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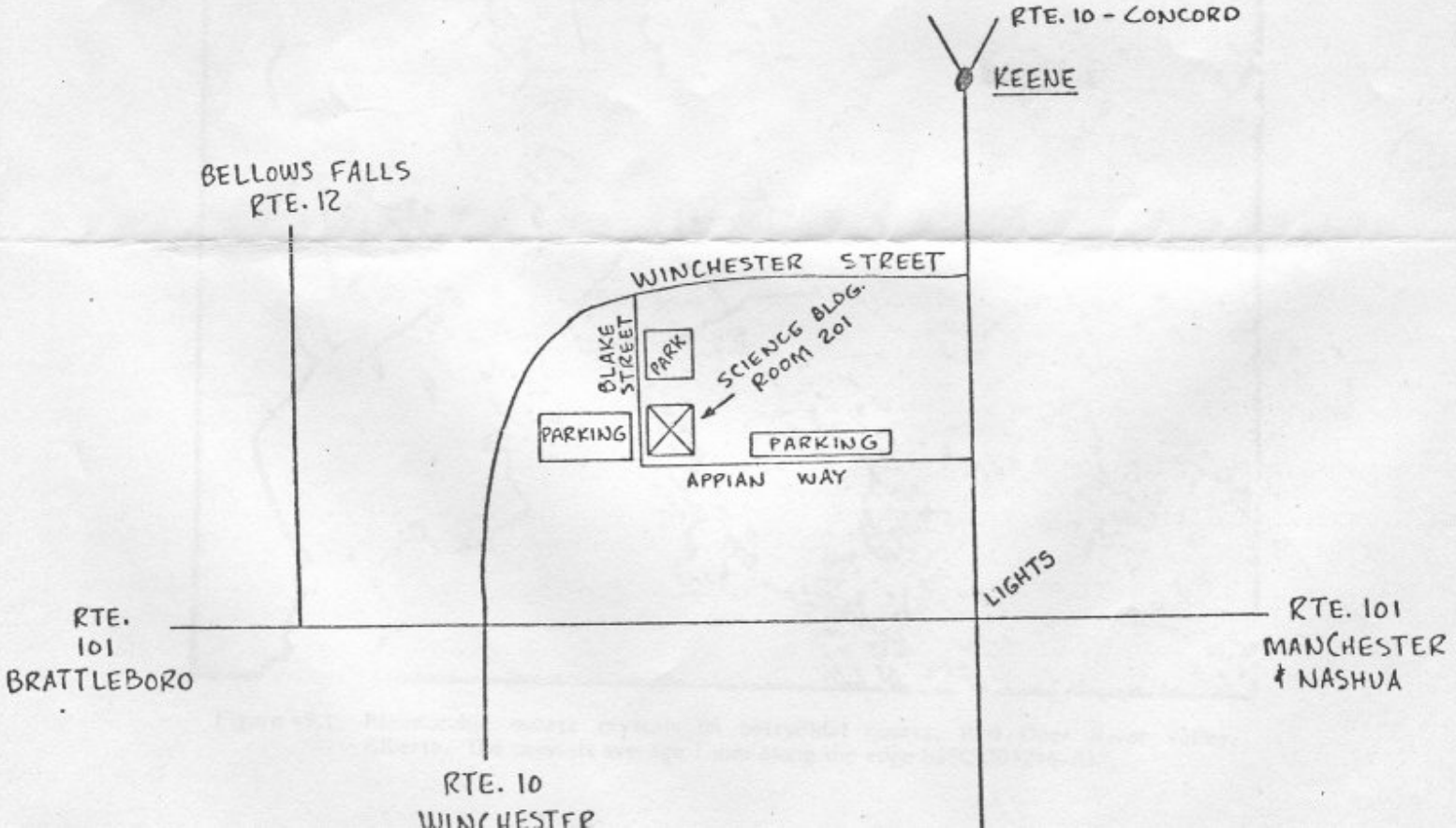
The next regular meeting of the Micromounters of New England will be at Keene State College, in Keene, NH. on Saturday, March 25, 1978, from 10 AM to 4 PM. As was the case last year, Cleaves Dodge has made the arrangements. Eating facilities are not available in the building but the center of Keene is just down the street.



SOME NEW MINERAL OCCURRENCES IN CANADA

Project 640048

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Central Laboratories and Administrative Services Division

Abstract

Sabina, Ann P., Some new mineral occurrences in Canada; Current Research, Part A, Geol. Surv. Can., Paper 78-1A, p. 253-258, 1978.

