



GEOLOGICAL
SURVEY
OF
CANADA

DEPARTMENT OF MINES
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BERYLLIUM OCCURRENCES IN CANADA

(Preliminary Account)

Robert Mulligan

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DEPARTMENT OF
MINES AND TECHNICAL SURVEYS
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BERYLLIUM OCCURRENCES IN CANADA

INTRODUCTION

No deposits are being mined primarily for beryllium at present. Beryl is recovered from a picking belt at the Lacorne molybdenite mine but no major sales had been made by late 1959. Some years ago one or more shipments of beryl were made from the Lyndock tp. occurrences near Quadeville, Ontario. Beryl has been stockpiled in southeastern Manitoba, and a serious attempt to develop mineable deposits was made there by Dalhart Beryllium Mines and Metals Corporation in 1956 and 1957. Some beryl was recovered and stockpiled from the Moose and Best Bet properties in the Yellowknife-Beaulieu region, Northwest Territories, but there is no record of shipments having been made.

A small amount of gem-quality beryl has been selected from some of the occurrences but on the whole, conditions at known Canadian occurrences are considered unfavourable for the discovery of important gem deposits.

A publication dealing with beryllium in Canada is being prepared by the Mineral Resources Division of this Department.

This preliminary account consists of short notes on more than fifty localities where beryllium minerals have been found in single occurrences or compact groups. It is intended to give some idea of the relative potentialities of the various occurrences and in this and other ways, to supplement the information contained in Map 1045A-M2, "Beryllium in Canada" by F.M. Vokes, published by the Geological Survey in 1958. All reported occurrences that have come to the attention of the writer up to the end of 1959 are mentioned, although some are considered dubious. The notes are based on field observations by the writer and on the references cited. Laboratory investigations of material collected and further field work are planned.

The localities are described in approximate order of their distribution from west to east, as shown on the metallogenic map (Map 1045A-M2); locality numbers correspond to those on the map.

WORLD PRODUCTION, PRICES, USES, AND TECHNOLOGY

World production of beryl in 1958 (U.S. Bureau of Mines, Minerals Yearbook 1958) was 7,000 short tons; domestic production was 463 tons, and U.S. consumption was 6,002 tons—the latter a record high. The chief producers in 1958 were the Belgian Congo, Brazil, Argentina, Union of South Africa, India, U.S.A., and Mozambique.

The U.S. price for beryl containing 10-12 per cent BeO was \$46-48 per short ton of domestic production, and \$28-35 for imported.

Beryllium's main use is in beryllium-copper alloys, which are highly resistant to fatigue, corrosion, heat, and wear. Beryllium is also alloyed with nickel and aluminium. Other alloy uses are being studied and developed. Beryllium metal is used in 'cans' to hold uranium-oxide fuel in a certain type of nuclear reactor.

Beryllium oxide is used in hot-pressed and machined shapes in the nuclear, aircraft, missile, and electronic industries. It is also used in crucibles and coatings for crucibles. Natural beryl also has ceramic applications in some electrical insulators and spark plugs.

The concentration of beryl ores by flotation methods has had some success in experimental plants. Other extraction methods are under investigation.

GENERAL GEOLOGICAL FEATURES

MINERALOGY

Beryl is the most common beryllium mineral and accounts for virtually all commercial production. It occurs in granite pegmatites and high-temperature or pegmatitic quartz veins. Chrysoberyl, also a pegmatite mineral, is much rarer, and only one occurrence, on Rivière du Poste, Maskinongé county, Quebec, has been reported in Canada. Phenacite, also rare, is chiefly a pegmatite mineral, but has been found in schist. The only known Canadian occurrence is at the Height of Land mine, Preissac tp., Abitibi, Quebec. Helvite and danalite, the end-members of a complex silicate-sulphide isomorphous series, are rare beryllium minerals closely resembling garnet. They are mainly found in magnetite-rich skarns, as at Needlepoint Mountain, British Columbia, and also in pegmatite, as at the reported occurrence at Walrus Island, James Bay. Gadolinite is a rare constituent of some complex pegmatites. It has been reported from Loughboro tp., Ontario, and Shatford Lake, southeastern Manitoba.

Other rare beryllium minerals include the oxide, bromellite; the complex silicates, milarite, eudidymite, leucophanite, barylite, trimerite, euclase, and bertrandite; the phosphates, beryllonite, kolbeckite, herderite; and a borate, hambergite.

Beryllium has also been detected in significant amounts in some vesuvianite (idocrase), as in Wentworth tp., Quebec, and in small amounts in some alkali feldspars, pyroxenes, amphiboles, feldspathoids, micas, tourmaline, garnets, epidote, allanite, and chlorite.

RECOGNITION AND TESTS

The silicate minerals, beryl, chrysoberyl, and phenacite are light-coloured glassy minerals that may be difficult to distinguish from the normally associated quartz and feldspars.

They are hard, practically infusible, and not readily adaptable to simple physical or chemical tests.

The specific gravity and refractive indices of beryl are only slightly above those of quartz and the feldspars. But beryl commonly has a finely textured sparkle--sometimes described as a greasy lustre--that is rather distinctive. It generally shows some development of its

Table I
Properties of Most Common Beryllium Minerals

Mineral	Ideal Formula	Theoretical or Approximate Per Cent BeO	Form and Habit	Cleavage	Colour and Lustre	Hardness	Specific Gravity
Beryl	$\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$	14.0	Hexagonal, prismatic crystals.	None, distinct, basal parting.	Green - blue, white, colourless, rarely pink; Vitreous to greasy	7.5 - 8	2.65 - 2.8
Chrysoberyl	BeAl_2O_4	19.8	Orthorhombic, pseudo-hexagonal crystals, striated, generally tabular.	"Quite Distinct"	Green, yellow, red; Vitreous	8.5	3.5 - 3.84
Phenacite	Be_2SiO_4	45.5	Tri-rhombohedral crystals, prismatic-lenticular	Second order, prismatic, distinct.	Colourless, also yellowish red; Vitreous	7.5 - 8	2.97 - 3.00
Helvite	$3(\text{Mn, Fe})\text{BeSiO}_4 \cdot \text{MnS}$	13.6 (approx.)	Isometric-tetrahedral Octahedral	Octahedral traces	Red, yellow, brown, grey; Vitreous to greasy	6 - 6.5	3.16 - 3.36
Danalite	$3(\text{Fe, Zn, Mn})\text{BeSiO}_4 \cdot \text{ZnS}$					5.5 - 6	3.427
Gadolinite	$\text{Be}_2\text{Fe}(\text{Y, Ce, etc.})_2\text{Si}_2\text{O}_{10}$	10.3 (anal. Loughboro township)	Monoclinic, prismatic, rough, commonly massive.	None	Black; Vitreous to greasy.	6.5 - 7	4.0 - 4.5

characteristic hexagonal prismatic crystal form, a greenish or bluish colour, and has no good cleavage. Apatite is similar in colour and shape, but is softer and can be scratched with a knife.

Rowe (1952)¹ described two tests for beryl. One, the Barlow beryl-quartz test is based on the slightly higher specific gravity of beryl than those of quartz and normally-associated feldspar. In this test, small, equidimensional fragments of beryl and quartz are dropped into a tube containing bromoform or acetylene tetrabromide. A few drops of benzene are carefully poured on top, and the tube is left undisturbed for several hours. The result is a variable specific-gravity column in which the beryl fragments float at a lower level than the quartz. Benzene gradually evaporates and may have to be replenished for further tests.

The other test, known as the Specter-Brown chemical test, employs the quinalizarin reaction. This test is delicate and rather difficult for field use. A number of other chemical tests have been described in recent literature.

Phenacite is almost similar to quartz. The helvite-danalite minerals closely resemble garnet but are easily fusible, and are attacked by hydrochloric acid, giving hydrogen sulphide.

Beryllium is readily detected by spectrographic methods, and fluorimetric methods of analysis are now commonly used. A portable field instrument, the Berylometer, is being marketed in Canada by Nuclear Enterprises Ltd., Winnipeg, Manitoba. It registers neutron emission from beryllium resulting from gamma-ray bombardment by a radioactive source carried within the instrument.

MINERAL ASSOCIATION

Beryl appears to be mostly concentrated with quartz and commonly with muscovite mica in pegmatites, although in well-zoned lithium-bearing pegmatites it is mostly outside the lithium- and quartz-rich core zones. Cleavelandite, the platy variety of albite feldspar, is commonly but not everywhere prominent. Beryl occurs in some dykes in most lithium-rich areas. It is much more widely distributed than lithium but has not been found in comparable concentrations. Tourmaline is very commonly associated with beryl but is much more abundant and widely distributed. Topaz also occurs under similar conditions.

Beryl is found with molybdenite in a significant number of pegmatites and pegmatitic veins with or without tourmaline, as in the Preissac-Lacorne district, Quebec. It is associated with the tungsten mineral, wolframite, in a few places—notably at the Burnt Hill mine, New Brunswick. It is commonly present at cassiterite occurrences. Fluorite is prominent in beryllium-bearing skarns.

¹Dates or names and dates in parentheses refer to publications listed in the References.

TYPES OF DEPOSITS

Beryllium occurrences in Canada fall into two broad classes. The main class includes pegmatites, high-temperature and pegmatitic quartz veins, and disseminations in granite. High-temperature quartz veins—as in the occurrences at Burnt Hill, New Brunswick, and Jordan Falls, Nova Scotia, are here distinguished from pegmatitic quartz veins—as at the Lacorne molybdenite and Height of Land mines, Quebec—by the apparent absence of feldspar. The Pabineau Lake, New Brunswick, occurrences have been described as disseminations in granite.

The other broad class, that of helvite-danalite occurrence in contact-metamorphic or skarn deposits, is represented in Canada by the Low Grade claims, Needlepoint Mountain, British Columbia.

GEOLOGICAL SETTING

Beryllium occurs in some parts of all those regions of Canada in which the bedded rocks have been intensely deformed and invaded by igneous rocks. However, the distribution of known occurrences within these regions is not uniform; it appears that they are confined to certain sub-regions or metallogenic provinces.

Thus for example, the Cordilleran beryllium occurrences lie within the northeastern marginal belt of the Western Cordilleran region, close to the eastern limit of major granitic intrusions. The outcropping bedded rocks are nearly all of Proterozoic or early Palaeozoic age and of moderate to high metamorphic grade, but the large granitic bodies and associated pegmatites are evidently Mesozoic.

Beryllium occurrences of the western Precambrian Shield are grouped within several widely separated areas: northeast of Great Slave Lake, northwest of Lake Winnipeg, southeastern Manitoba, and western Ontario. In the eastern Precambrian Shield, beryllium occurrences are scattered, apparently indiscriminately, among Keewatin - Timiskaming, and Grenville types of basement complex. In the Appalachian region they are associated with Devonian granitic intrusions.

