerals including albite, bismuthinite, monazite, molybdenite, tourmaline and beryl.

Stop 2 (29.02 N - 64.16 E) Hale Quarry.

From the center of Portland, Connecticut, go 2 miles east on Route 66, turn left on Route 17, and go 4.5 miles north to Isinglass Road. Go 0.2 miles to the east and the entrance to the quarry is on the right.

The Hale Quarry was first opened in 1902 and was operated until 1916 when the high cost of labor closed it down. In 1938 the quarry was re-opened and operations have continued almost until the present time. Although there is no active quarrying going on today, material from the remaining dumps is being trucked to the Feldspar Corporation's Mill in Middletown, and a great deal of brush clearing around the quarry indicates that more activity may come in the near future.

The pegmatite has intruded the contact between the Glastonbury Gneiss and the schistose rocks to the west. Its long dimension is generally parallel to the strike of the country rock but it does not conform to the dip of these rocks, and in this sense is crosscutting.

The primary purpose of this stop is to show some of the features of a zoned pegmatite. One of the most striking of these is the mammillary structures which form a wall zone on the west side of the pegmatite body. These are in a medium grained quartz, albite, mica zone with a distinct banding that is partially due to laminar concentrations of pale green mica. There is a quartz core that can be distinctly seen at the south end of the quarry. A large zonolith of schist is exposed in the east wall near the south end. Graphic granite is well developed and good specimens are available. Concentrations of tourmaline also occur in the wall zone. Jelle deBoer, of Wesleyan, is attempting to obtain some paleomagnetic poles from the hematite rich bands that can be seen in the east wall.

In the early 1940's museum specimens of uraninite, autunite, torbernite, and uranophane were removed from the quarry. The yellow stains on the west wall suggest the presence of uranium mineralization. Absolute age determinations have been made by Foye and Lane, and by Knopf (reported in Stugard, 1958), using uraninite and monazite respectively. The samples were taken from the Andrews Quarry which is just at the entrance to the Hale property. The dates calculated were 280 ± 10my (Foye and Lane) and 300 ± 10my (Knopf).

Stop 3 (25.85 N - 64.31 E) Strickland Quarry. From the center of Portland, Connecticut go 2 miles east on Route 66, turn left on Route 17 and go 1.1 miles north to Bartlett St., turn right and go 0.8 miles to the intersection of Collins Hill Rd. The entrance to the quarry is just on the other side of the road.

This quarry is owned by the International Minerals and Chemical Corp., Skokie, Ill. and permission must be gotten from them before going on the property.

The Strickland Quarry is one of the most famous mineral collecting localities in the central Connecticut area. The quarry was first opened prior to 1900 and in 1907 was leased to the Eureka Mica and Mining Co. who operated it steadily until 1937. In 1942 the quarry was reactivated

and operations continued until 1950, when all operations ceased. The early mining was primarily for feldspar, but during the 1930's considerable mica was produced. The last phase of activity produced both feldspar and mica and small amounts of beryl.

The main pegmatite body lies roughly parallel to the north - south strike of the crystalline country rock. It is composed essentially of quartz, plagioclase, perthite, and muscovite; with biotite, tourmaline, spodumene, garnet, apatite, and beryl as minor constituents. A comprehensive description of the pegmatite is given in Cameron and others (1954, p. 333-338).

For the mineral collector Strickland's reputation as a first class locality still stands, but today it takes a bit more work to find fresh material in the dumps. An excellent reference for the quarry is Zodac (1937). The various dumps that surround the main pit have been thoroughly picked over on the surface, but a little digging often turns up unexpected finds. These dumps contain enormous quantities of common pegmatite minerals, i.e. feldspars, quartz, and muscovite. Almost all of the minerals on Richard Schooner's list have been found in the Strickland area. A common technique of the local mineral collectors is to dig out a quantity of material on the main dump; let a few rain storms wash it down, then go back in and collect.

There is an excellent example of a glacial striation just away from the northeast corner of the main pit. It is about five feet long and is unusually deep.

A word of caution! The main pit, and the shaft just to the north of it have very steep sides, and it is best to stay well clear of them.

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