New occurrences of twenty-three relatively uncommon minerals were recently discovered and are described briefly. Four of these minerals occur in British Columbia, one in Alberta and the remainder in Ontario and Quebec. For each occurrence, brief descriptions of the mineral, its mode of occurrence, the associated minerals and its location are given. Included are occurrences of: ancylite, aurichalcite, bakerite, brugnatellite, burbankite, catapleiite, gunningite, hydromagnesite, hydrotalcite, hydroxyl-bastnaesite, hydrozincite, kasolite, ludwigite, perovskite, perrierite, phillipsite, pseudocubic quartz crystals, pyroaurite, sepiolite, stilpnomelane, tochilinite, uranophane, woodruffite.

Several new localities of relatively rare mineral species were encountered in the course of field investigations in Ontario and Quebec during the summer of 1977. These occurrences along with some mineral occurrences in Alberta and British Columbia are described briefly in this report. The minerals were identified by X-ray powder diffraction (by A.C. Roberts) and supplemented, in some cases by microprobe analysis (by A.G. Plant). The specimens are now in the National Mineral Collection.

Descriptions of these minerals and their localities follow. The National Topographic Series index number referring to 1:50 000 map sheets is given for each locality.

Ancylite $SrCe(CO_3)_2(OH)\cdot H_2O$

Burbankite $(Na,Ca,Sr,Ba,Ce)_6\ (CO_3)_5$

Catapleiite $Na_2ZrSi_3O_9\cdot 2H_2O$

Phillipsite $(K_2,Na_2,Ca)\ (Al_2Si_4)O_{12}\cdot 4\text{-}5H_2O$

These minerals occur sparingly in igneous dykes and sills which intrude Ordovician limestone at the Miron quarry, Jarry Street at Papineau Avenue, Montreal (31H/12). The igneous intrusions are believed to be satellite bodies related to the Monteregian intrusion. Ancylite was also found at the property of Desmont Mining Corporation, Limited near Wilberforce, Ontario (31E/1).