The number of known occurrences, although impressive, does not justify an attempt to define the favourable geological conditions in any restrictive way. In view of the known wide distribution and the difficulty in recognizing and detecting beryllium minerals, it seems probable that far more occurrences remain to be discovered than have already been found.

DESCRIPTION OF OCCURRENCES

CORDILLERAN REGION

Wolf Lake Area, Yukon Territory
(Lat. $60^{\circ}22\ 1/2'$, Long. $131^{\circ}20'$)

Map Locality 1 (GSC Map 1045A-M2).

Reference: Wolf Lake, Yukon Territory; Geol. Surv., Canada,
Map 22-1957.

Beryl was noted as scattered small pale-green crystals in a pegmatite segregation in granitic rocks of the Cassiar batholith at the above locality. The pegmatite contains pink feldspar and feldspar-quartz intergrowths up to 2 inches across, and is separated from somewhat graphic-textured granite by a zone, less than half an inch thick, of aplite with an outer, thread-like stringer of red garnet.

Beryllium in faint traces was also reported in spectrographic analyses of three specimens from two localities about 18 miles farther south. One specimen was from a tourmaline-fluorite-cassiterite quartz vein. Tungsten and tin mineralization occurs elsewhere in the map-area.

Jennings River Area, British Columbia
(Lat. $59^{\circ}59\ 1/2'$, Long. $131^{\circ}36'$)

This locality is immediately south of Wolf Lake area (above) and was reported by W.H. Poole (personal communication). Beryl occurs as small, poorly formed, rather opaque, bluish green crystals and shapeless masses. One specimen of granite contains a stringer about 2 inches long by nearly an inch wide composed mostly of beryl; some beryl is also visible in specimens of quartz.

In the general locality a number of granitic dykes 3 to 30 feet wide were found cutting altered limestone and quartzites near their contact with a granitic plug. The dykes are altered and laced with closely spaced quartz veins. Fluorite is accessory and one specimen shows wolframite in quartz attached to a piece of the granite.

Low Grade Claims, Needlepoint Mountain,
McDame Area, British Columbia
(Lat. $59^{\circ}08'$, Long. $129^{\circ}46'$)

Map Locality 2.

References: 1) McDame, B.C.; Geol. Surv., Canada, PS Map 54-10.
2) Holland, S.S.; 1956, p. 11.
3) Thompson, R.M.; Can. Mineralogist, vol. 6, pt. 1.

Helvite-danalite occurs in a magnetite-rich skarn in impure limestone near its contact with granitic rock of the Cassiar batholith. The property is at about 4,800 feet elevation, at the head of the east fork of the third mapped creek tributary to Cottonwood River east of Bass Creek. It is 2 miles northeast-by-east of the Cottonwood River bridge on the road to Dease Lake.

The discovery was made by Gerald Davis and the claims were located in 1954 by J. J. McDougall of St. Eugene Mining Corp. Ltd. No work had been done except for sampling purposes, and no claim markers were found by the writer in 1958.

A lenticular body of black skarn about 300 feet long and 35 feet in maximum width lies within a thin lens of impure crystalline limestone. It extends southeastward from the contact of the latter with granite in a creek gully, becoming narrower and passing beneath overburden. A small granite tongue lies above and parallel with the skarn. The limestone lens is overlain chiefly by argillite and underlain chiefly by blue-grey quartzites containing numerous quartz veins, all apparently dipping rather steeply to the northeast. Some patches of red and yellow gossan occur among the argillites, which are much contorted and faulted. There is, however, no evidence of a major fault along the creek bottom, which marks the contact.

The skarn is mostly black but in part banded. The massive black material is heavy and strongly magnetic, and is apparently composed largely of magnetite, with minor amounts of chlorite, garnet, and locally small irregular areas of fluorite and quartz. The beryllium mineral, classed as danalite by Thompson, is a sulphide-silicate of the helvite group, containing about 14 per cent BeO. It is red to reddish brown and similar to garnet in appearance. It occurs as individual grains generally less than 1 mm, and clusters or stringers occasionally 20 mm in length.

According to Holland, "clusters of grains are as much as 1/2 inch across, . . . it is accompanied by a few small grains of native bismuth, . . . it appears to be localized in a massive magnetite-rich core in the centre of the widest part of the skarn lens at its northwest end. . . a visual examination of the skarn indicates that the beryllium content is low, considerably less than 1 per cent".

Composite samples of material collected by the writer, but not including pieces containing visible helvite, were reported from spectrographic analyses to contain .02 and .015 per cent Be. A specimen of the carbonate-rich phase contained 0.004 per cent. Samples of slightly mineralized hornfels from three localities above the skarn showed Be in a concentration of less than 0.01 per cent. A sample of the granite in the vicinity showed no Be.

Cassiar Beryl, Horseranch Range, British Columbia
(Lat. 60° 21', Long. 128° 52')

Map Locality 3.

- References: 1) Holland, S.S.; 1956, p. 9.
2) McDame, B.C.; Geol. Surv., Canada, PS Map 54-10.

Beryl occurs in pegmatites cutting sedimentary and foliated metamorphic rocks of the Horseranch range. The property was not visited by the writer, and the following description is mainly from the report by Holland.

The property consists of 26 claims located in 1955 by Einar Hagen of Watson Lake, and others. The claims are between 5,000 and 6,000 feet elevation on the west side of the crest of the range, about 3 1/2 miles northwest of the highest peak (el. 7,300 feet). They are at the heads of three west-flowing creeks—locally known as Moosehorn, Camp, and Mica Creeks. Beryl is found in pegmatites in bluffs at the heads of the creeks, and in the talus below them.

Pegmatites ranging from a few inches to tens of feet thick intrude quartzites and mica schists in a zone 2,500 feet wide and at least 3 miles long. Most strike west to northwest parallel to the foliation of the rocks. The pegmatites are composed of feldspar, quartz, muscovite, subordinate black tourmaline, garnet, and minor beryl. Some of the narrower dykes are zoned. Beryl occurs with quartz and coarse feldspar in the core of one 12-inch dyke, surrounded by zones rich in tourmaline, garnet, and muscovite, respectively. However, most of the pegmatites are not zoned and beryl does not appear to occupy any preferred position within them.

The beryl crystals seen are a fraction of an inch across and rarely more than an inch long, and have a uniformly pale, watery-green colour. Most were seen in talus slides on the south side of the head of Camp Creek. The pegmatites were estimated to contain less than 1 per cent (maximum) BeO and to average less than 0.1 per cent.

McConnell Creek Area, British Columbia
(Lat. 56° 25', Long. 126° 07')

Reference: Lord, C.S.; McConnell Creek Map-area, Cassiar District, B.C., Geol. Surv., Canada, Mem. 251.

Beryl was identified in a block of pegmatite in a moraine near the source of Dortatelle Creek. Pink pegmatite dykes are abundant in that vicinity, cutting old schistose and gneissic rocks of the Asitka group, which is classed as "Lower Permian and (?) Earlier". The locality is near the northwest tip of a large granitic mass referred to the Ominica batholith.

Beryl crystals, up to 3/4 inch in diameter, were observed in a block of pegmatite from a dyke that was at least 3 feet wide, composed of pink feldspar and quartz with a little garnet and pyrite.

Molybdenite occurs at two localities 0.8 mile to 2 miles south, and a little chromite was found in an ultramafic plug nearby.

Findlay River Area, British Columbia
(Lat. 56° 30', Long. 124° 30' (approx.))

Reference: Dolmage, V.; Findlay River District, B.C., Geol. Surv., Canada, Sum. Rept. 1927, pt. A.

A well-developed crystal of pale bluish-green beryl was seen in a pegmatite dyke in the Butler Range, west of Findlay River. Pegmatites

occur in abundance in this region, particularly in an area about 10 miles, 5 to 10 miles south of Fort Grahame, in which a number of mica deposits have been developed. The dykes are mostly lenticular and parallel to the foliation of the enclosing old Palaeozoic and (?) Proterozoic schists and quartzites. No large granitic bodies are exposed nearby.

The pegmatites are 20 to 200 feet thick and 50 to 1,500 feet long. They are uniformly white and are composed chiefly of pink potash feldspar, smoky quartz, muscovite, and subordinate biotite, and minor tourmaline, garnet, and pyrite. Some dykes contain large crystals of high-grade muscovite. Considerable development work has been done on some of them, and small shipments of mica were made prior to 1928.

Bonanza Mine, Tête Jaune Cache, British Columbia
(Lat. 52°53', Long. 119°30')

Map Locality 4.

- References:
- 1) McEvoy, J.; Geol. Surv., Canada, Ann. Rept. 1898, vol. 11, pt. D, p. 39.
 - 2) de Schmid, H.S.; White Mica Occurrences in the Tête Jaune Cache and Big Bend Districts of British Columbia, Mines Branch, Canada, Sum. Rept. 1913, p. 42.
 - 3) Galloway, J.B.; North-Eastern District (No. 2), B.C. Dept. Mines, Ann. Rept. 1920, p. 95N.
 - 4) Lay, Douglas; North-Eastern Mineral Survey District (No. 2), B.C. Dept. Mines, Ann. Rept. 1928, p. C188.

Beryl was identified at the Bonanza mica mine, on Mica Mountain about 7 miles south of Tête Jaune Cache, and possibly in some of the other numerous pegmatite dykes in the general locality. The property is 5,300 feet above Fraser River. The dyke is about 15 feet wide where opened up. Quartz, feldspar, and muscovite are separated into large masses. The dyke dips up to 40 degrees with the schists in a direction S45°W. Mica of "excellent quality" occurs in crystals up to 18 by 11 inches, mostly near the hanging-wall; some was separated and shipped about 1898 (Ref. 1). According to information received by Johnston (1915) topaz was also found.

Fly Hill, near Salmon Arm, British Columbia
(Between Lat. 50 and 51°, Long. 119 and 120°)

Map Locality 5.

In Vokes' notes, the only reference to this reported occurrence is to "John Thornton, deceased". No further information has been found by the writer.

Mount Begbie, near Revelstoke, British Columbia
(Lat. $50^{\circ}53'1/2''$, Long. $118^{\circ}15''$)

Map Locality 6.

Reference: Jones, A.G.; Vernon Map-area, B.C., Geol. Surv.,
Canada, Mem. 296, pp. 33, 162, (1959).

Beryl occurs in a pegmatite dyke at the lower edge of the great snowfield on the northeast side of Mount Begbie, about 8 miles south of Revelstoke. It is associated with black, and a little green and red tourmaline, garnet, and lepidolite in a dyke, which is nowhere more than 5 feet wide. The pegmatites in the vicinity are considered to be of late (Mesozoic) age, cutting old meta-sedimentary rocks of the Monashee group.