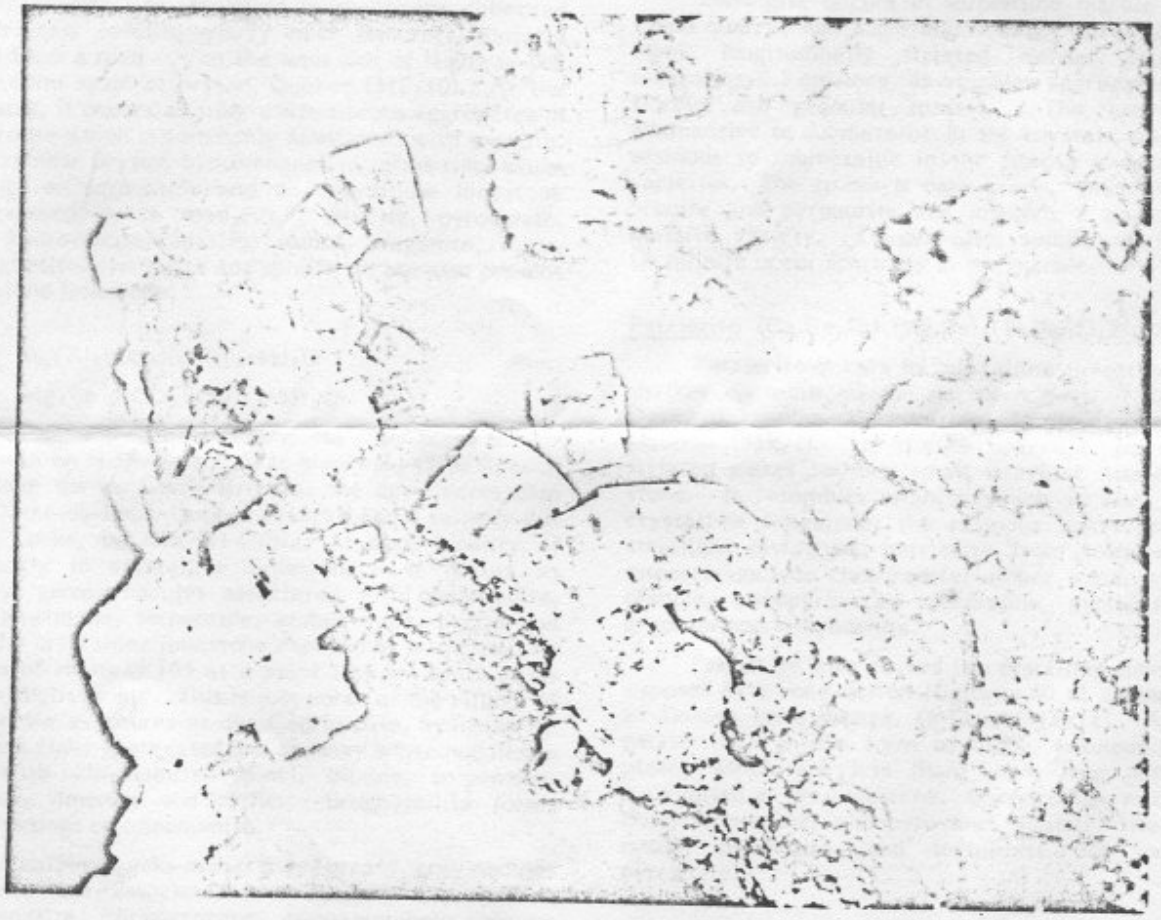

Figure 49.1. Pseudocubic quartz crystals on botryoidal quartz, Red Deer River valley, Alberta. The crystals average 1 mm along the edge (GSC 203246-A).

At the Miron quarry, ancylite occurs as vitreous to greasy, greenish brown to dark green, finely granular and platy aggregates (2 to 3 mm in diameter) in massive white analcime and in granular masses consisting of calcite and potash feldspar. Crystals of natrolite and, less commonly, of burbankite are associated with the ancylite.

The burbankite occupies small cavities measuring 3 to 4 mm in diameter in dolomite, analcime, natrolite, and in the igneous rock. It occurs as colourless, white or reddish hair-like to acicular aggregates in the cavities, and as bluish white finely flaky encrustations on natrolite.

Catapleiite forms light brown, greenish brown and orange lamellar and radiating platy aggregates (1 to 2 mm in diameter) in white massive potash feldspar which occupies fracture zones in the igneous rock. Its lustre varies from vitreous, pearly to greasy and is commonly characterized by a coppery tarnish.

Phillipsite occurs as snow white, sugary, spotty encrustations on the igneous rocks.

The dykes and sills at this quarry contain a number of other minerals which generally occupy vugs and fracture zones; these minerals are however, sparsely distributed. The following have been observed; dawsonite, fluorite, strontianite, harmotome, vesuvianite, titanite, acmite, chlorite, anatase, siderite, ilmenite, quartz, pyrite, sphalerite, magnetite and graphite. Ancylite at the Desmont property near Wilberforce, Ontario is intimately intergrown with stillwellite which was recently reported from the deposit (Sabina, 1977). The ancylite – stillwellite intergrowths form light brown vitreous masses in coarsely crystalline calcite.

Hydromagnesite $Mg_5(CO_3)_4(OH)_2 \cdot 4H_2O$

Hydromagnesite was identified in specimens collected from the Princess sodalite quarry near Bancroft, Ontario (31F/4), and from a road-cut on the west side of Highway 148 at a point 0.6 km south of Bryson, Quebec (31F/10). At the Princess quarry, it occurs as silky white fibrous aggregates in massive natrolite which is commonly associated with sodalite. In the locality near Bryson, hydromagnesite forms silky white flaky coatings on serpentine and on crystalline limestone which is exposed by a road-cut. Brucite, pyroaurite, szaibelyite, hydrotalcite, apatite, spinel, aragonite, mica, chlorite, magnetite, pyrrhotite and sphalerite are also present in the crystalline limestone.

Hydrotalcite $Mg_6Al_2(CO_3)(OH)_{16} \cdot 4H_2O$

Brugnatellite $Mg_6Fe^{+3}(CO_3)(OH)_{13} \cdot 4H_2O$

Hydrotalcite was noted in specimens from three localities: a road-cut on Highway 105 near Maniwaki (31J/5); rock exposures along the du lièvre River at the des Cèdres dam near Notre-Dame-du-Laus, Quebec (31J/4); and a railway-cut at Chaffeys Locks, Ontario (31 C/9). At each locality, it occurs sparingly in crystalline limestone. It occurs as charcoal-grey, greasy nodules associated with chondrodite, spinel, clinoamphibole, serpentine, amber mica, pyrite and graphite in the crystalline limestone exposed by a road-cut on the west side of Highway 105 at a point 10.4 km south of its junction with Highway 117. This is just north of the village of Maniwaki. In the exposures at des Cèdres dam, hydrotalcite occurs as white flaky aggregates and as waxy white nodules in association with clinohumite, spinel, olivine, serpentine, clinoamphibole, ilmenite and rutile. Brugnatellite forms white flaky coatings on clinohumite.