The writer examined a large number of pegmatite dykes in that vicinity. Most contain abundant black tourmaline, some in crystals a foot long, with a little garnet and not much muscovite. The dykes are mostly lenticular sill-like sheets among the rather gently dipping micaceous quartzites, but some cut sharply across the bedding along what appear to be fault-fractures. One or two bodies are distinctly zoned, with continuous quartz cores. A little lepidolite was found in one dyke but no beryl or coloured tourmaline was seen. The beryl-bearing dyke reported by Jones may have been covered, as most of the ground was still covered by snow, which extended half a mile or more down below the glaciers. This was on July 31, 1959.

Woolsey Creek, near Albert Canyon, British Columbia
(Lat. $51^{\circ}07''$, Long. $117^{\circ}54''$)

Reference: Gunning, H.C.; Geol. Surv., Canada, Sum. Rept. 1928,
pt. A, p. 156.

Beryl was found by Gunning in some of the pegmatites exposed on the Snowflake Trail a short distance from the railway. The trail follows a creek—shown as Silver Creek on old maps, Woolsey Creek on recent ones—about 2 miles west of Albert Canyon. It has apparently been obliterated by a logging road. The writer found a few small exposures of pegmatite and pieces of float but no beryl and little or no tourmaline. The area is one of sedimentary gneiss and schist, quartzite and granite-gneiss, cut by granite and pegmatite. It is a matter of metallogenic interest that stannite occurs at the Snowflake mine, about 5 miles north of the railroad.

Erdahl and Pinchbeck Claims,
Duncan River, British Columbia
(Lat. 50° 34', Long. 117° 00')

Map Locality 7.

Reference: Lynott, W.J.; B.C. Dept. Mines, Ann. Rept. 1945, p. 107A.

Beryllium was detected by spectrographic methods in vein material, consisting of quartz, tourmaline, mica, amphibole, and carbonate, with scattered grains of scheelite and local concentrations of sulphides. Tin was also detected but both it and beryllium are in the range 0.04 per cent or less and their mineral forms are not recognized.

Midge Creek, Kootenay Lake, British Columbia
(Lat. 49° 22', Long. 116° 49')

Map Locality 9.

Reference: Rice, H.M.A.; Nelson Map-area, East Half, B.C., Geol. Surv., Canada, Mem. 228, p. 35, 1941.

Beryl was found in large blue-green crystals, with garnet, magnetite and black tourmaline in pegmatite dykes, which are reported by Rice to be abundant in that vicinity. The particular beryl locality is just south of Midge Creek about 1 mile from Kootenay Lake (Rice, personal communication).

White Creek, East Kootenay District, British Columbia
(Lat. 49° 56', Long. 116° 18')

Map Locality 8.

References: 1) Rice, H.M.A.; Nelson Map-area, East Half, B.C., Geol. Surv., Canada, Mem. 228, p. 33, 1941.
2) Reesor, J.E.; Dewar Creek Map-area, with Special Emphasis on the White Creek Batholith, Geol. Surv., Canada, Mem. 292, p. 44 and Map 1053A, 1958.

Blue-green beryl is reported by Rice to occur locally with black tourmaline in pegmatites along the borders of the White Creek batholith. A particular beryl locality is said to be west of peak 9,010 on the ridge between the sources of White and Skookumchuk Creeks.

Skookumchuk Creek, East Kootenay, British Columbia
(Lat. 49° 58', Long. 116° 12')

Reference: Reesor, J.E.; Dewar Creek Map-area, with Special Emphasis on the White Creek Batholith, Geol. Surv., Canada, Mem. 292, incl. Map 1053A, 1958.

Beryl occurs in pegmatite dykes cutting Aldridge quartzite and dioritic intrusions west of Burnt Creek, a tributary of Skookumchuk Creek. North of the first west fork of Burnt Creek, pegmatite is very abundant in large dykes and loose blocks. The writer found a few very pale, glassy beryl crystals in three localities. The largest was about 2 inches in cross-section with several inches of its length

exposed, but most were much smaller. Black tourmaline is abundant, and muscovite and garnet are fairly plentiful, but beryl appears to be rare. Two or three beryl crystals were also seen in pegmatite north of Burnt Creek, about 2 miles farther upstream.

Hell-Roaring Creek, East Kootenay, British Columbia
(Lat. $49^{\circ}34'$, Long. $116^{\circ}11'$)

References: 1) Rice, H.M.A.; Nelson Map-area, East Half, B.C.,
Geol. Surv., Canada, Mem. 228, 1941.

2) Leech, G.B.; St. Mary Lake, Kootenay District, B.C.,
Geol. Surv., Canada, Map 15-1957.

Beryl was found in several places in pegmatite exposed along the road to the Boy Scout property, which is about 3 miles south of St. Mary Lake. The pegmatite is part of a large mass that extends across the ridge from Hell-Roaring Creek to Angus Creek. Beryl is reported to have been found also on Angus Creek. The ground, staked as the Linda claims, is held by Harold Bennett of Cranbrook, B.C.

The pegmatite exposed along the road is white and is partly segregated into masses of feldspar and quartz. Muscovite is fairly plentiful in places and bluish black tourmaline is locally common. Small blocks and stringers of galena and some pyrite were seen; also a black stain, possibly a manganese mineral. A pocket of galena several feet in diameter is reported to be the locality where beryl was first noticed. Some cross-cuts from the Boy Scout property are said to enter the pegmatite. The beryl seen by the writer is very pale — nearly white — but boundary surfaces are commonly stained green or red. Some smaller crystals are well formed, but larger ones are irregular. The largest mass found was about 3 inches across. Most of the beryl seen was intimately associated with muscovite near the boundaries of quartz segregations.

WESTERN PRECAMBRIAN SHIELD

Yellowknife-Beaulieu District, Northwest Territories
(Lat. 62° to 63° , Long. 112° to $114^{\circ}30'$)

Map Locality 12.

- References:
- 1) Jolliffe, 1944
 - 2) Rowe, 1952
 - 3) Henderson, J.F.; Beaulieu River, District of Mackenzie, Geol. Surv., Canada, Map 581A, 1941.
 - 4) Jolliffe, A.W.; Yellowknife Bay, District of Mackenzie, Geol. Surv., Canada, Map 709A, 1942.
 - 5) Jolliffe, A.W.; Prosperous Lake, District of Mackenzie, Geol. Surv., Canada, Map 868A, 1946.
 - 6) Fortier, 1946
 - 7) Fortier, Y.O.; Preliminary Map, Ross Lake, Northwest Territories, Geol. Surv., Canada, Paper 47-16, 1947.

- 8) Hutchinson, R. W.; Regional Zonation of Pegmatites near Ross Lake, District of Mackenzie, Northwest Territories, Geol. Surv., Canada, Bull. 34, 1955.
- 9) Mulligan, R.; Lithium in Canada, Geol. Surv., Canada, Econ. Geol. Ser. (in preparation).

Beryl occurs in pegmatite dykes in numerous localities within a belt extending northwest from Hearne Channel to Duncan and Gordon Lakes, and from Prosperous Lake to Redout Lake. The bedded rocks, chiefly sediments of the Yellowknife group, are closely folded and intruded by somewhat gneissic granite and masses of younger, pegmatitic muscovite granite. Metamorphic aureoles are particularly marked around these later granite bodies. Chiefly within these aureoles lie hundreds of pegmatite dykes, ranging up to thousands of feet in length and more than 100 feet in width. Several hundred of these dykes contain rare elements including lithium, beryllium, columbium-tantalum, and tin. A regional zoning is apparent in the relative distribution of these elements, lithium-bearing dykes being generally farther from the younger granite masses than those containing appreciable amounts of beryl or columbite-tantalite. Some dykes, however, especially near Hearne Channel, are distinctly zoned internally and carry substantial amounts of lithium minerals in inner zones, with beryl and columbite-tantalite in outer intermediate or wall zones.

The writer visited only a few of the internally zoned dykes, in the course of a survey of lithium deposits. The more important beryl-bearing dykes, however, had been studied and reported on by other officers of the Geological Survey (see references), and their descriptions are summarized in the following notes.

Prelude Lake Area (Lat. 62° 39', Long. 113° 58' (approx))

Probably the most promising beryl occurrences of the district lie within an area of 10 square miles, about 2 to 4 miles north of Prelude Lake, in which Jolliffe reports 56 beryl-bearing pegmatites in a total of 100 examined. The area includes the former Dyke group of claims. Two of the pegmatites were subsequently described by Rowe (1952).

The most northerly of three deposits that were given special mention (Jolliffe's No. 1, Fig. 7, Rowe's "Riker Pegmatite") was estimated by grain measurement to contain 2 per cent beryl in one area 50 by 5 feet (Jolliffe, 1944, p. 23). Rowe (1952, p. 32) determined the percentage as 0.42 in four beryl-bearing sections totalling 101,896 square inches. Jolliffe's Dyke No. 2 measured 0.5 per cent in an area 110 by 5 feet. On what appears to be the same dyke (Lily Pegmatite) Rowe determined the percentage of beryl to be 0.44 in 58,890 square inches. Dyke No. 3 (Ref. 1) was found to contain 0.3 per cent beryl in an area 200 by 10 feet. Much of the beryl is in crystals greater than 6 inches in maximum dimension.

The dykes are reported (Ref. 2) to be distinctly zoned. Tourmaline and some tantalite-columbite are present. Lithium minerals are apparently negligible.

Blaisdell Lake Area (Lat. 62°48', Long. 113°34' (approx.))

According to Jolliffe beryl was found in 32 of nearly 50 dykes examined in this area. The dykes are up to 2,000 feet long and 10 feet wide. One dyke, 3/4 mile north of Blaisdell Lake, contains an estimated 4 per cent beryl in two sections each about 30 feet long and 7 feet wide, or 1.5 per cent in an area 240 by 7 feet. Rowe estimated two beryl-rich sections to contain 0.44 per cent in 27,648 square inches, and 1.34 per cent in 21,888 square inches.

Most of the pegmatites carry tourmaline. Some are zoned but carry no appreciable amounts of lithium minerals.

North of Blaisdell Lake (Lat. 62°50', Long. 113°34')

Several beryllium-bearing pegmatite dykes immediately southwest of "Schist Lake" form part of the ground held by General Lithium Corporation. At the east end of No. 2 dyke a few beryl crystals were found by the writer (Ref. 9), associated with spodumene and triphylite-hühnerkobellite minerals. Small white beryl crystals are also fairly common near the north wall at the west end of No. 5 dyke. They are in a cleavelandite-quartz-muscovite assemblage beyond the apparent limits of spodumene distribution.

Sproule Lake Area (Lat. 62°44', Long. 113°29')

A zone of narrow pegmatite dykes extends some 1,600 feet southeastward from Sproule Lake, on ground formerly known as the "Bore Group" and more recently (1955) as the Taco claim. Jolliffe lists beryl as a minor occurrence in ten of thirty-four dyke-sections, in white to light green crystals up to 2 inches across. Several of the dykes are well zoned. Other minerals present include spodumene, amblygonite, lithiophilite, and noteworthy amounts of cassiterite and tantalite-columbite.

Ross Lake - Redout Lake Area (Lat. 62°45', Long. 113°7' (approx.))

Several hundred pegmatite dykes cut gneissic granodiorite in the area between Ross and Redout Lakes. A regional zoning is apparent, with beryl-bearing pegmatites occurring in a median position between simple granite pegmatites on the east and spodumene-bearing dykes on the extreme west. Columbium and tantalum minerals occur in the better-zoned dykes of the western part of the beryl zone, which generally strike northeasterly across the foliation of the gneisses.

A mill was built some years ago to extract columbite-tantalite from the pegmatites on ground held originally by Peg Tantalum Mines, Ltd., and subsequently by Tantalum Refining and Mining Corp. of America, Ltd. According to company records, 3,750 pounds of concentrate was recovered by July 1947, when operations ceased.

Beryl occurs in numerous dykes in the area but not apparently in important concentrations. According to Hutchinson (p. 15) the best concentrations and largest crystals occur in well-zoned pegmatites that contain a core of quartz-perthite composition. The beryl is most abundant at the outer margins of this zone close to its contact with the next zone—generally the perthite-plagioclase-quartz-muscovite wall zone—but may also be scattered through the quartz-perthite core.

Lit 1 and 2 Claims, Buckham Lake (Lat. 62° 20', Long. 112° 40')

The above claims, formerly known as Lita 5 and 6 or "Campbell Pegmatites" (Jolliffe, 1944), cover pegmatites in a zone extending about 2,400 feet along the north shore of Buckham Lake. A few crystals of beryl were found in a zoned body known as No. 2 Pegmatite (Rowe, 1952), which also carries some spodumene and columbite-tantalite.

Lit 3 Claim (McDonald Pegmatite), Near Buckham Lake (Lat. 62° 18', Long. 112° 46')

The above claim, originally staked as Lita 1 to 4, and subsequently known as the Ramona Group, lies about 5 miles southwest of the north end of Buckham Lake. It covers a pegmatite body averaging 25 feet in width over an exposed length of nearly 400 feet (Jolliffe, 1944). The dyke is distinctly zoned. Beryl, amblygonite, lithiophilite, and tantalite-columbite occur in the upper part of a central zone that is rich in coarse spodumene. This upper part contains discrete masses of cleavelandite and quartz, with muscovite distributed along the upper contact.

Tan Group, Blatchford Lake Area (Lat. 62° 12', Long. 112° 22')

The Tan claims, formerly the Buddy and Tan claims (Jolliffe, 1944), cover four pegmatite bodies grouped around a small lake just west of "Johnson" Lake, about 1 1/2 miles east of the southeast corner of Blatchford Lake. The dykes are zoned and carry spodumene, locally amblygonite, cassiterite, and tantalite-columbite. One composite dyke—"No. 3 Pegmatite" (Rowe, 1952)—contains fine beryl crystals distributed around the margin of a pod of quartz.

Best Bet Claims, Drever Lake (Lat. 62° 14', Long. 112° 18')

The Best Bet property lies just northwest of the north-central part of a lake about 3 miles long that is locally known as Drever Lake.

A quarry 260 feet long, 20 to 26 feet wide and up to 27 feet deep, and a shallow pit 50 feet long along the hanging-wall at the north end now (1957) occupy most of the outcrop area of a dyke more than 330 feet long (Mulligan, in preparation). Most of the material removed presumably was milled at the Moose property to recover its columbite-tantalite content. The dyke is well zoned. A series of quartz pods that make up a discontinuous core contain amblygonite and coarse spodumene. Creamy-white beryl is scattered through a surrounding cleavelandite-quartz-muscovite zone. It is rather abundant in one area on the east or foot-wall side of the dyke and also in the north pit. The writer found crystals of beryl up to 6 inches in cross-section, but only a few small beryl-rich patches were seen. Beryl, found stockpiled at the Moose property, may be from the Best Bet. Columbite-tantalite occurs chiefly in the same muscovite-rich assemblage as the beryl, but was found also at the borders of coarse spodumene crystals projecting from the quartz core.

Moose Group, Hearne Channel (Lat. 62° 11', Long. 112° 13')

(References 1, 2, and 9)

The main workings and millsite are on Moose No. 2 dyke, the easternmost of two pegmatite bodies, and are immediately north of Hearne Channel, Great Slave Lake. A shaft was sunk on the dyke in 1946 and a mill built to recover columbite-tantalite. Several large open-cuts were made later, apparently mostly between 1951 and 1955, when the mill was destroyed by fire.

The dyke is about 1,400 feet long and up to 200 feet wide, and is broken into several sections. It is distinctly though irregularly zoned, consisting of microcline, cleavelandite, quartz, and muscovite. Amblygonite occurs in quartz pods that represent discontinuous cores.

Beryl occurs in white irregular crystals and masses chiefly in cleavelandite-quartz-muscovite intermediate zones, with or without coarse microcline, and commonly associated with coarse spodumene. Some beryl was seen at an open-cut 31 feet across, south of a central muskeg-covered area.

In the southern section of the dyke a quarry 36 feet across exposes a quartz-amblygonite core 13 feet wide. Irregular white beryl crystals are numerous in a cleavelandite-quartz-mica zone bordering this core. On the northern section of the dyke an open-cut 96 feet across at the face has been quarried to a depth of 30 or 40 feet below the old head-frame. Beryl is prominent with coarse spodumene in cleavelandite on the west side of a quartz-rich indefinite core area.

A few beryl crystals were also seen in a small prospect pit, 100 feet north of the shaft.

Upwards of a ton of coarse white beryl crystals are stockpiled at the main workings. No record has been found of any shipments.

Moose No. 1 dyke, about 4,800 feet west of No. 2, is about 900 feet in exposed length, and up to 34 feet thick. Amblygonite occurs in a lenticular quartz core and coarse spodumene in an inner intermediate zone. Scattered beryl crystals were seen in an outer cleavelandite-microcline-quartz-muscovite zone.

Echo Group, Tanco Lake (Lat. 62° 26', Long. 112° 11')

Several large spodumene-bearing dykes lie less than half a mile east of the east arm of "Tanco" Lake, southeast of Francois Lake. One short lenticular dyke near the lake is distinctly zoned. It contains very coarse spodumene in a rude core zone with pink cleavelandite and quartz segregations. Numerous beryl crystals up to 3 inches across were seen at the edge of the zone and also among the spodumene crystals.

Bighill Lake Area (Lat. 62° 30', Long. 114° 1/2')

A number of beryl crystals associated with cleavelandite, quartz, and abundant muscovite were seen by the writer in a short spodumene-poor section of dyke just east of Bighill Lake.

Prosperous Lake Area (Ref. 4)

Six beryl occurrences are shown on GSC Map 868A around the south end of the large granite mass east of Prosperous Lake.

Lac de Gras - Aylmer Lake District, Northwest Territories

Map Localities 10 and 11

Beryl has been reported as a minor constituent of pegmatites in a number of localities about 200 miles northeast of Yellowknife. Specific occurrences mentioned are at:

- (1) Lat. 64° 44', Long. 110° 19'; northeast of Paul Lake, Lac de Gras map-area (GSC Map 977A).
- (2) Lat. 63° 44', Long. 109° 55'; Reid Lake, Walmsley Lake map-area (GSC Map 1013A).
- (3) Lat. 63° 59', Long. 108° 32'; Aylmer Lake, Walmsley Lake map-area (GSC Map 1013A).

Herb Lake District, Manitoba

Map Locality 13.

General Reference: Crowduck Bay; Geol. Surv., Canada, Map 987A, 1950.

Beryl occurs in spodumene-bearing pegmatites in two localities near the narrows leading into Crowduck Bay, Wekusko Lake, Manitoba. The area is about 10 miles north of the settlement of Herb Lake.

Green Bay Mining and Exploration Co. (Lat. 54°51 1/2', Long. 99°38')

Reference: Mulligan, R.; Lithium Deposits of Manitoba, Ontario, and Quebec, Geol. Surv., Canada, Paper 57-3, 1956.

The property lies north of a small lake about 2 1/2 miles south-east of Crowduck Bay. The country rocks are greenstones and schists, folded on northeasterly trending axes and broken by faults. A small granitic stock lies about a mile southwest of the property.

Seven pegmatite dykes have been exposed by surface work over lengths of up to 800 feet. They strike north to northwest, obliquely across a zone that trends about N60°E for some 7,000 feet. Several of the dykes have been diamond-drilled. The main or most westerly dyke is more than 600 feet long and up to 90 feet wide. The others range up to 800 feet long but are generally narrower and irregular.

The dykes are zoned, consisting chiefly of coarse pink feldspar, mainly microcline with quartz, muscovite, some tourmaline, and a little biotite. Spodumene-quartz-cleavelandite assemblages occur interstitially to coarse feldspar in rude core-zones.

Beryl was noted only in outer zones, which consist chiefly of pink aplite and coarse feldspar, and carry most of the mica and tourmaline, plus some spodumene. The beryl is mostly in poorly formed white crystals less than 1 inch across. It was observed in only three of the dykes and is prominent only in small patches around the mid-section of the main dyke.

Sherritt Gordon Property (Lat. 54°51', Long. 99°44')

Reference: Rowe, R.B.; Lithium Deposits of Manitoba, Geol. Surv., Canada, Paper 55-26, 1956.

This property is half a mile west of the narrows of Crowduck Bay. Two pegmatite dykes cut a quartz-diorite body near its contact with biotite granite. The southernmost dyke is at least 900 feet long and averages 18.5 feet in width, according to diamond-drilling data. It is predominantly a spodumene-bearing unzoned dyke but Rowe reported finding a few small crystals of golden beryl in broken rock in a small trench.

Cat Lake - Winnipeg River District, Manitoba
(Lat. $50^{\circ}15'$ to $50^{\circ}40'$, Long. $95^{\circ}10'$ to $95^{\circ}40'$)

Map Locality 14.

- References:
- 1) Stockwell, 1938, p. 127.
 - 2) Rowe, R.B.; Lithium Deposits of Manitoba, Geol. Surv., Canada, Paper 55-26, 1956.
 - 3) Mulligan, R.; Lithium Deposits of Manitoba, Ontario, and Quebec, 1956, Geol. Surv., Canada, Paper 57-3.
 - 4) Mulligan, R.; Lithium in Canada, Geol. Surv., Canada, Econ. Geol. Ser. (in preparation).
 - 5) Manitoba Dept. Mines Nat. Resources, Mines Br., Pub. 49-7, 54-1, 55-1, 56-1.