At the Chaffeys Locks occurrence, greasy, grey nodules of hydrotalcite are associated with clinohumite, spinel, serpentine, apatite, clinopyroxene, clinoamphibole, olivine and tourmaline.

Hydroxyl-bastnaesite $(Ce,La)CO_3(OH,F)$

This rare mineral was originally described in 1964 from carbonatites of a stock of alkalic and ultrabasic rocks, presumably in Russia (Kirillov, 1964). It was found during this investigation in specimens collected from the property of Desmont Mining Corporation, Limited near Wilberforce, Ontario (31/E/1).

At this locality it occurs as brownish yellow to dark brown, waxy to resinous finely granular aggregates in coarsely crystalline calcite. Associated with it are stillwellite, monazite, thorianite, uranothorite, clinopyroxene, ancylite, garnet, titanite, pyrite, potash feldspar and quartz. The calcite occurs in veins and lenses in sugary diopside-calcite rock enclosed in marble.

Kasolite $Pb(UO_2)SiO_4 \cdot H_2O$

Uranophane $Ca(UO_2)_2Si_2O_7 \cdot 6H_2O$

Kasolite and uranophane occur in tremolite-bearing diopside marble exposed by an open-cut on a ridge which parallels the Gibson Road at Tory Hill, Ontario (31D/16). The occurrence is north of McCue Lake and about 1100 m by road west of the junction of the Gibson Road and Highway 121.

Kasolite occurs as bright yellow, waxy, finely granular irregular masses in sugary diopside, uranophane as pale yellow to light brownish yellow, waxy, massive aggregates associated with thorianite. Coarse prismatic and bladed aggregates of white, grey and light green tremolite are common in the marble. Thorite, uraninite, apatite, talc, pyrite and quartz are also present in the marble.

Ludwigite $Mg_2Fe^{+3}BO_5$

Ludwigite occurs in serpentine marble at the Stephen Cross quarry near Wakefield, Quebec (31G/12). It occurs as black longitudinally striated slender prisms commonly measuring 0.5 cm long, as acicular aggregates, and as finely fibrous and granular masses. The lustre varies from adamantine to submetallic in the crystals, and from velvety, resinous to submetallic in the fibrous and granular massive varieties. The streak is dark green. Magnetite, pyrrhotite, brucite and pyroaurite are intimately associated with the massive variety. Clinohumite, spinel, olivine, pyrite and tochilinite occur sparingly in the marble.

Perrierite $(Ca,Ce,Th)_4(Mg,Fe)_2(Ti,Fe^{+3})_3Si_4O_{22}$

Perrierite occurs in crystalline limestone exposed by a shallow open-cut on the northern part of the property of Desmont Mining Corporation, Limited near Wilberforce, Ontario (31E/1). It occurs sparingly as reddish brown, striated plates forming small irregular masses in the limestone. It resembles titanite which is also present in the crystalline limestone; the resinous lustre, platy habit and striations distinguish perrierite from titanite. Associated minerals include chondrodite, amber mica, pyrite, clinoamphibole, clinopyroxene, tourmaline, pyrrhotite, sphalerite, graphite and molybdenite.

Perrierite also occurs in crystalline limestone which is exposed by a road-cut on Highway 60 at a point 2.3 km west of Golden Lake village, Ontario (31F/11). At this locality, perrierite is in the form of black, resinous to adamantine plates which are less than 1 mm long and are sparsely distributed in the limestone. Chondrodite, mica, clinoamphibole, serpentine, clinopyroxene, apatite, titanite, graphite, rutile, pyrrhotite, and tochilinite are associated with perrierite.