This district lies near the Manitoba-Ontario boundary, east of Lac du Bonnet and about 80 miles northeast of Winnipeg. It is noted for the number and diversity of pegmatite-mineral deposits, many of which have been known and extensively studied since 1925. Attempts to mine tin commercially were made at one deposit at Bernic Lake and one at Shatford Lake, and small shipments of lithium minerals were made from deposits south of Winnipeg River and near Bernic Lake. Recent exploration and development of lithium deposits has resulted in improved access and has increased the number of known beryl occurrences.

Cat Lake Area (Lat. $50^{\circ}37'$, Long. $95^{\circ}27'$)

Beryl occurs as a very minor constituent of some spodumene-bearing pegmatites near Cat Lake, which is now accessible by road. At the F.D. No. 5 claim a few small beryl crystals were found in microcline-quartz-plagioclase-biotite pegmatite. At the Eagle Group (Lithium Corporation of America) just north and west of Cat Lake, small, almost white beryl crystals are common in a pink cleavelandite-quartz-muscovite-tourmaline assemblage that appears to be a distinct dyke cutting across the main spodumene-bearing zone. At the Central claims, just south of Cat Lake, pale green and white beryl crystals more than an inch wide are common in a muscovite-rich assemblage above the spodumene zone at the western limit of exposure. A few crystals were noticed in other dykes on the property.

Bernic Lake Area (Lat. $50^{\circ}26'$, Long. $95^{\circ}25'$)

At the Montgarry property near the west end of Bernic Lake, white beryl is sparsely scattered through the outermost zones of a large, flat-lying, complex, zoned dyke. This dyke also carries rich spodumene assemblages and an intermittent quartz-amblygonite core in which rich concentrations of lepidolite, pollucite, and petalite are found. A drift was being driven toward the pollucite pocket in 1959. The dyke is not exposed, but it is directly beneath the site of the old Jack Nutt tin mine; its presence was revealed by diamond-drilling for tin.

A dyke exposed across the small bay just east of the shaft contains white beryl in coarse irregular crystals and masses. This dyke has been trenched and is largely covered by broken rock. A considerable amount of beryl has probably been removed, but the original concentration is not known.

At the Buck and Coe claims, now part of Lithium Corporation of Canada's holdings at the east end of Bernic Lake, beryl occurs as a minor component of the strongly zoned lithium-bearing dykes. Another small dyke there, unzoned and without lithium minerals, carries scattered beryl crystals commonly more than 5 inches across. At the large pit on the Buck claim, a few crystals are to be found in a mica-rich upper intermediate zone composed chiefly of quartz and feldspar. The inner zones carry spodumene, amblygonite, and triphylite. The wall zone consists largely of coarse tourmaline. Other zoned dykes at depth have been indicated by diamond-drilling. Beryl also occurs in a similar assemblage in a thinner dyke exposed at the edge of a swamp about 700 feet southwest of the pit.

Shatford Lake Area (Lat. 50° 23', Long. 95° 28')

Near the east end of Shatford Lake a number of pegmatite bodies carry beryl. They are mostly in a belt of meta-volcanic rocks that extends easterly along the south shore of the lake from a point about a mile west of the east end. The ground, now held by Contact Minerals Ltd., includes the site of the old Manitoba Tin Company's workings. Most of the dykes are unzoned and consist chiefly of feldspar and quartz, with muscovite and occasional curvilammellar, purplish mica and biotite. Beryl, in crystals commonly up to 2 inches across, is fairly abundant in limited areas. A large dyke about 3,500 feet west of the east end of the lake carries beryl associated with coarse curvilammellar lithia mica and a number of other rare minerals including topaz, monazite, and columbite-tantalite. Euxenite was identified by the Manitoba Department of Mines, and a small fragment of black vitreous material was identified as gadolinite by the Geological Survey.

Winnipeg River Area (Lat. 50° 21', Long. 95° 19')

The vicinity of Greer Lake, south of Winnipeg River, was the scene of the most aggressive assessment of beryllium occurrences to be carried out in Canada in recent years. The ground, controlled by Dalhart Beryllium Mines and Metals Corp., includes the Grace, Huron, and Annie claims.

The deposits are in pegmatite dykes and stringers cutting granitic and volcanic rocks near a large stock of pegmatitic albite granite, to which the dykes are believed to be related. The stock also carries beryl in scattered quartz-muscovite segregations. The pegmatites are characteristically pink, and lack important lithium minerals, although the latter are prominent in a zoned dyke on the Bob (Silverleaf) claim nearby.

At the Huron claim, famed as the source of the uraninite from which the great age of Canadian Precambrian rocks was first established, yellow-green beryl in crystals up to 18 inches across is quite abundant in the sides of a pit that exposes a flat-dipping coarse pegmatite body. Crystals of columbite-tantalite are also common. Cleavelandite-feldspar, black quartz, tourmaline, and some mica are associated with the above minerals.

On the Grace claims, and elsewhere on the property, some rich pockets of beryl have been found but are apparently quite limited in extent. The following estimated reserves have been reported (Northern Miner, Aug. 8, 1957, p. 3):

- No. 1 Zone—266, 666 tons, 0.5 per cent beryl over 800 by 20 by 200 feet deep.
- No. 6 Zone—0.63 per cent.
- No. 9 Zone—0.48 per cent, 400 by 20 feet.

At that time 20 tons of beryl were reported to be stock piled, in addition to an unstated quantity of "milling ore".

Other beryl occurrences have been described on the Clare No. 1, Captain, and Top of the World claims and elsewhere in the vicinity of Winnipeg River.

East Braintree-West Hawk Lake District, Manitoba
(Lat. 49° 39', Long. 95° 28')

Map Locality 15.

- References:
- 1) Rowe, R.B.; Lithium Deposits of Manitoba, Geol. Surv., Canada, Paper 55-26.
 - 2) Mulligan, R.; Lithium Deposits of Manitoba, Ontario, and Quebec, 1956, Geol. Surv., Canada, Paper 57-3.
 - 3) Springer, G.D.; Manitoba Mines Branch, Publ. 50-6.

The locality given above is approximately that of the Lucy and Artdon claims, on which the only noteworthy beryl occurrences have been reported. The showings are about half a mile north of the Trans-Canada Highway at a point 6.6 miles east of the East Braintree turnoff, or about 80 miles east of Winnipeg.

On Lucy No. 1 claim Springer reported small and scattered beryl crystals in a dyke that has abundant black and bluish tourmaline in an outer zone enveloping a thin lenticular quartz-spodumene pod. The writer found no beryl there, but did find a few loose fragments near a water-filled pit, about 300 feet farther north.

On the adjoining Artdon No. 2 claim, Springer reported beryl with spodumene in a dyke about 60 by 10 feet in exposed dimensions.

Western Ontario

English River (Lat. $50\ 1/4^\circ$, Long. $94\ 1/2^\circ$ (approx.))

Reference: Stockwell, 1938, p. 127.

Stockwell noted a few small crystals of beryl in a large pegmatite dyke on the east shore of English River 2 miles northwest of Separation Rapids, and in a small dyke cutting sediments 3 miles west of Oneman Lake.

Medicine Lake, Tustin and Bridges Townships (Lat. $49^\circ 51'$, Long. $93^\circ 46'$)

This property, owned by E. Zabeski of Kenora, is on the east shore of Medicine Lake in Tustin Township, about 35 miles east of Kenora. Pegmatite-streaked granite extends at least 500 feet south of a contact with greenstone. An area about 1,000 feet long adjoining the contact has been stripped and a number of trenches blasted out. The pegmatite phases consist of coarse, blocky, white and grey perthite crystals and large irregular masses of grey and smoky quartz, with some biotite and muscovite.

Beryl was found in noteworthy amount in two places. One about 40 feet long, near the cabin 200 feet from the lakeshore, contained a number of stained, altered-looking crystals along a shallow trench. The other, just west of the road, about 300 feet farther east, contained several well-formed yellow crystals up to 2 inches across. They are associated with black quartz, cleavelandite, muscovite, and red and black garnet. A few crystals of beryl were also seen in a trench east of the road.

Zealand Township (Lat. $49^\circ 49'$, Long. $92^\circ 44'$)

Map Locality 16.

Reference: Satterly, J.; Geology of the Dryden-Wabigoon Area, Ont. Dept. Mines, Ann. Rept. 50, pt. 2, p. 55

According to Satterly small green crystals of beryl were found in samples of pegmatite from lot 17, con. VII and VIII, about 10 miles east of Dryden. In this vicinity, the writer found numerous large and small pegmatite-granite and quartz veins with contorted banded structures and abundant black tourmaline, but saw no beryl. Some beryl is said to occur also in tourmaline-rich pegmatites northwest of Ghost Lake, about 3 miles farther northeast.

Turtle Lake, Rainy River District (Lat. 48°57', Long. 91°58')

Map Locality 17.

- References:
- 1) Quetico (west half), Rainy River district; Geol. Surv., Canada, Map 534A, 1939.
 - 2) Tanton, T.L.; Mineral Deposits of Steeprock Lake Map-area, Ontario, Geol. Surv., Canada, Sum. Rept. 1925, pt. C, p. 10.

According to Tanton translucent yellow-green crystals of beryl up to 2 inches long are unevenly distributed in a pegmatite dyke composed of quartz, micropertthite, dark mica, and minor garnet.

Lake St. Joseph Area (Lat. 51°, Long. 91° (approx.))

Map Locality 18.

- Reference: Bruce, E.L.; Iron Formation of Lake St. Joseph; Ont., Dept. of Mines, Ann. Rept., 1932, XXXI, pt. 8, p. 20, 1923.

According to Bruce one beryl crystal was found in the area, which has abundant pegmatite dykes along the south margin of a granite mass.

Caribou-Pikitiqushi Area (Lat. 50°33', Long. 88°50' (approx.))

Map Locality 19.

- Reference: Gussow, W.C.; Geology of the Caribou-Pikitiqushi Area; Ont. Dept. of Mines, Ann. Rept. 1940, vol. XLIX, pt. 6, p. 5, 1942.

This locality is Linklater Lake, through which the outcrop belt of the Linklater quartzite passes. According to Gussow the formation is cut by numerous quartz veins, and granite and pegmatite dykes containing microcline, muscovite, minor tourmaline, and garnet, and, rarely, beryl.

Saga Lake (Lat. 50°41', Long. 86°52')

Map Locality 20.

- Reference: Moore, E.S.; Goudreau and Michipicoten Gold Areas, District of Algoma; Ont. Dept. Mines, Ann. Rept. 1931, XL, pt. 4, p. 82.

Pegmatites occur in abundance in parts of the Kowkash-Ogoki map-area and commonly carry tourmaline. Beryl is said to occur sparsely in some of the dykes near Saga Lake.

Nipigon-Orient Bay Area (Lat. 49° 15', Long. 88° (approx.))

Map Locality 21.

Two pegmatite bodies in the area carry beryl. They lie within a large granite mass south of the main lithium deposits of this district.

At the MNW property, beryl is scattered fairly consistently through an intermediate zone that envelops a core of quartz-spodumene. It is associated with muscovite, cleavelandite, and quartz. Crystals an inch or two across are common; one mass 18 by 14 inches in exposed dimensions was seen.

At the Swanson property several areas of pegmatite are exposed in a steep-walled ravine. No definite dyke boundaries were seen. There is no suggestion of banding or zoning in the exposed areas although beryl seems to be restricted mainly to irregular pockets. These consist chiefly of pink-stained cleavelandite feldspar, quartz, and muscovite, with fairly abundant black tourmaline and masses of black friable material, part of which is hühnerkobellite. The beryl is largely stained and coated by black and greenish material and much of it is apparently altered. Crystals up to 2 by 12 inches were noted.

EASTERN PRECAMBRIAN SHIELD

Eastern Ontario

Calvin Township (Lat. 46° 15', Long. 78° 53')

Map Locality 23.

- References:
- 1) Hoffmann, G.C.; Geol. Surv., Canada, Ann. Rept. 1898, vol. 11 (new ser.), p. 14R.
 - 2) Ellsworth, 1932.
 - 3) Barlow, A.E.; Geol. Surv., Canada, Ann. Rept. 1897, vol. 10, (new ser.), p. 63I, 1899.

Beryl occurs in a pegmatite dyke just south of the road on lot 13, con. IV. The dyke strikes about north and has been opened up by pits and trenches, now partly filled, over a length of about 200 feet. It cuts the foliation of enclosing granitic gneiss almost perpendicularly. The dyke is composed of coarse, pink and white feldspar with quartz in irregular segregations and veins, and some muscovite. In the second pit from the north end, cleavelandite shows above the water-line, with abundant black tourmaline, quartz, and segregations of fine-grained garnet. One beryl crystal, yellow-green in colour and more than 1 inch across was found in the rim of rock between the second and third pits, and several cavities show the shape of crystals previously removed.

Beryl was also reported (Barlow, 1899) to be present in a dyke about a mile northwest of Eau Claire station. Ellsworth (1932)

described an occurrence of euxenite and polycrase in a dyke on lot 19 or 20, con. IX, possibly the same locality, but did not mention beryl.

A small amount of beryl is also reported to have been found at the old Purdy Mica Mine (lat. 46° 19', long. 78° 54') in Mattawan tp., about 3 miles north of Eau Claire.

Conger Township, Parry Sound District (Lat. 45°, Long 80° (approx.))

Map Locality 24.

Reference: Ellsworth, 1932, p. 171.

According to Ellsworth a few specimens of massive, greenish-blue beryl and several smaller crystals were found on lot 5, con. B in a pegmatite dyke carrying thucolite and other radioactive minerals.

Henvey Township, Parry Sound District (Lat. 45° 48', Long. 80° 32')

Reference: Spence, H.S.; Pegmatite Minerals of Ontario and Quebec; Am. Mineralogist, vol. 15, p. 513, 1930.

According to Spence beryl was reported to occur in small amounts at the old Besner feldspar mine about 2 miles northeast of Britt station.

Monmouth Township, Haliburton County

Map Locality 25.

Reference: Satterly, J.; Mineral Occurrences in the Haliburton Area; Ont. Dept. Mines, Ann. Rept., 1943, vol. LII, pt. 2, p. 85, 1943.

This locality is apparently that of the reported radioactive occurrences on lots 15 and 17, con. XII, about a mile northwest of Tory Hill. According to Satterly hornblende-syenite pegmatites are cut by calcite-apatite veins. No uraninite or rare-element minerals were found. A variety of rare elements including beryllium were reported by the owners.

Lyndock Township, Renfrew County (Lat. 45° 20', Long. 77° 24')

Map Locality 26.

Reference: Hewitt, D.F.; 1954, pp. 36, 42.

The two main beryl occurrences of the area—one on lot 23, con. XV, and one on lots 30 and 31, con. XV— have been thoroughly

described and shown diagrammatically by Hewitt. The ground is held by Canadian Beryllium Mines and Alloys Ltd.

On lot 23 a large T-shaped open-cut was made some years ago from which some beryl was shipped. A considerable amount of beryl is to be seen in a large bin of stockpiled material on the property. The lower arm of the cut was full of water in 1958, and the floor of the upper part was nearly covered by fine broken material and soil, in which trees over 15 feet high were rooted. Beryl was seen by the writer only in one small, bare, floor area about 3 feet long. This appears to be near the east end of the quartz core. The beryl here is in dark blue-green, altered-looking crystals associated with quartz, cleavelandite, and red perthite. Some other patches of quartz and cleavelandite carry tourmaline but not visible beryl. A little shiny black material, probably euxenite, was seen near the centre of the upper pit. Cyrtolite, allanite, and columbian anatase have also been identified.

On lots 30 and 31 old workings occupy most of a length of about 600 feet of an irregular pegmatite body, from which several hundred tons of feldspar have been quarried at various times. About 29 tons of beryl are said to have been recovered from stockpiled ore and sold in 1950. The texture of the dyke is variable. Very coarse segregations of pink microcline perthite and quartz characterize the western part. One large pod consists chiefly of rose quartz, apparently part of an irregular quartz core. According to Hewitt beryl was found only in the east workings, where the main pit is now largely covered by debris and heavily overgrown. Most of the beryl formerly exposed in the walls has probably been removed. Small crystals were found by the writer, however, in several places in small quartz segregations among pink perthite where pegmatitic material grades into granitic country rock on the north side of the main pit. Other minerals that have been identified from these workings include euxenite and columbite.

Hewitt lists several other reported beryl occurrences in the area, but states that he was unable to find any beryl in them.

Madoc Township, Hastings County (Lat. 44 1/2°, Long. 77 1/2° (approx.))

Map Locality 27.

- References:
- 1) Johnston, 1915, p. 40.
 - 2) Rose, E.R.; Iron Deposits of Eastern Ontario and Adjoining Quebec; Geol. Surv., Canada, Bull. 45, p. 74, 1958.

Johnston only states "A small crystal of beryl was found in Madoc I-IV". No reference is given and no other reference to the occurrence has been discovered.

Faint traces of beryllium were detected in spectrographic analyses of granite and rhyolite from near Madoc (Rose, 1958).

Loughboro Township, Frontenac County (Lat. 44° 28', Long. 76° 33')

Map Locality 28.

Reference: Ellsworth, H.V.; 1932, p. 232.

Gadolinite, a beryllium-bearing rare-earth mineral, was identified in the form of a single specimen weighing about 1/4 pound from a pegmatite dyke formerly worked for feldspar on lot 11, con. IX, about 2 miles west of Perth Road station. A few small specimens of euxenite were also found but no more gadolinite, and operations ceased soon afterwards. The dyke was said to be typical of those mined for feldspar in the region, and to have no especially noteworthy features.

Western Quebec

Walrus Island, Paint Hills Group, James Bay (Lat. 52° 56', Long. 79° 00' (approx.))

Map Locality 22.

References: 1) Johnston, 1915, p. 83.
2) Hoffman, G.C.; Geol. Surv., Canada, Ann. Rept. 1899, vol. 12 (new ser.), p. 15R.

According to Johnston "Danalite has been observed in small crystals in a vein composed of orthoclase, spodumene, and quartz cutting syenite" at the above locality. The identification was apparently made on the basis of physical and chemical properties described in ref. 2.

Preissac Township, Abitibi County (Lat. 48° 25', Long. 78° 21')

Map Locality 29.

References: 1) Ellsworth, 1932, p. 247.
2) Norman, 1944.
3) Rowe, 1953.

Phenacite is associated in minute quantities with beryl at the old Height of Land molybdenite mine on lot 22, rge. X, about a mile north of Preissac village. This is the only known occurrence of this mineral in Canada. The old workings are scattered along the west bank of Kinojevis River, which passes through the western limit of the Preissac-Lacorne batholith at that locality. According to the old descriptions (Ellsworth, 1932), dykes of granite and pegmatite occur in a zone varying up to 90 feet in width along the river-bank. The dykes are said to be up to 15 feet wide and to be cut by molybdenite and bismuthinite-bearing quartz veins, one of which is 15 feet wide at the site of the shaft in the southern part of the property.

The writer found the old shaft and dump now thickly overgrown and covered by decayed vegetation. About 100 pounds of beryl-rich material was found during a couple of hours digging in the dump. A number of crystalline aggregates contained individual crystals several inches across. The beryl is partly fresh, translucent, bright green in colour, partly yellowish or bluish altered-looking material. Some is associated with cleavelandite-type feldspar and muscovite; some is isolated in quartz. Molybdenite is in scattered books, also with cleavelandite, muscovite, and quartz. At one point, what appears to be the in-place contact between quartz and granite is just exposed.

No veins or dykes on the property were found to be well exposed. At the old north workings a large trench is largely filled and heavily overgrown. This is presumably the locality where the phenacite-bearing material was collected. No beryl was found by the writer and no phenacite recognized in preliminary superficial examination of specimens collected.

Beryl has been reported (Rowe, 1953) to occur also in minor amounts at several other localities along the contact zone of the Preissac-Lacorne batholith, in Preissac, Villemontel, Figury, and La Motte townships.

Lacorne Township, Abitibi County (Lat. 48° 17' to 48° 26', Long. 77° 47' to 78° 00').

Map Locality 30.

- References:
- 1) Tremblay, 1950.
 - 2) Rowe, 1953.
 - 3) Mulligan, R.; Lithium Deposits of Manitoba, Ontario and Quebec, 1956, Geol. Surv., Canada, Paper 57-3.
 - 4) Quebec Dept. Mines Pub. S32, and maps, Lacorne Township.

As in Preissac and adjoining townships, beryl occurs in pegmatite bodies that are related to the Preissac-Lacorne batholith, and are most numerous in Lacorne tp. Most of these pegmatites are within or marginal to a muscovite-bearing granite mass, unlike the spodumene deposits, which are more commonly marginal or exterior pegmatites. The latter, as at the Quebec Lithium mine, rarely carry significant amounts of beryl. Three localities are selected for special mention here.

At the Lacorne molybdenite mine, in the southwest corner of the township, several hundred pounds per month of beryl have been recovered from a picking belt. The beryl is deep blue-green and occurs in compound crystal masses up to a foot or more in maximum dimension. It occurs in an "east-west" set of veins, generally on the foot-wall associated with cleavelandite, muscovite, and quartz. The writer understands that these veins now provide most of the ore from which molybdenite and bismuthinite are recovered. Some beryl has been sold for mineral specimens but most is stockpiled.