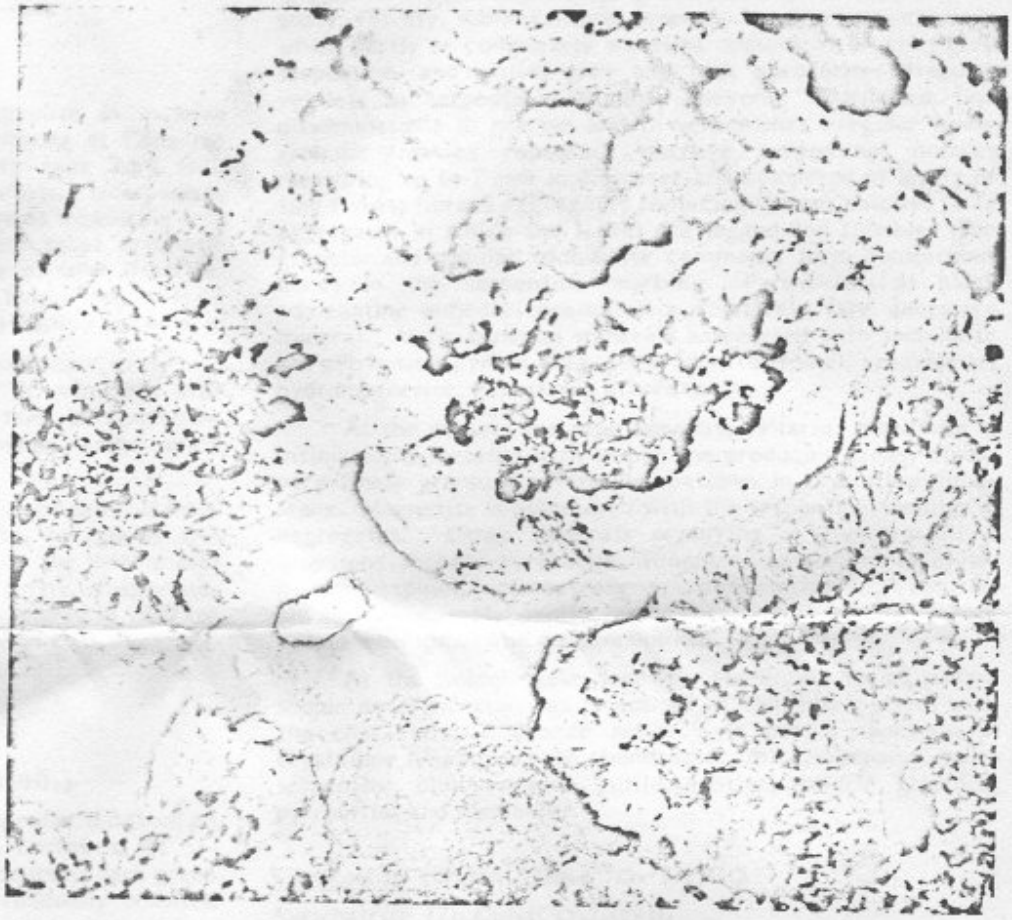

Figure 49.2

Woodruffite in botryoidal smithsonite, Willett Mines Limited property, Lardeau, British Columbia. X 10 (GSC 203094-R).

Pseudocubic Quartz SiO_2

An occurrence of pseudocubic quartz crystals was brought to the author's attention by Mr. Fred Dorwood, of Edmonton, Alberta, who submitted several specimens for identification. They were collected from a locality along the Red Deer River valley, about 4 miles northwest of Drumheller, Alberta (82P/7). The quartz crystals are associated with silicified wood which occurs in the Upper Cretaceous Edmonton Formation consisting of sandstone, siltstone, shale, coal, and ironstone (Irish, 1967). The formation is exposed extensively along the valley of the Red Deer River in the Drumheller area.

Rhombohedral crystals of quartz resembling cubes and referred to as pseudocubic quartz crystals occur on botryoidal quartz which forms masses around a core of goethite-bearing silicified wood, and occupies fissures in the silicified wood. These crystals result from the development of only one set of the rhombohedral faces of normal quartz crystals, the other rhombohedral faces and the prism faces being completely excluded in their development. The pseudocubes occur singly and as groups of crystals in random orientation and as interlocking "cubes" resembling the Greek key symbol. The individual crystals measure on the average, 1 mm along the edge. Their surfaces are smooth with a frosty appearance; the broken crystals reveal the interior to be colourless, transparent, vitreous with a conchoidal fracture. The rhombohedra are characterized by sharp edges and the corners are unmodified by other rhombohedral faces. They appear to have developed from the botryoidal quartz; some rhombohedra project only partially from the botryoidal quartz, and are characterized by rounded edges and finely botryoidal surfaces.

Other crystal forms of quartz occur on the botryoidal quartz. Included are (a) colourless transparent prisms (about 1 mm in diameter) terminated at one or both ends by rhombohedral faces but lacking transverse striations on the prism faces, and (b) rhombohedral plates stacked to form narrow columns measuring about 1 cm by 2 mm. These rhombohedral plates are commonly curved and have cloudy to frosty surfaces.

The botryoidal quartz is translucent, colourless, white or grey with some inky blue areas, the blue colour possibly due to iron; some of the globular forms resemble ammonites. The surface of the botryoidal quartz is generally smooth but in some areas, has a rough appearance due to a profusion of protruding rhombohedral faces resembling normal quartz crystal terminations but with edges that are generally rounded.

The X-ray powder pattern of each of these varieties of quartz is that of low-quartz. Occurrences of pseudocubic quartz crystals are rare. One notable occurrence is in Artesia, New Mexico where these crystals occur with prismatic crystals and with doubly terminated crystals resembling hexagonal pyramids. The New Mexican pseudocubic crystals differ from the Red Deer River crystals in that they are larger (up to 1 cm across) and are commonly modified by a rhombohedral face at the corners (Tarr and Lonsdale, 1929). Crystals averaging 0.5 mm along the edge have been reported from localities in Germany(Witteborg, 1933).

Pyroaurite $Mg_6Fe_2^{+3}(CO_3)(OH)_{16}\cdot 4H_2O$

Nodules of colourless to grey translucent pyroaurite are associated with greenish yellow serpentine in magnesite-dolomite ore at the Canadian Refractories Limited property in Kilmar, Quebec (31G/15). The nodules measure up to 0.5 cm in diameter. Associated with the pyroaurite are: brucite, clinopyroxene, talc, phlogopite, spinel, titanite, pyrite, graphite and sphalerite.

piolite $Mg_4Si_6O_{15}(OH)_2 \cdot 6H_2O$

bakerite $Ca_4B_4(BO_4)(SiO_4)_3(OH)_3$

Bakerite occurs sparingly with sepiolite in massive diopside-bearing calcite at the North Showing of Canadian All-Metals Explorations Limited property near Tory Hill, Ontario (31D/16). Bakerite is colourless, transparent, vitreous, massive, and forms irregular masses measuring 1 to 2 mm across on calcite; rare tabular and squat prismatic crystals have developed in some of the massive bakerite. These crystals measure up to 0.5 mm long. The bakerite generally occurs at the edges of sepiolite-filled pockets in calcite. Sepiolite is white, silky to waxy, and scaly, craggy or pulverulent. In some pockets, bari e is admixed with sepiolite. Silky, finely flaky white talc is commonly associated with sepiolite, and clinoamphibole, amber mica and colourless quartz occur in the calcite.

The diopside-rich calcite occurs in a silicated marble zone enclosed in a complex of quartzite, paragneiss and granite gneiss. Other minerals occurring in the marble are: uraninite, thorianite, betafite, zircon, pyrite, magnetite, graphite and serpentine. The deposit was explored in 1955 for radioactive mineralization by an adit and open-cuts.

Stilpnomelane $K(Fe,^{+2},Fe,^{+3}Al)_{10}Si_{12}O_{30}(OH)_{12}$

Stilpnomelane was found in specimens collected from an inactive soapstone quarry located 1.6 km northwest of St-Pierre-de-Broughton, Quebec (31L/6). It occurs as dark green and dark brown radiating, foliated, and randomly oriented plates in coarsely granular quartz-plagioclase aggregates. The individual plates measure 2 to 3 mm in diameter. In some specimens, the plates form bands in the rock. Talc is commonly associated with the stilpnomelane. Other minerals present in the deposit are: magnesite, dolomite, chlorite, pyrite, galena, magnetite, chromite, goethite, and quartz crystals.

Tochilinite $6Fe_{0.9}S \cdot 5(Mg,Fe)(OH)_2$

Perovskite $CaTiO_3$

Tochilinite was originally reported as an unnamed mineral in 1969 from the Muskox Intrusion in the Northwest Territories and described as a new mineral species in 1971 from serpentinite in a copper-nickel deposit, Voronezh region, U.S.S.R.; it was also reported from Cornwall, England, from Morgantown, Pennsylvania, and from the Dumont Nickel Corporation property near Amos, Quebec (Jambor, 1976). This investigation has yielded four new occurrences: at the Maxwell quarry and the Stephen Cross quarry near Wakefield, Quebec (31G/12) and in road-cuts near Douglas, Ontario (31F/10) and near Golden Lake, Ontario (31F/11).