The Massberyl property, in the southern part of rge. VIII, was mapped and described by Rowe in 1952 and has been considered the most promising beryl property in the region. According to Rowe three main pegmatite bodies occur in an area 1,000 by 500 feet. One body 880 by 20 feet was estimated to contain 0.03 per cent of exposed beryl with 0.87 per cent in one beryl-rich area of 14,400 square inches. Another body, 760 by 20 feet, was estimated to contain 0.15 per cent beryl at the surface, with 3.09 per cent in a beryl-rich area of 13,824 square inches. A third beryl-rich area of 16,704 square inches in a smaller body contained 0.63 per cent beryl.

An area about 550 by 200 feet has been cleared and extensively trenched. Beryl crystals up to 6 inches in cross-section are to be found here and there, but no such concentrations as described by Rowe are apparent. It seems likely that most of the beryl that was exposed in the various trenches has been removed. The beryl seen is mostly in and near quartz stringers and segregations in coarse perthitic pegmatite. Most is associated with muscovite. The quartz stringers and pods, especially in the northwest part, appear to represent intermittent cores in rudely zoned pegmatitic segregations.

At the Valor property, in the southern part of lot 22, rge. VIII, a zoned pegmatitic segregation some 400 by 75 feet, as exposed, cuts granitic country rock. Coarse spodumene is embedded in a cleavelandite-quartz-lepidolite aggregate in an irregular core zone about 125 feet long. This is commonly separated from coarse perthitic pegmatite and granite by banded aplite, and beryl is mostly distributed along these contact zones in narrow bands rich in muscovite and quartz. It is in pale-green crystals, commonly several inches across, and fairly abundant in a few small areas. Beryl also occurs in rare, almost white shapeless masses among the spodumene crystals in the core assemblage. A little was also seen in other small pegmatite bodies on the property. The caesium mineral pollusite also occurs on this property.

Abitibi-Temiscamingue Area (Lat. 48°, Long. 77 to 79° (approx.))

Map Localities 31 and 32.

- References:
- 1) Freeman, P. V.; Béraud-Mazerac Area, Rouyn-Noranda Abitibi East Electoral Districts, Quebec Dept. Mines, P.R. 340, 1957.
 - 2) -----, Darlens-Chabert Area, Rouyn-Noranda Electoral District, Quebec Dept. of Mines, P.R. 341, 1957.
 - 3) Denis, B. T.; Sabourin Map-area, Temiscamingue County, Quebec Bur. Mines, Ann. Rept., 1934-C, 1935.
 - 4) Tiphane, M. and Dawson, K. R.; Villebon; Geol. Surv., Canada, Map 998A., 1950.
 - 5) MacLaren, A. S.; Kenojevis, Temiscamingue County, Quebec, Geol. Surv., Canada, Paper 52-6.

This area comprises a broad contact zone that extends roughly along the 48th parallel (the Abitibi-Temiscamingue county boundary, in part) between the so-called Pontiac schists and the large granitic area that extends to the south. A large number of minor beryl occurrences have been reported, most of which are mentioned in the references listed.

In Montanier tp., at about lat. 48° 06', long. 78° 30', on the Rapide II road a zoned dyke carries spodumene in a discontinuous core zone composed of quartz-rich pods. Beryl occurs as scattered pale-green crystals up to 4 inches long. It is associated with muscovite and black tourmaline, mostly in interior parts of the dyke; none was seen in the quartz-spodumene pods.

The other occurrences are described as follows in the references:

- (1) Scattered crystals associated with segregations of quartz in pegmatite at:
 - (a) a small island in Mourier Lake (Desroberts tp.).
 - (b) 1 1/2 miles east of Mourier Lake, in rge. VIII, Desroberts tp.
 - (c) a small island just south of Carriere Bay in rge. IX, Jourdan tp.
 - (d) rge. IX, Chabert tp.
 - (e) quartz vugs in Pontiac schist near pegmatite on Rapide 7 road east of Ferguson Lake (Beraud tp.).
- (2)
 - (a) small crystals in thin quartz veins cutting pegmatite on lot 1, rge. IX-X, Darlens tp.
 - (b) one large crystal in pegmatite on lot 40, rge. V, Basserode tp.
- (3) Crystals of beryl were found at "three widely separated localities" in Sabourin map-area, which includes the townships of Laubanie, Sabourin, and Marrias.
- (4) Beryl occurs locally with tourmaline in muscovite pegmatite west of Grand Lake Victoria (Granet tp.).
- (5) Pegmatites in Bellecombe tp. carry some spodumene, beryl, and molybdenite, but no economic deposits of these minerals have been found.

Delbreuil Township, Temiscamingue County (Lat. 47° 41', Long. 78° 36')

Beryl occurs in several localities in a massive pegmatitic body near the northeast corner of Lac Expanse (Lac Simard), on claims held by R. Legault of Lorraineville, Quebec. One trench in micropegmatite-aplite shows a few green crystals of beryl; nearby a patch of pinkish quartz about 5 feet in diameter has about a dozen green to white crystals in cleavelandite around its edge. At another locality a few scattered crystals of beryl occur with muscovite bursts in pink micropegmatite.

At the main showing an L-shaped trench measures about 40 and 15 feet on the limbs and about 10 feet in width. About 80 crystals are

exposed in pockets and as single crystals ranging up to 1.6 by 0.6 feet exposed area, and many others, perhaps a majority, are several inches across. They occur in feldspar, in dark grey quartz, and in the interstices. Most are associated with muscovite. The feldspar is pink and perthitic-looking, in part in micropegmatite intergrowths, up to 4 feet long. Quartz is in irregular segregations. Little or no cleavelandite was seen and no zoning or systematic distribution of beryl is apparent. A little spodumene, also occurs in limited areas that are apparently pockets distributed at random in the large pegmatitic mass on which the claims are located.

Robertson Township, Labelle County (Lat. 46° 30', Long. 75° 33')

Map Locality 33.

- References:
- 1) Aubert de la Rue, E.; Nominique and Sicotte Map-areas, Labelle and Gatineau Counties, Quebec Dept. Mines, Geol. Rept. 23, 1948.
 - 2) ----- Kensington Area, Gatineau and Labelle Counties, Quebec Dept. Mines, Geol. Rept. 50, 1953.

This locality is on lot 25, rge. IV, at the north end of Lac des Isles, about 7 miles by road southwest of Mont Laurier. A pegmatite dyke is poorly exposed in a trench, about 40 feet long and more than 10 feet in maximum depth. The trench is now mostly covered with debris and partly overgrown. The property is held by Mr. Phras Arbic of Mont Laurier.

No beryl was found by the writer in this locality nor was any found by Aubert de la Rue, but it is considered probable that beryl has been found here, as stated in old reports. The property has been known for many years and development work has been done for feldspar and for mica.

The dyke is composed of white feldspar, quartz, and muscovite with plentiful black tourmaline and garnet. It appears to grade imperceptibly into granitic country rock on the west but more quartz-tourmaline pegmatite is exposed just beyond and also on top of a hill about 1,000 feet west, the intervening exposures being of contorted granitic gneiss.

Campbell Township, Labelle County

Map Locality 34.

The writer has not been able to find any authentic reference to a beryl occurrence in Campbell tp.; the report cited on the map may refer to the occurrence in Robertson tp.

Villeneuve Mine, Villeneuve Township, Papineau County, (Lat. 45°50', Long. 75°36')

Map Locality 35.

Reference: Ellsworth, 1932, p. 240.

The Villeneuve Mine, on lot 31, rge. I, about 20 miles north of Buckingham, is in a large pegmatite body. It has been worked extensively for mica and feldspar and still presents plenty of clean rock exposure. Beryl has been listed among a variety of accessory minerals found in the dyke, which consists chiefly of coarse white microcline and albite with abundant muscovite and black tourmaline. No beryl was found by the writer in the exposed faces or in the dump material examined.

Wentworth Township, Argenteuil County (Lat. 45°51', Long. 74°28')

Map Locality 36.

Reference: Osborne, F.F.; Lachute Map Area, Quebec Bur. Mines, Ann. Rept. 1936, pt. C, p. 25, 1937.

This locality is Laurel, Quebec, near which beryl and leucophane were reported to have been found (Financial Times, Feb. 10, 1939). Osborne states that a number of beryl claims had been staked in the vicinity. He found no beryl but beryllium was detected in "small amount" in vesuvianite from near Laurel.

Brassard Township, Berthier County

Map Locality 37.

This locality is in error, and actually refers to the Maisonneuve mine.

Maisonneuve Mine, Maisonneuve Township, Berthier County (Lat. 46°46', Long. 74°04')

Map Locality 38.

Reference: Ellsworth, 1932, p. 248.

A pegmatite on lots 1 and 2, rge. II, about 10 miles northwest of St. Michel des Saints was developed many years ago as a mica mine. Ellsworth reports the finding of one good-sized crystal of beryl in place on the surface of the dyke, which consists chiefly of microcline, quartz, iridescent plagioclase, muscovite, biotite, tourmaline, and garnet. Samarskite is a common accessory mineral.

Rivière du Poste, Maskinongé County (Lat. 47°, Long. 73° 50' (approx.))

Map Locality 39.

References: 1) Johnston, 1915.
2) Evans, N.N.; Chrysoberyl from Canada, Am. J. Sci., vol. XIX, ser. 4, p. 316, 1905.

Chrysoberyl was identified by Evans in material supplied by F.D. Adams from a point "1 mile below the junction of streams from Lac Long and Lac Clair". Great dykes and veins of pegmatite consisting of quartz, orthoclase, and muscovite, with black tourmaline, are said to cross the river at that point.

Central and Eastern Quebec and Labrador

Taché Township, Chicoutimi County (Lat. 48 1/2°, Long. 71 1/2°)

Map Locality 41.

Reference: Ellsworth, 1932, p. 252.

Beryl was found by Ellsworth in dump material from a pegmatite body on lot 13, rge. V, worked for mica prior to 1923. Topaz was also found, in greater abundance than beryl. Both are greenish and in masses 2 or 3 inches in diameter. Cleavelandite feldspar is prominent and a little amazonstone, solid hydrocarbon, and radioactive brownish material were noted.

Kenogami Township, Chicoutimi County (Lat. 48 1/2°, Long. 71 1/2° (approx.))

Map Locality 41.

Reference: Ellsworth, 1932, p. 254.

Two small greenish beryl crystals 1/4 inch in diameter and between 1 inch and 2 inches long were found by Ellsworth in a small pegmatite stringer on lot 1, rge. II.

Jonquière Township, Chicoutimi County

Map Locality 41.

Reference: Ellsworth, 1932, p. 253.

Ellsworth investigated a reported beryl occurrence on lot 21, north range, but was unable to find any beryl in pegmatite examined in that vicinity.

Mine du Lac Pied des Monts, Lacoste (?) Township, Charlevoix County

Map Locality 40.