At the Maxwell and Stephen Cross quarries, which were formerly mined for brucite by the Aluminum Company of Canada, it occurs fairly abundantly in serpentine marble which is enclosed in syenite and monzonite. Perovskite is also found in the marble. Tochilinite occurs sparingly in crystalline limestone exposed by road-cuts on Highway 60 at points 2 km northwest of its junction with County Road 5 near Douglas, Ontario and 2.3 km west of Golden Lake village, Ontario.

sooty, velvety, submetallic or bronzy. It occurs as: coatings which partly or completely surround nodules of brucite, grey serpentine, and white, grey and pink pyroaurite; irregular veinlets in serpentine nodules; unevenly distributed fine disseminations in calcite and in serpentine; irregular finely granular masses replacing massive serpentine; nodules measuring up to 2 mm in diameter and composed of layers of fine flakes; fibrous aggregates replacing fibrous calcite; flaky aggregates in which the flakes are jagged and flexible. The granular and nodular tochilinite commonly form conspicuous bands in the serpentine marble. Perovskite, as black adamantine anhedral grains, is a relatively rare accessory mineral. More common minerals associated with tochilinite are pyrrhotite, pyrite, magnetite, apatite, spinel, vesuvianite, hydromagnesite, galena and graphite.

At the occurrence near Douglas, Ontario, tochilinite is intimately associated with serpentine producing greasy black, very finely granular smear-like patches in crystalline limestone. Magnetite is associated with the serpentine-tochilinite aggregates. Other minerals occurring in the crystalline limestone include pyrrhotite, ilmenite, amber mica, clinohumite, spinel, clinopyroxene, clinoamphibole, apatite, chlorite, and molybdenite. Hydrotalcite occurs as white coatings on spinel and on clinohumite.

At the Golden Lake locality, tochilinite forms microscopic dendritic coatings composed of thin black plates with the characteristic bronze lustre. It occurs sparingly in crystalline limestone with chondrodite, mica, clinoamphibole, serpentine, clinopyroxene, rutile, apatite, titanite, graphite, pyrrhotite, and perrierite.

Woodruffite $(Zn,Mn^{+2})Mn_3^{+4}O_7 \cdot 1\text{-}2H_2O$

Aurichalcite $(Zn,Cu)_5(CO_3)_2(OH)_6$

Gunningite $(Zn,Mn)SO_4 \cdot H_2O$

Hydrozincite $Zn_5(CO_3)_2(OH)_6$

These minerals are associated with smithsonite which occurs in the silver-lead zinc deposit (Moonshine claims) formerly (1954-1957) worked by Willett Mines Limited near Lardeau, British Columbia (82K/2). The ore mineralization consists of galena and sphalerite with minor chalcopyrite and quartz in fracture zones in Lower Cambrian crystalline limestone (Fyles, 1964). The workings consist of adits, a shaft and trenches. Specimens from the deposit were collected by Mr. Allan Ingleson of Calgary, Alberta.

The specimens examined consist of masses of crystalline smithsonite capped by radiating fibrous smithsonite producing botryoidal surfaces. The mineral is grey with a vitreous lustre. Woodruffite and aurichalcite occur in the smithsonite, and gunningite and hydrozincite form patchy encrustations on it. Gunningite occurs as white, earthy, crumbly aggregates, hydrozincite as white, compact, powdery, and finely botryoidal crusts. Gunningite also forms crusts on woodruffite. Aurichalcite, as light blue flaky aggregates, is associated with the fibrous smithsonite. Orange to brown pulverulent goethite occurs in smithsonite.

The woodruffite is black with a lustre that varies from sooty to velvety, greasy and submetallic. It occurs in smithsonite occupying spaces between the fibrous cap and the crystalline aggregates, and admixed with crystalline massive smithsonite. Beneath the fibrous cap, which is 1 to 2 mm thick, woodruffite occurs as paper-thin, concentric layers forming spheres and hemispheres conforming to the botryoidal cap of smithsonite. The layers are smooth, finely botryoidal or crinkly and friable, and commonly have open spaces between the layers. Woodruffite also occurs as randomly oriented thin plates and scales, and as finely granular aggregates admixed with and occupying pockets in crystalline aggregates of smithsonite.

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