- References:
- 1) Obalski, J.; Mining Operations in the Province of Quebec for the year 1901, Quebec Dept. Col. Mines, p. 21 (French Ed.) 1902.
 - 2) de Schmid, H.S.; Feldspar in Canada, Canada Mines Branch, pub. 401, p. 45, 1916.
 - 3) Ellsworth, 1932, p. 250.

According to Obalski a few small crystals of beryl were found in pegmatite that was worked for mica prior to 1908. De Schmid states that the locality de Sales tp. was given in error by Obalski. It is about 17 miles northwest of La Malbaie.

Lac Xavier Mica Mine, Harvey Township, Chicoutimi County

Map Locality 42.

According to information on file at the Quebec Department of Mines a few crystals of beryl were found on the dump of the Lac Xavier mica mine, where a dyke 5 to 7 feet wide and exposed for 130 feet, cuts anorthosite, and consists of glassy quartz, pink feldspar, garnet, and muscovite.

McGie Mica Mine, Bergeronnes Township, Saguenay District

Map Locality 43.

Reference: Ellsworth, 1932, p. 294.

Beryl crystals up to 3 inches in diameter were reported to have been found in a pegmatite dyke several hundred feet long and 15 to 75 feet wide. The occurrence is in block G, north of Point aux Sauvages.

Small crystals of beryl were reported to occur sparingly also in some old mica workings north of Tadoussac.

Grande Watshishow River, Druccourt and Johan Beetz Townships, Saguenay District (Lat. 50° 16', Long. 62° 43' (approx.))

Map Locality 44.

Reference: Longley, W. W.; North Shore of the St. Lawrence, Mingan to Aguanish, Que. Dept. Mines, P.R. 184, p. 14, 1944.

Longley has reported a few beryl crystals in pegmatite at the following three localities:

- 1) On an island off the point on the southeast side of the entrance to Quétachow Bay.
- 2) On a small island near the west side of the bay at the mouth of Watshishow River.
- 3) On the tip of a long point forming the east side of the same bay.

Some of the pegmatites were worked for feldspar about 1924. K.G. Ellard, Grubstake Syndicate, now holds 26 claims in the area and has announced the discovery of six beryl occurrences.

Nutak Area, Labrador (Lat. 57° 25', Long. 61° 30')

Map Locality 50.

This occurrence, reported by British Newfoundland Explorations Ltd., is on a small island east of Nutak Island.

APPALACHIAN REGION

Burtts Corner Area, York County, New Brunswick
(Lat. 46° 04', Long. 66° 58')

Map Locality 45.

Reference: Burtts Corner (west half), York County, N.B.; Geol. Surv., Canada, Map 7-1957.

Beryl occurs in small crystals with tourmaline and a little molybdenite in pegmatite stringers cutting granite, on a ridge about 1 1/2 miles west of Zealand Station.

Burnt Hill Mine, York County, New Brunswick
(Lat. 46° 33', Long. 66° 50')

Reference: Victor, I.; Burnt Hill Wolframite Deposit, New Brunswick, Canada; Econ. Geol., vol. 52, No. 2, p. 149, 1957.

Beryl occurs with topaz, wolframite, molybdenite, minor cassiterite, and a variety of sulphide and other minerals in a high-temperature quartz vein at the Burnt Hill mine, on the south side of Southwest Miramichi River near Burnt Hill Brook. It is 16 miles by road north of Maple Grove station and about 40 miles north of Fredericton. It was operated as a tungsten mine at least as recently as 1955 but was not operating in 1959 and the workings were inaccessible. The writer found beryl in a number of places in the dump material, characteristically as radiating bursts of slender needles up to 2 inches long, associated with quartz, wolframite, topaz, and molybdenite. Practically all was in fragments of vein material to which some schistose country rock was attached. It thus appears to be characteristically localized near the vein walls.

Pabineau Lake, Gloucester County, New Brunswick
(Lat. 47° 30', Long. 65° 46')

Map Locality 46.

- References:
- 1) Bathurst-Newcastle Area, Northumberland, Restigouche and Gloucester Counties, N.B., Geol. Surv., Canada, Map 1-1957.
 - 2) Alcock, F. J.; Jacquet River and Tetagouche River Map-areas, New Brunswick, Geol. Surv., Canada, Mem. 227, p. 39.
 - 3) Wright, W. J.; Molybdenum Prospect at Pabineau Lake, Gloucester County, N.B., New Brunswick Dept. Lands and Mines, Paper 40-1, 1940.

Beryl occurs with molybdenite, as small crystals disseminated in granite, northwest of Pabineau Lake about 10 miles southwest of Bathurst. Bedrock is not exposed but granitic boulders are widespread in the vicinity. According to Wright molybdenite was found at fifteen points in an area 1,300 by 400 feet and in pits sunk to bedrock at five points. In one trench beryl was found as sheaves of crystals 1/4 inch across and up to 3 inches long, associated with quartz and molybdenite. Some development work was done prior to and during 1939.

Jordan Falls Area, Shelburne County, Nova Scotia
(Lat. 43° 52', Long. 65° 13')

Map Locality 47 (listed as 48 in error).

Beryl is present in some abundance, along with a little tourmaline and molybdenite, in parts of a high-temperature quartz vein about 1/2 mile east of a point 3 miles by road north of Jordan Falls. In 1959 about 100 feet of the vein was exposed by stripping and trenching; another short section was exposed about 50 feet southwest on strike. Towards the northeast end the dyke splits around a horse of country rock, the maximum thickness of vein material being about 4 feet. The quartz is glassy, in part rose-coloured, and has the laminated structure commonly seen in pegmatitic veins. No feldspar was seen, but muscovite occurs locally in stringers along the vein walls. The beryl, pale-green in colour, is in small crystals and clusters, and in shapeless masses and stringers nearly a foot long. Most of it is in the northeast part of the vein; it is perhaps more abundant near the vein walls.

Reeves Farm, New Ross, Lunenburg County, Nova Scotia
(Lat. 44°43', Long. 64°31')

Map Locality 48 (listed as 47 in error).

- References: 1) Ellsworth, 1932, p. 255.
2) Faribault, E.R.; Lunenburg County, Nova Scotia;
Geol. Surv., Canada, Sum. Rept. 1907, p. 82.
3) Chester Basin Sheet; Geol. Surv., Canada, Map No.
87.

Beryl was found among a large variety of minerals in a small pegmatite body about 3/8 mile south of a point 3 miles by road west of New Ross. The body was first worked about 1906 for quartz crystals and subsequently investigated as a tin occurrence. An old pit, now full of water, occupies the whole outcrop area of the pegmatite, about 30 feet long by 8 feet wide at its widest point at the southwest end. Faribault reported in 1907 that the pit was then 18 feet deep, 12 feet long and 10 feet wide. The pegmatite is a segregation in granite and pinches out at both ends.

Among the minerals reported are amblygonite, lepidolite, tourmaline, topaz, fluorite, monazite, and columbite-tantalite. The loose material now lying nearby comprises deeply weathered feldspar, quartz, and muscovite. A number of large rough quartz crystals were seen near the pit. The writer found only one small beryl crystal and a few flakes of lepidolite in the dump material.

Port Mouton Area, Queens County, Nova Scotia
(Lat. 43°49' to 44°, Long. 64°40' to 64°54')

Beryl has been found in pegmatites in several localities along a 17-mile strip of coast-line from Sandy Cove to Western Head; the occurrences are in granite near its contact with quartzites and schists of the Meguma series.

Perhaps the best showings are on a point on the west shore of the southern part of Mouton Island where a number of pegmatite stringers up to 4 feet thick occur in biotite granite in an area 300 feet long and from 60 to 120 feet wide. The pegmatite is composed of pink perthitic feldspar, in some places in rectangular prisms up to 6 inches across, white featureless feldspar, darkish grey laminated quartz, and muscovite. The muscovite is fairly plentiful in intermittent pods, mostly in the central parts of the stringers. Some garnets more than 1 inch across were seen. Pale-green to white beryl was noted in eight scattered localities, mostly in fairly rich but small pockets. In these, crystals and crystal aggregates up to 2 inches across and commonly 2 to 3 inches long are found in and among quartz segregations, and alongside large perthite crystals.

At Sandy Cove, east of Port Hebert, numerous crystals 1 inch or more across were seen in two places in narrow quartz stringers that contain much muscovite. The exposed rock is a granite-pegmatite complex notable for plumose quartz-muscovite structures. Some nests of tourmaline were seen in intervening boulders. Some beryl was seen in pockets in adjoining pegmatite containing rectangular crystals of graphic granite. One boulder about 1/4 mile northeast showed fifteen crystals in about 6 square feet of surface.

Beryl was seen also in stringers at Hunts Point Wharf, and was reported (F.C. Taylor, personal communication) at Western Head, and in boulders at Summerville Beach. The occurrences were investigated in 1959 by a party of the Nova Scotia Department of Mines, using an electronic detector.

Pioneer Mine, Caribou Gold District, Halifax County, Nova Scotia
(Lat. 45°03', Long. 62°57')

Reference: Moose River; Geol. Surv., Canada, Map Sheet No. 50.

T. L. Phipson ("On the Gold Ore of Nova Scotia", Chemical News, Sept. 1, 1871) reported 0.33 per cent glucina (beryllium oxide) in an analysis of "green schistose rock which accompanies the white quartz in the Caribou district". Alumina is reported separately but the detailed procedure is not described.

The writer was unable to find any record or any local information as to the whereabouts of the Pioneer mine. The schistose wall-rock of the mine dumps seen by the writer is all of apparently low metamorphic grade and the quartz is milky, commonly crystalline, and vuggy, unlike the 'high-temperature' quartz normally associated with beryl.

Georgeville, Antigonish County, Nova Scotia
(Lat. 45°49', Long. 62°01')

Reference: Gross, G.A.; Uranium Deposits in Gaspé, New Brunswick, and Nova Scotia; Geol. Surv., Canada, Paper 57-2, p. 21, 1957.

One small crystal, thought to be beryl, was found by the writer near the waterline in a pegmatite dyke that is accessible only at low tide. The dyke is one of a number of irregular segregations in the granite that outcrops along the beach northwest of Georgeville. Some of these segregations are roughly zoned and some contain radioactive minerals.

Indian Head Area, St. Georges Bay, Newfoundland
(Lat. 48°32', Long. 58°29')

Map Locality 49

Reference: Johnson, H., et al.; Contributions to the Economic Geology of Newfoundland; Geol. Surv., Canada, Bull. 27, p. 46, 1954.

Beryl was reported as an accessory mineral with tourmaline, zircon, uraninite, gummite, and magnetite in a single pegmatite body at a sharp bend in the highway south of Oxback Pond. The pegmatite is coarse grained, with crystals 8 or 10 inches across, and has a dominant graphic texture and large plates of biotite. Ordinary pegmatites are numerous in the area and some contain magnetite.

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